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Enquiry: Evidence relating to feeding of semi-skimmed milk to a 4 week old baby

Search completed: Alison Price, 8th September 2011

Below are extracts from government and professional organisational websites relating to the introduction of cow's milk, including semi-skimmed, into the infant diet.

**NHS Living Well Website**

**Babies and children under five**
Milk and dairy products are an important part of a child's diet. They are a good source of energy and protein, and contain a wide range of vitamins and minerals. They are rich in calcium, which growing children and young people need to build healthy bones and teeth.

For around the first six months of your baby's life, the Department of Health recommends exclusive breastfeeding (with no other food or drink). If you are not breastfeeding, you can use formula milk instead.

**Cow's milk should not be given as a drink until a baby is a year old. This is because it doesn't contain the right balance of nutrients to meet your baby's needs.**

Full-fat cow's milk can be used in small amounts for cooking in foods such as cheese sauce and custard from six months.

Babies under one year old should not be given condensed milk, evaporated milk, dried milk, or any other type of drinks often known as milks, such as rice, oat or almond drinks.

**Children should drink full-fat milk until they are at least two years old, because they may not get the calories or essential vitamins they need from lower-fat milks.**

After the age of two, children can gradually move to semi-skimmed milk as a main drink, as long as they are eating a varied and balanced diet and growing well.

Don't give skimmed or 1% fat milk to children as a main drink until they're at least five years old, because neither of these contains enough vitamin A and skimmed milk doesn't contain enough calories.

Children between the ages of one and three need to have around 350mg of calcium a day. About 300ml milk (just over half a pint) would provide this.

Evidence into Action: Nutrition in the Under Fives
At present, recommendations for healthy weaning practice in Scotland (and the rest of the UK) derive from the 1994 COMA report. Key recommendations are as follows.
• The majority of infants should not be given solid foods before the age of four months. A mixed diet should be offered from the age of six months.
• Weaning before four months should be particularly discouraged where there is a family history of allergy. The introduction of foods traditionally regarded as allergenic should be delayed until six months at the earliest.
• Pasteurised, whole cows’ milk should not be used as a main milk drink before the age of one year to minimise the risk of allergy development. Semi-skimmed milk is not suitable as a drink before the age of two years.


Information for Health Professionals on Infant Feeding
The World Health Organisation (WHO) revised its guidance in 2001 to recommend exclusive breastfeeding for the first six months of an infant’s life. The UK supported this resolution at the World Health Assembly. Since its adoption 159 Member States have demonstrated their determination to act by preparing or strengthening their national nutrition policies and plans, with France, Australia and Ireland also announcing recommendations of six months’ exclusive breastfeeding.
The UK’s Scientific Advisory Committee on Nutrition (SACN) stated in 2001 that there was sufficient evidence that exclusive breastfeeding for six months is nutritionally adequate, but that due to current practices in the UK there should be some flexibility in the advice. SACN agreed that the available evidence did not support the commonly held concern that between four to six months breastmilk was inadequate to support normal infant growth.
Following WHO’s revised guidance, the Department of Health, London issued a new recommendation on breastfeeding last year. Key professional and voluntary bodies have supported this recommendation, including the Royal College of Midwives, the Community Practitioners and Health Visitors Association and the National Childbirth Trust.

Cow, Goat and sheep’s milk are not suitable as drinks for babies under a year old as they do not contain enough iron and other nutrients to meet their needs.

(p.7 Which Drinks are Suitable?)
Cow's milk is not recommended by the American Academy of Pediatrics for children under 1 year old. Infants fed whole cow's milk don't get enough vitamin E, iron, and essential fatty acids. They also get too much protein, sodium, and potassium. These levels may be too high for the infant's system to handle. Also, whole cow's milk protein and fat are more difficult for an infant to digest and absorb.

For the best infant nutrition, pick the right milk source and eventually introduce the infant to solid foods. The American Academy of Pediatrics recommends that infants be fed breast milk or iron-fortified formula during the first 12 months of life. Between ages 4 - 6 months, certain solid foods may be added. Breast milk or iron-fortified formula, along with age-appropriate solid foods and juices during the first year of life, provides more balanced nutrition.

Almost all babies and infants do well on these formulas, if they are used. Fussiness and colic are common problems. Most of the time, cow's milk formulas are not the cause of these symptoms and switching to a different formula is not needed.

Iron-fortified infant formula or breast milk should be used until a child is 1 year old. Children age 1 - 2 who are risk of being overweight should get reduced-fat milk

Talk to a registered dietitian or doctor about your child's diet. Slightly reducing calories will allow the infant to "grow into his weight" without a rapid change in body fat. Rapid weight loss can be dangerous, particularly in a small child. Reducing fat too much might not leave enough energy stores for the infant to fight a serious illness. Many doctors question the serious, unknown consequences of a rapid loss of fat.

Suggested Dairy Intake for Babies and Toddlers

• None for infants 0 - 3 months
• None for infants 4 - 5 months
• None for infants 6 - 8 months
• Small servings for infants 9 - 12 months
• 20 - 24 oz. whole milk for toddlers 1 - 2 years

See also: Infant formulas


Infant Nutrition Council (US)
The National Health and Medical Research Council does not recommend giving cow’s milk to babies under 12 months. For babies under a year old, cow's milk is too high in proteins, salt and can affect immature kidneys – it’s also too low in iron and other vitamins and minerals and difficult for young tummies to digest.

http://infantnutritioncouncil.com/faqs/
Nutrition for Healthy Term Infants - Statement of the Joint Working Group: Canadian Paediatric Society, Dietitians of Canada and Health Canada

Extract on alternate milks

(i) Pasteurized cow's milk. Due to risks of infection, non-pasteurized milk (cow's or goat's) is contraindicated. The quality and quantity of nutrients in cow's milk differ greatly from those of human milk and cow's milk does not contain many of the various growth and immunological factors found in human milk. With regard to nutrient content, cow's milk contains greater amounts of protein and minerals (calcium, phosphorus, sodium, chloride and potassium) and smaller amounts of essential fatty acids (linoleic and alpha-linolenic acid), zinc, vitamin C and niacin than human milk. The higher renal solute load of cow's milk results in a urine osmolality approximately two times higher than that observed in breastfed infants (Fuchs et al., 1992). Usually, there are no adverse clinical sequelae associated with the increased renal solute load; however, in an infant with increased water losses (e.g. diarrhea) and decreased intake (e.g. from vomiting), cow’s milk may not supply enough free water (Fomon, 1993).

The use of pasteurized cow's milk is associated with occult blood loss in stool, especially in infants in the first 6 months of life. Recent studies suggest that after 6 months of age, occult blood loss in stool is unlikely to occur (Fuchs et al., 1993). Cow's milk has a low iron content and the iron is poorly absorbed. To lower the risk of iron deficiency anemia, cow's milk is not recommended before 9 to 12 months of age.

Skim milk is an inappropriate milk choice during the first two years (Fomon, 1997). It provides no essential fatty acids and has a very low energy density. To meet energy needs, an infant would have to drink very large volumes of this milk. With high intakes, protein and solute intake would be significantly higher than the infant needs. Partially skimmed milk (1% or 2% fat) is also low in essential fatty acids and energy. To meet energy and essential fatty acid needs, the infant would have to eat a wide variety and adequate quantity of other foods. Approximately 15% of Canadian infants are on 2% milk around 1 year of age. Although there is no clear indication of negative consequences, there is no medical or nutritional indication to recommend the routine use of partially skimmed milk, other than convenience. There is, however, a theoretical risk of growth faltering and essential fatty acid deficiency when partially skimmed milk provides a significant component of the infants’ daily intake. Therefore, while whole cow's milk (3.25% butterfat) continues to be recommended for the second year of life, 2% milk may be an acceptable alternative provided that the child is eating a variety of foods and growing at an acceptable rate.

(ii) Goat's milk. For the same reasons as cow's milk, pasteurized goat's milk is not an appropriate milk choice for infants before 9 to 12 months of age (Taitz and Armitage, 1984). Unlike cow's milk, goat's milk may or may not be fortified with vitamin D (fortification will be indicated on the label). Because of cross-reactivity, infants who are allergic to cow's milk protein are also likely to have an allergic reaction to goat's milk (Fomon, 1993; Jeness et al., 1967; Saperstein, 1960). After 9 months of age, full-fat goat's milk may be used as an alternative to cow's milk (Razafindrakoto et al., 1994). If partly skimmed or skimmed goat's milk is ever used, a product with added vitamin A as well as vitamin D should be chosen.
Soy, rice and other vegetarian beverages. Soy, rice and other vegetarian beverages, whether or not they are "fortified," are not appropriate alternatives to breast milk or infant formula or to pasteurized whole milk in the first two years. "Fortified" vegetarian beverages will be fortified with vitamins A, D and B12, riboflavin, calcium and zinc, and may contain other vitamins and minerals. However, there are no minimum requirements for total fat or protein. Rice and vegetarian beverages other than soy contain virtually no protein and if used as a whole or major source of nutrition, may result in marasmus and failure-to-thrive (Muir and Kalnins, 1987).

www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut_infant_nourrisson_term_4-eng.php#other-1

**Nutrition Guidelines for the Under Fives: Guidelines for managers of under fives facilities, catering staff and others involved in feeding young children in education and social work services, day care, residential care and hospitals**

Table presenting an overview of milk use in infants from this Scottish document is overleaf:
Research Evidence – Cow’s Milk and Infant Nutrition

Whole cow’s milk: why, what and when?
Michaelsen KF, Hoppe C, Lauritzen L, Molgaard C.
There are differences between at what age industrialized countries recommend that cow's milk can be introduced to infants. Most countries recommend waiting until 12 months of age, but according to recommendations from some countries (e.g. Canada, Sweden and Denmark) cow’s milk can be introduced from 9 or 10 months. The main reason for delaying introduction is to prevent iron deficiency as cow's milk is a poor iron source. In one study mainly milk intake above 500 ml/day caused iron deficiency. Cow's milk has a very low content of linoleic acid (LA), but a more favorable LA/alpha-linolenic ratio, which is likely to be the reason why red blood cell docosahexaenoic acid (DHA) levels seem to be more favorable in infants drinking cow's milk compared to infants drinking infant formula that is not supplemented with DHA. It has been suggested that cow's milk intake can affect the later risk of obesity, blood pressure and linear growth, but the evidence is not convincing. There are also considerable differences in recommendations on at what age cow's milk with reduced fat intake can be introduced. The main consideration is that low-fat milk might limit energy intake and thereby growth, but the potential effects on development of early obesity should also be considered. Recommendations about the age for introduction of cow's milk should take into consideration traditions and feeding patterns in the population, especially the intake of iron and long-chain polyunsaturated fatty acids and should also give recommendations on the volume of milk.

Cow’s milk versus formula in older infants: consequences for human nutrition.
Udall JN Jr, Suskind RM.
Human milk is the preferred feeding for all infants, including premature and sick newborns, with rare exceptions. However, modern technology has produced alternative, "humanized formulae", which closely mimic the composition of human milk. The ingestion of human milk, "humanized formulae" or whole cow's milk has consequences for human nutrition. Gastroesophageal reflux, iron deficiency, calcium and sodium excesses or deficiencies may be influenced by the type and amount of milk fed to the infant. Likewise, neurological development and the likelihood of developing diabetes or cancer may also be influenced by early dietary practices. Until new information is available, we should continue to pattern formulae for older infants after breast milk, but with sufficient protein, calories, lipid and minerals to support optimal growth.
[Recommendations for prevention of iron deficiency. Delay cow’s milk intake as a beverage to infants until 10-12 months of age].
[Article in Swedish]
Axelsson I, Gebre-Medhin M, Hernell O, Jakobsson I, Michaelsen KF, Samuelson G.
Breast-feeding is to be encouraged during the first six months of life. Iron deficiency is extremely rare in exclusively breast-fed infants during this period. Any cow-milk based formula used should be iron-fortified. During the second half of infancy, the iron content of weaning foods is important in preventing iron deficiency. Indeed, owing to the low iron content of dairy products, it is hard to compose a weaning diet sufficiently rich in iron to meet the demands of rapidly growing infants, if it is to include substantial amounts of cow milk, sour milk or yoghurt. Accordingly, the Paediatric Committee on Nutrition and Health, of the Swedish Paediatric Association and the National Food Administration, recommend delaying the introduction of cow’s milk and cow-milk products until the infant is 10-12 months of age. Until then, breast-feeding, and the use of iron-fortified formula or gruel with modified protein and sodium content are encouraged; iron-fortified porridges of softer consistency can be prepared to circumvent the need of extra fluids, or porridge can be served with breast milk or iron-fortified formula; small amounts of milk may be used for cooking purposes.

The effect of dairy products on iron availability.
Jackson LS, Lee K.
Many researchers report substantial reductions in iron availability when dairy products are consumed with solutions of iron. Yet other studies indicate that dairy products have little effect on iron availability when added to complex meals. The conflicting data may be due to differences in the technique used to measure availability, species of animal used, form of iron in the diet, and meal composition. Human studies show superior bioavailability of iron in human milk when compared with cow's milk. Definitive causes for the differences between human and cow's milk have not been identified. Human milk contains lower amounts of casein, phosphate, and calcium, components thought to inhibit iron absorption. More work is needed to identify the factors that influence iron-dairy interactions. The nutritional benefits provided by dairy products outweigh the slight inhibitory effect they may have on iron availability.
The pediatrician is faced with a difficult challenge in providing recommendations for optimal nutrition in older infants. Because the milk (or formula) portion of the diet represents 35% to 100% of total daily calories and because WCM and breast milk or infant formula differ markedly in composition, the selection of a milk or formula has a great impact on nutrient intake. Infants fed WCM have low intakes of iron, linoleic acid, and vitamin E, and excessive intakes of sodium, potassium, and protein, illustrating the poor nutritional compatibility of solid foods and WCM. These nutrient intakes are not optimal and may result in altered nutritional status, with the most dramatic effect on iron status. Infants fed iron-fortified formula or breast milk for the first 12 months of life generally maintain normal iron status. No studies have concluded that the introduction of WCM into the diet at 6 months of age produces adequate iron status in later infancy; however, recent studies have demonstrated that iron status is significantly impaired when WCM is introduced into the diet of 6-month-old infants. Data from studies abroad of highly iron-deficient infant populations suggest that infants fed partially modified milk formulas with supplemental iron in a highly bioavailable form (ferrous sulfate) may maintain adequate iron status. However, these studies do not address the overall nutritional adequacy of the infant's diet. Such formulas have not been studied in the United States. Optimal nutrition of the infant involves selecting the appropriate milk source and eventually introducing infant solid foods. (ABSTRACT TRUNCATED AT 250 WORDS)

Impact on iron status of introducing cow's milk in the second six months of life.
Penrod JC, Anderson K, Acosta PB.
To determine the impact on iron status of introducing cow's milk (CM) into the diet during the second 6 months of life, nutrient intake was assessed and iron status measured in 100 infants. Nutrient intake for 40 of the 45 infants, age 8 to 13 months, fed CM as the primary beverage for at least 3 months prior to the study and for 45 of 55 infants the same age fed a milk-based infant formula (FF) as the primary beverage for at least 3 months were assessed. All infants in the study were healthy, and the majority were taking no medications or supplements other than vitamins or fluoride for 3 weeks prior to the assessment. Blood drawn by peripheral venipuncture was analyzed by Coulter Counter for complete blood count; plasma albumin, iron, ferritin, transferrin saturation, and total iron-binding capacity were measured in all infants. CM-fed infants had significantly lower mean iron and vitamin C intakes, plasma albumin, transferrin saturation, and ferritin than did FF infants. The frequency of low plasma iron, low transferrin saturation, and low plasma ferritin was significantly greater in CM-fed than in FF infants. The percentage of subjects with three or more abnormal iron indices was more than twice as great in CM-fed infants (58%) as in FF infants (23%). Feeding infants iron-fortified formula to 12 months of age appears to deter iron deficiency.
Cow milk feeding in infancy: further observations on blood loss from the gastrointestinal tract.

Citation: Journal of Pediatrics, January 1990, vol./is. 116/1(11-8), 0022-3476;0022-3476

Author(s): Ziegler EE, Fomon SJ, Nelson SE, Rebuocne CJ, Edwards BB, Rogers RR,

Abstract: Because feeding of cow milk causes normal infants to lose increased amounts of occult blood from the gastrointestinal tract, we conducted a prospective trial to measure intestinal blood loss quantitatively and to monitor iron nutritional status. Fifty-two infants entered the trial at 168 days of age and were assigned at random to receive either cow milk or a milk-based formula. Initially, 31 infants had been breast-fed and 21 had been fed formulas. With the feeding of cow milk, the proportion of guaiac-positive stools increased from 3.0% at baseline to 30.3% during the first 28 days of the trial (p less than 0.01), whereas the proportion of positive stools remained low (5.0%) with the feeding of formula. The proportion of guaiac-positive stools among cow milk-fed infants declined later, but for the entire trial it remained significantly (p less than 0.01) elevated. Stool hemoglobin concentration increased markedly with the introduction of cow milk, rising from a mean (SD) of 622 527 micrograms/gm dry stool at baseline to 3598 10,479 micrograms/gm dry stool during the first 28 days of ingestion of cow milk. Among infants fed formula, stool hemoglobin did not increase and was significantly (p less than 0.01) less than in the cow milk group. Among infants fed cow milk, the increase in hemoglobin concentration tended to be greater for those who had initially been fed human milk than for those who had initially been fed formulas. Iron nutritional status was not significantly different between the two feeding groups. However, one infant became iron deficient after 4 weeks of ingesting cow milk. We conclude that cow milk feeding leads to increased intestinal tract blood loss in a large proportion of normal infants and that the amount of iron lost is nutritionally important.

Milks and formulas for older infants.

Citation: Journal of Pediatrics, August 1990, vol./is. 117/2 Pt 2(S76-9), 0022-3476;0022-

Author(s): Ziegler EE

Abstract: Older infants derive a substantial proportion of their nutrient intake from beikost (foods other than milk or formula). Milks and formulas fed to older infants should complement the nutrient intake provided by beikost without unduly stressing the infant's capacity to excrete waste products. Using contemporary data regarding nutrient intakes from beikost, I examined the total nutrient intake of 6- to 12-month-old infants. Nutrient intakes of infants fed beikost plus iron-fortified formulas designed for younger infants are entirely satisfactory. On the other hand, when cow milk is fed together with beikost, infants receive unnecessarily high intakes of protein and electrolytes, resulting in an unduly high renal solute load. Because cow milk is also prone to cause occult intestinal blood loss, it is not considered a suitable feeding for 6- to 12-month-old infants.
Food and nutrient intake of 6- to 12-month-old infants fed formula or cow milk: a summary of four national surveys.
Ernst JA, Brady MS, Rickard KA.
Food and nutrient intakes of infants during the second 6 months of life were summarized with the use of four national surveys as the data base. Three of the surveys, the second National Health and Nutrition Examination Survey (1976-1980), the Ross Nutrition Survey (1984), and the U.S. Department of Agriculture Nationwide Food Consumption Survey (1977-1978), summarized and compared the nutrient composition of the diets of infants fed formula with that of the diets of infants fed cow milk during the second 6 months of life. The Gerber Nutrition Survey (GNS) summarized the nutrient composition of the diets of infants fed formula, cow milk, or human milk, or a combination of these, during 1986. Iron-fortified formula with beikost provided adequate but not excessive intakes of all nutrients for infants during the second 6 months of life with the possible exception of calcium for older infants. In contrast to cow milk, formula provided readily absorbed and adequate iron, generous linoleic acid, and adequate but not excessive intakes of protein, phosphorus, sodium, and potassium. The distribution of energy between protein, carbohydrate and fat, and potential renal solute load was reasonable in infants fed formula. Cow milk with beikost provided low intakes of readily bioavailable iron and linoleic acid and high intakes of protein, calcium, phosphorus, sodium, potassium, and potential renal solute load during the second 6 months of life. The diets of infants fed low-fat milks were even lower in linoleic acid and higher in volume of food consumed, protein, calcium, phosphorus, sodium, potassium, and potential renal solute load than the diets of infants fed whole cow milk. Apparently, infants fed cow milk were treated differently than those fed formula (i.e., they were given more solids and table foods and less baby food at all ages and less volume of milk at 9 and 12 months of age). These data provided the basis for the development of practical suggestions for feeding infants during the second 6 months of life.

Horst CH, Obermann-de Boer GL, Kromhout D.
During infancy different types of milk feeding can be used, i.e. breast milk, formula or cow's milk. In the Leiden Pre-School Children Study food intake and anthropometric data of four-, six- and nine-month-old infants were collected to study the influence of the type of milk feeding on the energy and nutrient intake on one hand and on height and weight on the other hand. All three different types of milk feeding were studied in the four-month-old infants. In the six- and nine-month-old infants food intake data of those breast-fed were not collected. No differences in energy intake and in height and weight were found between formula-fed infants and infants fed on cow's milk at the three age levels. The influence on nutrient intake, on the contrary, was substantial. Compared to formula feeding, cow's milk feeding resulted in a significantly higher intake of protein, sodium, potassium, calcium and phosphorus and a significantly lower intake of linoleic acid, iron and ascorbic acid. Cow's milk feeding at four months was more prevalent among less educated mothers than among mothers with higher education. Breast feeding was strongly positively related to educational level of the mother at all three ages. It can be concluded that more information should be given about the advantages and disadvantages of different types of milk feeding especially to less educated mothers.
Feeding low-fat milk during infancy.
Ryan AS, Martinez GA, Krieger FW.
Despite the widespread agreement that low-fat milk should not be used during infancy, there is a sizable portion of infants in the United States who were fed a diet that included low-fat milk (less than or equal to 2% fat). In 1985, 14% of infants 8 months old, 20% of infants 10 months old, and 32% of infants 12 months old were fed low-fat milk. The reasons given most often by mothers for low-fat milk use was their consideration that low-fat milk has less fat than whole cow's milk and that low-fat milk use was recommended/suggested by their physician. Nutrient intakes of infants fed low-fat milk are compared to those of infants fed whole cow's milk and infant formula. Except for fat, nutrient intakes of infants fed low-fat milk or whole cow's milk were similar. A majority of infants fed either low-fat milk or whole cow's milk received amounts of sodium, potassium, and chloride that exceeded the recommended safe and adequate ranges and amounts of iron below the RDA. These data are considered in relation to dietary requirements during infancy.

Nutrient intakes of American infants and children fed cow's milk or infant formula.
Martinez GA, Ryan AS, Malec DJ.
Between April 1984 and August 1984, a national survey, the Ross Laboratories Infant Nutrition Survey, was undertaken to assess patterns of food consumption of American infants ranging in age from 6.5 months to 13.4 months. Nutrient intakes of 865 infants were evaluated according to different foods (milk and milk products, non-iron-fortified formula, iron-fortified formula, infant cereal, commercial baby foods, and home-prepared table foods). Results indicated that most American infants consumed nutrients in appropriate amounts. However, a large proportion of infants who were fed a diet that included cow's milk received amounts of sodium, potassium, and chloride that exceeded the recommended safe and adequate ranges. The median intake of iron of infants fed either cow's milk or a non-iron-fortified formula was below the recommended dietary allowance; a low percentage of these infants received medicinal iron supplementation. The results also indicated that the median estimated renal solute load of the diet of infants fed cow's milk was approximately twice the amount of that of infants fed formula. These data may be useful in the development of nutritional programs for older infants.
Immunologic consequences of feeding infants with cow milk and soy products.
Acta Paediatrica Scandinavica, 1982, vol./is. 71/1(43-51), Author: May CD, Fomon SJ,
Abstract: Various products and regimens proposed for feeding infants when the mother's milk is not available have been evaluated intensively for capacity to achieve optimal nutrition. The immunologic consequences of feeding the foreign proteins contained in the various products have received much less attention and no systematic investigations have been done for comparable immunologic evaluation. Sera obtained at intervals from normal infants fed cow milk and soybean products from birth in different regimens were analyzed for antibodies to five major milk proteins and a soy protein isolate. Antibody levels increased slowly during the first 4 months, reaching a peak about 6 months of age. In infants fed cow milk products or a soy product from birth to 112 days of age and then given various cow milk products the following antibody responses were observed: The level of serum antibodies attained was highest with pasteurized cow milk and lower with heat-treated cow milk or a milk base formula of lower protein content. Feeding a soy product from birth for 112 days did not prevent a brisk antibody response to cow milk introduced subsequently, comparable to or greater than the antibody response seen when cow milk products were fed from birth. Clinically no immunologic disorders were detected in association with antibody responses to the various products and regimens. The implications of the findings for infant feeding and immunologic disorders are discussed.

Cow milk feeding in infancy: gastrointestinal blood loss and iron nutritional status. Journal of Pediatrics, 1981, vol./is. 98/4(540-5) Author(s): Fomon SJ, Ziegler EE,
Abstract: Eighty-one normal infants were studied between 112 and 196 days of age. Thirty-nine infants were fed pasteurized cow milk and the remainder were fed either Enfamil or heat-treated cow milk. During the age interval of 112 to 140 days, the proportion of infants with guaiac-positive stools was significantly (P less than 0.01) greater among infants fed pasteurized cow milk than among those fed Enfamil or heat-treated cow milk. Similarly, infants fed cow milk had a significantly (P less than 0.001) greater number of guaiac-positive stools than did the other infants. After 140 days of age, there was no difference between feeding groups in the number of guaiac-positive stools. No significant differences were observed in mean hemoglobin, hematocrit, serum iron, total iron-binding capacity, or transferrin saturation between feeding groups nor between infants with and those without guaiac-positive stools. It is concluded that pasteurized cow milk should not be fed before 140 days of age.

Skim milk in infant feeding.
Citation: Acta Paediatrica Scandinavica, January 1977, vol./is. 66/1(17-30), 0001-
Author(s): Fomon SJ, Filer LJ, Ziegler EE, Bergmann KE, Bergmann RL
Abstract: Skim milk in infant feeding. Acta Paediatr Scand, 66:17, 1977.--Ninety-four infants were enrolled at 112 days of age in a study of food intake and growth and 88 were considered to have completed satisfactorily the planned 56 days of observation. The infants lived at home. Feedings consisted of a commercially available formula (Similac, 67 kcal/100 ml) or a slightly modified skim milk (Formula 305, 36 kcal/100 ml) and commercially prepared strained foods. Energy intake and gain in weight were significantly greater by infants fed Similac than by those fed Formula 305. Gain in length was nearly identical in the two feeding groups. During the 56 days of observation, triceps and subscapular skinfold thicknesses changed little in infants fed Similac but decreased approximately 25% in infants fed Formula 305. It is suggested that body fat stores of infants fed Formula 305 were mobilized to permit growth of fat-free tissue.
Infant nutrition.
Reina D.
Although most physicians agree that human milk is superior to artificial feeding, the latter is far more popular in well developed countries. There are various reasons for the decrease in breast feeding but a major factor has been the introduction of a variety of simple, safe milk and milk-substitute formulas. The healthy full-term infant will thrive on any of a number of properly prepared formulas as well as human milk. Mothers should be encouraged to breast feed by the obstetrician and pediatrician, but should not be made to feel guilty if they do not. Regardless of the method used for feeding, proper instruction is mandatory. A practical approach to the management of breast feeding is presented, as is a guide to artificial feeding. A brief review of the full-term infant's nutritional requirements is given together with a comparison of human milk, cow's milk, and commercially prepared feeding products. The availability and use of the specialized formulas is also included.

New growth charts: soy, cow, and breast milk comparison.
Citation: Annals of Allergy, March 1971, vol./is. 29/3(126-34), 0003-4738;0003-4738
Author(s): Sellars WA, Halpern SR, Johnson RB, Anderson DW Jr, Saperstein S,
Abstract: Weight and length measurements were recorded for 1583 babies during the 1st year of life. The population sample was fairly constant and composed of children from white, middle and upper income families seen in the private practice of 11 pediatricians in Dallas, Texas. This study was part of a larger research effort to determine how diets during the 1st 6 months affect subsequent development of allergy. The babies were subdivided into 3 groups according to family history for allergy and 3 groups according to diet (cow, breast or soy milk) during the 1st 6 months. After examination at birth, the babies were reexamined monthly up to 6 months of age and bimonthly thereafter up to age 1. Nearly 22,000 observations were made in all. Tables and charts were constructed showing mean weight and length measurements plotted from birth through 38 weeks against 24 possible combinations of sex, family allergy history, and diet. No significant difference was detectable between subgroups when differences in birth weight were taken into account. Compared with the Iowa norms for infant growth which were established from measurements taken 1926-49, these babies grew taller in the 1st year of life; weight differences were minimal. Revised infant growth charts, more consistent with today's growth patterns, are needed.