

# Food in early life: communicating about food and health

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**FOOD, CONSUMER  
BEHAVIOUR & HEALTH**  
RESEARCH CENTRE

# Influencing health



through mother's diet

through baby's diet



## Balancing risks and benefits

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- **Benefits:** Regular consumption of fish and seafood, particularly varieties high in omega-3 fatty acids DHA and EPA, have been linked most strongly to a reduced risk of heart disease, neurological function in unborn babies - as well as several other benefits including eye health and joint health.
- **Risks:** The presence of contaminants methylmercury, PCBs and dioxins in fish could be harmful to human health.



# Nutrients versus contaminants

## FOR MORE INFORMATION

This is part of a series about how to enjoy fish safely. You can also read "Should I Eat the Fish I Catch?: A guide to healthy eating of the fish you catch" (available in several languages) to learn more about selecting fish from clean areas, choosing smaller fish, cleaning, and preparation. Call 1-800-490-9198 to order.

For more information about reducing your health risks from eating fish that contain chemical pollutants, contact your health or environmental protection department. You can find the telephone number in the blue section of your local telephone book.

You may also contact

U.S. Environmental Protection Agency  
MS-4305  
1200 Pennsylvania NW  
Washington DC 20460

On the World Wide Web see  
[www.epa.gov/ost/fish](http://www.epa.gov/ost/fish)

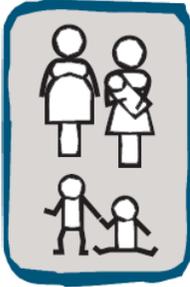
for information on fish advisories and links to all advisory programs and contacts

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United States Environmental Protection Agency  
Office of Science and Technology (OST)

**EPA SHOULD I EAT THE FISH I CATCH?**

A guide to healthy eating for women and children



Developed in collaboration with the Agency for Toxic Substances and Disease Registry, U.S. Public Health Service

## INTRODUCTION

Fish can be an important part of a healthy diet. But, some fish have harmful amounts of mercury. Mercury consumed by a **pregnant or nursing woman, or a young child, can harm the developing brain and nervous system.**

You can get the benefits of fish and avoid the risks of mercury by following fish advisories. Contact your Health Department for advice about the fish caught and sold in your area. If there is no special advice for your area, follow the federal advice given here.

In 2001, the U.S. Environmental Protection Agency and the U.S. Food and Drug Administration issued national advisories concerning mercury in fish.



## FRESHWATER FISH CAUGHT BY FAMILY AND FRIENDS

Contact your local Health Department for specific advisories for your area. If there are none, follow the federal advisories, below.

The U.S. Environmental Protection Agency (EPA) advises **pregnant women, women who may become pregnant, nursing mothers, and young children** to:

- ✓ limit their consumption of freshwater fish caught by family and friends to **one meal per week.**
  - for adults, one meal is 6 ounces of fish (cooked weight)
  - for children, one meal is 2 ounces
- ✓ for ocean fish caught by family and friends, use the advice for fish purchased in stores and restaurants.

see the next panel



## FISH PURCHASED IN STORES AND RESTAURANTS

Contact your local Health Department for specific advisories for your area. If there are none, follow the federal advisories, below.

The U.S. Food and Drug Administration (FDA) advises **pregnant women, women who may become pregnant, nursing mothers, and young children** to:

- ✓ **not eat shark, swordfish, king mackerel, and tilefish**

Women who are or may become pregnant:

- ✓ **can safely eat an average of 12 ounces per week (cooked weight) of other types of fish**
  - choose a variety from shell fish, canned fish, smaller ocean fish, and farm-raised fish
  - fish purchased in stores and restaurants usually have less mercury than freshwater fish caught by family and friends, so you can safely eat more.



# Maternal seafood consumption

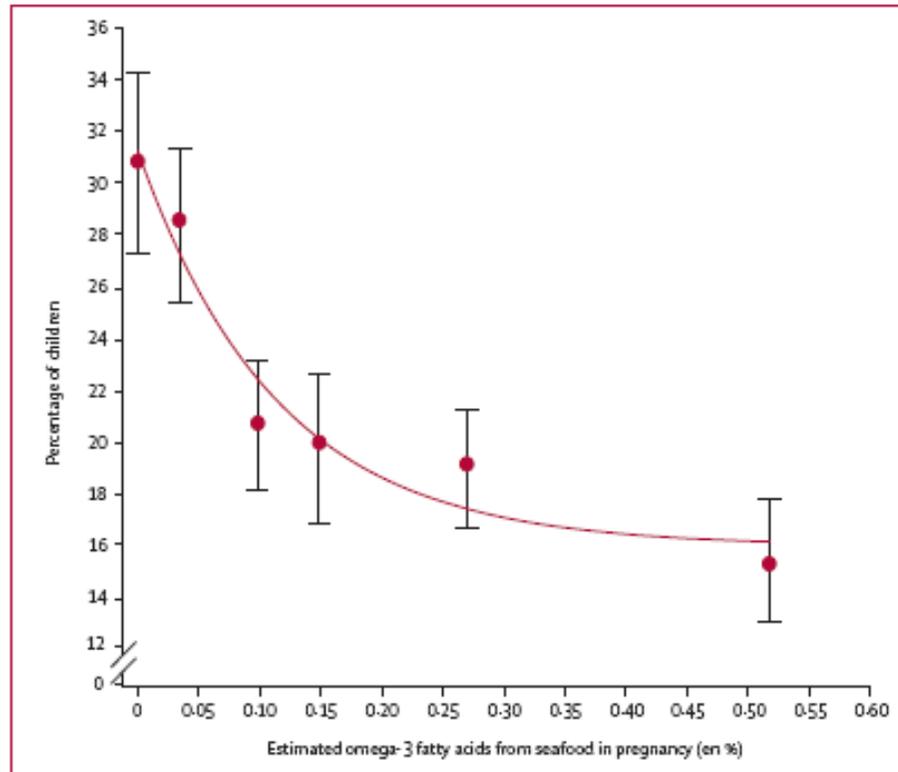


Figure 2: Prevalence of children with low verbal IQ according to mothers' omega-3 fatty acid from seafood



Articles

## Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study

Joseph Hibberd, John M Davis, Colin Steer, Pauline Emmett, Imogen Rogers, Cathy Williams, Jean Golding

**Summary**  
Background Seafood is the predominant source of omega-3 fatty acids, which are essential for optimum neural development. However, in the USA, women are advised to limit their seafood intake during pregnancy to 340 g per week. We used the Avon Longitudinal Study of Parents and Children (ALSPAC) to assess the possible benefits and hazards to a child's development of different levels of maternal seafood intake during pregnancy.

**Methods** 11 875 pregnant women completed a food frequency questionnaire assessing seafood consumption at 32 weeks' gestation. Multivariable logistic regression models including 28 potential confounders assessing social disadvantage, perinatal, and dietary items were used to compare developmental, behavioural, and cognitive outcomes of the children from age 6 months to 8 years in women consuming none, some (1–340 g per week), and > 340 g per week.

**Findings** After adjustment, maternal seafood intake during pregnancy of less than 340 g per week was associated with increased risk of their children being in the lowest quartile for verbal intelligence quotient (IQ) (no seafood consumption, odds ratio [OR] 1.48, 95% CI 1.16–1.90; some, 1.09, 0.92–1.25; overall trend,  $p=0.004$ ), compared with mothers who consumed more than 340 g per week. Low maternal seafood intake was also associated with increased risk of suboptimum outcomes for prosocial behaviour, fine motor, communication, and social development scores. For each outcome measure, the lower the intake of seafood during pregnancy, the higher the risk of suboptimum developmental outcome.

**Interpretation** Maternal seafood consumption of less than 340 g per week in pregnancy did not protect children from adverse outcomes; rather, we recorded beneficial effects on child development with maternal seafood intakes of more than 340 g per week, suggesting that advice to limit seafood consumption could actually be detrimental. These results show that risks from the loss of nutrients were greater than the risks of harm from exposure to trace contaminants in 340 g seafood eaten weekly.

**Introduction**  
Optimum fetal neurodevelopment is dependent on specific nutrients derived solely from dietary sources, including docosahexaenoic acid (DHA), an omega-3 essential fatty acid, of which seafood is a major source.<sup>1</sup> Low seafood intake during pregnancy could lead to fetal deficiency in essential long-chain omega-3 fatty acids such as DHA and eicosapentaenoic acid (EPA) resulting in adverse effects on neurodevelopment.<sup>2</sup> DHA deficiency leads to reduced dendritic arborisation<sup>3</sup> and impaired gene expression for regulation of neurogenesis, neurotransmission, and connectivity.<sup>4</sup> In severe conditions of DHA deprivation, such as Zellweger disease and peroxisomal disorders, mental retardation is common, yet restoration of dietary DHA intake improves clinical outcomes and neuronal myelination.<sup>5,7</sup>

In 2004, advice<sup>8</sup> was issued jointly by two US Federal Government agencies for pregnant women or women likely to become pregnant to restrict their overall consumption of seafood to 340 g per week,<sup>9</sup> to avoid fetal exposure to trace amounts of neurotoxins. However, such control of seafood consumption could cause intake of long-chain omega-3 fatty acids to fall below quantities adequate for best fetal neurodevelopment.<sup>10</sup> We analysed an observational cohort study, the Avon Longitudinal Study of Parents and Children (ALSPAC), to assess whether the advice is successful in providing protection from adverse neurodevelopmental outcomes.

**Methods**  
ALSPAC was designed to assess environmental factors (including diet) during and after pregnancy that might affect the development, health, or well-being of the child. All pregnant women living in Bristol, UK, and surrounding areas, with an expected delivery date between April 1, 1991 and Dec 31, 1992 were eligible for inclusion.<sup>11</sup> Of 14541 pregnancies, 13988 children survived for at least 12 months. About 85% of eligible expectant mothers participated; recruitment, dropout, and other methodologies have been described elsewhere.<sup>12</sup> Mothers were sent postal questionnaires four times during pregnancy and then at specific time points<sup>13</sup> after birth of the child to obtain information about diet, education, social circumstances, behaviour, and developmental outcomes. The investigation used singleton and first-twin births for whom data were available for 28 key social, demographic, and other confounding variables ( $n=8546$ ). Mothers answered questions about development or behaviour of their children at ages 6, 18, 30, 42, and 81 months (number completing at

578 [www.thelancet.com](http://www.thelancet.com) Vol 369 February 12, 2007

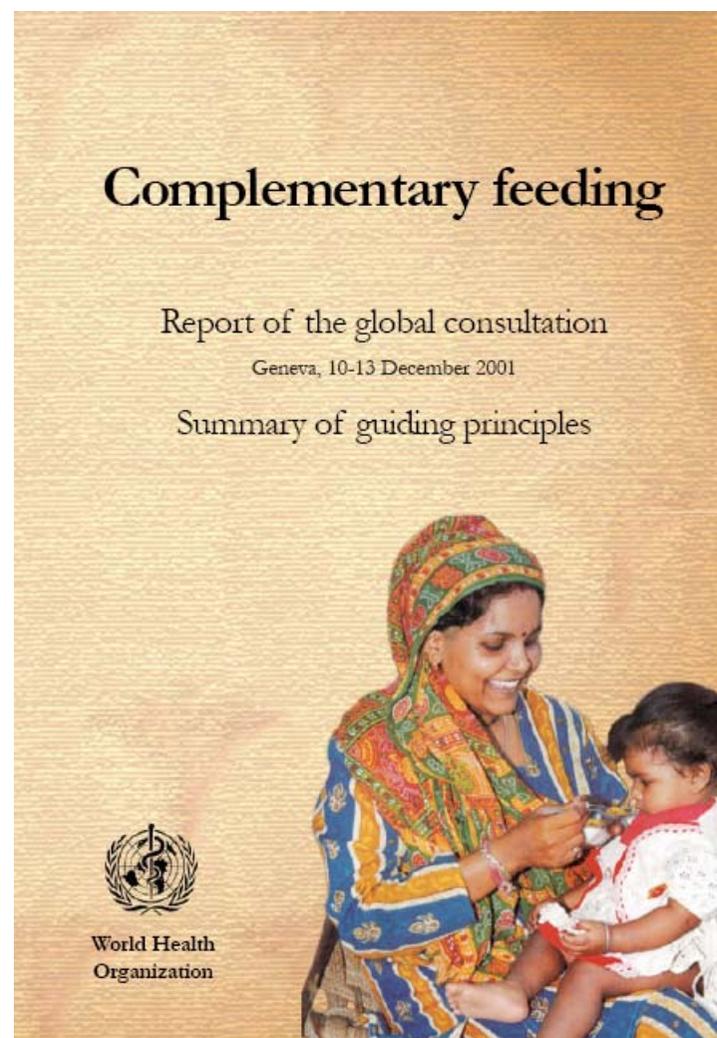
## Common recommendations

### **8. NUTRIENT CONTENT OF COMPLEMENTARY FOODS:**

*Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Vegetarian diets cannot meet nutrient needs at this age unless nutrient supplements or fortified products are used (see 9. below). Vitamin A-rich fruits and vegetables should be eaten daily. Provide diets with adequate fat content. Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered so as to avoid displacing more nutrient-rich foods.*



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# Common recommendations across Europe

*Fish is also an important source of high quality protein and weight-for-weight has the same amount as lean meat. Moreover all fish (freshwater fish, saltwater fish and shellfish) are rich sources of essential amino acids. As well as being good sources of protein, white fish and shellfish are also very low in fat, and the fat in other fish (such as salmon, tuna, sardines, herring and mackerel) has a high proportion of n-3 long-chain polyunsaturated fatty acids, which are important for neurodevelopment. Fish also provides a good source of iron and zinc, which are found in slightly lower concentrations than in meat, with the exception of shellfish. Saltwater fish are the key source of iodine for infants, apart from breast milk. Iodine deficiency is still prevalent in Europe, especially where salt is not iodised, and iodine is essential for optimal child development and growth.*



**Infant and young child feeding:  
standard recommendations for the European Union**

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## Most helpful source of advice on feeding

	England & Wales		Scotland		Northern Ireland		United Kingdom	
	1995 %	2000 %	1995 %	2000 %	1995 %	2000 %	1995 %	2000 %
Health visitor	62	59	60	60	57	59	61	59
Friends/ relatives	50	51	52	51	55	56	50	51
Books/ leaflets etc.	27	32	26	32	22	27	27	32
Midwife	9	10	7	10	8	10	9	10
Doctor/ GP	9	7	9	9	9	11	9	7
Vol.organisation	2	1	1	1	-	*	2	1
TV/ radio	1	1	1	1	1	1	1	1
Other	2	4	1	3	2	3	2	3
<i>Base</i> <i>(All Stage 3 mothers)</i>	4300	4112	1747	1718	1399	1437	4848	7267

Percentages do not add up to 100% as some mothers gave more than one answer



## Most helpful source of advice on feeding

	First babies %	Later babies %	All babies %
Health visitor	60	58	59
Friends/ relatives	65	39	51
Books/ leaflets/ magazines	38	26	32
Midwife	12	9	10
Doctor/ GP	6	8	7
Nurse	1	1	1
Voluntary organisation	2	1	1
TV/ radio	1	1	1
Other	2	4	3
<i>Base (All Stage 3 mothers)</i>	<i>3367</i>	<i>3900</i>	<i>7267</i>

Percentages do not add up to 100% as some mothers gave more than one answer.



## Cross-cultural differences

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- **Focus groups in Germany, Italy, Scotland, Spain and Sweden**
- **Most significant sources of information on infant feeding were the paediatrician in Italy, Spain and Germany, the child health clinic in Sweden and health visitors in Scotland.**
- **Participants did not rely solely on the infant feeding guidelines from relevant health authorities but obtained information on infant feeding from other sources including family and friends, the internet and other literature sources.**
- **Majority of parents do not necessarily adhere to infant feeding guidelines and advice from family or relatives on infant feeding practices.**
- **More positive reactions are evident among participants in Italy and Spain, where the guidelines arise from the paediatrician. These guidelines are mostly accepted and influence infant feeding practice within these countries.**
- **Sources of information from the baby food manufacturers including leaflets and handouts, especially in Germany and Sweden, exert a negative influence on parents' attitudes and practice.**



## Infant feeding in the media

Table 1 Number of references to breast and bottle feeding in different programme types

Programme type	Programme episodes		References to infant feeding*		
	Analysed	With infant feeding	Bottle	Breast	Total
Health or parenting	26	23	142	2	144
Medical drama or soap opera	64	8	39	29	68
News or documentary	37	1	1	0	1
Daytime non-fiction	23	3	9	10	19
Intermission advertisements	1246	2	3	0	3
<b>Total</b>	<b>1396</b>	<b>37</b>	<b>194</b>	<b>41</b>	<b>235</b>

\*Visual or verbal, or both.

*Source: Henderson, Kitzinger, Green (2000) Representing infant feeding: content analysis of British media portrayals of bottle feeding and breast feeding. BMJ 321:1196–8*



## Infant feeding in the media

Table 2 Number of visual and verbal references to breast and bottle feeding in different programme types

Programme type	References to breast feeding		References to bottle feeding	
	Visual	Verbal	Visual	Verbal
Health or parenting	0	2	127	15
Medical drama or soap opera	10	19	30	9
News or documentary	0	0	1	0
Daytime non-fiction	0	10	9	0
Intermission advertisements	0	0	3	0
Total	10	31	170	24

*Source: Henderson, Kitzinger, Green (2000) Representing infant feeding: content analysis of British media portrayals of bottle feeding and breast feeding. BMJ 321:1196–8*



## Taking advice - reliance on professionals

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Two months after the birth:

***“When I think he needs to move on like I’ll ask when it’s best for him to go on to solids. I know I’ve got the book and everything but it’s nice to get it from the doctor or the health visitor isn’t it, so you’re 100% sure you know that what you’re doing is right.”***

Two months later:

***“Yeah, he’s on a tablespoon now because before he was on two teaspoons but his growth and weight was very dramatic when we last weighed him, so she [health visitor] says, ‘Oh, just give him two teaspoons twice a day’ and this time she weighed him, he’s just gone up a pound, so she says, ‘you can increase his food now’. She told me how much to give him.”***

(Older mother, occupational class 4/5)



## Taking advice - gaining experience

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When interviewed antenatally:

***“It’s always better to get a professional, professional answer than someone who thinks they know.”***

Two months after her baby’s birth:

***“I’ve just gone and done it (made decisions about what and how much to feed the baby) without asking the health visitor or the midwife. The only way you learn is by doing it yourself. Before I had him, I just sat there and read books but I haven’t related to the books since I had him. I just went and done it.”***

(Younger mother, occupational class 4/5)



## Rigid guidelines vs individualised

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*“I think it is all very well them saying until 6 months but every baby’s different. I mean Alan’s starving all the time”*

*“4 months is guideline only and if baby is hungrier earlier then they are ready’*

*“babies are individual, some hungry all the time, some sleep all the time so guidelines have to be flexible”*



## Knowledge of guidelines

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*“feeding solids blocks the goodness of [breast] milk”*

*“bowel develops differently if give solids early”*

*“digestive system is not mature enough”*

*“they get immunity from infections for the first 3 months”*

*“antibodies”* (nobody expanded on what this meant)

One participant mentioned that her husband was now suffering an illness which she was concerned could be traced back to the early introduction of solids.



## When to introduce solids

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- baby led as shown by some physical characteristic (e.g. reaching the recommended age of 4 months, reaching a pre-defined weight or subjective size, starting teething, increased saliva production and the development of constipation) or behavioural action of the infant (e.g. hunger)
- non hunger related reasons:
  - feeding can be used to settle them (e.g. *“it was easy to feed them when they cry because it settles them, like comfort food. If you give a baby food they will eat it”*)
  - because of changes in sleeping that it also enabled the participants to sleep better as well as the baby.
  - the attractiveness of solid foods (*“the jars look brilliant”*)
  - eagerness to observe this stage in development (*“I couldn’t wait for him to start solids and I was really looking forward to it”*)



## Feelings about baby's first solid food

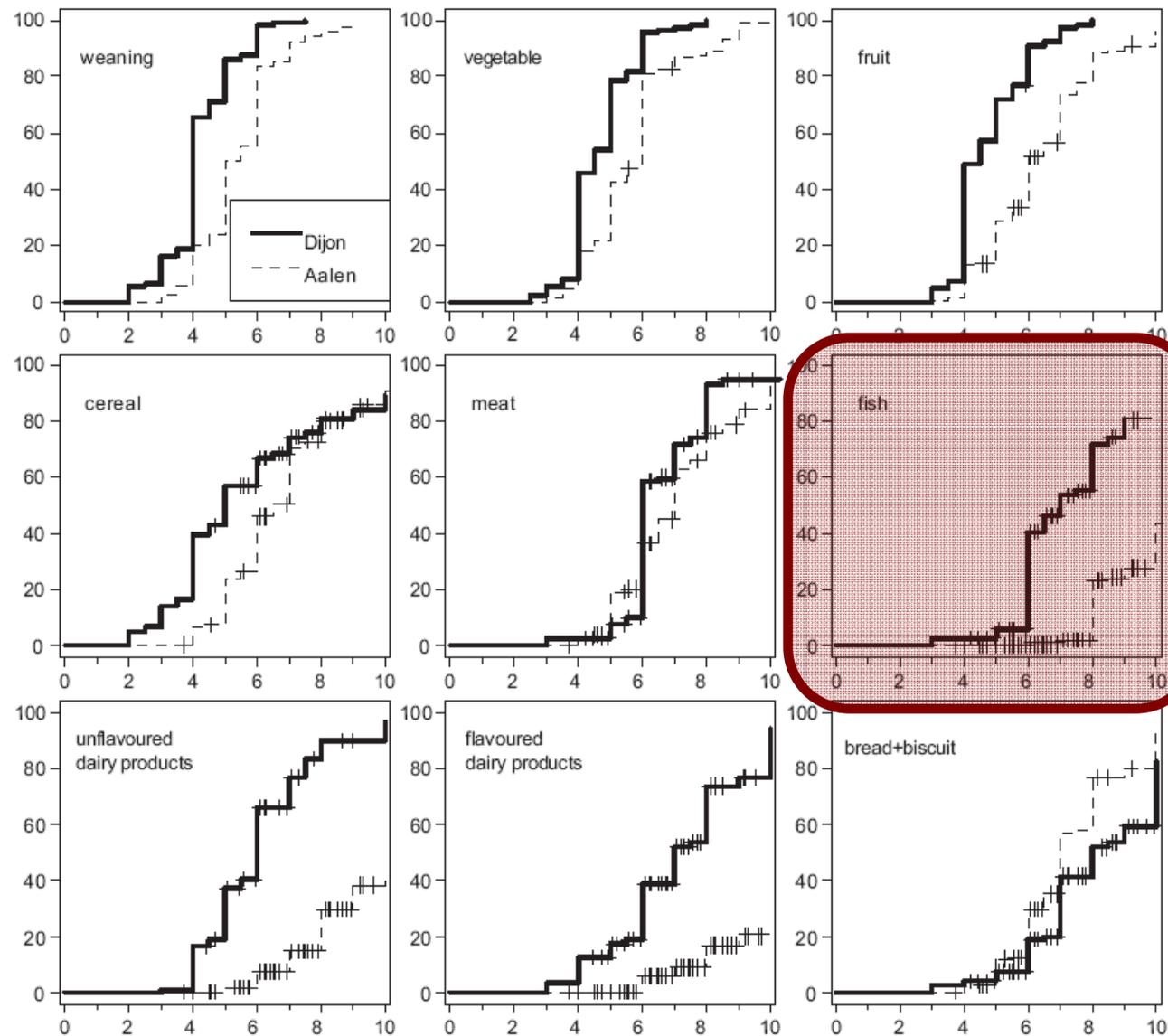
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- pride (e.g. *“it was a big achievement for a baby to eat solids” “it feels like he is getting big”*) - also pride expressed in achieving a healthy, happy strong baby solely on breast milk.
- if the baby became content and did not suffer any obvious ill effects - participants reassured that the correct course of action had been taken and baby needed the food
- exciting (e.g. *“baby looks cute”, “amazing to see your baby eating with a spoon”, “I could hardly wait to see what he would do”*)
- fun to watch (e.g. *“see baby getting excited”, “watch baby laugh”, “baby rattles plate”*)
- guilt - they knew they were introducing solids earlier than the recommended - however these participants went on to justify their behaviour



# Age at introduction of first foods

*Maier et al (2007) Food-related sensory experience from birth through weaning: Contrasted patterns in two nearby European regions. Appetite*



## Need to adapt recommendations

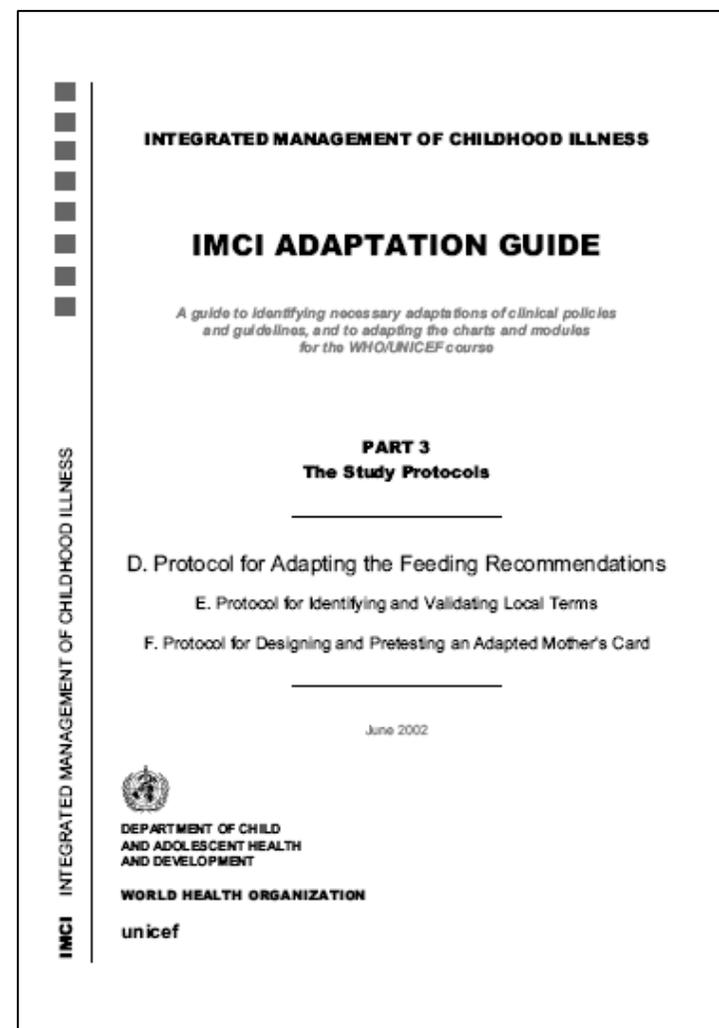
In Mali fish is considered a traditional baby food, and women were reported to have said,

“We give fish to our children because it is our tradition, because we have always done it, and because fish is good for babies to eat.”

**Sources: Dettwyler KA. Soc Sci Med 1987;23: 651–64;  
Dettwyler KA. Soc Sci Med 1987;24:633–44.**



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## Conclusions

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- the decision to wean is one that is made by the mother after taking a number of factors into account (e.g. Morgan, Kimber, Redfern & Stordy 1995; Anderson et al, 2001)
- food choices are “only tangentially about food per se, and even where food choices are more centrally about food they are not always made in terms of the nutritional functions of food” (Murphy et al, 1998)
- successful interventions need to focus on those variables that can be changed by health promotion interventions whilst recognising the need for greater societal changes (Alder et al, 2004)
- both the qualitative and quantitative results support the suggestion that the mothers’ introduction of solids is led by their perception of their baby’s needs; this could provide a promising message for the design of an effective educational intervention (Alder et al, 2004)



## EARNEST (Theme 4) Study partners

Finland



Germany



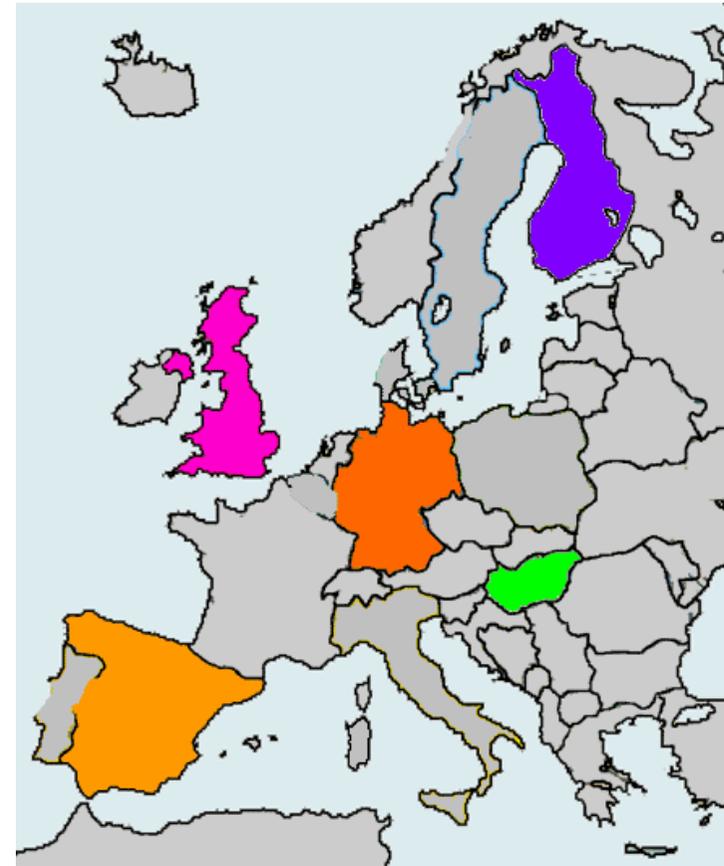
Hungary



Spain



UK



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## Project objectives

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- to explore the extent to which the relationship between early diet and later health is reflected in nutrition information and policies in selected EU countries
  - Policy documents
  - Leaflets and magazines aimed at parents
  - Views of health professionals, policy makers, the media and industry who communicate with consumers
- to explore parental understanding of the relationship between early diet and later health in selected EU countries



## Health outcome categories

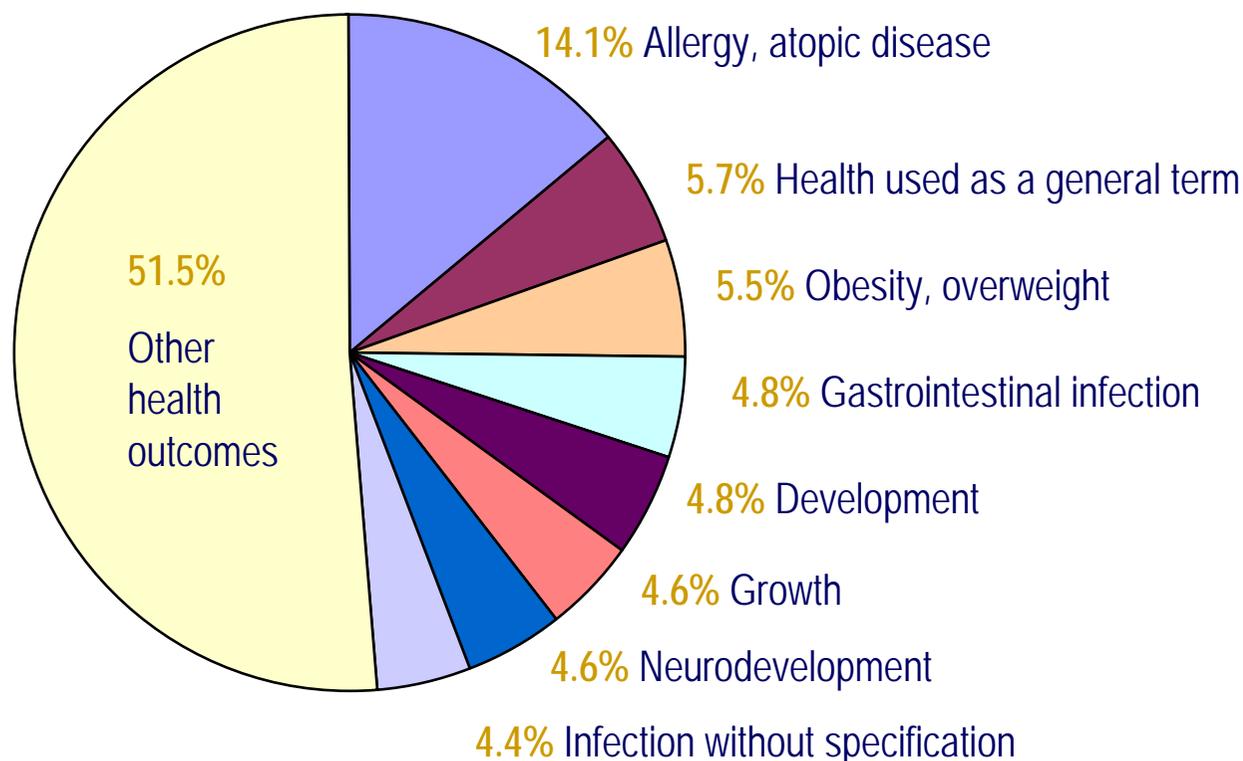
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- Allergy
- Bone disease
- Cancer
- Cardiovascular disease
- Diabetes
- Eating Habits
- Gastrointestinal diseases
- Growth and development
- Health in general
- Immune function
- Mental development
- Obesity
- Risk of disease
- Risk of infection
- Other

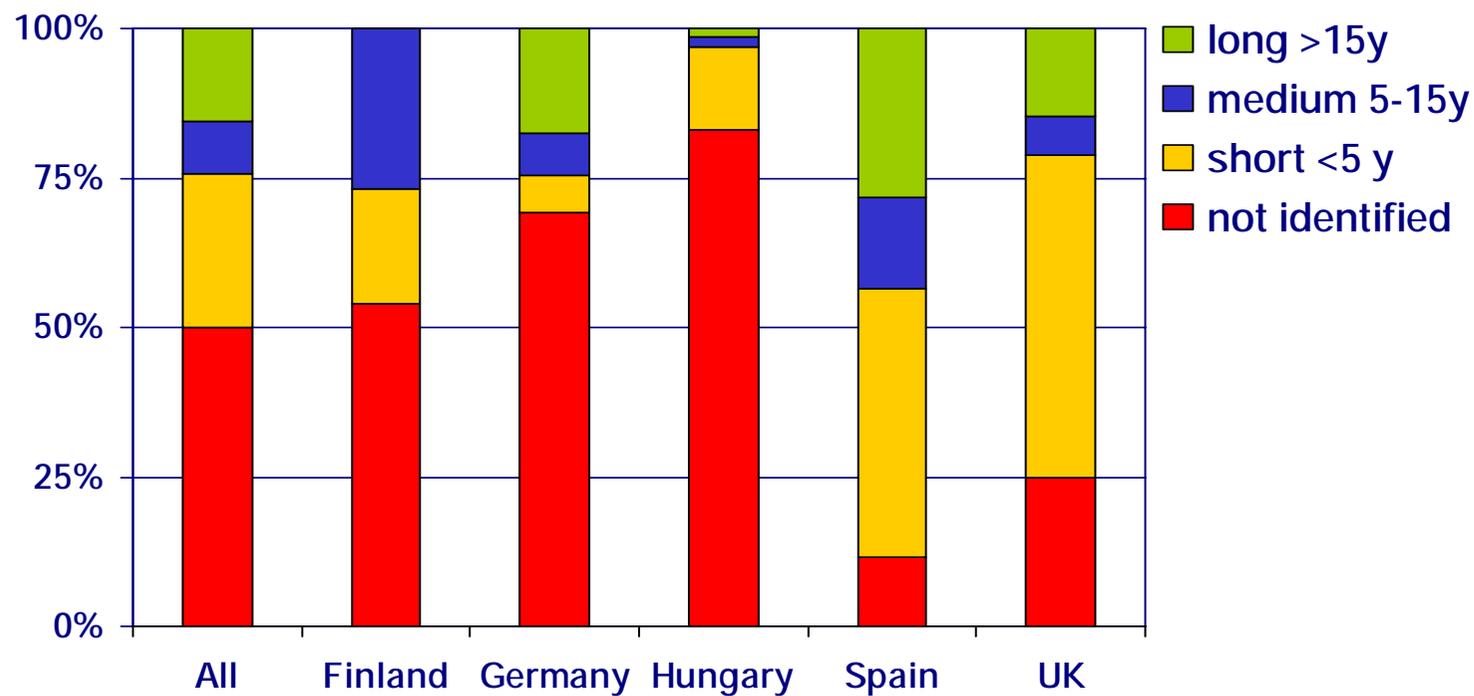


## Policy documents: Health outcomes

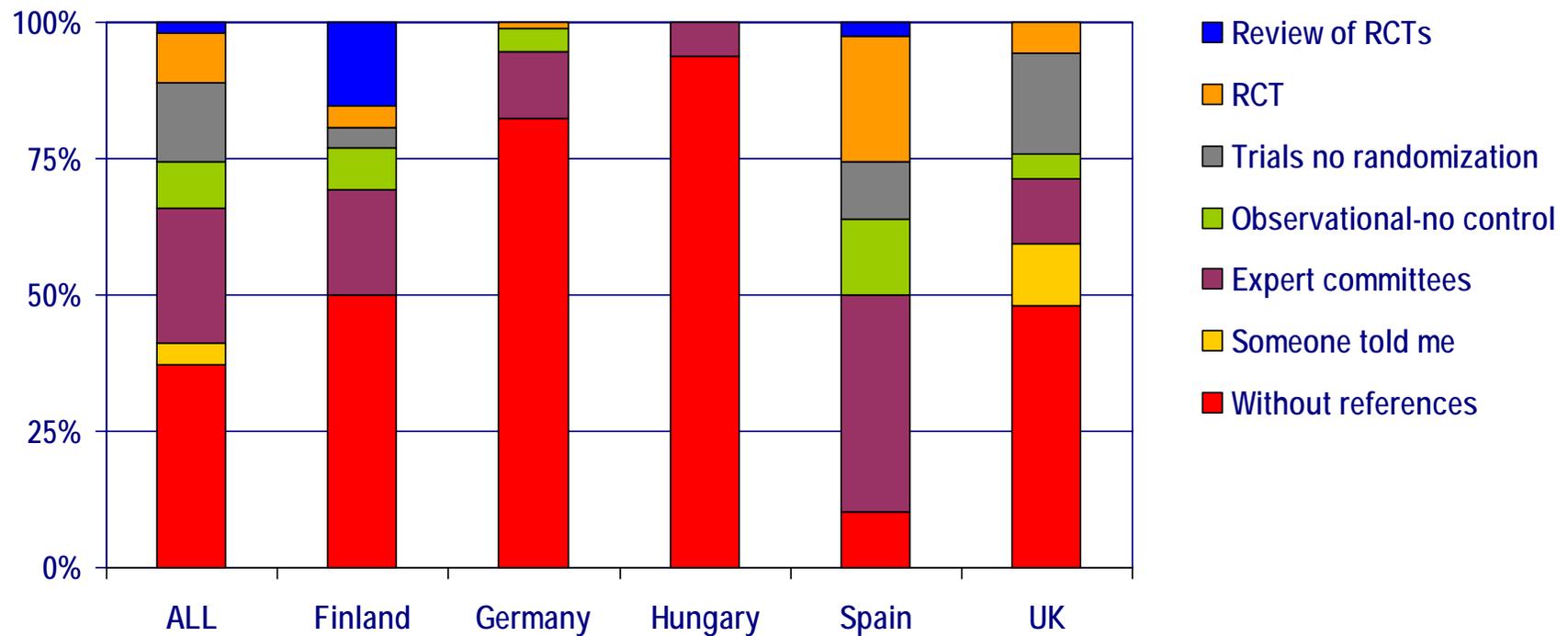
Altogether **455** statements → categorized into **53** different health outcomes



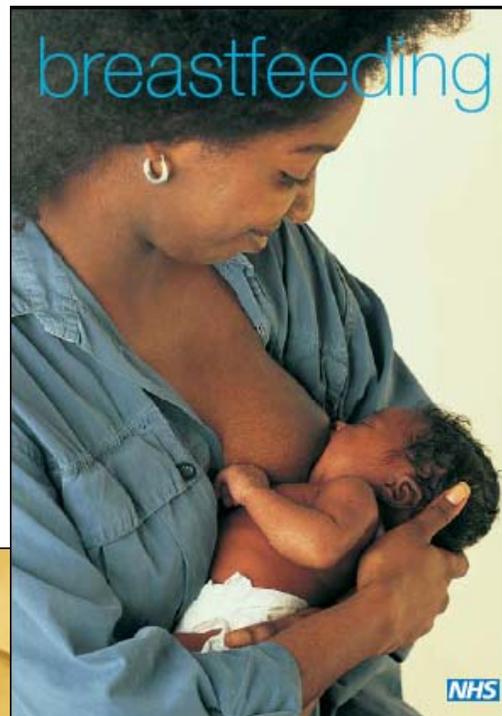
## Policy documents: Duration of effect



# Policy documents: Evidence base



# Information for parents



Recomendaciones  
para la  
**LACTANCIA  
MATERNA**



*¡Tómalo a pecho!*

Comité de  
*lactancia  
materna*  
de la AEP




## Ausschließlich Stillen

Empfehlung der WHO als wesentliches Gesundheitsziel  
zusammengestellt von Uta Reich-Schottky



**AFS**  
Arbeitsgemeinschaft Freier Stillgruppen  
Bundesverband e.V.

**ausschließlich  
stillen während  
der ersten  
6 Lebensmonate**

Die Weltgesundheitsorganisation (WHO, World Health Organisation) empfiehlt für alle Kinder: Ausschließlich stillen während der ersten 6 Lebensmonate und anschließend neben geeigneter Beikost weiter stillen bis zum Alter von 2 Jahren und darüber hinaus. Dies ist eines der wesentlichen Gesundheitsziele der im Jahr 2002 verabschiedeten Globalen Strategie zur Ernährung von Säuglingen und Kleinkindern.

Natürlich sind auch kürzere Stillzeiten oder nicht ausschließliches Stillen allemal ein Gewinn gegenüber nicht stillen. Was ist das Besondere am ausschließlichen Stillen? Was heißt das überhaupt?

**Was heißt „ausschließlich stillen“?**

Ausschließlich stillen heißt, dass der Säugling von Geburt an Muttermilch und nur Muttermilch erhält. Er bekommt keine Glukose, keinen Tee, kein Wasser oder Saft, keine künstliche Säuglingsernährung und keine feste Kost.

Wenn der Säugling nicht direkt gestillt wird, kann er auch abgepumpte oder von Hand gewonnene Muttermilch erhalten.

Muss das Baby Medikamente, Vitamine oder Spurenelemente erhalten, gilt es im Rahmen dieser Definition immer noch als „ausschließlich gestillt“.

**Warum ausschließlich stillen?**

**Die biologische Norm**

Stillen, Milch der Mutter als maßgeschneiderte Nahrung für die Kleinen, gibt es seit ca. 220 Millionen Jahren. Es ist ein stabiles, erprobtes System. Mütter und Kinder sind biologisch auf ausschließliches Stillen eingestellt.

**Mehr als Ernährung**

Stillen ist Ernährung und Immunschutz. Es ist ein normaler körperlicher Vorgang: Jede Mutter bildet nach der Geburt reichlich Milch für ihr Kind, unabhängig von den Umständen (von ganz seltenen Ausnahmen abgesehen). Und es ist Nähe und Wärme – Stillen bringt Mutter und Kind nahtnah zusammen.

**Wissenschaftliche Hinweise (Evidenz)**

Von neuen Methoden und Eingriffen („Interventionen“) wird heutzutage gefordert, dass sie erst dann auf breiter Ebene eingesetzt werden, wenn in wissenschaftlich fundierten Studien nachgewiesen ist, dass sie besser sind als die bisherigen Methoden. Säuglingen fälschlicherweise etwas anderes als Muttermilch zu geben, ist ein neuer Eingriff. Es gibt keinen wissenschaftlichen Beleg dafür, dass routinemäßige Zufüttern bei gesunden, reifen Neugeborenen in stillfreundlicher Umgebung gesundheitliche Vorteile brächte (Stoekchen, Nationale Stillkommission: Zur Frage der Zufütterung von gesunden, gestillten Neugeborenen, Berlin 2001). Es gibt andererseits viele wissenschaftliche Belege dafür, dass Kinder, die gar nicht oder in den ersten Monaten nicht ausschließlich gestillt werden, erhöhten Risiken ausgesetzt sind (Leach-Cava, N.: Quantifying the benefits of breastfeeding: a summary of the evidence. Washington, D.C.: FAO 2002).

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## Examples of statements

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- Breastmilk even boosts his brain development and will help prevent obesity later in life
- Breastfeeding also makes him less vulnerable to allergies like asthma and eczema, and illnesses such as diabetes and leukemia
- Breastfeeding exclusively during your baby's first four months can halve his risk of developing asthma, says a new study from the US
- But if he eats a lot of highly processed, sugary, salty and fatty foods, this will not only spoil his taste for healthier foods, it will also put him at risk of ill-health and obesity
- Breastfeeding your baby boosts his IQ



## Health outcomes in leaflets and magazines

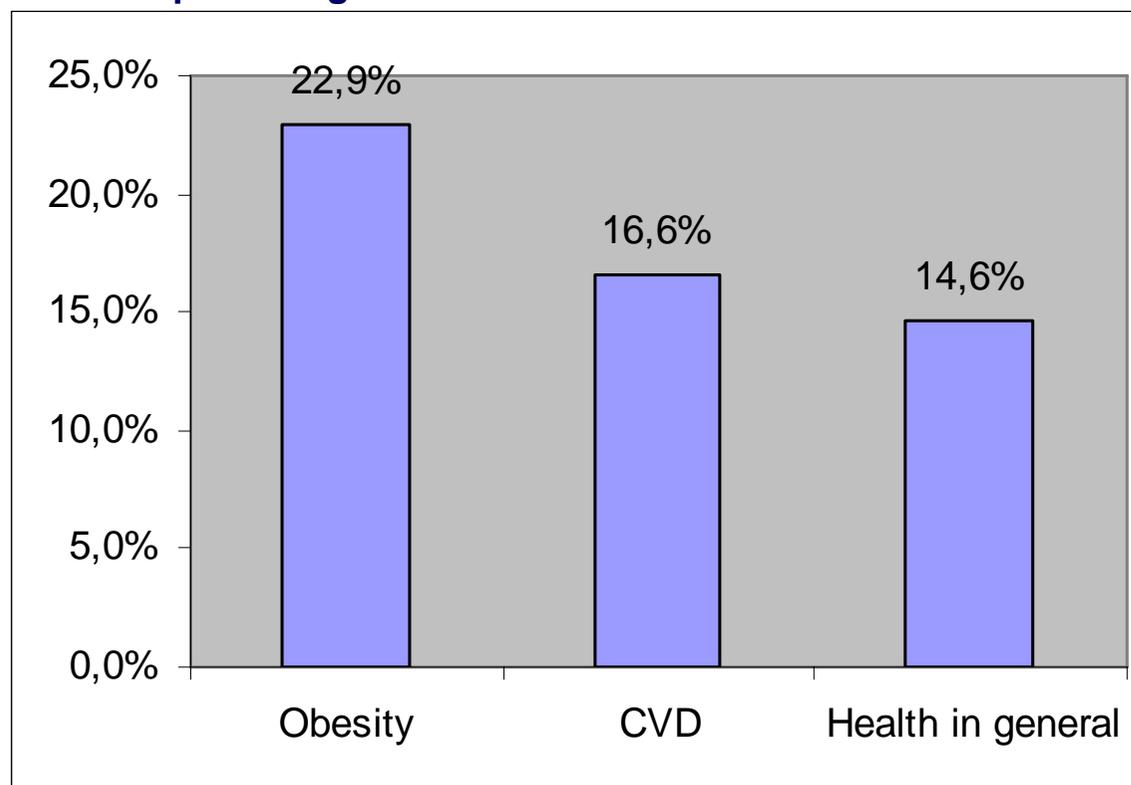
Health outcome categories	UK		FI		DE		HU		ES		All countries	
	n	%	n	%	n	%	n	%	n	%	n	%
Allergy	46	25.7	4	10.5	44	22.2	28	23.5	10	9.6	132	20.7
Risk of infection	41	22.9	3	7.9	13	6.6	20	16.8	22	21.2	99	15.5
Growth and development	10	5.6	7	18.4	34	17.2	9	7.6	13	12.5	73	11.4
<b>Obesity</b>	<b>11</b>	<b>6.1</b>	<b>5</b>	<b>13.2</b>	<b>18</b>	<b>9.1</b>	<b>9</b>	<b>7.6</b>	<b>11</b>	<b>10.6</b>	<b>54</b>	<b>8.5</b>
Risk of disease in general	19	10.6	3	7.9	10	5.1	9	7.6	10	9.6	51	8.0
Mental development	9	5.0	1	2.6	12	6.1	9	7.6	8	7.7	39	6.1
Other health outcomes	43	24.1	15	39.5	67	33.7	35	29.3	30	28.8	190	29.8



## Life course perspective

- majority of statements (68.2%, n 435) did not refer to the duration of the programming effects
- 18.2% (n 122) referred to short-term
- 5.1% (n 33) to medium-term
- only 7.5% (n 48) to long-term

Most frequent long-term health outcomes



## Final conclusions

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- Given the importance of early nutrition programming, a major challenge is to promote healthy infant feeding by parents. However, this cannot be accomplished unless both parents and health professionals understand basic infant nutrition and its implications for later health.
- There is need to understand better the choice criteria of parents with respect to weaning and baby foods, in order to also tailor the messages delivering the health information.
- With increasing mobility of populations across the EC, it would be preferable, for all EC citizens, if advice and information on maternal and infant feeding for professionals and for consumers were consistent.

