

Scottish Needs Assessment Programme



Breastfeeding in Scotland

**FOR
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SCOTTISH FORUM FOR PUBLIC HEALTH MEDICINE

613.
953
SC0
REF

69 Oakfield Avenue
Glasgow
G12 8QQ
Tel - 041-330-5607
Tel/Fax - 041-307-8036

Health Promotion Library Scotland
Health Education Board for Scotland
The Priory, Canaan Lane
Edinburgh EH10 4SG
Tel: 0345 125 442 Fax: 0131 447 6180

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Health Promotion Review

Breastfeeding in Scotland

Dr Harry Campbell

**Department of Public Health
Fife Health Board**

Dr Ian G Jones

**Department of Public Health
Fife Health Board**

March 1994

**Scottish Forum for Public Health Medicine
69 Oakfield Avenue
Glasgow G12 8QQ
Tel - 041 330 5607
Fax - 041 307 8036**

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Executive Summary

The prevalence of breastfeeding in Scotland is the second lowest in Europe and unlike a number of other European countries in which breastfeeding rates have increased substantially in the last 20 years, there is no evidence of any recent improvement in Scotland.

Breastfeeding was common in Scotland until the 1960s when it began to decline. For the past ten or more years only around one half of women ever breastfeed their babies and by four months the figure is down to 20%. The current breastfeeding prevalence rates vary very widely throughout Scotland from one area to another:

- rates at discharge from maternity unit by health board area range from 27%-63%
- rates at end of first week of life by postcode district range from 9%-77%

Decisions on breastfeeding are generally made before the first antenatal visit but those who are undecided at this stage tend to use formula feeding.

There is conclusive evidence from a small number of studies that breastfeeding results in decreased gastrointestinal, and to a lesser extent lower respiratory illness, in the first year of life and reduced serious infections in low birth weight babies. In addition the current hospital costs to a health board with 4000 births annually and a prevalence rate of breastfeeding for at least three months of 20%, attributable to lack of breastfeeding may be as high as £240 000. An increase in the proportion of women breastfeeding for at least four months from 20% to 40% could potentially reduce these hospital costs by about £60 000.

Published evidence for the effectiveness of interventions which seek to promote successful breastfeeding is scanty and of poor quality although there are clear associations between breastfeeding outcomes and such factors as formula milk advertising; policies and practices regarding supplementation, rooming-in, demand feeding and mother-baby contact after delivery; and general beliefs about breastfeeding.

Numerous studies have highlighted hospital practices which discourage breastfeeding and act to undermine the confidence of breastfeeding mothers. A graphic illustration of this is the fact that the babies of 45% of breastfeeding mothers are currently given infant formula feeds while in medical care. This practice is only justified medically in a minority of breastfeeding babies and has been shown to result in the early failure of breastfeeding. Changing these poor practices has been shown to be achievable and can lead to improved breastfeeding rates. Experience from Scandinavia and Australia in the last 20 years has shown that breastfeeding rates can double if priority is given to this issue and appropriate action taken at both national and local levels.

In England and Wales but not in Scotland a national target for improving breastfeeding prevalence has been set. Breastfeeding rates are an excellent candidate for adoption as a local health target since breastfeeding results in important health gain and reduces health service costs, and breastfeeding promotion activities have been shown to result in improvements in breastfeeding rates. In addition, breastfeeding rates are readily understood by the population and are measurable and so can be monitored. Substantial improvements in breastfeeding rates have been achieved in several European countries. Even modest improvements in the current Scottish rates would make a valuable contribution to the health of the population of Scotland.

A number of possible strategies to improve both the incidence and prevalence of breastfeeding are proposed which involve action at national and local level.

Recommendations for action

A number of recommendations based on the findings of this report fall within one of three categories depending on the level of action which is required on a particular issue. These are based on a critical and objective review of the best available evidence on the epidemiology and health gain associated with breastfeeding together with the evidence for the impact of breastfeeding interventions. These are listed in three categories depending on the level of action which is required on a particular issue.

1 National

- 1.1 a reconsideration of the need for national targets or promotion of local targets for breastfeeding; these could include
- an increase in the proportion of women breastfeeding at birth from 50% to 60% over a five year period
 - an increase in the proportion of women breastfeeding for at least six weeks from 30% to more than 50% by the year 2005
 - an increase in the proportion of women who breastfeed for at least four months from 20% to 40% by the year 2005

An assessment of the degree of achievement of these targets could be made from data collected by the five yearly OPCS infant feeding surveys.

- 1.2 a statement re-affirming the Scottish Health Service's adoption of the International Code on the Marketing of Breastmilk Substitutes with specific guidance to health boards reminding them of the statutes of the code and giving practical guidance on how these can be enforced.
- 1.3 a review of the current level of financial support for national advertising to promote breastfeeding. In the light of the potential for savings within the Scottish Health Service there should be a review of the appropriateness of this budget.
- 1.4 consideration to be given to extending the period of financial support to the Scottish Joint Breastfeeding Initiative from 1995 to 2000. This is particularly important at a time when the number of local multidisciplinary Joint Breastfeeding Initiatives has grown to 21 in Scotland over the period 1990 - 1994. These local groups would benefit from the continuing support of the national SJBI until they are more fully established.
- 1.5 a review and re-evaluation of the emphasis on breastfeeding in medical, nursing, midwifery and health visiting curricula. Published studies have shown that there is insufficient emphasis on the acquisition of practical breastfeeding management skills.
- 1.6 a commitment to support an annual survey of breastfeeding rates in Scotland for the next 10 years. The first national breastfeeding survey led by the Scottish Joint Breastfeeding Initiative Co-ordinator was conducted in 1993 and successfully achieved collaboration from all 25 Scottish maternity hospitals. These data enable maternity hospitals to look at the effectiveness of their participation in the "Baby Friendly Initiative" and other measures they may introduce to improve breastfeeding rates.

- 1.7 an evaluation of the impact of the current "milk token scheme" on breastfeeding rates.
- 1.8 a review of the relative need for and thus emphasis and resources given to antenatal clinics which tend to focus on medical procedures and antenatal classes which focus on broader issues and give the opportunity for health promotion including the promotion of breastfeeding.
- 1.9 a review of the level of maternity leave and maternity allowances in Scotland in comparison to other European countries.
- 1.10 a review of work legislation on flexible working hours for mothers and on creche and nursery provision and other facilities for nursing mothers in the workplace.
- 1.11 support given to research on breastfeeding - for example, evaluation of effectiveness of national advertising in increasing breastfeeding rates and observational studies on the attitudes of young men to breastfeeding.

2 Health board

- 2.1 in the absence of national targets, adoption of local targets for breastfeeding. Local targets should be formulated which relate to local baseline rates; these could include
 - an increase in the proportion of women breastfeeding at birth from 50% to 60% over a five year period
 - an increase in the proportion of women breastfeeding for at least six weeks from 30% to more than 50% by the year 2005
 - an increase in the proportion of women who breastfeed for at least four months from 20% to 40% by the year 2005
- 2.2 a commitment to an annual survey of local breastfeeding rates for the next 10 years. This would provide useful monitoring information for purchasers who wish to monitor their achievements in promoting breastfeeding. Ideally information on breastfeeding rates at birth, discharge from hospital, six weeks and four months postpartum should be routinely collected and recorded. If this is not possible it would be gathered by requiring provider maternity hospitals to participate in the Scottish Joint Breastfeeding Initiative national breastfeeding survey or through a local audit project.
- 2.3 incorporation in all relevant provider unit and trust contracts the requirement that the International Code on the Marketing of Breastmilk Substitutes should be strictly adopted as a service specification. In particular it should be made quite clear that there should be no advertising or free samples of infant formulae manufacturer products on health service premises.
- 2.4 incorporation in all relevant provider unit/trust contracts the requirement for maternity services to participate in the national "Baby Friendly Initiative". Standardised assessment tools have been produced which evaluate a maternity services performance in relation to World Health Organization standards. Information from this evaluation will give purchasers feedback not only on hospital breastfeeding practices but this broad ranging review covers issues including staff training, responsiveness to clients wishes, and adequate discharge planning and thus will give an indication of the quality of general

maternity services both in absolute terms but also in comparison with similar units throughout the United Kingdom. Participation in this scheme will also encourage appropriate audit of service quality by provider units/trusts.

- 2.5 attention given to ensuring that adequate community support for breastfeeding mothers is considered when moving towards contracting for shorter postnatal stays in hospital. Numerous models for the provision of improved professional support have been described. Lay support for breastfeeding mothers can be provided through the establishment of peer support groups such as those promoted by the La Leche League. Initial evaluation of the latter in Nottingham suggests that these are effective at promoting breastfeeding in the community. Consider targeting these resources to low breastfeeding prevalence areas (see Annex A).
- 2.6 foster and provide essential basic funding for a local "joint breastfeeding initiative", a multidisciplinary forum through which breastfeeding initiatives can be encouraged and evaluated and through which lay women can contribute to local promotion activities.
- 2.7 adoption of breastfeeding promotion as a "core" health promotion topic for the local health promotion department and encouragement for initiatives outwith the health sector in schools, the workplace and in public facilities.
- 2.8 as an employer review current facilities for nursing mothers employed by the health board.

3 Provider level

- 3.1 adopt a service policy which actively supports breastfeeding such as the World Health Organization policy statement "Ten Steps to Successful Breastfeeding" or the "Redbridge" policy statement.
- 3.2 adopt and implement the International Code on the Marketing of Breastmilk Substitutes.
- 3.3 participate in the national "Baby Friendly Initiative" as part of a policy of encouraging audit of maternity services. Designation as a "Baby Friendly Hospital" would be seen as a statement of quality in the services provided in that maternity hospital and is likely to attract more women to use that facility.
- 3.4 participate in the national survey of breastfeeding practices led by the Scottish Joint Breastfeeding Initiative Co-ordinator.
- 3.5 review the breastfeeding sections of in-service training for existing staff and introductory courses for new staff. A number of materials are available to facilitate the process of up-grading staff skills including the "Bloomsbury Pack" currently being used by maternity hospitals in two Health Board areas and the Health Education Board for Scotland is currently developing a resource training pack for those working with breastfeeding mothers.
- 3.6 support the establishment of improved community support for breastfeeding mothers through initiatives involving both professional and lay personnel as part of proper discharge planning and support for breastfeeding mothers.
- 3.7 in the light of the recent evidence for the advantages to pre-term babies associated with breastfeeding, promote a strongly positive view of breastfeeding in special care units and pursue policies which facilitate breastfeeding of pre-term and low birth weight babies.

1 Introduction

Like many other features of our society with a bearing on health, breastfeeding is heavily influenced by cultural considerations. This is particularly so in a society in which women's breasts have been regarded for a number of years as symbols of sexuality. Because of this, the incidence and prevalence of breastfeeding have varied over time in our society as it has changed particularly in the attitudes to women at work and its general attitude to breasts and breastfeeding, and the availability of powdered cows' milk. Similarly the current incidence and prevalence of breastfeeding in other societies in Europe and the developing world are known to differ considerably from ours where their attitudes to women's breasts may be less restricted and where the problems with powdered milk may be more readily obvious. In recent years researchers have shown an increasing interest in the health gain associated with breastfeeding and in the problems arising from bottle feeding and there has been an ideological shift towards the belief that breastfeeding is beneficial. This is reflected nationally in that increasing the incidence and prevalence of breastfeeding is now a target of the health services in England although no similar target has been proposed for Scotland. The purpose of this paper is to document the epidemiology of breastfeeding, review the evidence in its favour, identify proven strategies to promote it, comment on the cost of these strategies and lay out a way forward.

2 Epidemiology of breastfeeding

It is widely believed that the great majority of babies were breastfed in Britain until the 1930s although the move from breast-feeding to artificial feeding has been traced to the 1850s and 1860s or even earlier.¹ By the mid-1960s around a third of women in Britain never breastfed and a further quarter stopped breastfeeding in the first month. In Scotland 49% of infants were never breastfed. The variation in practice in different parts of the country, among women of different education and background, and among women of different ages and parity has been the subject of more recent investigation. Although there is no evidence of a fall in the prevalence of breastfeeding between birth and 9 months of age the prevalence has been lower in Scotland than the rest of Britain since 1980 and at no age has it ever risen above 50% (Table 1).

Table 1
Prevalence of breastfeeding (%) at ages up to nine months, Great Britain, Scotland, 1980, 1985, 1990

	Great Britain			Scotland		
	1980	1985	1990	1980	1985	1990
Birth	65	64	63	50	48	50
1 week	57	55	53	44	41	41
2 weeks	52	51	50	41	38	39
6 weeks	41	38	39	32	29	30
4 months	26	26	25	21	22	20
6 months	22	21	21	18	18	16
9 months	12	11	11	9	9	9

From White et al,² table 2.27

The percentage of breastfeeding among different countries in Europe varies widely, with rates of over 90% in Sweden, Norway and Poland. Scotland is second only to Ireland in its low incidence of breastfeeding.³

In Britain older (Table 2) and better educated (Table 3) mothers have a higher incidence of breastfeeding.

Table 2
Incidence of breastfeeding by mother's age (first births only), Great Britain 1980, 1985, 1990

Mother's age	Initially breastfed (%)		
	1980	1985	1990
< 20	47	42	39
20 - 24	69	65	61
25 - 29	87	81	77
30+	86	86	86
All first babies	74	69	69

From White et al,² table 2.5

Table 3
Incidence of breastfeeding by age at which mother completed full-time education, Great Britain, 1980, 1985, 1990

Age	Initially breastfed (%)		
	1980	1985	1990
16 or under	55	53	50
17 or 18	76	75	71
Over 18	89	89	91
All babies	65	64	63

From White et al,² table 2.4

There is a steady fall in the incidence of breastfeeding with each subsequent baby (Table 4).

Table 4
Incidence of breastfeeding by birth order, Great Britain, 1980, 1985, 1990

	Initially breastfed (%)		
	1980	1985	1990
First birth	74	69	69
Second birth	60	60	59
Third birth	56	57	58
Fourth or later	49	56	52

From White et al,² table 2.2

Information about breastfeeding within Scotland is much more scanty. Table 5 shows the proportion of infants breastfeeding at the end of the first week of life in the four major Scottish cities during 1990.⁴

Table 5
Percentage of all mothers breastfeeding at the end of the first week, Scottish cities, 1990

	Mothers breastfeeding at end of first week (%)
Aberdeen	50
Edinburgh	43
Dundee	38
Glasgow	27

From Working Party Report⁴ table 2.6.1

Information on feeding arrangements on discharge from maternity hospital is collected on form SMR11 and collated for each health board. These data, however, are incomplete for years before 1992 and their quality are unknown. Moreover, they relate to a variable time period after birth and do not include figures for babies admitted to special care baby units. Nevertheless, they do show a relatively low level of breastfeeding throughout Scotland (Table 6).

Table 6

Percentage of all mothers breastfeeding on discharge from maternity unit, Scotland, 1992

	Mothers breastfeeding %
Orkney	63
Shetland	56
Western Isles	55
Borders	53
Highland	53
Grampian	52
Lothian	48
Tayside	47
Dumfries and Galloway	47
Fife	43
Ayrshire and Arran	39
Greater Glasgow	37
Forth Valley	36
Argyll and Clyde	35
Lanarkshire	27
Scotland	42

Data on breastfeeding practices collected around the end of the first week of life at the time of the Guthrie test and collated by the Scottish Neonatal Screening Laboratory reveal considerable variation among different postcode districts within each Health Board and permit the identification of areas of particularly low breastfeeding prevalence (Annex A).

An infant feeding audit led by the Scottish Joint Feeding Initiative Co-ordinator was carried out in 1993 and collected data on a cohort of 3248 women. All 25 maternity units in Scotland participated and reported breastfeeding intentions at booking and breast feeding practices at delivery, transfer from hospital, six weeks and four months post-partum. Table 7 summarises the interim findings.

Table 7

Feeding intentions and practices among over 3000 women in Scotland, 1993

	Breast (%)	Undecided (%)	Formula (%)
Feeding intention at booking	47	17	36
Feeding intention at delivery	51	1	48
	Breast only (%)	Mixed (%)	Formula only (%)
Feeding practices at transfer¹	38	8	54

From Elton RA,⁵ table 2

¹ Note: mean time of transfer was at 3.2 days postpartum

This shows that the majority of women who were undecided at booking had changed their intention to formula feeding by delivery and that a further move from breast to formula took place between delivery and transfer. The report also found that a small proportion of women who definitely intended to use formula feeding at any stage later changed their minds, while nearly one quarter of those who originally intended to breastfeed were using formula by the time they were transferred. Finally, the report drew attention to a marked observed association between breastfeeding rates at birth and a derived index of deprivation based on postcode of residence.

3 Evidence for health benefits to infants associated with breastfeeding

In vitro studies of the anti-infectious properties of breast milk^{6,7,8} and many clinical studies of the effects of breastfeeding against infections, particularly diarrhoeal diseases and respiratory infections, in developing countries have provided convincing evidence that breastfeeding protects against infections in infants.^{9,10} Leading from this it has become increasingly clear that the promotion of breastfeeding in developing countries can make a major contribution to efforts to control common childhood infections^{11,12} and this is reflected in the current priority given to breastfeeding promotion internationally by the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) through the "Baby Friendly Hospital" and other initiatives.

Clinical studies from industrialised countries have produced conflicting results on the protective effects of breastfeeding. The random assignment of breast or formula milk to well infants is unethical and so randomised controlled trials have not been possible. Many of the published observational cohort or case-control studies have not met important methodological standards and reported results are therefore difficult to interpret or are of uncertain scientific validity.¹³ A number of recent studies,¹⁴⁻²⁴ which provide the best evidence for positive health outcomes as a result of breastfeeding, are listed in tables 8 and 9.

Table 8 presents some basic descriptive details about the studies together with details about the observed associations. Individual factors by which the possible causality of these associations may be judged are also presented in table 8. Table 9 considers four important methodological standards^{25,26} by which the validity of the findings of these studies may be assessed. These are avoidance of detection bias, for example because of differential use of health care facilities by mothers of breastfed and non-breastfed infants, adjustment for potential confounding variables, adequate definition of the outcome event and adequate definition of breastfeeding status. Judgements were made in as far as this was possible with the data presented in the published articles. Articles reporting on associations between breastfeeding and subsequent breast and ovarian cancers in the mother are not considered here since published results show no consistent associations and data are difficult to interpret because of the likelihood of substantial recall bias over long periods of time between the period of breastfeeding and the outcome event.

It can be seen from table 9 that methodological flaws exist in many of the investigations although five of the studies^{14,15,16,17,18} were well designed and implemented and have successfully incorporated important design features. In at least three of these studies many of the factors pointing to the observed association being causal were also present.

The Dundee study¹⁴ showing an association between breastfeeding and a decreased incidence of diarrhoeal disease and respiratory infection in babies appears convincing and accords with data from numerous developing country studies and a more limited number of relatively well designed investigations from industrial nations published some years ago. The study showed that babies who were fed for the first 12 weeks of life had substantially reduced rates of gastrointestinal illness which persisted for up to 1 year of age. The rate of gastrointestinal illness in babies breastfed for at least 13 weeks was less than one third that of formula fed babies and resulted in fewer hospital admissions for gastrointestinal illness throughout infancy, and beyond the period of breastfeeding itself. Periods of breastfeeding less than 13 weeks were not found to be protective. Interestingly, the early introduction

Table 8: Details of reported observations between breastfeeding and various health outcomes

	Study description	Study size	Biological plausibility	Strength of association (95% confidence interval)	Independence of association	Consistency of association	Dose response effect	Coherence with related information	Experimental confirmation
1.	Gastro-intestinal (and respiratory infections) (Howie et al 1989)	Cohort prospective 674	Yes	OR ⁴ 0.16 (0.4-0.7) gastrointestinal illness 0.44 ⁴ (0.1-1.3) respiratory illness	Yes ¹	Yes with developing country studies	Yes ⁶	Yes	No
2.	Respiratory infections (Victoria et al 1989)	Prospective case/control -community based 254 controls	yes	OR ³ 3.6 (2-8)	Yes ¹	Yes	No	Yes	No
3.	Otitis media (Duncan et al 1993)	Prospective cohort 1013	?Yes	OR ³ 0.6 (0.4-0.9) ⁹ 0.4 (0.2-0.7) ⁶	Yes	?	Yes	Yes	No
4.	Necrotising Enterocolitis (Lucas 1990a)	RCT* multicentre 926	Yes	OR ³ 10.6 (3-7)	Yes ²	Yes	Yes	?	Yes
5.	Eczema (Lucas et al 1990b)	RCT* multicentre 777	Yes	3.6 (1.2-11)	Yes ²	?	No	No	Yes
6.	Increased intelligence (Lucas et al 1992)	RCT* multicentre 300	?Yes	Not quoted ⁸	Yes ²		Yes	Yes ⁷	No
7.	Whozeze (Burr et al 1989)	RCT 483	Yes	OR ⁴ 0.5 (0.3-0.9)	Yes ²	No	No	?	No
8.	SIDS (Mitchell et al 1991)	Retrospective case control 162 cases 589 controls	?	OR ¹ 2.5 (1.3-4.6)	Yes	No	No	?	No
9.	Enhanced Immunity (Pabst & Spady 1990)	Cohort prospective 128	?Yes	Not quoted ⁹	No	?	No	?	No
10.	Meningitis (Hib) (Peterson et al 1991)								
11.	Diabetes (IDDM) (Mayer et al 1988, Karjalainen 1992)	Retrospective case control 268 cases 497 controls	?Yes	OR ⁴ 0.7 (0.5-1.0)	Partial	No	?Yes	?	No
12.	Urinary tract infections (Pischnane et al 1992)	Retrospective case control 128 cases 128 controls	?Yes	OR ³ 0.18 (0.09-0.36)	No	-	No	-	No

NOTE: * Randomised control trial (all on same study population of babies with birthweight less than 1850g)

1 Adjustment for confounding factors in analysis

2 Randomised trial

3 Odds ratio: bottle versus breast milk

4 Odds ratio: breast versus bottle milk

5 Those with family history of atopy only

6 Dose response effect not consistently stepwise

7 Similar result at 18 months and 8 years of age

8 IQ difference statistically highly significant (p<0.0001)

9 Antibody level difference statistically significant (p<0.04)

Table 9: Methodological standards in studies reviewed

	Detection bias minimised	Control of confounders	Adequate definition of breast/feeding	Adequate outcome definition
1. Howie 1990	Yes	Yes	Yes	Yes
2. Victora 1989	Yes	Yes	Partial	Yes
3. Duncan 1993	Yes	Yes	Yes	No
4. Lucas 1990a	Yes	Yes	Partial	Yes
5. Lucas 1990b	Yes	Yes	Partial	Partial
6. Lucas 1992	Yes	Yes	Partial	Yes
7. Burr 1989	Yes	Yes	Partial	Partial
8. Mitchell 1991	No, recall bias	Yes	Partial	Yes
9. Pabst 1990	Yes	No	Partial	Yes
10. Petersen 1991				
11. Mayer 1988	No, recall bias (18 years)	Partial	No	Yes
12. Piscanne 1992	No	No	Partial	Yes

of supplements did not reduce the protective effect, suggesting that some positive factor in breastmilk reduced the incidence of illness.

Evidence for an association between breastfeeding in low birth weight (under 1850 grams) infants and a reduced incidence of necrotising enterocolitis (NEC) is also strong with NEC rates in preterm formula fed infants being some six times higher than in breastfed infants. Recent studies reporting a strong observed association between breastfeeding of low birth weight infants and enhanced neurodevelopment, measured as increased intelligence scores on the Wechsler scale for children, at ages 18 months and 8 years would appear to be methodologically sound and there is some corroborative evidence from a case control study in Australia.²⁷ Although this association has as yet been found in only one study population, it is biologically plausible since certain long chain polyunsaturated fatty acids thought to be essential for neurodevelopment are lacking in formula feeds. It will be important to investigate this in further study populations.

Evidence for an association between breastfeeding and a reduced incidence of sudden infant death syndrome (SIDS)²⁰ is of interest but has been challenged on the grounds that the observed effect may be confounded by maternal smoking and socio-economic status. This requires further elucidation by analysis of existing datasets and further study.

Recent published studies^{17,19} considering the association between breastfeeding and atopy report reduced incidence of wheeze (in infants with a family history of atopy) and eczema but the observed associations are not strong and detailed findings of these studies conflict with other reports.¹⁴

In conclusion, there are still relatively sparse published data on the observed associations between breastfeeding and health outcomes in infants. Interpretation of these studies must still be guarded since adjustment for known confounding factors cannot control for, as yet unrecognised, demographic confounders or differences in parenting associated with breastfeeding. Nevertheless there is strong evidence that breastfeeding results in decreased gastrointestinal, and to a lesser extent respiratory illness, in the first year of life. Health professionals should therefore give clear advice to parents that breastfeeding for three months will reduce the chance of their baby developing gastrointestinal or respiratory illness. In addition, there is strong evidence for the health benefits of breastfeeding in low birth weight babies. Current evidence suggests that breastfeeding reduces NEC and infection²⁸ and may enhance development outcome of low birth weight babies. This has resulted in a revival of interest in its use in this high risk group.²⁹ Studies linking lack of breastfeeding to SIDS require further critical analysis with respect to the effect of possible confounding factors.

The data suggest that breastfeeding should be maintained for at least 13 weeks for full benefit and that early supplementation may not reduce the observed health benefits associated with breastfeeding.

4 Promotion of breastfeeding

Numerous studies have shown that most women have already decided whether or not to breastfeed by early in their pregnancy and that the great majority of these women do not change from this chosen course of action.^{5,30} In Scotland, as already noted in table 1, only 50% of women start breastfeeding at birth and of those who start at that time 40% have stopped breastfeeding within six weeks.

The promotion of breastfeeding can be considered the cumulative effect of a number of activities from several different disciplines. Two broad aims are the promotion of breastfeeding within the general population, and the promotion of breastfeeding for at least three months by provision of support and encouragement to women who choose to breastfeed. The first also addresses the issue of women attending antenatal classes who have already decided to bottle feed their baby. Evidence suggests that there is little to be gained by targeting these women at this stage for breastfeeding promotion.

Rather these women need to be influenced at an earlier stage by a wider approach seeking to inform and influence their cultural group. The second recognises, as stated above, that opportunities to change the mother's preferred choice of infant feeding are limited after the antenatal period. However there is considerable scope to influence the subsequent duration of successful breastfeeding. Related to this is the proposal that women who do indicate a desire to breastfeed should be given strong encouragement to do so, should not be discouraged by inappropriate ward routines and should have access to adequate post-natal support at home.

Factors such as lower maternal confidence in ability to breastfeed and less certainty in the decision to breastfeed have been shown to be predictive of failure to breastfeed for more than seven days.³¹ Together with the minority of women who are undecided on feeding method during the antenatal period they can be considered a target group for additional advice and counselling.

Published evidence for the effectiveness of interventions which seek to promote successful breastfeeding is scanty. Moreover, the quality of many of the studies, and in particular the intervention studies, is generally poor. Common problems include the assignment to study groups in non-random ways, inadequate sample sizes to permit sufficient power to detect clinically meaningful differences and analyses which do not take into account known confounding factors.

4.1 Promotion of breastfeeding within the general population

4.1.1 Health promotion strategies

Published evidence for effective strategies within the United Kingdom to promote breastfeeding in the general population is weak. Indeed the whole area of research in breastfeeding is characterised by narrowly based studies with lack of common definitions which are poorly designed.³² Randomised controlled trials are virtually impossible to carry out in this area and intervention studies limited. Much of the literature comprises descriptive studies and surveys of knowledge, attitudes and practices.

Surveys have demonstrated both in England and Scotland that teenagers regard breastfeeding as natural, normal and healthy.^{33,34} Only around 12% to 15% found breastfeeding to be embarrassing. The vast majority of the Scottish 16-year-olds had seen a baby being breastfed and most regarded breastfeeding as the best way to feed a newborn baby.

As already noted there is some evidence that, although the antenatal period may appear to be an ideal time to influence potential mothers on breastfeeding, about 80% of mothers have already made up their minds about method of infant feeding before the booking visit.^{5,30} Moreover, attendance at antenatal classes, at which infant feeding education might be considered most effectively delivered, has been found to be only about 30%.³⁵ Targeting antenatal women for breastfeeding promotion is likely to have only a limited impact. Rather women need to be influenced at an earlier stage by a wider approach seeking to inform and influence their cultural group.

Tables 10 and 11 give the results of national studies of post-partum women which have examined their reasons for planning to breastfeed or bottle feed.²

Table 10

Mother's reasons for planning to breast-feed, Great Britain, 1980, 1985, 1990

Mother's reasons	All babies (%)		
	1980	1985	1990
Breast feeding is best for the baby	80	78	82
Breast feeding is more convenient	40	33	36
Closer bond between mother and baby	22	21	23
Breast feeding is cheaper	22	16	17
Mother's own experience	15	15	15
Breast feeding is natural	23	17	14
Breast feeding is best for mother	8	6	8
Cannot overfeed by breast	2	0	1
Influenced by medical personnel	2	2	2
Influenced by friends or relatives	2	2	1
No particular reason	2	2	1
Other reasons	2	3	0

From White et al,² table 3.3

Table 11

Mother's reasons for planning to bottle feed, Great Britain, 1980, 1985, 1990

Mother's reasons	All babies (%)		
	1980	1985	1990
Other people can feed baby with bottle	38	38	39
Mother's own previous experience	34	31	26
Did not like idea of breast feeding	23	23	21
Would be embarrassed to breastfeed	11	6	7
You can see how much the baby has had	10	6	6
Medical reasons for not breastfeeding	4	4	3
Expecting to return to work soon	3	4	5
Persuaded by other people	2	1	1
No particular reason	6	4	3
Other reasons	5	6	6

From White et al,² table 3.4

These findings have largely been confirmed by cohort studies.³⁶ Factors which influence the choice of infant feeding method have been found to fall within four categories - beliefs about breastfeeding, demographic factors, social relationships and the influence of health professionals. On the basis of these it has proved possible to develop and validate instruments to predict infant feeding orientation.^{37,38} Other studies have emphasised the importance of social support in determining feeding practice, and in particular the role of the partner in this.^{39,40}

There is a paucity of research which has identified specific barriers to breastfeeding and implemented intervention studies to address these. Nevertheless a European strategy for breastfeeding promotion has been devised.³ It identifies a number of factors at national and local level, based on Scandinavian experience, which can contribute to an increase in breastfeeding, including an increased availability of practical information on how to deal with breastfeeding problems, mother-to-mother support, adequate maternity leave, changed maternity ward practices, low profile infant formulae marketing, a supportive feminist movement and healthy attitudes about the female body.

Several small campaigns have been carried out in different parts of Canada to promote breastfeeding but these have produced mixed results. An advertising campaign involving the use of television and newspapers was evaluated by testing the attitudes of teenage girls to breastfeeding. Television appeared to have some effect but the outcome as measured by changes in breastfeeding practice was not reported.⁴¹ A professional and public education exercise in the late 1970s in Manitoba produced no discernible effect, with 57% of mothers breastfeeding before the campaign and 56% afterwards.⁴² The authors of the latter paper concluded that future programmes to promote breastfeeding should be longer and more intensive but presented no evidence in support of this strategy. A small study among Chinese women in Montreal in the late 1970s which involved a culturally targeted programme and which included individual prenatal counselling and a community-wide promotion and education campaign appeared to produce a short term benefit. Among the counselled group 59% breastfed at birth compared to only 43% in the uncounselled mothers. Regrettably this improvement was not maintained at one month or beyond.⁴³

4.1.2 Government legislation

With increasing entry of women into the workforce the promotion of breastfeeding often conflicts with the practical imperatives faced by many young mothers. The United Kingdom currently has the shortest period of maternity leave in Europe. Legislation which improves both maternity leave and allowances and revises the milk token scheme together with work legislation which promotes more flexible working hours for mothers and better creche and nursery facilities in the workplace is very likely to have a major influence on breastfeeding rates in Scotland.

Experience from Scandinavian countries in the 1970s and 1980s suggests that improvements in breastfeeding practices were the result, at least in part, of changes in government legislation which gave greater support to breastfeeding mothers.³ Important areas of legislation included adoption of the international code of practice of advertising by baby milk manufacturers, maternity leave and allowances and legislation related to support for women in the workplace. Unfortunately, there are no published studies which have specifically evaluated the impact of these changes in legislation for national breastfeeding practices. Anecdotal evidence, particularly from developing countries supports the contention that formula feed advertising decreases the incidence and prevalence of breastfeeding and has been the driving force behind the international code of practice on advertising by baby milk manufacturers. This situation seems to mirror that of tobacco advertising and smoking.

4.2 Promotion of breastfeeding for at least three months by provision of support and encouragement to women who choose to breastfeed

The European strategy for breastfeeding promotion has identified five intervention areas related to the basic knowledge, attitude and skills of health staff, maternity ward routines, formation of breastfeeding mothers support groups, support for employed mothers who want to breastfeed, and commercial pressure on health workers and mothers.^{3,44} Published evidence for factors associated with breastfeeding success and for the effectiveness of interventions to increase the proportion of women who breastfeed for at least three months can be reviewed within one of these categories.

4.2.1 The knowledge, attitudes and skills of health staff

Health staff providing breastfeeding advice to mothers include hospital and community midwives, health visitors and general practitioners. There are numerous reports of conflicting feeding advice being given by various professionals and it is likely that the resulting confusion undermines the confidence of the mother in her ability to breastfeed.^{45,46} Given the reported variation in breastfeeding knowledge and practice it is not surprising that breastfeeding mothers' most frequent complaint has been noted to be conflicting advice.⁴⁷ Levels of knowledge show a marked decrease with years since training, highlighting the need for in-service training on recent advances in breastfeeding.

Midwives have been found to use outdated information in teaching mothers about breastfeeding⁴⁸, are confused about drug contra-indications for breastfeeding, lack knowledge about breastfeeding management and underestimate mothers' interest in breastfeeding.⁴⁹ These practices have been linked to prevention of successful breastfeeding. It is of concern that postgraduate training and refresher courses in breastfeeding management are not widely attended and that much postgraduate information received on this issue by midwives may be provided by manufacturers of infant formulae.⁵⁰ Certification for midwives in breastfeeding management has been proposed⁵¹ although midwifery training is currently regulated by the United Kingdom Central Council (UKCC) and once a midwife is on the register she has to maintain her skills and knowledge to remain on it.

A number of studies have shown that paediatric and obstetric medical staff do not have either adequate educational or practical experience to prepare them to be able to give information and advice on breastfeeding to expectant mothers.⁵² It has been recommended that postgraduate education for paediatricians should provide comprehensive education on breastfeeding but the impact of this has not been studied.

Many clinical practices such as restricting breastfeeding time in an attempt to minimise nipple tenderness, promoting three to five hourly feeding to be more convenient to staff,⁵³ and placing babies in night nurseries resulting in them being bottle fed overnight are inconsistent with current research evidence. In addition nursing attitudes towards breastfeeding have been found to be ambivalent rather than positive with midwives' concern about inducing guilt in bottle feeding mothers overriding their desire to promote breastfeeding positively.⁵⁴

Several studies have suggested that the employment of lactation consultants positively influences breastfeeding duration.^{55,56,57} It seems likely that this occurs through an effect on increasing midwives' knowledge of breastfeeding together with their involvement in helping to direct and support changes in practice.

The level of information on breastfeeding in pregnant women has been found to be positively related to success in breastfeeding and improving women's information support by providing access to health staff may increase the proportion of women who are satisfied with their breastfeeding experience.^{58,59}

Table 12 presents a summary of published data supporting the importance of maternity staff knowledge, attitude and skills on breastfeeding prevalence.

4.2.2 Maternity ward routines

The effect of certain hospital practices on breastfeeding behaviour is well documented and widely accepted.^{54,60-64} There is evidence that the non-verbal modelling provided by routine hospital practices has more influence on breastfeeding outcome than what is actually said to mothers.⁶⁵ Many of the criticisms of the level of support and encouragement for breastfeeding within a hospital environment may be attributed to the fact that childbirth is not an illness and does not fit comfortably into a medical framework of diagnosis and treatment, or into the confines of a standard hospital timetable and ward regime. Breastfeeding mothers require a sensitive and supportive environment which is flexible enough to allow feeding to happen when the mother and baby want it and which helps mothers to take responsibility and decisions so that the transition from hospital to home is not an abrupt one.⁶⁶

A recent study in Newcastle⁶⁰ highlighted the fact that hospital practices maybe at considerable variance from stated policies on breastfeeding. It found that 60% of mothers were separated from their babies on the first night and that 56% of breastfed babies were given water or food other than breast milk. The current WHO/UNICEF global "baby friendly hospital" seeks to evaluate hospital practices against the WHO 10 point code of practice which has been widely adopted. Dissemination of the initiative within Scotland would promote the objective evaluation of hospital practices and draw attention to deficiencies in current practices. It is important that any process of change in policies and practice be planned and managed properly and a number of individual initiatives in this area have been published.^{54,67} It has been found that an educational programme alone without subsequent reinforcement may have little impact in reducing incorrect practices.⁶⁸

Breastfeeding frequency has been found to be significantly higher in babies rooming-in than in those not rooming-in and weight increase per day significantly greater.⁶⁹

Table 13 presents a summary of published data supporting the importance of maternity ward routines on breastfeeding prevalence.

4.2.3 Formation of breastfeeding mothers' support groups

Concern about having an inadequate milk supply and problems with sore nipples are common in the early post partum period.⁷⁰ It is known that health staff practices (such as frequent weighing of the baby) may undermine the confidence of mothers and that sore nipples may be due to wrong feeding position which can be corrected. These suggest that appropriate health staff input would be beneficial.

Providing timely advice and support to breastfeeding mothers is generally regarded to be essential for successful breastfeeding. With the promotion of DOMINO and other schemes designed to reduce the mean period of maternity hospital stay the establishment of community support for breastfeeding mothers becomes particularly important. Poor community support has been shown to be associated with the early introduction of formula feeding⁷¹ and so it is reasonable to

Table 12: Summary of published evidence for importance of maternity staff knowledge, attitudes and skills on breastfeeding prevalence

Factors with observed association with positive breastfeeding outcome		Evidence for effectiveness of intervention on breastfeeding				
	Ref	Study description	Size	Intervention	Result	Ref
consistent advice and support	55,56	randomised trial	649	employment of lactation nurse	84% breastfed at 4 weeks compared to 72% in control group	55
staff have positive attitude to breastfeeding	88	before and after comparison	435	staff seminar, complementary fluids stopped	40% breastfed at time of discharge compared to 27% in control group	88
ability to correct mothers sucking technique	90	randomised trial	82	poor technique of mothers corrected	introduction of bottle feeding 3-10 times less likely in the first 1-3 months	90

Table 13: Summary of published evidence for importance of maternity ward routines on breastfeeding prevalence

Factors with observed association with breastfeeding duration		Evidence for effectiveness of intervention on breastfeeding ¹					
	Ref	Study description	Size	Intervention	Result	Ref	
a) baby put to breast immediately after birth	87	Controlled trial	72	Uninterrupted dose contact for at least 1 hour	24/38 showed correct sucking technique compared to 7/34 in the control group	87	
b) baby not normally offered complementary feeds or water	71, 86	Before and after comparison	407		Mean length of breastfeeding increased from 6.9 to 8 months and of exclusive breastfeeding from 3.5 to 4.5 months	71	
	88	Before and after comparison	435	staff seminar, complementary feeds stopped	40% breastfed at time of discharge compared to 27% in control group	88	
c) "rooming in" (baby kept in same room as mother)	69						
d) no advertising or promotion of infant formula in hospital premises	57						
e) pethidine sedation of mothers restricted	87						
f) promotion of "breastfeeding on demand" policy	89						
g) proportion of assisted deliveries reduced ²	54, 84, 85						

¹ evidence that promoting good practice (section a) - g)) improves breastfeeding rates

² evidence of association with breastfeeding duration is conflicting

extrapolate from this that the provision of support and advice at home to breastfeeding mothers would promote an increased proportion of mothers to breastfeed for at least 3 months.

The exact nature of the support required has not yet been closely defined and the relative importance of professional and lay support to mothers has not yet been established. Increasing women's access to support from health staff over this period has been shown to increase their satisfaction with the experience of breastfeeding,⁵⁸ and organised programmes offering prenatal education and postnatal intervention by health staff have been proposed but not yet adequately evaluated. One small randomised trial of 97 women in USA found that intensive post partum education and support for breastfeeding women provided by midwives did not significantly influence breastfeeding duration.⁷² Conversely another intervention study of 146 Turkish mothers which evaluated the impact of continuing support to mothers delivered through six postnatal visits to health staff reported a striking increase in the frequency of exclusive breastfeeding in the group receiving their support.⁷³ The extension of support to women beyond the confines of the maternity hospital has been advocated including involvement of primary care staff⁷⁴ and support by other women.⁷⁵

A peer counsellor programme undertaken in Nottingham by the La Leche League involved training mothers who had successfully breastfed to support other mothers. The results of the evaluation of this programme have not been published. A modest improvement in breastfeeding duration was recorded in the intervention group (Sarah Gill, personal communication) but the study sample size was too small for definitive conclusions to be drawn.

4.2.4 Support for employed mothers who want to breastfeed

It has been found that mothers who breastfeed are more likely to want to return to paid employment, although this observation is likely to be confounded by age and social class of the mother. In addition, many of these mothers wish to continue to breastfeed during their period of employment.^{76,77} However, breastfeeding mothers who return to work have been found to breastfeed for shorter durations than those who do not work outside of the home.⁷⁸ Within employment subcategories women vary widely in breastfeeding duration.⁷⁹ Women returning to professional occupations have been found to have a longer duration of breastfeeding than women returning to technical positions (after adjusting for known confounders).⁷⁷ Reasons for this variation have been suggested to be a composite of work-related and maternal variables together with the policy of employers towards maternity leave and support.⁷⁹

Employment for no more than 20 hours per week⁷⁸ and delaying return to work until two months post partum⁸⁰ have been found to be protective for continued breastfeeding.

A prospective community-based study in Denmark followed 500 babies over the first year of life and considered breastfeeding in a survival analysis model. It showed a greater than two-fold increase in the rate of discontinuation of breastfeeding in babies who attended day-care.⁸¹

The available evidence suggests that until employers develop maternity policies which do not discourage breastfeeding it will be difficult for most employed women to maintain successful breastfeeding over the first three months of life. However, no intervention studies have been identified which have shown that such policy changes result in improved breastfeeding durations or more satisfying breastfeeding experiences for mothers.

4.2.5 Commercial pressure on health workers and mothers

The WHO code on marketing of breast milk substitutes states⁸² that mothers should not be given literature which contains advertising nor should they be given free samples of formula milk before discharge from hospital. Although endorsed by most industrialised country governments this code of practice is not universally implemented.⁸³

One randomised controlled trial in the United States found that special counselling of breastfeeding mothers had a less prolonged effect on the maintenance of breastfeeding than did replacing commercial discharge packs with packs consistent with the WHO code.⁶³

A recent survey of rural maternity units in Ireland found that manufacturers of infant formula were the main source of continuing education information on infant feeding to midwives.⁵⁰

It is of concern that Baby Milk Action continue to draw attention to the continuing prominent advertising by these manufacturers in the United Kingdom and the great disparity between the government's advertising budget of about £50 000 annual in support of breastfeeding compared to the £12 000 000 spent by manufacturers of infant formulae. It is particularly deplorable that such advertising continues to exist in health service premises in Scotland. This is in contravention of the international code on the marketing of breast milk substitutes which states that:

- there should be no advertising or other form of promotion to the public of these products
- no facility of a health care system should be used for the purpose of promoting these products including a ban on the "display of products, posters; distribution of materials provided by a manufacturer or distributor which refers to a proprietary product"
- manufacturers and distributors should not provide, directly or indirectly, to pregnant women, mothers or members of their families, samples of these products. Health workers should not give samples.

4.2.6 Summary of strategies to promote breastfeeding by provision of support to women who choose to breastfeed

There is good evidence for the association between certain factors including unrestricted mother-baby contact after delivery, demand feeding, rooming-in, no supplementation unless for clear medical indication, no advertising of formula feeding and improved breastfeeding outcomes. There is less secure evidence for the effectiveness of interventions seeking to change the frequency of these factors on mean breastfeeding duration. Nevertheless it seems likely that breastfeeding will be successfully supported if:

a) antenatally,

- women are presented with the full facts about breastfeeding in an imaginative format by staff who are persuaded of and able to communicate its advantages whilst at the same time including a frank discussion of the potential difficulties in breastfeeding
- women who have decided to breastfeed are enthusiastically encouraged to do so and provided with appropriate information and advice to prepare them to breastfeed successfully
- women who are undecided on feeding method or have decided to breastfeed for the first time are targeted for additional advice and counselling by professional or lay staff and are encouraged to attend antenatal or parentcraft classes so that this decision can be further discussed and appropriate support offered

b) during maternity stay,

- the hospital environment and staff practices are fully supportive of and sufficiently flexible to accommodate mothers who want to breastfeed
- staff are competent in the practical management of breastfeeding
- there is no advertising or free distribution of formula milks
- hospitals adopt the WHO 10 point code of practice and audit practices against this policy, for example through the "baby friendly hospital" programme

c) postnatally,

- breastfeeding mothers receive special support to enable them to overcome problems
- community staff adopt practices which promote the confidence of breastfeeding mothers and are able to effectively manage common breastfeeding problems
- breastfeeding mothers have easy access to culturally appropriate breastfeeding mothers support groups

An important sub-group of women who should be considered separately in relation to breastfeeding promotion are those with known HIV infection. Human Immunodeficiency Virus type 1 (HIV-1) has been detected in breast milk by both culture and polymerase chain reaction. The risk of transmission through breastfeeding over and above transmission in utero or during delivery has been estimated at 14% [95% CI 7-22%].⁹² In 1985, the Centers for Disease Control recommended that HIV-infected women be advised against breastfeeding⁹³ and this recommendation has been adopted widely by other industrialised countries.

5 Economic appraisal of the impact of breastfeeding

It is extremely difficult, if not impossible, to estimate the detailed costs associated with specific breastfeeding interventions. These include the direct costs, including opportunity staff costs and the costs of support materials, and indirect costs, including the training of staff in breastfeeding, the cost of disseminating information and materials, and the cost of support services, including those associated with recording and monitoring the incidence and prevalence of breastfeeding. Most staff involvement in this area is incidental to their work in other areas and the proportion of their time spent on promoting breastfeeding is variable, generally extremely small within the overall context of their working week, and not easy to quantify. Moreover, ceasing activity in this area is unlikely to release time which could usefully be redirected. It is, therefore, inappropriate to form estimates of cost based on converting professional time currently directed towards breastfeeding to whole time equivalents.

5.1 Potential cost savings associated with improving breastfeeding practices

The well designed and executed prospective cohort study of the relation between breastfeeding and infant illness in Dundee¹⁴ provide good quality data from Scotland. It contains sufficient detail to permit the calculation of potential savings which might accrue from improved breastfeeding practices in Scotland.

This section is limited to a consideration of gastrointestinal illness only since its treatment incurs substantial costs to the Scottish health service and the evidence for a causal association between lack of breastfeeding and gastrointestinal illness is particularly strong. It should be noted therefore that the estimated savings are conservative since neither the treatment of other conditions nor potential savings in primary care associated with gastrointestinal infections in infancy been considered due to lack of good quality information.

Table 14 gives the number of discharges by health board in 1992 for gastrointestinal illness in the first year of life together with mean lengths of stay in hospital. Data from the most recent edition of "Scottish Health Service Costs" quote the mean daily direct in-patient care costs for paediatric services in Scotland.

Data taken from tables II, III and VI of the Dundee study¹⁴ present the rates of illness and hospitalisation for gastrointestinal illness for each of three groups of infants: those breastfed for at least three months, those breastfed for less than three months, and those never breastfed.

Table 1 (page 2) presents the prevalence of breastfeeding in Scotland in 1990 at birth and at a number of points throughout the first year of life. According to the categories above this shows approximately that 20% breastfeed for at least three months, 30% breastfeed for less than three months and 50% never breastfeed. It is possible therefore to combine these data with the published rates of illness and hospitalisation and then relate these to the observed discharge statistics. Projections can then be made for each individual health board on the reductions in in-patient bed days and hence direct patient costs that will result in each of three scenarios (based on improvements in breastfeeding practices which are considered achievable):

Table 14

In-patient discharges in infants for gastrointestinal infections: costs in 1992 and projected potential savings in hospital costs if breastfeeding rates improved as specified in three options

Health Board	1992 Discharges*	Total bed days	Direct patient costs	Potential Savings** Scenario A	Potential Savings** Scenario B	Potential Savings** Scenario C
Argyll & Clyde	27	78	£11 600	£2800	£700	£4300
Ayrshire & Arran	83	241	£35 700	£8600	£2100	£13 200
Borders	26	78	£11 500	£2800	£700	£4300
Dumfries & Galloway	10	30	£4400	£1100	£300	£1700
Fife	93	632	£93 500	£22 400	£5600	£34 600
Forth Valley	28	118	£17 500	£4200	£1100	£6500
Grampian	180	738	£109 200	£26 200	£6600	£40 400
Greater Glasgow	314	1382	£204 500	£49 100	£12 300	£75 700
Highland	32	64	£9500	£2300	£600	£3500
Lanarkshire	147	632	£93 500	£22 400	£5600	£34 600
Lothian	188	714	£105 700	£25 400	£6400	£39 100
Orkney	4	14	£2100	£500	£100	£800
Shetland	1	3	£400	£100	-	£200
Tayside	119	416	£61 600	£14 800	£3700	£22 800
Western Isles						
Scotland	1252	5133	£759 700	£182 300	£45 600	£281 100

* Data from Information and Statistics Division

** See text for details

- Scenario A** if breastfeeding rate at birth were to remain static at 50% but the percentage of women continuing to breastfeed at three months increased from 20% to 40%.
- Scenario B** if the breastfeeding rate at birth increase from 50% to 65% but the proportion of these women continuing to breastfeed for at least three months remained unchanged.
- Scenario C** if the breastfeeding rate at birth increase from 50% to 65% and the proportion of these women continuing to breastfeed for at least three months doubled from 20% to 40%.

Experience from Scandinavia in the 1970s and 1980s has shown that these magnitudes of change are achievable.

Table 14 presents for each health board and for Scotland as a whole the numbers of bed days and associated direct patient costs for gastrointestinal illness in infants in 1992, the projected numbers of bed days and associated costs if the breastfeeding rates in the three options above were to be achieved. This tables assumes that there are no cost differences in achieving each of the three scenarios since their achievement reflects differing levels of success in delivering effective education and support to mothers rather than the application of more resources.

A similar analysis performed by Mary Broadfoot (personal communication, unpublished) has projected the in-patient costs associated with gastrointestinal illness in infants. These projections are based once again on data presented in the Dundee study¹⁴ and on the observed rates of hospital admission from gastrointestinal illness of 7.8% among infants bottle fed or breastfed for less than three months, and 1.4% among infants breastfed for at least three months. Average costs of an admission were taken to be £1190.

This analysis projects the rate of hospital admission which was found in the Dundee study to the national population and so is somewhat less accurate than the estimates given in table 14. The projections consider the proportion of admissions in infants from gastrointestinal illness which could be attributable to lack of breastfeeding for at least three months. Dr Broadfoot estimates on this basis that there is the potential for a national saving of £44 823 for every percentage point increase in the prevalence rate of breastfeeding at three months postpartum from a current baseline of approximately 22%.

Table 15 represents these estimates in an alternative format to allow individual health boards to consider the potential impact in their own area. The table presents the projected in-patient costs from gastrointestinal illness in infants which can be attributed to lack of breastfeeding for various prevalence rates of breastfeeding. For example a health board with 4 000 births annually and a prevalence rate of breastfeeding for at least three months of 20% would have costs of approximately £240 000 attributable to lack of breastfeeding. An increase of the breastfeeding prevalence rate at three months from 20% to 40% would result in a reduction in costs of approximately £60 000.

Table 15

Estimated national costs of hospital admissions for gastrointestinal illness in infants by proportion of women breastfeeding for at least three months

Breastfeeding rate at 3 months	Cost per 1000 births
5%	£71 221
10%	£67 473
15%	£63 724
20%	£59 976
25%	£56 227
30%	£52 479
35%	£48 730
40%	£44 982
45%	£41 233
50%	£37 485

Based on analysis by M Broadfoot of data presented in reference 14 (personal communication, unpublished)

Clearly there are dangers in making projections such as these in this way. First the data are taken from a single study and assume that the findings in Dundee can legitimately be extrapolated throughout Scotland. Nevertheless this study was well designed and executed and represents the best available Scottish data on this subject. Secondly, the study involved taking a sample of children which was believed to be representative of Tayside children. The above calculations have not considered sampling variability and have not quoted confidence intervals for the estimates presented. However, sampling error cannot account for the cost savings which have been projected. Nevertheless an analysis of the data based on the lowest cost estimate (2.5% confidence interval) for hospital costs in babies bottle fed or breastfed for less than three months and on the highest cost estimate (97.5% confidence interval) for babies breastfed for at least three months still suggest very substantial costs attributable to lack of breastfeeding at a national level.

Nevertheless they serve to highlight the fact that breastfeeding promotion can be strongly supported on economic as well as medical arguments and these figures should be considered when the level of resources at national and health board levels which are given to breastfeeding promotion activities are decided.

Once again it should be stressed that these estimates should be considered to be conservative in that they do not consider possible savings from reduction in hospital admissions from other conditions such as lower respiratory illness and serious infections in premature babies. Neither do these estimates consider primary care costs for babies whose gastrointestinal illness was not sufficiently severe to warrant hospital admission, the costs to the nation in days off work to care for children during these illness episodes not the financial costs and emotional toll on the family of a sick baby.

A study of primary care costs associated with acute diarrhoeal episodes in American children under the age of three years showed that only 60% of medical costs and 37% of total costs, including cost to family of days off work, travel and nappies, were due to hospital costs. This study presents a detailed breakdown of how costs were calculated.⁹¹ The largest difference from costs in Scotland was in the much higher hospitalisation costs (£750 a day compared to £160 a day) and so extrapolation of these data to Scotland is likely to underestimate non-hospital costs. Nevertheless if these proportionate costs were to apply to diarrhoeal episodes in Scottish infants the total medical costs in Scotland would be £1 266 000 and the total medical and family costs would be £2 053 000.

6 Conclusions

6.1 Breastfeeding rates in Scotland

Breastfeeding rates in Scotland are the second lowest in Europe. This is of particular concern as there is good evidence that improved breastfeeding practices would both improve the health of Scottish infants and could potentially result in savings to the Scottish health service. The experience from Scandinavia in the 1970s and 1980s showed that the proportion of women breastfeeding at three months increased from 30% to 60%. Thus dramatic increases in breastfeeding rates are achievable through combined government and health service action over a relatively short time period.

Contrary to the situation in England and Wales, the Scottish health service has not chosen breastfeeding as one of its national targets. However, there are many aspects of breastfeeding which make it an attractive candidate as a local target. It is readily measurable, there is good evidence of health gain associated with improved breastfeeding rates, there is some evidence to show that interventions are effective in improving breastfeeding rates at a local and national level; and it is easily understood by the public.

6.2 The evidence for health gain

The national and international medical community strongly advocates breastfeeding for the first three to six months of an infant's life. There is good evidence that breastfeeding results in health gain and in particular reduces the incidence and severity of gastrointestinal and lower respiratory illness in the first year of life and reduces the incidence of serious infections in preterm babies. The observed associations between breastfeeding and improved neuro-development of preterm babies and reduced mortality from sudden infant death syndrome may also prove to be important but require further investigation.

It seems likely that the potential for health gain by improving breastfeeding practices will be greatest in the most disadvantaged communities, or at risk groups such as premature or low birth weight babies, just as the evidence for the benefits of breastfeeding is stronger in developing than industrialised countries.

Even relatively modest improvements in breastfeeding practices could potentially result in financial savings, principally through reductions in hospital admissions in infants for gastrointestinal infections. The estimates presented in this report do not consider any potential savings resulting from likely impact on other conditions and so can be considered as conservative.

6.3 Maternity hospital practices

It is of concern that there are numerous published studies showing that maternity hospital practices are not consistent with World Health Organisation recommendations and are not fully supportive of breastfeeding. An illustrative example of this is the fact that 1990 OPCS survey found that 45% of breastfed babies were given a formula feed while under medical supervision in hospital. In the majority of cases there could have been no medical justification for this practice which has clearly been shown to compromise breastfeeding success. There is sufficient evidence available to suggest that bringing routine hospital practices in line with World Health Organisation/UNICEF policy would result in improved breastfeeding rates in Scotland. Indeed this is the aim of the national "Baby Friendly Initiative" which is supported by all the relevant national professional associations.

The most recent changes in the structure of the National Health Service provide an opportunity to consider this as an essential "quality" indicator which should be specifically detailed by purchasers in contracts with maternity hospitals. Tools are available to monitor the degree to which hospitals meet the World Health Organisation standards. In addition, the performance of provider unit maternity services on these internationally agreed standards which cover a broad range of issues such as staff training, responsiveness to clients wishes, and adequate discharge planning is likely to act as a useful "quality indicator" for the maternity service as a whole.

Linked to improving hospital practices is the need for professional and voluntary groups to work together to support breastfeeding women. This is particularly so at a time when purchasers are aiming to increase the proportion of women who have short postnatal stays to reduce maternity costs and to respond to the wishes of women. Part of the increased community support that will be required to facilitate this process will be the improved professional and lay support for breastfeeding mothers both through improved access to professional assistance and to lay community breastfeeding support groups. A number of models for the provision of this assistance have been proposed and the most appropriate of these could be selected locally and wholly or partly funded through savings in in-patient direct care costs as the number of postnatal bed days is reduced.

6.4 Breastfeeding promotion

There is relatively little published evidence from which to assess the likely impact of public campaigns to promote breastfeeding the impact of health education measures such as those which take place within the health and social education curricula within Scottish schools. In part this is because such studies are difficult to perform or are likely to have an impact which is measurable only after a number of years.

It is reasonable nevertheless to postulate that these activities are indeed worthwhile and will result in improved breastfeeding rates in Scotland. Evaluating the effectiveness of any interventions is essential and individual health boards should build in an evaluation of any interventions undertaken in this area.

6.5 Government legislation

There are no published data on the effectiveness of changes in government legislation for national breastfeeding practices. However, a strong case based on experience with advertising in other areas could be made to support the assertion that advertising of infant formulae is detrimental to breastfeeding rates. Government legislation should therefore enforce the international code of practice on advertising by baby milk manufacturers.

With increasing entry of women into the workforce the promotion of breastfeeding often conflicts with the practical imperatives faced by many young mothers. The United Kingdom currently has the shortest period of maternity leave in Europe. Legislation which improves both maternity leave and allowances and revises the milk token scheme together with work legislation which promotes more flexible working hours for mothers and better creche and nursery facilities in the workplace is very likely to have a major influence on breastfeeding rates in Scotland.

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ANNEX A

**Breastfeeding rates at the end of the first week postpartum by health board
and postcode of residence, 1992**

Health board	Postcode district	Number breastfeeding	Proportion of all women breastfeeding
Grampian	AB1	625	56%
	AB2	743	47%
	AB3	525	63%
	AB4	624	44%
	AB5	509	54%
	AB6	17	65%
Tayside	DD1	68	52%
	DD2	221	36%
	DD3	167	36%
	DD4	198	31%
	DD5	144	53%
	DD6	76	48%
	DD7	62	42%
	DD8	154	47%
	DD9	79	51%
	DD10	93	40%
	DD11	154	36%
	PH1	202	47%
	PH2	211	56%
	PH3	36	56%
	PH4	28	52%
	PH5	8	67%
	PH6	37	64%
	PH7	39	52%
	PH8	19	61%
	PH10	42	45%
	PH11	28	55%
	PH12	18	60%
	PH13	14	45%
	PH14	15	71%
	PH15	28	76%
	PH16	17	65%
	PH19	2	100%
	PH20	5	56%
	PH21	9	69%
	PH22	13	45%
	PH26	16	52%
	PH33	61	43%
	Dumfries & Galloway	DG1	99
DG2		126	36%
DG3		21	44%
DG4		21	28%
DG5		20	32%
DG6		19	35%
DG8		61	40%
DG9		58	28%
DG10		18	50%
DG11		85	49%
DG12		48	33%

	DG14	3	50%
Lothian	EH2	59	50%
	EH3	174	64%
	EH4	297	45%
	EH5	130	42%
	EH6	211	47%
	EH7	175	49%
	EH8	134	56%
	EH9	129	71%
	EH10	255	77%
	EH11	190	40%
	EH12	255	54%
	EH13	74	48%
	EH14	205	45%
	EH15	98	47%
	EH16	113	33%
	EH17	56	26%
	EH18	21	58%
	EH19	48	31%
	EH20	25	32%
	EH21	140	40%
	EH22	125	31%
	EH23	39	33%
	EH24	13	62%
	EH25	19	43%
	EH26	127	58%
	EH27	18	43%
	EH28	13	37%
	EH29	14	41%
	EH30	62	48%
	EH31	20	69%
	EH32	98	47%
	EH33	58	39%
	EH34	18	67%
	EH35	14	39%
	EH37	4	36%
	EH39	44	72%
	EH40	16	57%
EH41	84	48%	
EH42	58	51%	
EH43	5	38%	
EH44	15	38%	
EH45	44	58%	
EH46	16	67%	
EH47	53	21%	
EH48	76	25%	
EH49	84	51%	
EH51	48	29%	
EH52	61	28%	
EH53	63	40%	
EH54	221	32%	
EH55	29	28%	
EH57	5	55%	
Forth Valley	FK1	116	34%
	FK2	146	28%
	FK3	59	23%

	FK4	73	32%
	FK5	70	32%
	FK6	54	27%
	FK7	132	35%
	FK8	80	41%
	FK9	43	47%
	FK10	118	25%
	FK11	6	30%
	FK12	33	41%
	FK13	34	35%
	FK14	16	59%
	FK15	48	58%
	FK16	9	45%
	FK17	5	25%
	FK21	4	50%
Greater Glasgow	G1	13	48%
	G2	6	23%
	G3	66	42%
	G4	31	41%
	G5	17	14%
	G11	98	53%
	G12	174	62%
	G13	87	30%
	G14	83	32%
	G15	42	11%
	G20	113	27%
	G22	37	11%
	G23	40	26%
	G31	77	20%
	G32	97	19%
	G33	98	15%
	G34	32	12%
	G40	24	14%
	G41	233	52%
	G42	134	31%
	G43	74	47%
	G44	169	40%
	G45	23	9%
	G46	163	43%
	G51	65	15%
	G60	33	48%
	G61	165	62%
	G62	72	54%
	G63	24	75%
	G64	177	51%
	G65	107	31%
	G66	146	39%
	G67	220	32%
	G69	85	25%
	G71	110	33%
	G72	103	21%
	G73	131	30%
	G74	185	38%
	G75	176	31%
	G76	131	49%
	G77	116	48%
	G78	92	30%

	G81	97	19%
	G82	120	30%
	G83	93	26%
	G84	155	52%
Highland	IV1	106	49%
	IV2	153	48%
	IV3	135	42%
	IV4	45	56%
	IV5	9	56%
	IV6	43	58%
	IV7	23	47%
	IV8	9	56%
	IV9	8	57%
	IV10	12	71%
	IV11	16	55%
	IV12	82	50%
	IV13	10	77%
	IV14	17	42%
	IV15	22	46%
	IV16	6	43%
	IV17	29	27%
	IV18	28	38%
	IV19	26	38%
	IV20	15	48%
	IV21	3	30%
	IV22	8	89%
	IV24	5	50%
	IV25	7	39%
	IV26	15	58%
	IV27	12	41%
	IV30	167	44%
	IV31	52	47%
	IV32	17	53%
	IV33	8	53%
	IV36	134	58%
	IV40	13	54%
	IV49	8	50%
	IV51	36	56%
	IV54	6	60%
	IV55	6	67%
	KW1	68	35%
	KW2	2	25%
	KW3	5	56%
	KW4	4	36%
	KW9	9	41%
	KW10	15	62%
	KW11	0	0%
	KW12	9	47%
	KW14	66	49%
	KW15	31	51%
	KW16	14	56%
	KW17	85	61%
Ayrshire & Arran	KA1	93	27%
	KA2	95	33%
	KA3	130	33%
	KA4	30	29%

	KA5	40	30%
	KA6	102	27%
	KA7	96	50%
	KA8	38	21%
	KA9	63	45%
	KA11	99	29%
	KA12	39	18%
	KA13	65	26%
	KA15	43	43%
	KA16	19	30%
	KA17	28	51%
	KA18	68	23%
	KA19	39	34%
	KA20	20	14%
	KA21	40	24%
	KA22	38	26%
	KA23	20	37%
	KA24	39	44%
	KA25	22	27%
	KA26	46	35%
	KA27	25	66%
	KA28	7	58%
	KA30	59	46%
Fife	KY1	135	41%
	KY2	162	38%
	KY3	77	49%
	KY4	97	34%
	KY5	71	26%
	KY6	166	41%
	KY7	145	45%
	KY8	138	37%
	KY9	12	48%
	KY10	52	54%
	KY11	310	48%
	KY12	244	54%
	KY13	50	53%
	KY14	23	56%
	KY15	101	61%
	KY16	100	57%
Lanarkshire	ML1	144	23%
	ML2	107	20%
	ML3	139	21%
	ML4	69	18%
	ML5	102	18%
	ML6	159	23%
	ML7	36	19%
	ML8	67	30%
	ML9	76	23%
	ML10	32	39%
	ML11	139	33%
	ML12	30	46%
Argyll & Clyde	PA1	50	27%
	PA2	123	25%
	PA3	51	18%
	PA4	183	30%

	PA5	68	25%
	PA6	63	43%
	PA7	44	52%
	PA8	79	38%
	PA9	8	47%
	PA10	9	31%
	PA11	33	39%
	PA12	32	46%
	PA13	32	73%
	PA14	51	20%
	PA15	42	20%
	PA16	85	24%
	PA17	5	26%
	PA18	11	44%
	PA19	67	39%
	PA20	30	43%
	PA21	2	25%
	PA23	60	44%
	PA28	45	41%
	PA29	18	50%
	PA30	3	33%
	PA31	23	47%
	PA32	7	54%
	PA34	51	54%
	PA35	11	85%
	PA37	15	54%
	PA39	7	54%
	PA42	6	46%
	PA43	10	63%
	PA80	6	38%
	PA81	8	40%
	PA82	6	40%
	PA83	0	0%
	PA84	4	57%
	PA85	7	58%
	PA86	64	58%
	PA87	48	52%
	PA88	8	40%
Borders	TD1	100	51%
	TD2	12	52%
	TD3	7	88%
	TD4	16	41%
	TD5	48	43%
	TD6	46	59%
	TD7	28	38%
	TD8	29	39%
	TD9	94	41%
	TD11	43	54%
	TD12	28	61%
	TD14	33	51%
	TD15	11	52%
Shetland	ZE1	75	55%
	ZE2	111	61%

Footnote The mapping of postcodes to health board areas in this annex is approximate only; please check postal address file details for exact mapping.