

## Forum: Breastfeeding and post-partum contraception



### The lactational amenorrhoea method re-examined: a response to Bracher's simulation models

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The Breastfeeding Division of the Institute for Reproductive Health has been involved in the study and implementation of the Lactational Amenorrhoea Method (LAM) for nearly five years and, as individuals, we have been involved in the study of breastfeeding and its impact on fertility since the mid-1970s. Upon examination, we are forced to conclude that the article by Bracher (1992) is based on an inappropriate data set and biased comparison groups, resulting in conclusions that we consider to be misleading. The interpretations do not seem to take published data or the public-health perspective into account. We comment on the simulation procedures used, alternative approaches to the study of a new method of family planning, results from ongoing studies, and the public-health implications.

Bracher poses five questions: the birth-spacing implications of the Bellagio guidelines; the effect of untimely adoption of a complementary method after LAM; the effect of a delay; alternative post-partum family-planning strategies; and the effect of prolonging LAM use. In order to address these questions, he performed a number of simulation procedures using data from the Nursing Mothers' Association of Australia (Lewis et al. 1991). A basic assumption of the simulations is that the data of the Nursing Mothers' Association can be taken as a representation of the use of the Lactational Amenorrhoea Method. We believe that this is an inappropriate assumption because this was an observational study of nursing women who were not using LAM. In the research procedure, the LAM criteria were applied *ex post facto* to these data. Despite this fundamental objection, we will proceed with an examination of the merits of the simulation procedures.

The first data presented, in Bracher's Figure I, shows the comparison between proportions conceiving using breastfeeding alone and using breastfeeding together with a highly effective contraceptive. It should be noted that breastfeeding and not lactational amenorrhoea is the comparison used here. The graph cannot be taken as a reasonable approximation of LAM use since data for all breastfeeding women, regardless of amenorrhoea status, are included. However, Bracher does state that in the nursing mothers' data 'the proportion conceiving while in lactational amenorrhoea was seven per cent at the end of one year' (Bracher 1992:25). For the assessment of the Lactational Amenorrhoea Method, only the first six months post partum would be of interest.

Figure 2 also compares breastfeeding women to those not breastfeeding, regardless of amenorrhoea or the other LAM criteria. The graph shows that the median birth interval for breastfeeding women using the nursing mothers' data was 22 months as compared to six months for non-breastfeeding women not using contraception. The author takes these data as a test of 'the first of

the two Bellagio recommendations' (Bracher 1992:28). The recommendations he refers to are addressed to the special case of couples for whom no other contraceptive choices exist, due to religious objections or poor access or supply failures. These particular Bellagio recommendations were not intended to speak to the more general population and are, perhaps, taken a bit out of context.

Figure 3 is the first model in the paper in which Bracher fits the LAM criteria using the nursing mothers' data. The model adds to the LAM criteria an additional stringent burden by attributing failure to adopt a subsequent method to LAM use. In contrast, the comparison group that is used for the graph is entirely theoretical: it is one in which other contraceptive methods are adopted, with perfect continuation to the end of the interval and with use-effectiveness that approximates theoretical effectiveness. A more appropriate comparison is given later when Bracher adds the variable of adoption of a continuation method to the model. It should be noted that the levels of adoption attributed to LAM users are not based on any population data but are purely theoretical.

On page 30 Bracher (1992) concludes:

so long as women initiate contraception when its need is first indicated by the Bellagio guidelines, they fare almost as well, as a group, as those who adopt contraception several months earlier ... the critical factor here is not the time at which contraception is introduced but the reliability of the method adopted and the application with which it is used.

Thus, Bracher states that there is no problem with the LAM criteria *per se* and rests his case rather on the *anticipated* field outcomes of its use. Our preliminary field studies mentioned below suggest that this is not the case.

Next, Bracher chooses to focus on what he regards as a key weakness of LAM, the probability of adopting a continuation method of family planning immediately in accordance with the Bellagio guidelines as compared to various delays in the adoption of contraception. He also gives very limited data for models that incorporate a discontinuation rate for six-week-post-partum users of other methods.

Bracher's Table 3 addresses the effect of delays in combination with a moderate discontinuation rate. Although the data presented are difficult to interpret, Bracher states that 'with low to medium rates of discontinuation ... LAM does no better than the post-partum adoption of contraception [six weeks post partum in Bracher's simulations] ... for high rates of premature discontinuation (39 per cent of users abandoning contraception within twelve months), LAM performs better than the post-partum strategy but the incidence of short intervals reaches an unacceptable level' (Bracher 1992:37-38). The data for high levels of discontinuation are not presented. However, we take Bracher to mean that given high levels of contraceptive discontinuation, LAM is the preferred strategy and given low or moderate discontinuation rates, LAM is no worse. In actual field situations, high or moderate discontinuation levels are common. Bracher states that both groups, six weeks post partum and LAM, have many short birth intervals. Because the data for high rates of discontinuation are not presented in tabular or graphical form, the statement is difficult to interpret. Nevertheless, it seems that adding contraceptive discontinuation to even this model balances the negative effects of delays. We believe it offers a fairer simulation of actual programmatic conditions and a more appropriate comparison than the delay with no discontinuation factor model.

The following questions can be raised in relation to these analyses:

Is it reasonable to attribute delays in adoption of continuing contraception to LAM?

What constitutes an appropriate control for such a comparison?

Is the probability of double protection not a similar weakness of the proposed alternative strategy – contraceptive introduction at six weeks post partum?

From a public-health perspective, should not the discussion consider the positive impact of support for optimal breastfeeding that exists when LAM is provided?

The data and strategy that Bracher has chosen for such analysis is inappropriate for the determination of how a new contraceptive program will behave in the field. It rests on unproven assumptions and thus can be taken as an 'if ... then' scenario rather than a reasonable test of the hypothesis. The outcomes for any new method are likely to vary according to program, population, method mix and providers, among others. Bracher's simulations are insufficient for the prediction of the acceptance of continuation methods by LAM users in the field.

A preferred strategy to address this question of the field performance of LAM would be family-planning operations research of the sort that the Institute for Reproductive Health (IRH) is currently undertaking. Such research includes estimation, in actual field situations, of the acceptance of continued family planning by LAM users. Acceptors of other methods will be compared to LAM acceptors on the basis of achieved birth interval and thus method discontinuation and double protection will be taken into account for users of other methods and the effectiveness for the methods would be based on actual use-effectiveness in particular settings. In addition, such research will assess whether LAM is effective in bringing in new acceptors and introducing them to the other methods for the first time. For this purpose, it is necessary to determine the proportion of new users among LAM acceptors as opposed to other methods. In addition, it will be possible to determine if ethnic or economic subgroups at the greatest risk for short birth intervals preferentially benefit from the use of LAM.

The public-health impact of breastfeeding does not stem only from its effect on fertility and we heartily agree with Bracher that breastfeeding should be supported for its many maternal and child health effects. However, many studies showing very effective breastfeeding-support programs have commented on the difficulties in attaining optimal breastfeeding practices. In contrast there are at least two studies in the literature that document that when women are also using breastfeeding for child spacing, their breastfeeding practices are enhanced and they are more likely to practise full breastfeeding (Koçturk 1988; Perez, Labbok and Queenan 1992).

Perhaps the last word remains in the future. However, to date, the single strongest response to Bracher's contention that women who use LAM will be at higher risk of unplanned pregnancy are the prospective studies already completed that show otherwise. In the IRH study in Chile, LAM was offered to the intervention group and data were also gathered on a control group (Perez, Labbok and Queenan 1992). The six-month life-table efficacy was greater than 99 per cent. As yet unpublished data on the pregnancy rates for the first year post partum in the Chilean study show that the intervention group of LAM users were less likely to conceive than the control population. In Honduras, where LAM was offered as a family-planning option, there was over 75 per cent compliance with all guidance, including the timely introduction of a complementary method. These results compare well to compliance with any interim method. Bracher's modelling used data derived from a population of women unaware of the LAM parameters and making no attempt to comply with the guidance. If he had selected a data base of LAM users, his results would have been different, and considerably more relevant.

This concern remains relevant when considering prolonging LAM use beyond six months. Again Bracher assumes no method counselling nor modification. In fact, guidance exists for behaviour change that enhances the impact of the method after six months: this guidance consists of suggesting that the mother breastfeed prior to each supplemental feeding and maintain a high frequency of feeds. In

Rwanda, such a method is in use and a study is in the planning stages to assess the use-effectiveness under field conditions. Anecdotal reports are extremely encouraging.

The development and presentation of the Bellagio Consensus as LAM in the form of an algorithm has added to the usefulness of the method and its potential in the family-planning service setting (Institute of Reproductive Health 1990). The use of an algorithm approach has been reviewed (Labbok and Chassel 1988) and is currently being studied further by the US Agency for Health Care Policy and Research (Hadorn, McCormick and Diokno 1992). Experience has shown that each program adapts the algorithm to its particular needs. As a method of family planning, LAM is being credited with 0.25 couple-years of protection (CYP) per acceptor and, perhaps most importantly in light of Bracher's arguments, it is attracting women who have not previously chosen to accept family planning.

Although we cannot predict the results of the in-progress studies, we can ask for a level playing field. Let us not prejudge the case on LAM on the basis of biased comparisons using inappropriate data sets. The early studies are reconfirming LAM's high efficacy, its attractiveness to those who were not previously interested in family planning, and its many positive 'side effects': better health and nutrition for the infant, the resolution of the biological effects of pregnancy for the mother, and the timely adoption of a complementary method among acceptors. Let us continue to refine and study the method as we would any new interim method, undertaking such family-planning operations research as is appropriate to any new contraceptive technique.

## Promoting breastfeeding as birth control

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### The Bellagio Consensus Statement in context

The Bellagio Consensus Statement on breastfeeding as a family-planning method (Family Health International 1988) advises that breastfeeding be recognized as effective contraception until the first of the introduction of supplementary feeding, the return of the mother's menses, or the completion of the sixth month post partum occurs. This set of rules defines the approach to reliance on breastfeeding for birth-control purposes that is now being promoted as the Lactational Amenorrhoea Method (LAM), and for which its advocates claim a failure rate of two per cent or less. Although the Consensus Statement itself leaves its underlying rationale unstated, advocacy of LAM may be seen as a response to several concerns:

1. Spacing births is recognized as beneficial by both health practitioners and mothers in much of the world.
2. Breastfeeding is clearly the preferred feeding method in infancy, especially where surrounding circumstances make it difficult to use alternative feeding methods safely.
3. Methods of natural family planning that rely on the observation of signs of reproductive state such as cervical mucus or basal body temperature are particularly difficult to use during lactation.
4. Incompatibility between breastfeeding and use of modern contraception (whether based in physiology or perception) in some settings may make combined use of breastfeeding and modern contraception unlikely.
5. Thus, promotion of early post-partum contraceptive adoption may lead to abandonment of breastfeeding.
6. Furthermore, if discontinuation rates are high or use ineffective, this disadvantage may not even be associated with the improvement in birth spacing expected as a result of contraceptive adoption. In some cases, the decision to stop breastfeeding and adopt contraception may actually result in a more rapid repeat conception than if breastfeeding had continued and contraception had not been adopted.
7. Even if women continue breastfeeding, early adoption of some forms of contraception, when continuation rates are low, may lead to a more rapid repeat conception than if adoption had not occurred. It has been suggested that use of birth-control pills during lactation may hasten the re-establishment of the menstrual cycle.
8. To the extent that contraceptive use occurs during the period of post-partum anovulation, the protection it provides is redundant; this may be seen as a waste of scarce resources.

### The importance of birth spacing

In evaluating the potential impact of LAM, perhaps we should remind ourselves once again of the importance of birth spacing. The shortest birth intervals are associated with sharply increased risks of

mortality for both the birth opening and the birth closing the interval. Avoidance of the shortest birth intervals could contribute substantially to child survival, and any tendency of real-world implementation of LAM to increase the frequency of such very short intervals should be taken extremely seriously.

Effects on the mother have been less studied, but may also deserve close attention. Indeed, mechanisms suggested through which the effect of birth spacing on child survival may operate include maternal depletion and its possible effects on foetal development, lactation, and the quality of child care (Palloni and Millman 1986). On average, births that are closely spaced allow the mother less opportunity to recover from the strains of pregnancy and lactation before the process is repeated; at the extreme, when lactation continuing into the following pregnancy cuts the recuperative interval to zero, depleted maternal nutrient stores result (Merchant, Martorell and Haas 1990). All pregnancies occurring during use of LAM, and many of those occurring during any gap in coverage when its protection has lapsed and no alternative method has yet been adopted, will involve just this situation of overlap between lactation and pregnancy.

The nutritional strains of reproduction are compounded in a number of settings by a diet that is strikingly less adequate during pregnancy and lactation than at other times. This situation has been documented for Pakistan, the Philippines, rural Kenya, Papua New Guinea, Mexico, and much of India (Millman, work in progress). In other settings, women consume severely inadequate diets during pregnancy and lactation although there is no evidence that the situation is any better at other times. Whatever the reasons for the widespread inadequacy of women's diets during pregnancy and lactation, one implication is that recuperative time is more needed before the next pregnancy than if women remained well nourished throughout the reproductive process. Another is that those promoting breastfeeding in any particular setting need to consider whether women's diets during lactation are adequate in that setting. If not, promotion of breastfeeding should be accompanied by interventions to improve the diets of breastfeeding women lest it impose an undue burden.

### **Effects of various post-partum strategies on birth spacing**

Earlier work on consequences of various post-partum strategies for birth spacing focused on mean birth intervals as the outcome measure. For example, Potter, Kobrin and Langsten (1979) carried out a simulation comparing mean birth intervals resulting from early adoption of contraception (within the first month post partum) with those resulting from a 'mixed-T' strategy calling for contraceptive adoption at the earlier of some specified duration or the return of menses. They found that early adoption was consistently competitive only under the assumption of both a relatively brief anovulatory period and a high monthly probability of conception for unprotected women. With the monthly probability of conception at the (lower) level typical of many Third World populations, 'no plausible continuation rate' (Potter, Kobrin and Langsten 1979:157) could keep the early adoption strategy competitive.

Recall, however, that problems are by far the worst for the very shortest birth intervals. A high mean interval could coincide with a high proportion of very short intervals, if those women not becoming pregnant again quite rapidly had much longer delays to conception. Perhaps we should be focusing, not on mean interval length, but on the frequency of these extremely short intervals. This is the outcome on which Bracher (1992) focuses in his response to the Bellagio Consensus Statement.

Bracher compares distributions of birth intervals that would result under different regimes of breastfeeding and (other) contraception. He concludes that, given real-world difficulties in implementation, LAM is likely to lead to a higher proportion of very short birth intervals than a policy of early post-partum contraceptive adoption. Since the very shortest birth intervals display the highest health risks, this conclusion is a troubling one. If in practice LAM will actually increase the frequency

of the highest-risk birth intervals, then despite the importance of encouraging breastfeeding we may be ill-advised to promote it as a contraceptive method.

### **Two approaches to supporting breastfeeding in family-planning programs**

LAM is acceptable to those committed to natural family planning. Other methods of natural family planning require extensive abstinence during breastfeeding as body signs women are taught to monitor for warning of ovulation may be confused and difficult to read during lactation and especially during lactational amenorrhoea. If the only acceptable alternative is the combination of close attention to ambiguous body signs and considerable abstinence, the Lactational Amenorrhoea Method may be viewed as a real breakthrough. And if the two per cent pregnancy rate claimed by its advocates is contrasted to the failure rates for other forms of natural family planning during the post-partum period, the level of risk may be quite acceptable.

For those who are not opposed to contraception, however, an alternative approach may be appealing precisely because of the great importance of continued breastfeeding. Children's survival chances are very much improved if they are breastfed, especially under conditions of poverty, poor sanitation, illiteracy, and frequent exposure to disease. An early repeat pregnancy for a mother may force premature weaning of her infant, threatening its health and development. Mothers who understand this may be very highly motivated to adopt contraception in order to avoid a rapid repeat pregnancy, precisely so that they can continue to breastfeed. After all, not all forms of contraception are incompatible with breastfeeding.<sup>1</sup>

Family-planning programs justly concerned to promote breastfeeding might therefore take either of two very different approaches to the relationship between breastfeeding and contraception. In the first, women are encouraged to rely upon breastfeeding for fertility control. In the second, women are encouraged to adopt appropriate forms of contraception to protect continued breastfeeding.

The two approaches are unfortunately somewhat contradictory. Promotion of breastfeeding as a method of fertility regulation would seem to undermine any argument favouring early contraceptive adoption for women who plan to breastfeed; in turn, encouraging early post-partum adoption of contraception to protect breastfeeding would reduce the credibility of LAM. Yet, each may be the preferred approach for a different set of women. Women who are ideologically opposed to modern contraception, and committed to use of natural family planning, may welcome an alternative to other methods of natural family planning during a period when these methods are especially difficult and demanding. And they may be as well protected by LAM as by the other methods they employ at other

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<sup>1</sup> Oral hormonal contraceptives combining oestrogen and progestogen interfere with lactation, causing 'a reduction in milk volume, a deficit in calories, and widespread changes in minerals' (WHO 1988). McGregor's (1983) useful review cites evidence that at least with high-estrogen formulations, infantile malnutrition sometimes results. These findings suggest that breastfeeding mothers would be well advised to seek some other method. The impact of the combined-formulation pills on lactation seems to be due to their oestrogen content; no adverse effect has been found for hormonal contraceptives containing only progestogen. There is even some suggestion that the progestogen-based injectable contraceptive DMPA may enhance lactation. The WHO report cited above concluded: 'This study reiterates the need to avoid combined OCs during the first few weeks or months of lactation. Both norgestrel and DMPA appear to be safe for use in both developing and developed countries, at least when nutritional status of the mother and infant are adequate, but further research is needed on the safety of these contraceptives in populations with malnutrition' (WHO 1988:361). Turning to non-hormonal methods, the IUD and the various barrier methods appear as appropriate during lactation as at other times. And for couples wishing to terminate childbearing rather than merely postpone the next birth, neither male nor female sterilization procedures pose any threat to lactation.

times.<sup>2</sup> Women who do not object to contraception, on the other hand, may prefer the greater certainty<sup>3</sup> of deferring conception that modern technology can provide.

The addition of LAM to the set of natural family-planning methods does no disservice to those already committed to this approach. For others, however, it may be seen as rendering unnecessary any attempt to provide early post-partum contraception. Rates of pregnancy while the three criteria of LAM remain in effect are low, although non-zero. The greater potential difficulty lies in the transition to other methods when this protection lapses. Some proponents of LAM recommend 'that a woman have her complementary method in hand or readily accessible, that is, that she be given a temporary method as well at the time she accepts LAM' (Labbok 1991:112). On the other hand, the Bellagio Consensus Statement itself recommends only that once the first event signalling the end of protection under the LAM occurs, '*consideration must be given* [italics added] to adoption of other means of family planning if a high degree of protection is desired or needed' (Family Health International 1988:1204). As Trussell and Santow (1991) and Bracher (1992) have aptly noted, literal implementation of this rule implies a significant gap in coverage. Problems in access to family-planning clinics, and in supply, will compound any delays in the couple's decision-making. Bracher's simulations suggest that the gap in coverage, if other methods are not adopted as soon as the protection afforded by the LAM lapses, may increase the number of births born after very short intervals.

If women who do not object to modern contraception choose to use LAM, it is of crucial importance that the transition to another form of contraception is handled effectively. Providers expose their clients to increased risks of a very early repeat pregnancy if they implement the recommendation of the Consensus Statement literally. Labbok's suggestion that a backup method should be made available when LAM is accepted to avoid this potential gap in coverage is very much to the point. However, the same concern over waste of scarce resources that contributes to the attractiveness of the LAM might also make providers reluctant to give out supplies in advance. After all, those supplies might never be used. And even if supplies are provided, they may be lost or damaged by the time they are needed. It is certainly possible in principle to avoid this gap. We must consider, however, whether this avoidance is likely in practice. In many situations it may not be.

### **Breastfeeding and contraception: why the inverse association?**

It may be useful to place the LAM debate in a broader theoretical context. An inverse association between breastfeeding and contraception has been observed in many settings. I have argued elsewhere (Millman 1985) that there are three possible explanations for this pattern. First, contraception may interfere physiologically with lactation, or a *perceived* incompatibility between breastfeeding and contraception may be at work even in the absence of such a physiological mechanism. Secondly, women may view breastfeeding and contraception as alternative methods of fertility control, and therefore choose between them. Thirdly, some common-cause variable may affect breastfeeding and contraception in opposite directions.

A direct physiological effect of contraception on lactation can serve to explain less breastfeeding only among women using those methods that interfere with the physiological process of lactation.

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<sup>2</sup> In a summary of results from a decade of research on natural family planning, Kambic (1991) shows life-table pregnancy rates for a year of exposure ranging from 2.5 to 27.9 births per 100 women.

<sup>3</sup> Reanalysing data collected by the World Health Organization, Trussell and Grummer-Strawn (1991) found that while perfect use of the ovulation method was associated with a first-year probability of failure of only 3.1 per cent, that probability skyrocketed to 86.4 per cent with imperfect use.

When users of other methods also breastfeed less than non-contraceptors, some other explanation is required. However, a perceived incompatibility between breastfeeding and contraception may be generated even for methods quite compatible with lactation, depending on messages women receive from health practitioners and family-planning workers.

The promotion of LAM identifies contraception during the period it covers as unnecessary, and clearly sets up a choice between lactation and (other) forms of contraception as means of fertility regulation. Some women may have already perceived breastfeeding as one of several possible means of birth spacing. Any such perception is clearly reinforced, however, if family-planning personnel treat breastfeeding as one method among many.

In Bracher's view the search for 'a third factor that is associated negatively with breastfeeding and positively with contraceptive use' (Bracher 1992:22) has been unrewarding. In fact, there is a substantial set of variables that affect breastfeeding and contraception in opposite directions. These include (based both on my detailed analysis of Taiwanese data, and others' work with WFS and other data for countries representing all regions of the developing world) urban as opposed to rural residence, maternal education or literacy, socioeconomic status, maternal modern-sector employment, and mass-media exposure. Contact with modern health-care systems also sometimes plays this role, although presumably such a pattern would depend on the stance taken by health workers on infant-feeding issues. Further, if a current-status measure of breastfeeding is used, higher values of time since birth inevitably both reduce the probability that the child is (still) breastfed at survey and increase the probability that contraception has been adopted since the child's birth. The search for factors influencing breastfeeding negatively and contraception positively is unrewarding only in the sense that such factors turn out not to explain (much of) the inverse association between breastfeeding and contraception: the relationship persists despite the introduction of these variables as controls.

Bracher correctly observes that sexual activity itself is a plausible common cause of (not) breastfeeding and of contraception. This may occur if women believe that the resumption of intercourse both makes their breast milk dangerous to the child and mandates some defence against an early repeat conception; or the resumption of intercourse could cause a change in sleeping arrangements that reduces the frequency of night-time feedings and thus leads to earlier weaning. However, any effect of sexual activity on breastfeeding would be both empirically and conceptually difficult to separate from effects of breastfeeding on sexual activity. For example, frequent night-time feedings could leave mothers so tired that they have little interest in intercourse, or sleeping arrangements designed to facilitate these feedings could make intercourse awkward.

Perhaps we should be thinking of women's behaviours on the three dimensions of sexual activity, contraception, and breastfeeding as jointly determined. Particular combinations of choices on all three dimensions could be made more or less probable by perceptions of the compatibility or incompatibility of breastfeeding with both intercourse and contraception; these perceptions in turn might be expected to vary according to cultural setting, messages from health practitioners, sleeping arrangements, and individual characteristics.

This formulation suggests one additional limitation on the LAM approach. Where it is believed that breast milk is contaminated by sexual activity and rendered dangerous to the infant, little interest can be expected in LAM. A perception of breastfeeding and sexual activity as incompatible implies that those breastfeeding will not be on the market for *any* form of birth control. Conversely, LAM will not be among the methods acceptable to those who choose to resume intercourse but are also interested in postponing their next conception.

More broadly, considering the set of choices regarding breastfeeding, contraception, and sexual activity as jointly determined suggests the possibility of an undesired side effect of promoting LAM.

We might expect that promotion of breastfeeding specifically as a form of birth control would reinforce any existing perception that breastfeeding and contraception are alternatives from which one might choose. For those women not ideologically opposed to contraception, this message may well decrease rather than increase their tendency to breastfeed. A more constructive message to such women would stress the role of contraception in protecting breastfeeding, and the importance of breastfeeding for other reasons. Family-planning programs face a dilemma in their attempts to promote breastfeeding. The messages that may be most useful in doing so for the natural family-planning audience may be, not just neutral, but counter-productive, for a different set of women.

## Rejoinder to Bracher\*

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Bracher's article is a thought-provoking addition to the family-planning literature. However, its tone is rather negative and it includes unsupported assumptions.

Since other colleagues in this Forum will comment on the technical merit of the analysis presented in the paper, we prefer to accept the data analysis at face value (although it is based on some assumptions which we question). We do not argue with Bracher's results, but with his interpretation of the results. He finds that the correct use of LAM produces outcomes that compare favourably with the results of immediate post-partum adoption of contraception but, for him, the LAM glass is half empty rather than half full. The contraceptive efficacy of LAM is not at issue in his analysis. For him, the degree to which LAM is 'discontinued', that is, the degree to which there is a gap between the end of LAM use and the commencement of use of another method, is the issue. Bracher's microsimulation suggests that when LAM is 'discontinued', women will become pregnant. For this reason he concludes that LAM should not be promoted. Indeed, we have an abundance of clinical data to demonstrate that fertility returns when LAM protection expires. All this means is that the method fails when it is no longer in effect. But so too do pills or barriers fail when they are not used. Indeed, all user-dependent methods are unforgiving of non-use. We reject this rationale as the basis for not promoting LAM.

We believe that it is better to have a wide variety of contraceptive choices. Although LAM does not suit every breastfeeding woman, it still is a viable option for many and should be promoted like any other contraceptive method, recognizing its advantages and disadvantages. If LAM were a commercial product it would sell very well because salesmen could draw on the additional benefits of breastfeeding.

Certainly, like all contraceptives, LAM has disadvantages. For example, we agree that women who give supplements early in the post-partum period are not good candidates for LAM. However, it has been shown that the duration of unsupplemented breastfeeding can be increased with proper education. Thus, learning LAM may result in better health outcomes for mother and baby, in addition to child spacing, in women who otherwise would not breastfeed as long or as well.

The article raises the point that the financial implications of double protection should be studied, with which we agree. We also agree that women in societies in transition need attention regarding birth spacing. Probably Bracher would advocate helping these women adopt a provider-dependent effective modern contraceptive. We cannot disagree, but can point out first, that we would do a grave disservice if, having access to such women, we did not promote unsupplemented breastfeeding for up to six months, and secondly, that not all such women will welcome methods such as IUDs, pills, injectables, Norplant, barriers or sterilization during the post-partum period. Some will be pressured by husbands

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and elders to avoid contraception; others will be afraid of possible harm to their infants of artificial contraceptive methods. LAM is unthreatening to this audience and can provide up to a six-month period of adjustment to the idea of using a contraceptive. While allowing time for education from a family-planning worker, it can empower these women to have some control over the timing of the next pregnancy.

LAM is, in some ways, a new contraceptive method. Accordingly, few clinical and programmatic studies have been completed, though several more are in progress. Experience with these new studies suggests that two assumptions of Bracher will not be supported. One is that LAM is difficult to learn or use. In our projects, we have taught women a LAM jingle in their native language. Our initial impression is that women have had few if any problems. Our more complete analysis will include an evaluation of comprehension and application of the LAM rules.

The second assumption is that LAM use will thwart the otherwise continuous use of a more effective, modern contraceptive. Our current trials of LAM are conducted in the context of counselling and provision of all locally available contraceptives. LAM is simply offered as one choice among many. Somewhat to our surprise, we have had no trouble recruiting LAM acceptors into the study. Most women interested in LAM have never used a contraceptive before. They want to space births and they want to breastfeed, but for whatever reason have not accepted modern family-planning methods before. It must be noted that many women are communicating with family-planning workers for the first time because of, and through, LAM.

We hope and expect that this rapport may result in the uptake of a consecutive method when otherwise the woman would never have used any method at all. And if the woman does not use a consecutive method after using LAM this time, possibly the empowerment she experienced by using LAM in the past plus her new rapport with the family-planning sector may result in her use of a modern method after some subsequent pregnancy. Obviously, no data exist to show the extent to which such a scenario will play out, but experience to date challenges Bracher's assumption that to promote LAM is to undermine other family-planning efforts.

LAM is neither as effective nor as easy to use as some other provider-dependent methods, and it may be as unforgiving of incorrect use as barrier methods. But since LAM (used correctly) is as efficacious as some other methods currently promoted (used correctly), the motivation to withhold information on LAM from women should be examined. The breastfeeding women of the world deserve to know, and it is their right to know, that the mode they have chosen for feeding their infant also has the potential for fertility regulation. We should not assume that women will be confused by this information, but rather we should strive to create the kind of health program Bracher so beautifully lays out, where health workers, in addition to teaching LAM, are occupied in promoting breastfeeding for its nutritional, immunological and anti-bacterial benefits, monitoring infant development and maternal nutrition and assisting women in finding the contraceptive best suited for them.

## **Bellagio revisited**

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The three contributions address the Bellagio Consensus Statement (Family Health International 1988), and my article (Bracher 1992), from different standpoints. Laukaran and Labbok take issue with both my simulation models and the data on which they are based. Millman highlights and expands a number

of interpretational points in my original article. Kennedy, Visness, Bathija and Williamson concentrate on aspects of implementing the lactational amenorrhoea method (LAM) in the field.

Laukaran and Labbok object to my basing simulation models on the results of a study of nursing mothers rather than a group of women employing LAM. This is a spurious distinction. In its prescriptive mode<sup>1</sup> the lactational amenorrhoea method recommends that consideration be given to adopting contraception at the earliest of supplementation, menses and the infant's reaching six months of age; and the models therefore needed to simulate the timing of these critical events. The durations of lactational amenorrhoea used in the simulations are those reported for a study of members of the Nursing Mothers' Association of Australia: this is the largest single prospective clinical study of lactational amenorrhoea and anovulation (Lewis et al. 1991) and, indeed, a study that has been widely cited in support of the Bellagio consensus. Although insufficient information was available to allow the timing of supplementation to be incorporated explicitly in the models, early supplementary feeding was reportedly rare, with most women exclusively breastfeeding at least into the fifth month. The other items of information were available, and were incorporated in the models. Whether or not the women who participated in the Australian study were considering adopting contraception is beside the point: my models incorporate a range of subsequent behaviours including not adopting any subsequent contraception but continuing to breastfeed (lower curve Figure 2); adopting contraception of varying (realistic) efficiencies<sup>2</sup> (Figure 3); adopting contraception of varying efficiencies but after a short delay (Figure 5 and Table 1); and with a range of rates of premature discontinuation (Table 2).

Laukaran and Labbok feel that the preferred strategy for evaluating LAM is family-planning operations research. I am puzzled by their belief that field trials obviate the need for other methods of evaluation and by the fact that these trials are being conducted many years after the Bellagio Consensus Statement was first published. A more conventional course of action would have been to issue recommendations only after the results of both clinical and field trials were available to inform them; and possibly after the sort of modelling presented in my article.

It is perhaps a reflection of the reverse order of events that some of the Bellagio signatories themselves have been rethinking the original statement. For example, initial confidence led to claims that the six-month rule could perhaps be extended (Kennedy, Rivera and McNeilly 1989); or that supplementation might be safely ignored (Kennedy et al. 1991). The results of field trials led to greater caution, although the need for un-supplemented breastfeeding was still questioned (Kennedy and Visness 1992).

Part of Laukaran and Labbok's objection to microsimulation modelling may stem from a misunderstanding of its purpose. They criticize the models as taking an 'if ... then' approach. This approach is of great value when we know how a process works, and the values or realistic ranges of values of its basic parameters, but do not know which parameters have the greatest influence on the outcome or even which are the likeliest outcomes. Thus, Figure 1 does not purport to be a 'reasonable

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<sup>1</sup> This is actually the second Bellagio recommendation. The first stated that for women or couples who do not wish to use other family-planning methods or to whom other methods are unavailable, breastfeeding could be used as a birth-spacing method in its own right. I do not follow Laukaran and Labbok's claim that by illustrating the implications of this recommendation for birth spacing I have taken it 'a bit out of context'.

<sup>2</sup> Contrary to Laukaran and Labbok, the range of values of contraceptive efficacy do not reflect 'theoretical effectiveness' as they are derived from population-based observational studies. Further, if by 'levels of adoption' is meant the prevalence of the adoption of a method at the point indicated by the LAM formula, then the 'levels' are indeed theoretical. They are universal. Poorer birth-spacing outcomes would be achieved if they were not.

approximation of LAM' but, rather, sets the stage for the models that follow: whatever women do, they are unlikely to conceive at a faster rate than indicated by the uppermost curve, or at a slower rate than the lowermost curve. It is useful to find that varying a parameter has no impact on the outcome; conversely, it is critically important to know whether such variation is a major determinant of the outcome. Laukaran and Labbok note that the 'simulations are insufficient for the prediction of the acceptance of continuation methods by LAM users in the field'. The models attempt no such prediction. Rather, they highlight the importance of prompt adoption of contraception and illustrate the effect on birth spacing when this does not occur.<sup>3</sup>

Millman takes the discussion back to the advantages of birth spacing and breastfeeding for both infant and maternal health. She notes the importance of examining distributional measures of birth spacing rather than measures of central tendency, the aim of LAM being to reduce the proportion of birth intervals that are dangerously short rather than simply increasing the average time between births, and highlights my findings that LAM provides no easy remedy to short birth spacing. She identifies a dilemma: not advocating the early adoption of post-partum contraception may promote breastfeeding if breastfeeding and contraception are seen as incompatible, or may curtail breastfeeding if a new pregnancy ensues.

Millman concludes by elaborating an important point in my original article. This is that the Bellagio recommendations do not take into account the resumption of sexual activity. Beliefs that sexual intercourse contaminates the mother's milk and therefore jeopardizes the health of her child are common to very diverse cultures: an equally common belief is that a child should be weaned if sexual relations are resumed. Nevertheless, practices related to the former belief are being eroded. Indeed, the advocacy of post-partum contraception may signal that it is expected that sexual activity will have recommenced. I return to this issue later on.

Finally, Kennedy et al. take a field-oriented view. Current trials conducted by Family Health International (FHI) promote LAM as one choice among many methods, and acceptors have reportedly been recruited with little difficulty. Women have been taught the algorithm that signals when contraception should be 'considered'. Most women interested in LAM 'have never used a contraceptive before' but want both to space births and to breastfeed, and while Kennedy et al. recognise that some women will not adopt contraception when its need is indicated by LAM, they believe that the 'empowerment' women experience by using LAM may be beneficial in later adoption of contraception. They conclude by stating that while 'LAM is neither as effective nor as easy to use as some other provider-dependent methods', women have a right to know that breastfeeding has a potential for regulating fertility.

None of these statements really alleviates concern. Teaching women 'a LAM jingle in their native language' is not merely resource-intensive but may also be seen to be patronizing: how would such an approach be received in a family-planning clinic in the continental United States? Moreover, while one hopes for a degree of resultant 'empowerment' among LAM adherents it is clear that any such empowerment would result not from any characteristics of LAM itself but from frequent contact with clinic staff: that is, not from a woman's controlling her fertility but from her reception of the idea that her fertility is indeed controllable. The problem is that, unlike taking or not taking a pill, for example,

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<sup>3</sup> Laukaran and Labbok's frequent use of the word 'data' may reflect their confusion since they use it interchangeably to refer to both the output of the simulations and the actual input data. Contrary to their voiced concerns, the input data are fully described and attributed in the paper and its Appendix.

neither ovulation nor the return of the menses is under direct personal control. We should be concerned about the women who, though they follow the guidelines perfectly, menstruate well before the six months are up. Pooling results from FHI trials, Kennedy and Visness (1992) report rates of premature discontinuation that would not be tolerated in a mechanical or hormonal method of contraception: 21 per cent of the original group of (full and partially) breastfeeding women had menstruated within three months, and half within six months. The early menstruator may be discouraged; so also, of course, will be the woman who conceives. Rather than this experience's sending her back to the clinic at a later date, it may suggest to her that the clinic has little to offer.

Finally, advocating that women should be informed of the contraceptive properties of breastfeeding ignores the fact that most societies *already* have some notion that breastfeeding women are at reduced risk of conception. Nevertheless, trust in breastfeeding tends not to have been absolute<sup>4</sup>, and some of this trust undoubtedly reflects the absence or diminution of sexual activity during breastfeeding (see, for example, Van Galen and Voorhoeve 1991).

Considerable effort and financial resources appear to have been dedicated to promoting and testing LAM in the field. It is fair to wonder, however, whether these resources would not be better spent transmitting the message that contraception protects breastfeeding among sexually active women. Greater efforts could be directed also at encouraging continuing contraceptive use. Despite their general mistrust of the models, Laukaran and Labbok seize on the simulation finding that LAM does slightly better than the adoption of contraception at six-weeks post partum if rates of premature discontinuation are high (19 per cent after four months and 39 per cent after one year) to conclude that LAM is the preferred strategy when contraceptive continuation is poor. This misses the point: the preferred strategy here is to improve contraceptive continuation since acceptable birth spacing will be achieved only by the conscientious use of contraception after fecundity returns.<sup>5</sup>

The proponents of LAM still invoke the wastefulness of double protection as a justification for delaying the adoption of contraception. It is by no means clear, however, why the spectre of double protection should be more frightening than the spectre of no protection at all. Moreover, how much double protection are we talking about here? Laukaran and Labbok declare that LAM is being 'credited with 0.25 couple-years of protection (CYP) per acceptor'. This translates as three months. Yet, even if women do not breastfeed at all, they are most likely to be assured of at least six weeks. The difference is six weeks. The cost of a six-week condom or pill supply is not negligible, but is certainly less than the sort of intensive counselling described by both Laukaran and Labbok and Kennedy et al.<sup>6</sup> If the avoidance of perilously short birth intervals is also of concern, then this cost is certainly justified by the prevention of early conceptions that occur because the return of fecundity was unheralded by a menstrual flow.

The Bellagio guidelines invite criticism by suggesting only that *consideration be given* to the adoption of contraception at the critical point determined by the child's age, the mother's menstrual

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<sup>4</sup> Note, for example, the nineteenth-century popular English ditty (McLaren 1984:67):

If women want from children to be freed,  
To trust in nursing's but a broken reed.

<sup>5</sup> The advocacy of LAM, or extensions of it, can lead to extraordinary blindness in other areas as well. Laukaran and Labbok report that a variant of LAM that aims to increase its impact after six months is now being tested in Rwanda. Yet, given the severity of the AIDS epidemic in that country, surely condom promotion would be of more benefit to both mothers and children.

<sup>6</sup> For example, the World Health Organization is able to provide a cycle of the pill for less than US\$1.

status and the introduction of supplementary feeding (see, for example, Trussell and Santow 1991). The application of LAM is now more interventionist than originally formulated, but intervention appears to be directed at breastfeeding practices as much as at the adoption of contraception. In current field-trial applications of LAM, it appears that mothers are being encouraged to breastfeed, to breastfeed for longer durations and to breastfeed fully for longer durations. The influence of rich Western countries, through their promotion of infant feeding substitutes, has been harmful to infant health, and perhaps some redressing of the balance is in order. Nevertheless, couples in poor countries have not incurred the expense of such formulas solely out of the desire to emulate Western modes of behaviour, and the importation of Western economic systems must also take some blame. It is now probably only in the very richest countries and the very poorest that breastfeeding does not interrupt a woman's daily schedule.<sup>7</sup>

Even more seriously, one might question the reasonableness of advocating delayed supplementation: Laukaran and Labbok refer with approval to studies in which women who use breastfeeding to space births 'are more likely to practise full breastfeeding'; and Kennedy et al. state that 'the duration of un-supplemented breastfeeding can be increased with proper education'. Nevertheless, the recommendation ignores, first, the serious implications of prolonged and intensive lactation for maternal health, as Millman catalogues, and secondly, the demands that modern ways of life are imposing on women even in poor countries.<sup>8</sup> Early supplementation is thus likely to remain a real stumbling block in the implementation of LAM.

Kennedy et al. characterize my views as seeing 'the LAM glass ... half empty rather than half full', but I fear that they exaggerate my estimation of the glass's contents. The contraceptive benefits of lactational amenorrhoea will be available to breastfeeding women whether or not they are employing - or, indeed, are even aware of - the Lactational Amenorrhea Method. Delaying the adoption of post-partum contraception, at the cost of a few weeks of redundant protection, can serve only to increase the likelihood of a new conception when the existing infant is still very tiny. Scarce family-planning resources would be better employed in broadcasting the message not just that breastfeeding is good for young babies but that it needs to be protected; and in hastening the moment when women take real control over both their reproduction and their breastfeeding by adopting and continuing to use effective contraception.

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<sup>7</sup> Similar points are made in a series of letters to *The Lancet* that took issue with either Short et al. (1991) or the editorial in the same issue: see Campbell (1991); Jewell (1991); Gray (1991).

<sup>8</sup> A massive effort would be needed to persuade mothers to delay supplementation. All societies believe that breastfeeding is a good thing, which supports the task of the advocates of LAM; but most also have strong beliefs about the nature and timing of the introduction of other foods, and this can be quite early: indeed, pooled FHI results suggest even poorer continuation of full breastfeeding than of amenorrhoea, with 33 per cent of women supplementing within the first three months and 71 per cent within the first six (Kennedy and Visness 1992). Health messages concerning aspects of breastfeeding often find themselves in conflict with traditional views on infant feeding. A clear example is the difficulty that health programs have experienced in removing the suspicion of colostrum: the neonates of many societies continue to fast for the first two days of life, or to be given other liquids until 'real' milk appears.

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