

Final Report

Systematic review of contraceptive medicines “Does choice make a difference?”

October 2006

Reviewers

Andrew Lofts Gray

Senior Lecturer, Department of Therapeutics and Medicines Management, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, South Africa.

Jennifer Ann Smit

Director: Contraception and Barrier Methods, Reproductive Health and HIV Research Unit (Durban Office), Wits Health Consortium, University of the Witwatersrand, South Africa.

Ntsiki Manzini

Senior Researcher, Reproductive Health and HIV Research Unit (Durban Office), Wits Health Consortium, University of the Witwatersrand, South Africa.

Mags Beksinska

Deputy Executive Director, Reproductive Health and HIV Research Unit (Durban Office), Wits Health Consortium, University of the Witwatersrand, South Africa.

Table of Contents

1. Terms of reference	3
1.1 Research question	3
1.2 Objectives	3
1.3 Criteria for considering studies	3
1.4 Types of outcome measures.....	3
1.5 Comment.....	4
2. Executive Summary	5
3. Background.....	9
4. Methods.....	14
4.1 Search strategy for identification of studies.....	14
4.2 Study Selection, description and analysis.....	16
5. Results.....	18
5.1 Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive uptake?.....	18
5.1.1 Systematic reviews.....	18
5.1.2 Randomised controlled trials	18
5.1.3 Cohort studies	18
5.1.4 Cross-sectional studies.....	20
5.1.5 Miscellaneous study designs.....	21
5.2 Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive acceptability/satisfaction, and hence adherence/continuation?	23
5.2.1 Systematic reviews.....	25
5.2.2 Randomised controlled trials	28
5.2.3 Cohort studies	31
5.2.4 Cross-sectional studies.....	35
5.2.5 Miscellaneous study designs.....	37
5.3 Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve maternal health and well-being (including the reduction of unintended pregnancies)?	37
5.3.1 Systematic reviews.....	38
5.3.2 Randomised controlled trials	38
5.3.3 Cohort studies	38
5.3.4 Cross-sectional studies.....	38
5.3.5 Miscellaneous study designs.....	40
5.4 Other review articles	40
6. Conclusions.....	41
7. Acknowledgments.....	43
8. References.....	44

1. Terms of reference

1.1 Research question

Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve health outcomes including: contraceptive uptake, acceptability, adherence, continuation and satisfaction; reduction of unintended pregnancy; and improved maternal health and wellbeing?

1.2 Objectives

- To systematically review, summarize and assess all relevant evidence on whether the provision of a wide choice of modern contraceptive methods is associated with improved health outcomes (intermediate and ultimate) including: uptake, acceptability, adherence, continuation, satisfaction, reduction of unintended pregnancy, improved maternal health and wellbeing.
- To identify a minimum optimal range of contraceptive methods to be made available.
- Nominate priority products for applications to be included in the WHO Essential Medicines List (separate report submitted to WHO, 14 July 2006).

1.3 Criteria for considering studies

Studies included in the review will not be restricted by country of origin or language (where access to translation is not an impediment within the review timeframe). We will identify primary literature on relevant studies of all designs. There will be no date restrictions in our search. The following will be included:

- Head-to-head randomised and non-randomised comparison studies on the effectiveness, safety, uptake, acceptability, adherence and continuation of different contraceptive methods.
- Observational studies on the introduction of a variety of contraceptives which measure health outcomes and/or uptake, acceptability, adherence and continuation or similar parameters.
- Needs analyses of contraceptive requirements from countries or regions.
- Reports, opinion papers and position papers from contraceptive service suppliers/product distributors.

1.4 Types of outcome measures

Intermediate

- Contraceptive uptake
- Unmet need for contraception
- Contraceptive method acceptability
- Adherence to contraceptive method
- Contraceptive method continuation
- Reasons for method discontinuation
- Satisfaction with contraceptive method

Ultimate

- Rates of unintended pregnancy

- Maternal mortality
- Maternal morbidity

1.5 Comment

In other words, the research question can be re-posed as follows:

- Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive uptake?
- Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive adherence?
- Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive continuation?
- Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive method satisfaction?
- Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, reduce unintended pregnancy?
- Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve maternal health and well-being?

It is, nonetheless, recognised that some of these issues are directly interlinked: satisfaction with an acceptable contraceptive method is correlated with increased adherence and continuation. Studies may address these issues with a single intervention or group results as representative of one or more factors.

2. Executive Summary

A systematic review of the literature was conducted, for evidence on whether a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improves health outcomes such as contraceptive uptake, acceptability, adherence, continuation and satisfaction; reduction of unintended pregnancy; and improved maternal health and wellbeing. Studies of all designs, reviews, reports, policy documents, commentaries, opinion papers and position papers were included in a search of MEDLINE (via Pubmed, Ovid MEDLINE and Old Ovid MEDLINE), All EBM Reviews, POPLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), LILACS and Psyc Info. A total of 6977 citations were identified. Of these, 3586 were duplicates, leaving 3391 titles/abstracts for screening. After more sensitive review by three authors (AG, JS, NM), 231 citations were included in the review. Two authors (AG, JS) independently extracted data from full reports or papers of all included studies. In a few instances, the full text could not be accessed and the study was assessed on the abstract only.

Not unsurprisingly, this systematic review has failed to find large quantities of high quality evidence that increasing choice has a direct impact on the contraceptive outcomes of interest. The best evidence retrieved is summarised in Table 1.

What evidence does exist is either dated (such as that provided by Jain, Pariani *et al.* and the Caldwells), on newer methods (such as the female condom, as in Fontanet *et al.*), the process of providing choice (such as that provided by Lazcano Ponce *et al.*) or from non-experimental studies (such as the cohort studies by Kalaca *et al.*, Baveja *et al.*, and Stevens-Simon *et al.*). It supports the contention that increased choice is associated with increased uptake and with better health outcomes (such as lower pregnancy rates and fewer STIs), and that women given a choice exercise it and continue use of their chosen contraceptives to a greater degree than those denied their choices. There is no evidence to the contrary. Nonetheless, a commitment to expanded choice is pervasive in the literature, and has informed global and national policies. Such an approach is consistent with a human rights and Essential Medicines approach.

In contrast to other medicine selection issues, consideration has to be given to the changing nature of contraceptive choices over the 3 decades of a woman's reproductive life. Choices are made under particular circumstances and vary in differing social and cultural contexts. As early as 1985, Snowden wrote that no contraceptive method is perfect and that women need to make trade-offs among different methods, necessitating access to a range of methods: "The methods of fertility regulation from which most couples choose represent a choice among unpleasant alternatives. The choice is not so much a positive discrimination but a negative one, in that the methods not chosen are even more disliked than the method that is chosen". Unlike the choice of an antihypertensive or diabetic medicine, the choices of contraceptive methods may therefore represent a choice of the least unpleasant of a set of alternatives. Walsh states that "... the notion of a perfect, more or less universally acceptable contraceptive for women is unrealistic – women's needs, concerns and (above all) their expectations and

experiences of using contraception are very diverse”. Such realisations have informed, and should continue to inform, policy at the WHO, country and programme levels. Factors that have been identified as affecting method choice include age, gender, contraceptive intention (spacing versus limiting), lactation status, health profile, tolerance of side effects, and income. Contraceptive choice is also, in part, dependent on how effective the method is and continuation rates are generally higher with more effective methods. Nonetheless, outmoded methods may persist in some settings, even when the social circumstances that led to their adoption have disappeared.

No “ideal” method mix has been recognised, but increasingly contraceptives which provide protection against unwanted pregnancies and the acquisition of HIV and other sexually transmitted infections, and which protect future fertility, will be important as part of any method mix.

Table 1: Summary of the best evidence

Author(s), date	Country/Population/ Setting	Study design	Outcomes	Comment
Systematic reviews				
No key studies retrieved				
Randomised controlled trials				
Fontanet <i>et al.</i> , 1998	Thailand; 4 cities	71 sex establishments assigned to a male or female condom group (34 establishments, 249 women) or male condom only (37 establishments, 255 women); measured proportion of unprotected sex acts and incidence of sexually transmitted infections (STIs) over 24 weeks. <i>Follow-up</i> every 14 days for 24 weeks	Decreased proportion of unprotected sex acts (5.9% vs. 7.1%, p=0.16); reduced incidence of STIs (2.81 vs. 3.69 per 100 person weeks, p=0.18)	Number of women in each establishment is small; use data based on fortnightly interviews and coital logs, with inconsistent data not recorded for analysis; statistically significant difference shown despite high prevalence of condom use (more than 97% in both groups); sample size achieved was less than that determined in the initial power calculation; high loss to follow up
Lazcano Ponce <i>et al.</i> , 2000	Mexico; urban polyclinic	2107 women, assigned to information and choice group (n=1074) or to standard practice in which method choice was by the provider (n=1033); assessment of choices made in relation to guidelines. <i>Follow-up</i> at end of counselling session (intervention group asked to select appropriate contraceptive)	Fewer women selected an IUD (58.2% vs. 88.2%, p=0.0000) when allowed an informed choice, especially when presenting with a cervical infection (47.8% vs. 93.2%, p=0.0000)	Groups were well-matched; randomization process not described in detail; follow up was not an issue as post-clinic interviews were within 2 weeks; no reporting of numbers screened-out; prevalence of cervical infections was lower than expected; only 44 infected women were included
Cohort studies				
Kalaca <i>et al.</i> , 2005	Istanbul, Turkey; low income urban setting	657 couples identified from a systematic sampling of households; offered a Standard Days Method as an additional option to non-users and users of less effective methods (withdrawal). <i>Follow-up</i> 1 & 4 months to assess uptake and satisfaction	At 1 month, 105/132 acceptors were still using the method; and after 4 months 67/79 interviewed (50.7% of initial acceptors) were still using the method; 4/6 pregnancies occurred in the first month of use	Non-randomised design; authors comment that sample size was inadequate to allow for statistical analysis; non-hormonal method
Pariani <i>et al.</i> , 1991	Indonesia; 6 regencies and a city	2501 new contraceptive clients; to assess continuation and reasons for	Lower discontinuation rate in those afforded their initial choice (8.9%) at	High follow up rate; purposive choice of study areas (in which IUD, COC or

		discontinuation <i>Follow-up</i> 12 months (n=1945)	12 months vs. those denied their choice (72.2%)	injectables were the most frequent choices); only 14% denied initial choice
Baveja <i>et al.</i> 2000	India; 10 hospitals	8077 potential clients given a balanced presentation on all available contraceptive methods (including a new option of an implant); recording of first choice; acceptance of first choice and provider choice. <i>Follow up</i> - 1 year.	Majority (80%) opted for a spacing method compared to a permanent method (17%); clients were able to override provider bias towards a particular choice	Large cohort, but data cross-sectional in nature; only those who had not made a choice prior to presentation (8077/22178 presenters over a 1-year period) were enrolled and provided with “balanced information”
Stevens-Simon <i>et al.</i> , 2001	Colorado, USA; urban teaching hospital	373 teenage mothers offered a comprehensive, multidisciplinary, adolescent-oriented maternity programme, including contraceptive choices; measured repeat adolescent pregnancy <i>Follow-up</i> 1 & 2 yrs	Failure to choose a long-acting implant was associated with a higher risk of repeat pregnancy (relative risk 8.89, 95% confidence interval 2.80 to 28.50); similar effect for not using an injectable (RR 2.30, 95% CI 1.60 to 3.29)	High loss to follow up (only 245/373 retained in the programme at 1 year and 191/373 at 2 years)
Miscellaneous study designs				
Jain, 1989	72 Developing countries	Retrospective review; theoretical analysis of the links between quality of service and reduced fertility, based on available data from developing countries and specific large-scale programmes (such as Matlab); regression of contraceptive prevalence data from 72 developing countries against an index of method availability	Retrospective evidence (from circa 1982) that the addition of a method yields a net increase in contraceptive prevalence; that one-method family planning programs are inadequate to meet individual fertility goals and that the availability of multiple methods increases contraceptive use; that contraceptive prevalence depends upon the number of methods made available through multiple outlets in a country	Country-level data are from many years ago, when the majority of developing countries offered only one method
Caldwell and Caldwell, 1992	Matlab, Bangladesh (reanalysis)	Re-analysis of the Matlab experience	Provision of choice had a greater effect on uptake than was previously thought, as a latent demand for contraception exists even in the poorest societies; few data exist on the reasons for contraceptive behaviours; demand existed for methods that not coitally related or require daily action	Closely argued commentary on a rich body of evidence, but does also identify the lack of data on the reasons behind the exercise of various contraceptive choices

3. Background

“At the 14th meeting of the WHO Expert Committee on Essential Medicines, a number of applications for new contraceptive medicines were considered and rejected. As part of the discussion for these applications it was noted that the approach to provision of medicines for family planning was a philosophy of choice and therefore a wide list of options, whereas for the Essential Medicines List generally, the approach is one of identifying the minimum needed to provide health care. As the provision of additional methods of contraception has an opportunity cost both with reproductive health services and health services generally, it was therefore suggested that to facilitate further consideration of contraceptive applications in the future, it would be important to have a review of the evidence supporting the value of the choice philosophy undertaken, and presented to the Committee.”
(ToR for systematic review of contraceptive medicines, February 2006).

The concept of the right to contraceptive choice, as an essential component of reproductive and sexual rights, has been endorsed by several landmark global consensus documents and international institutions. For instance, the Programme of Action adopted at the International Conference on Population and Development (ICPD) held in Cairo in 1994 recommended that family planning programmes should "Recognize that appropriate methods for couples and individuals vary according to their age, parity, family-size preference and other factors, and ensure that women and men have information and access to the widest possible range of safe and effective family-planning methods in order to enable them to exercise free and informed choice" (United Nations Population Information Network, 1994). The first edition (1996) of the World Health Organization's Medical Eligibility Criteria (MEC) states that WHO "is giving priority to improving access to high-quality care in family planning through a variety of strategies", and lists one of these strategies as "promoting the widest availability of different contraceptive methods so that people may select what is most appropriate to their needs and circumstances" (WHO, 1996). The recognition of right to choice continues to be emphasized in the 3rd edition of the MEC which states: "All individuals have the right to access, choice and the benefits of scientific progress in the selection of family planning methods." (WHO, 2004b). The rights-based approach to contraceptive provision is also endorsed by Hatcher *et al.* in the handbook for clinic staff on the essentials of contraceptive technology (Hatcher *et al.*, 2005). A rights-based approach has also informed the use of the MEC process in safely widening the range of providers who can offer different contraceptive options (Welsh *et al.*, 2006).

Choice of methods has been described as one of six elements regarded as critical to quality of care in family programmes which will lead to improved initial acceptance and sustained use. Bruce defines "Choice of methods" as "both the number of contraceptive methods offered on a reliable basis and their intrinsic variability" (Bruce, 1990). The meaning of choice is encapsulated by Bruce: "Providing a choice does not necessarily mean that every program must provide all methods, but overall program effort on a

geographic basis should be sufficient so that prospective users have reasonable if not utterly equal access to a variety of methods.” Choices are made under particular circumstances and vary in differing social and cultural contexts,(WHO, 2002, WHO, 2004b) “... research [has] demonstrated that choices are complex, multifactorial and subject to change”(Walsh, 1997). In as early as 1985, Snowden wrote that no contraceptive method is perfect and that women need to make trade-offs among different methods, necessitating access to a range of methods: “The methods of fertility regulation from which most couples choose represent a choice among unpleasant alternatives. The choice is not so much a positive discrimination but a negative one, in that the methods not chosen are even more disliked than the method that is chosen”. The contraceptive methods most people use are therefore the least unpleasant set of alternatives. However, it is most important that this realistic summary is set against the other reality that consumers greatly prefer the available range of methods to no method at all (Snowden 1985, cited in Walsh, 1997). Walsh states that “... the notion of a perfect, more or less universally acceptable contraceptive for women is unrealistic – women’s needs, concerns and (above all) their expectations and experiences of using contraception are very diverse”. Recognition of these trade-offs and the changeability of contraceptive needs was again documented by WHO in 2004: “Decision-making for contraceptive methods usually requires the need to make trade-offs among the different methods, with advantages and disadvantages of specific methods varying according to individual circumstances, perceptions and interpretations” (WHO, 2004b). Factors such as age, gender, contraceptive intention (spacing versus limiting), lactation status, health profile, tolerance of side effects, and income are reported to affect method choice (Bruce, 1990).

Contraceptive choice is said to be in part dependent on how effective the method is and continuation rates are generally higher with more effective methods. For instance, with the male condom, the percentage of women experiencing an unintended pregnancy within the first year of typical use was reported to be 15%, with the 53% of women continuing use at one year (WHO, 2004b). On the other hand, with the intrauterine device the percentage of women experiencing an unintended pregnancy within the first year of typical use was found to be 0.8%, with the 78% of women continuing use at one year (WHO, 2004b).

With the advent of the HIV/AIDS pandemic, the spotlight has fallen on contraceptives which provide protection against unwanted pregnancies and the acquisition of HIV and other sexually transmitted infections (Cates Jr and Stone, 1992a, Mitchell and Stephens, 2004). This concept is often articulated as dual protection or dual method use (where more than one method is used at the same time (Brady, 2003, Cates and Steiner, 2002). Since the most effective contraceptives available provide little or no protection against STDs/HIV, choice about which method to use involves trade-offs between pregnancy prevention and disease acquisition (Cates Jr and Stone, 1992a, Cates Jr and Stone, 1992b). The importance of being able to choose a female controlled or female initiated method is also highlighted (Cates Jr and Stone, 1992b). An alternate construct has also been suggested, which talks of “triple protection” – against unintended pregnancy, STDs and safeguarding fertility (Brady, 2003, Cates, 1996).

The notion that access to a choice of methods has positive outcomes, has been expressed by several authors (Bruce, 1990, Heise, 1997, May, 2005, Shah, 1994, Walsh, 1997, Jain, 1989). For instance, a global review of women's perspectives on fertility regulating devices established that, beyond safety and freedom from side effects, the only factors that consistently predict uptake and continued use of a contraceptive method are direct involvement of the user in the choice of method, advance information on potential side effects and support from spouse (Shah 1995, cited in (Heise, 1997). Walsh suggests that the key to improving effective use includes the access to a full range of methods (Walsh, 1997). Provision of a wide range of safe, effective, and convenient family planning methods is said to encourage more people to use contraception (May, 2005). An early review (1989) of the literature and modelling of existing data on the relationship between increasing the number of methods and the demographic impact indicated that enhancing choice of contraceptive methods increased contraceptive practice, resulting in fertility reduction (Jain, 1989). Four central findings from the data reviewed and analysed were:

- “1. Addition of a method yields a net increase in contraceptive prevalence.
2. One-method family planning programs are inadequate to meet individual fertility goals.
3. Availability of multiple methods increases contraceptive use.
4. Contraceptive prevalence depends upon the number of methods made available through multiple outlets in a country.”

Jain states that, even in poor countries, increasing the choice of methods available can lead to increased contraceptive prevalence.

There is however little evidence on how women choose between contraceptive methods and what socio-economic, demographic or other factors influence their choice (Hardon, 1997). Heise argues for reorienting research on contraceptive choice which includes the exploration of “how and why women make the trade-offs they do when choosing among available methods” (Heise, 1997). It has been recognised though that women have very different contraceptive needs at different times in their lives (Anonymous, No date-b).

Key findings released by the United Nations Department of Economic and Social Affairs Population Division on current contraceptive practice from 160 countries and areas worldwide show that 61% of all women of reproductive age who are married or in a consensual union are using contraception¹ (Department of Economic and Social Affairs Population Division, 2003). Nine out of ten women rely on modern methods, most commonly female sterilization (21% of women married or in union), intrauterine devices (14%), and oral contraceptives (7%). In developing countries, longer-acting, highly effective methods are more popular (female sterilization, used by 23%; IUDs, used by 15%), and in developed countries, short-acting and reversible methods (oral contraceptives, used by 16%; condoms, used by 13%), are more often used. Further, condoms are usually used as the primary contraceptive method in developed countries, while in developing countries, they tend to be used with other more effective methods, in addition to being used less frequently than in developed countries. These findings provide some sense of the diversity of method popularity across the world. Importantly,

¹ Data were compiled mainly from survey based on nationally representative samples of women, 15-49 years, and refer mainly to 1998.

outmoded methods may persist in some settings, even when the social circumstances that led to their adoption have disappeared (Potter, 1999). No “ideal” method mix has been recognised and many countries’ existing method mix has been portrayed as “skewed” (defined as a situation where a single method accounts for 50% or more of current use) (Sullivan *et al.*, 2006). Sullivan has, in fact, argued that the idea is to offer “a balance of methods”. Bongaarts and Johansson have predicted a “gradual increase in availability of a wider range of methods” in developing countries, making the explicit value judgments that this will be due to and associated with improved quality of services, more open markets and higher levels of contraceptive knowledge and education (Bongaarts and Johansson, 2002). Within the life cycle of a contraceptive product, a “boom and bust” phenomenon has been identified, with periods of very positive public image followed by periods of increasingly negative public image (Boonstra *et al.*, 2000).

Given the existence of a large unmet need and an expanding set of technological options, some may see a conflict between a rights-based approach (consistent with the provision of a wide choice of methods) and an approach consistent with the Essential Medicines concept (consistent with a rationed choice between methods). Essential medicines must be carefully selected, on the basis of explicit criteria, to meet the priority healthcare needs of a population. Far from being antithetical to a rights-based approach, application of the Essential Medicines has been described as a means for countries to practically implement their obligations in respect of human rights (Hogerzeil, 2006). A tension between states’ obligations to provide access to “health” (especially when correctly seen as a state of complete physical, mental and social wellbeing, rather than just the absence of disease) and the availability of resources cannot be avoided in any setting, whether in the developed or the developing world. Instead, as Hogerzeil has argued, a rights-informed application of the Essential Medicines concept would demand that particular vulnerable groups be considered. Women are usually included as one such group. Young people also constitute a particular group whose sexual and reproductive rights have not always been given the necessary attention by policymakers and service providers (Sundby, 2006). An Essential Medicines programme that pays specific attention to the progressive attainment of reproductive health rights would thus be seen as entirely in concert with a rights-based approach. Equally, restricting contraceptive choices on moral grounds that are “not universally shared in pluralistic societies” is not consistent with a human rights approach, as has been argued in relation to emergency contraceptive options (Croxatto and Fernandez, 2006). An “ideal” contraceptive has been described as “100% effective, completely safe, and unrelated to coitus”, with “minimal resupply requirements” and offering “immediate return to fertility after discontinuation” (Huezo, 1998). Huezo, however, noted that “in the absence of an ideal method of contraception which would suit every individual, there is a variety of contraceptive methods with advantages in some aspects and disadvantages in others from which people should be able to choose according to their particular characteristics and needs”. It cannot, however, be assumed that the introduction of every new technology will enhance choice or meet an unmet need (Skibiak, 2002), nor that some existing choices may not need reconsideration (Simmons *et al.*, 1997). Nonetheless, a review of evidence-based contraceptive choices has recently noted that “[t]he most successful contraceptive method is likely to be the one that the woman (or man) chooses, rather than the one the clinician chooses for them” (Scott and

Glasier, 2006). Exchanges in the medical media over the introduction of long-acting implantable contraceptives have highlighted the human rights angle (Thompson, 1996, Bromham, 1996).

In this review we examine the evidence on whether a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improves health outcomes such as contraceptive uptake, acceptability, adherence, continuation and satisfaction; reduction of unintended pregnancy; and improved maternal health and wellbeing. The results are presented as a hierarchy of evidence, within groupings of research questions. In addition, attention is given to the cross-cutting concerns of meeting the needs of women through the stages of life, of particular groups (such as adolescents, those infected or at-risk of HIV or with medical conditions), and of those seeking to space or limit their families.

4. Methods

4.1 Search strategy for identification of studies

Studies of all designs, reviews, reports, policy documents, commentaries, opinion papers and position papers were included in the search. The search was not be restricted by country of origin or language (where access to translation was not an impediment within the review timeframe). There was no date restriction in our search and the earliest article retrieved in the initial search was published in 1944. The search strategy was conducted by one of the authors (NM) and two postgraduate student interns.

We searched the following computerized databases for studies and reviews on the impact of a wide choice of hormonal contraceptives on health outcomes: MEDLINE (via Pubmed, Ovid MEDLINE and Old Ovid MEDLINE), All EBM Reviews, POPLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), LILACS and Psc Info.

The search strategies for the abovementioned databases were individually tailored to the database being searched.

We searched MEDLINE using the strategy:

Search 1

“Contracepti\$ Choice\$”;
“Contracepti\$ Choice\$” AND uptake;
“Contracepti\$ Choice\$” AND unmet need\$;
“Contracepti\$ Choice\$” AND accept\$;
“Contracepti\$ Choice\$” AND (adher\$ OR compl\$);
“Contracepti\$ Choice\$” AND (continu\$ or discontinu\$) ;
“Contracepti\$ Choice\$” AND satisf\$;
“Contracepti\$ Choice\$” AND availab\$;
“Contracepti\$ Choice\$” AND “uninten\$ pregnanc\$”;
“Contracepti\$ Choice\$” AND “maternal mor\$”.

Search 2

“Contracepti\$ Method\$”;
“Contracepti\$ Method\$” AND uptake;
“Contracepti\$ Method\$” AND “unmet need\$”;
“Contracepti\$ Method\$” AND accept\$;
“Contracepti\$ Method\$” AND (adher\$ OR compl\$);
“Contracepti\$ Method\$” AND (continu\$ OR discontinu\$);
“Contracepti\$ Method\$” AND satisf\$;
“Contracepti\$ Method\$” AND availab\$;
“Contracepti\$ Method\$” AND “uninten\$ pregnanc\$”;
“Contracepti\$ Method\$” AND “maternal mor\$”.

Search 3

“Method\$ mix”;
“Method\$ mix” AND uptake;
“Method\$ mix” AND “unmet need\$”;
“Method\$ mix” AND accept\$;
“Method\$ mix” AND (adher\$ OR compl\$);
“Method\$ mix” AND (continu\$ or discontinu\$);
“Method\$ mix” AND satisf\$;
“Method\$ mix” AND availab\$;
“Method\$ mix” AND “uninten\$ pregnanc\$”;
“Method\$ mix” AND “maternal mor\$”.

Search 4

“Barrier method\$”;
“Barrier method\$ ” AND uptake;
“Barrier method\$” AND “unmet need\$”;
“Barrier method\$” AND accept\$;
“Barrier method\$” AND (adher\$ OR compl\$);
“Barrier method\$” AND (continu\$ or discontinu\$);
“Barrier method\$” AND satisf\$;
“Barrier method\$” AND availab\$;
“Barrier method\$” AND “uninten\$ pregnanc\$”;
“Barrier method\$” AND “maternal mor\$”.

Search 5

(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”)
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND uptake
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND “unmet need\$”
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND acceptab\$
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND (adher\$ OR compli\$)
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND (continu\$ or discontinu\$)
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND satisf\$
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND availab\$
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND “uninten\$ pregnanc\$”
(“Hormon\$ contracepti\$” OR “Hormon\$ method\$”) AND “maternal mor\$”

Search 6

(Contracepti\$ agent\$ OR Contracept\$ prevalence)
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND uptake
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND “unmet need\$”
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND acceptab\$
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND (adher\$ OR compl\$)
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND (discontinuu\$ OR continuu\$)
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND satisf\$
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND availab\$
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND “uninten\$ pregnanc\$”
(Contracepti\$ agent\$ OR Contracept\$ prevalence) AND “maternal mor\$”

We searched EMBASE using the search strategy:

contracepti\$ choice\$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]

We searched Reproductive Health Gateway and Development Gateway using the term “Contraceptive AND Choice”.

We search POPLINE using the search term "Contraceptive Choice"

Other websites were searched for relevant studies, reviews, reports, commentaries, opinion papers and position papers. These websites included: Reproductive Health Gateway, Development Gateway, World Health Organization (WHO), Association of Reproductive Health Professionals, Family Health International, Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs, Alan Guttmacher Institute, UNFPA, PATH, CONRAD, Global Health Council, Population Connection, and Population Health Info Share.

We hand searched the reference lists of all identified publications for other relevant literature.

We posted requests for unpublished studies, studies not found in the databases, conference proceedings, reports, opinion papers and position papers, on the electronic lists REPRO-L and E-DRUG. No feedback was received from these postings.

4.2 Study Selection, description and analysis

A total of 6977 citations were identified. Of these, 3586 were duplicates, leaving 3391 titles/abstracts for screening. These identified titles and abstracts were reviewed by one of the authors (NM) and two postgraduate student interns to determine broad eligibility. In this way 660 citations were identified for more sensitive review by three authors (AG, JS, NM). Where there was possibility for inclusion, the full text was obtained. This yielded 231 citations for inclusion in the review. Studies which addressed only one contraceptive method; studies/reports which were published more than 15 years ago, could not be retrieved and seemed irrelevant from the title/abstract; and dissertations were not included.

The articles or reports included were systematic reviews; randomized controlled trials; case-control studies; cohort studies (prospective and retrospective); cross-sectional studies including multi-country studies; policy documents/technical reports; methodological papers; and reviews (not systematic), commentaries and opinion pieces. Most studies included were cross-sectional or cohort studies. The earliest study included was published in 1980.

The selected studies addressed, directly or indirectly, the impact of contraceptive method choice on contraceptive uptake, acceptability, adherence and continuation, effectiveness,

and safety. Studies on contraceptive introductory strategies and country needs analyses were also included. The selected studies included hormonal methods (oral, injectable, emergency contraception, implants, transdermal, vaginal ring), male condoms, female condoms and intrauterine devices, but did include fertility awareness-based methods, lactational amenorrhoea, coitus interruptus, sterilization, copper intrauterine devices for emergency contraception (unless such studies addressed the issue of choice). However, few studies directly addressed the research question.

Two authors (AG, JS) independently extracted data from full reports or papers of all included studies. In a few instances, the full text could not be accessed and the study was assessed on the abstract only. Disagreement between reviewers was resolved through discussion.

The results are presented in relation to the research questions posed, each time starting with a critical appraisal of the best available evidence. Additional evidence is provided in a descriptive fashion.

5. Results

The evidence retrieved in this review is presented in hierarchical order, within groupings of the research questions posed, which are:

1. Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive uptake?
2. Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive acceptability/satisfaction, and hence adherence/continuation?
3. Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve maternal health and well-being (including the reduction of unintended pregnancies)?

5.1 Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive uptake?

Very few studies have specifically addressed the issue of “uptake”, as opposed to “choice”. We have construed “uptake” to refer to the **prevalence of contraception**, rather than to the exercise of “choice” between methods. An intervention aimed at improving contraceptive uptake would therefore have to increase the total proportion of women using contraception, rather than the choice of a particular method relative to other methods. The best available evidence is summarised in Table 2.

5.1.1 Systematic reviews

No Cochrane or non-Cochrane systematic reviews have directly addressed this question.

5.1.2 Randomised controlled trials

No randomised controlled trials have directly addressed this question.

5.1.3 Cohort studies

Given the lack of evidence, a prospective cohort study conducted in Turkey was included in this review (Kalaca *et al.*, 2005). This study concerned the introduction of a fertility-awareness method, and was hence ineligible for inclusion according to the set criteria. In this study, 657 couples using a method with low effectiveness or no family planning method were offered the choice of the Standard Days Method (SDM). Those accepting the method were re-interviewed after 1 and 4 months. Almost half of those who accepted the method were still using it after 4 months and intended to continue using it. The authors concluded that “adding the option of SDM may benefit Turkish women”, affirmation of the accepted wisdom that a wider choice of contraceptive methods is desirable.

Table 2: Summary of evidence on effect of widened choice on contraceptive uptake

Author(s), date	Country/Population/ Setting	Study design	Outcomes	Comment
Systematic reviews				
No key studies retrieved				
Randomised controlled trials				
No key studies retrieved				
Cohort studies				
Kalaca <i>et al.</i> , 2005	Istanbul, Turkey; low income urban setting	657 couples identified from a systematic sampling of households; offered a Standard Days Method as an additional option to non-users and users of less effective methods (withdrawal). <i>Follow-up</i> 1 & 4 months to assess uptake and satisfaction	At 1 month, 105/132 acceptors were still using the method; and after 4 months 67/79 interviewed (50.7% of initial acceptors) were still using the method; 4/6 pregnancies occurred in the first month of use	Non-randomised design; authors comment that sample size was inadequate to allow for statistical analysis; non-hormonal method
Miscellaneous study designs				
Jain, 1989	72 Developing countries	Retrospective review; theoretical analysis of the links between quality of service and reduced fertility, based on available data from developing countries and specific large-scale programmes (such as Matlab); regression of contraceptive prevalence data from 72 developing countries against an index of method availability	Retrospective evidence (from circa 1982) that the addition of a method yields a net increase in contraceptive prevalence; that one-method family planning programs are inadequate to meet individual fertility goals and that the availability of multiple methods increases contraceptive use; that contraceptive prevalence depends upon the number of methods made available through multiple outlets in a country	Country-level data are from many years ago, when the majority of developing countries offered only one method
Caldwell and Caldwell, 1992	Matlab, Bangladesh (reanalysis)	Re-analysis of the Matlab experience	Provision of choice had a greater effect on uptake than was previously thought, as a latent demand for contraception exists even in the poorest societies; few data exist on the reasons for contraceptive behaviours; demand existed for methods that not coitally related or require daily action	Closely argued commentary on a rich body of evidence, but does also identify the lack of data on the reasons behind the exercise of various contraceptive choices

5.1.4 Cross-sectional studies

No cross-sectional studies have directly addressed this question. There is, however, a rich literature addressing the question of the unmet need for contraception.

Although many women are using a contraceptive method, the unmet need for family planning is reported to be high, especially in developing countries with 23% of women married or in a union, in sub-Saharan Africa reporting that they want no more children or want to delay their next pregnancy by two or more years, not using contraception (Department of Economic and Social Affairs Population Division, 2003). A limited range of contraceptive methods is reported to be one of the factors contributing to this unmet need (Finger, 1999). Unmet needs have also been identified in developed country settings, such as in Europe (Newton, 1998). It has also been argued that contraceptive choices are being reduced rather than expanded, particularly in Western countries (Weisberg, 1991). It has been suggested that rather than attempting to reduce or eliminate unmet need in settings resistant to change, a strategy for meeting unmet needs may be to provide contraceptive methods that are appropriate to women's needs (Dixon-Mueller and Germain, 2006).

Numerous country-level or sub-country surveys have been conducted, showing variable use of contraceptives, persistent barriers to use and high levels of discontinuation. Two Canadian surveys, from 1998 and 2002, have been extensively documented (Boroditsky *et al.*, 1999a, Boroditsky *et al.*, 1999b, Boroditsky *et al.*, 1999c, Boroditsky *et al.*, 1999d, Boroditsky *et al.*, 1999e, Boroditsky *et al.*, 1999f, Fisher and Boroditsky, 2000, Fisher *et al.*, 2004a, Fisher *et al.*, 2004b). Surveys have also been conducted in the US (Grady *et al.*, 1988, Henshaw, 1998, Fu *et al.*, 1999, Foster *et al.*, 2004, Bensyl *et al.*, 2005). The most recent of these showed that the prevalence of use for the 4 most commonly used methods (OCs, vasectomy, tubal ligation and condoms) varied considerably between states (as much as six-fold for vasectomy and three- to four-fold for the others). Data from the 1982 survey (reported in 1988) were interpreted as suggesting that "women are increasingly dissatisfied with available contraceptive methods". More than a decade later, 49% of pregnancies were still unintended. Poverty remained a serious barrier to effective contraceptive practice in the US.

Other countries from which cross-sectional surveys have been reported include Uganda (Katende, 2003), Turkey (Koc, 2000), Indonesia (Lerman *et al.*, 1989), Nigeria (Oye-Adeniran *et al.*, 2005, Adinma *et al.*, 1998), Ghana (Parr, 2003), Romania (Serbanescu *et al.*, 1995), Nepal (Stash, 1999), Sweden (Wulff and Lalos, 2002), China (Xiao and Li, 1997, Xiao and Li, 1998), Vietnam (Knodel, 1995, Minh Thang and Nguyen Anh, 2002, Dang, 1995), Guatemala (Brambila and Taracena, 2003), Kenya (Magadi and Curtis, 2003, Kamau *et al.*, 1996), South Africa (Gready *et al.*, 1997), India (Ravindran and Rao, 1997), the United Kingdom (Walsh, 1997) and Myanmar (WHO, 1997). Multi-country studies have also been reported (Anonymous, 1980, Oddens and Lehert, 1997, Oddens, 1997, Da Costa Leite *et al.*, 2004, Skouby, 2004). The last of these, by Skouby, surveyed more than 12 000 randomly selected women in 5 European countries (France, Germany, Italy, Spain, UK). Even in this highly developed environment, 4.7 million women were

estimated to be at risk of an unwanted pregnancy. Respondents in a 7-country study, which included widely divergent developing and developed countries (Cambodia, India, Mexico, Pakistan, Peru, South Africa and the US), expressed a strong need for “improved, long-acting, highly effective (yet reversible) methods” and also “overall dissatisfaction with available methods” (Snow *et al.*, 1997).

5.1.5 Miscellaneous study designs

Although published 17 years ago, a theoretical and analytical paper on the quality of family planning services and its relationship to desired demographic goals is still instructive (Jain, 1989). Jain built on the Bruce model of quality (which has 6 elements, the first of which is choice), linking this to reduced fertility. The schematic representation of that relationship, as depicted by Jain, is shown below (Figure 1).

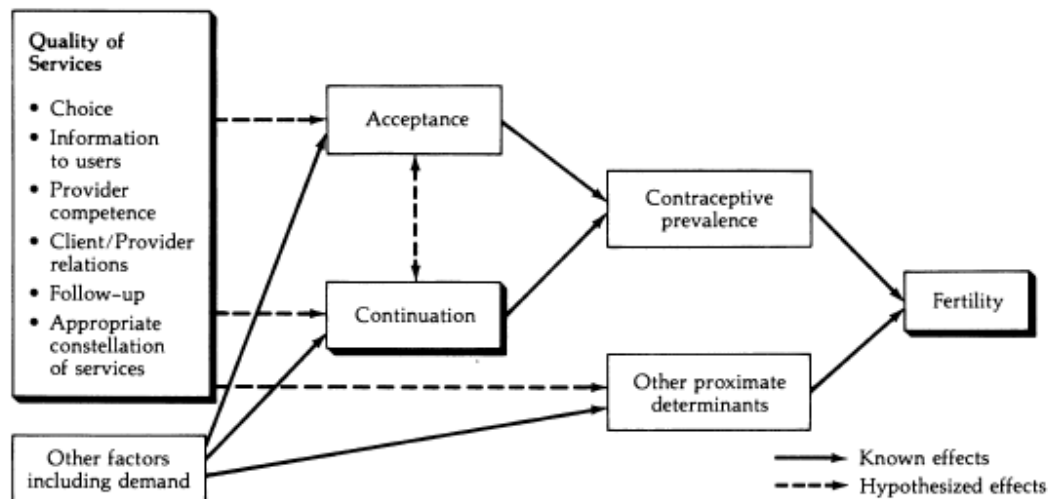


Figure 1: Schematic representation of the links between quality of family planning services and fertility (Jain, 1989)

Jain proceeded to seek empiric evidence of the effect of these quality elements on contraceptive prevalence and fertility. Two elements were explored: the “interplay between acceptance and discontinuation rates” and “the impact of increasing the choice of methods on contraceptive prevalence”. Having found that “empiric information to demonstrate the impact of quality of service elements on contraceptive use and fertility is rare”, Jain extracted pertinent lessons from the Matlab experience in Bangladesh. He showed how successively increasing the range of methods provided in Matlab had resulted in successive increases in contraceptive prevalence. This was, Jain argued, consistent with previous experiences in Taiwan, South Korea, Thailand, Hong Kong and India. Jain also reviewed evidence from simulation studies that had demonstrated the inadequacy of one-method programmes (including one permanent method programmes).

Jain also performed a regression of contraceptive prevalence data from 72 developing countries (using data from circa 1982) against an index of method availability. The resulting graph is shown below (Figure 2). Jain’s conclusion was that “even in poor

countries, increased availability of a variety of methods – meaning an increase in the choice of methods available – can be expected to lead to an increased use of contraceptives”. Jain’s conclusion was that one additional method (about 4 points on the availability index) would be associated with a 12% increase in contraceptive prevalence. This regression analysis must be viewed with some caution. Jain noted that, at the time, the average index of availability score for 100 developing countries was 7.3, indicating an availability of “a little less than two methods per country”. There were strong regional differences, with African countries scoring lowest and Latin American highest. Countries with similar cultural and social systems are thus not evenly distributed on the continuum of availability. Potentially, factors other than availability may be responsible for the differences in contraceptive prevalence demonstrated by the regression analysis.

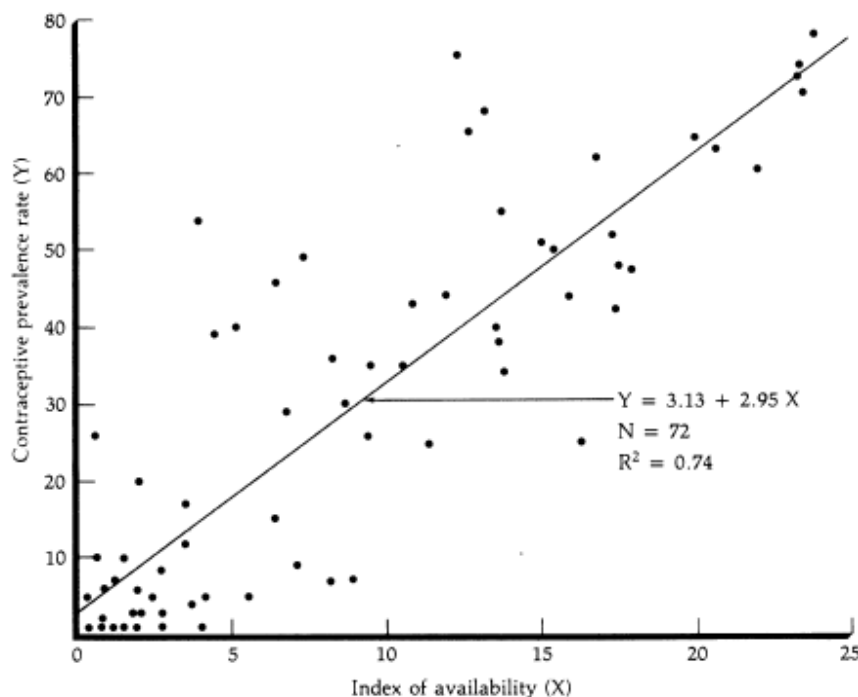


Figure 2: Relationship between contraceptive prevalence and availability of methods for 72 developing countries, circa 1982 (Jain, 1989)

A more recent review of the Matlab experience has also emphasized the importance of broadening method choice (Caldwell and Caldwell, 1992). The Caldwells’ conclusion is worth repeating: “This article suggests that the Matlab experience of two types of family planning provision in the second half of the 1970s has often been misunderstood, so that the importance of adding new contraceptive methods to the available cafeteria has been underestimated, and accordingly a disproportionate emphasis has been placed on the type of service delivery offered, and especially on the characteristics of those who deliver the services”. The point is made that “methods of contraception are not interchangeable”. The most important lesson from Matlab would seem to be that choice makes a difference.

This seems to be in line with experiences elsewhere. For example, a review of the dramatic decline in teenage pregnancy seen in the Yukon territory of Canada in the 1990s attributed this success to a “multidimensional approach”, including increased access to longer-acting hormonal contraceptives (Wackett, 2002).

5.2 Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve contraceptive acceptability/satisfaction, and hence adherence/continuation?

Few studies were retrieved which specifically addressed the issue of whether increasing choice *per se* will improve “acceptability/ satisfaction”, and hence “adherence/ continuation”. In contrast, there are data to show that there are differences between methods or between choices within a broadly-defined method in relation to these outcomes. Based on first principles, such differences must have an impact on both contraceptive prevalence and ultimately on fertility and maternal health. This is the basis of the analysis presented by Jain (1989).

Only 2 randomised controlled trials and 2 cohort studies can be construed to have included an intervention based on the provision of an additional or measurably freer choice of contraceptive method, and to have measured the impact on acceptability or sustained use. These are summarised in Table 3.

Table 3: Summary of evidence on effect of widened choice on contraceptive acceptability/satisfaction & hence adherence/continuation

Author(s), date	Country/Population/Setting	Study design	Outcomes	Comment
Systematic reviews				
No key studies retrieved				
Randomised controlled trials				
Fontanet <i>et al.</i> , 1998	Thailand; 4 cities	71 sex establishments assigned to a male or female condom group (34 establishments, 249 women) or male condom only (37 establishments, 255 women); measured proportion of unprotected sex acts and incidence of sexually transmitted infections (STIs) over 24 weeks. <i>Follow-up</i> every 14 days for 24 weeks	Decreased proportion of unprotected sex acts (5.9% vs. 7.1%, $p=0.16$); reduced incidence of STIs (2.81 vs. 3.69 per 100 person weeks, $p=0.18$)	Number of women in each establishment is small; use data based on fortnightly interviews and coital logs, with inconsistent data not recorded for analysis; statistically significant difference shown despite high prevalence of condom use (more than 97% in both groups); sample size achieved was less than that determined in the initial power calculation; high loss to follow up
Lazcano Ponce <i>et al.</i> , 2000	Mexico; urban polyclinic	2107 women, assigned to information and choice group ($n=1074$) or to standard practice in which method choice was by the provider ($n=1033$); assessment of choices made in relation to guidelines. <i>Follow-up</i> at end of counselling session (intervention group asked to select appropriate contraceptive)	Fewer women selected an IUD (58.2% vs. 88.2%, $p=0.0000$) when allowed an informed choice, especially when presenting with a cervical infection (47.8% vs. 93.2%, $p=0.0000$)	Groups were well-matched; randomization process not described in detail; follow up was not an issue as post-clinic interviews were within 2 weeks; no reporting of numbers screened-out; prevalence of cervical infections was lower than expected; only 44 infected women were included
Cohort studies				
Pariani <i>et al.</i> , 1991	Indonesia; 6 regencies and a city	2501 new contraceptive clients; to assess continuation and reasons for discontinuation <i>Follow-up</i> 12 months ($n=1945$)	Lower discontinuation rate in those afforded their initial choice (8.9%) at 12 months vs. those denied their choice (72.2%)	High follow up rate; purposive choice of study areas (in which IUD, COC or injectables were the most frequent choices); only 14% denied initial choice
Baveja <i>et al.</i> , 2000	India; 10 hospitals	8077 potential clients given a balanced presentation on all available contraceptive methods (including a new option of an implant); recording of first choice; acceptance of first choice and provider choice. <i>Follow up</i> - 1 year.	Majority (80%) opted for a spacing method compared to a permanent method (17%); clients were able to override provider bias towards a particular choice	Large cohort, but data cross-sectional in nature; only those who had not made a choice prior to presentation (8077/22178 presenters over a 1-year period) were enrolled and provided with "balanced information"

5.2.1 Systematic reviews

Although no Cochrane or non-Cochrane systematic reviews have directly addressed the issue of whether providing a wider choice of contraceptive methods has an impact on any particular health outcome, a number of such reviews have addressed the differences between methods, issues related to adverse effects, use in selected populations and programmatic issues. Given that such differences may have an important impact, these data are presented in some detail.

A Cochrane review has addressed the issue of ancillary techniques used to improve adherence to and continuation of hormonal methods of contraception (Halpern *et al.*, 2006). Noting that typical use of such methods results in lower effectiveness than would be expected from efficacy studies, the authors looked for evidence from randomised controlled trials (RCTs) of the effectiveness of various client-provider interventions in comparison with standard family planning counselling. The interventions included were group motivation, structured, peer, or multi-component counselling and intensive reminders of appointments. The outcomes of interest were discontinuation, reasons for discontinuation, number of missed pills and on-time injections, and pregnancy. Of 6 RCTs retrieved, only one showed a significant benefit (of repeated, structured information about injectable depot medroxyprogesterone acetate on discontinuation). Of relevance to the question of choice, this review does provide some evidence of the intractability of the adherence challenge with various hormonal methods. The underlying assumption here is that increasing choice and the provision of longer-term reversible methods should contribute to retention of more women in contraception programmes as they, for various reasons, choose not to use or fail to effectively use other methods.

A non-Cochrane review has addressed the questions of when in the menstrual cycle a woman can initiate combined oral contraceptives (COCs) and how to deal with missed pills (Curtis *et al.*, 2006). Though of limited relevance to the question of choice, this review does emphasise the problem encountered of small sample sizes in many studies of contraceptive methods.

Six Cochrane studies have looked at comparisons of different contraceptive methods (Draper *et al.*, 2006, French *et al.*, 2006b, Truitt *et al.*, 2005, Gallo *et al.*, 2006a, Gallo *et al.*, 2006b, Gallo *et al.*, 2005). These have varied from within-method comparisons to between method comparisons.

Most recently, Draper *et al.* (2006) have looked for evidence of differences in contraceptive effectiveness, reversibility, discontinuation patterns, and minor and major adverse effects between two injectable progestogens that are commonly provided (depot medroxyprogesterone acetate (DMPA) and norethisterone oenanthate (NET-EN), both given intramuscularly). Based on data from RCTs, the authors concluded that there was little difference between these two methods, despite the difference in duration of action. Two RCTs comparing DMPA and NET-EN were included, one of which reported discontinuation rates separately for 13 research sites used. No statistically significant difference in discontinuation at 12 months or 24 months could be shown. Even within

broadly comparable methods, a difference in the adverse effect profile of alternatives may be important, however. Women unable or unwilling to tolerate a particular adverse effect may well benefit from the ability to switch to another in the same broadly-defined group. The authors found that women on DMPA were 21% more likely to develop amenorrhoea. If amenorrhoea were perceived as an adverse effect, it could impact on continuation, but if perceived as a positive attribute it could enhance method acceptability.

A Cochrane Review by French *et al* has looked at the contraceptive efficacy, tolerability and acceptability of hormonally impregnated intrauterine systems (IUSs) in comparison to other reversible methods. A protocol for another Cochrane Review by the same group has been registered, which will seek evidence for the effectiveness, adverse effects and cost-effectiveness of subdermal implantable contraceptives (French *et al.*, 2006a). While users of the levonorgestrel IUS (LNG-20) IUSs were no less likely to have unwanted pregnancies than users of non-hormonal intrauterine devices (IUDs), if $>250\text{mm}^2$, or subdermal implants, the completed Cochrane Review did show differences in adverse effects. Women using the LNG-20 IUS were more likely to experience amenorrhoea and device expulsion than those using IUDs containing $>250\text{mm}^2$ of copper. Compared to all IUDs, users of the LNG-20 devices were more likely to discontinue use because of hormonal side effects and menstrual disturbances. In contrast, users of the Norplant implant were more likely to experience prolonged spotting and bleeding than were users of the LNG-20 IUS. The Progestasert IUS was more effective than non-medicated IUDs, but not copper-containing IUDs $\leq 250\text{mm}^2$. Differences in adverse effects and discontinuation rates were also evident with this product. For example, Progestasert users were less likely to expel the device but more likely to discontinue use because of menstrual bleeding and pain than users of copper IUDs $\leq 250\text{mm}^2$. In essence, this review underlines the point that, even within a broadly-defined method, differences may exist that are known to correlate with important outcomes such as discontinuation.

Hormonal IUSs and subdermal implants have also been subjected to a formal health technology assessment (French *et al.*, 2000). In addition to the finding on cost-effectiveness, this assessment noted “[p]oor study design, lack of clarity in measurement of contraceptive effectiveness and heterogeneity between studies” and made some important methodological recommendations, which are cited verbatim:

- “Standardisation of methods and measurements used in contraceptive research should be encouraged.”
- “Well-designed prospective cohort studies should be carried out to follow up women using different contraceptive methods.”
- “An RCT is required to assess the impact of counselling on discontinuation rates of subdermal implants and IUSs, particularly in relation to the effect of amenorrhoea.”
- “There should be consumer involvement in the development of contraceptive research to identify user-related questions.”
- “Evaluation should be carried out to determine the most effective training for healthcare workers in the insertion and removal of implantable contraceptives.”

- Economic endpoints should be included in primary research on methods of contraception.”

The conclusion provided is important: “Due to the paucity of evidence, these systematic reviews were unable to determine whether subdermal implants and IUSs were any more or less effective in preventing unwanted pregnancy than other reversible methods with which they were compared. However, women using either of these methods were more likely to experience amenorrhoea and this event was a notable reason for discontinuation.”

Gallo *et al* (2006a) showed similar contraceptive efficacy rates for transdermal contraceptive patches and COCs, but with self-reported adherence to the patch better. In contrast, breast tenderness was more common in those randomised to use the patch. Evidence for a difference in discontinuation rates was however mixed. This review could not retrieve any eligible trials concerning the vaginal ring. The same group (2006b) had previously shown that one version of the cervical cap was as effective as the diaphragm, while another was not. However, in each case, only 1 RCT was retrieved. Comparing combined injectables with any other contraceptive method, another Cochrane Review by Gallo *et al* (2005) retrieved 10 RCTs. The combination injectables were shown to be associated with lower rates of early study discontinuation due to amenorrhoea or other bleeding problems than comparator progestin-only products, but higher rates of discontinuation due to other reasons. However, the authors cautioned that discontinuation rates, while viewed as a measure of method acceptability, may also be due to many other factors.

Truitt *et al* (2006) looked at the effect of combined hormonal, non-hormonal and progestin-only contraceptives on lactation, but failed to find good quality evidence from RCTs. Nevertheless, if such differences do exist, they could have an impact of method acceptability in lactating women. A previous non-Cochrane review had also looked at contraceptive choices during lactation (Truitt *et al.*, 2003). The authors conclude that “[a]t least one properly conducted randomized trial of adequate size is urgently needed to make recommendations regarding hormonal contraceptive use for lactating women”.

An earlier non-Cochrane review (Kuyoh *et al.*, 2006) looked at the efficacy and discontinuation of contraceptive vaginal sponges, containing spermicides, compared to diaphragms. The sponge was shown to be less effective and to be associated with higher discontinuation rates. The authors, however, raised the issue of non-contraceptive outcomes such as the prevention of sexually transmitted infections and the incidence of adverse effects, calling for new randomised controlled trials to address these questions.

In order to inform the WHO policymaking process, a systematic review was conducted to address the issue of contraception for women in selected circumstances, looking at key contraceptive method and condition combinations (Curtis *et al.*, 2002). These were COC use in women with hypertension or headaches, COC use for emergency contraception and adverse events, progestogen-only contraception among young women and those breast-feeding, tubal ligation among young women, hormonal contraception and IUD use among HIV-positive women, those with AIDS and those at high risk of HIV infection. At

that time, sufficient evidence was only available to conclude that there was an increased risk of cardiovascular complications in women with hypertension or migraine who used COCs. What the review did underscore, however, was the wide range of challenging scenarios that confronted women and their health care providers when choosing a safe and effective contraceptive method.

Recently, a non-Cochrane review has been published, addressing the question of bone mineral density (BMD) changes in women using progestogen-only (Curtis and Martins, 2006). The review did show a decrease in BMD in users of DMPA over time, which was reversed on discontinuation of use. Importantly for issues of choice, the authors concluded that “[l]imited evidence suggested that use of progestogen-only contraceptives other than DMPA did not affect BMD”.

A non-Cochrane systematic review of female condom effectiveness has outlined “limited, but convincing evidence” that use of this method can increase protected sex and decrease STD incidence among women (Vijayakumar *et al.*, 2006). The same ground has been covered in another systematic review of all female-controlled barrier methods (Minnis and Padian, 2005). Including female condoms in the contraceptive method mix should therefore provide important non-contraceptive benefits.

5.2.2 Randomised controlled trials

Evidence from randomised controlled trials in which the provision of a choice (or choices) between contraceptive methods or between alternatives within a single broadly-defined method was randomly assigned in order to examine its effect on contraceptive or non-contraceptive outcomes was specifically sought for this review. Such evidence is, not unsurprisingly, rare. What evidence could be retrieved was somewhat tangential to the key issues of whether to provide a wide range of closely related alternatives within the confines of an Essential Medicines programme. Such evidence was also more likely to deal with newer contraceptive methods than established methods.

Only two RCTs which specifically addressed choice were retrieved. These are described, together with all other RCTs that have tangentially addressed issues of acceptability, satisfaction, adherence or continuation. That there are demonstrated differences between and within methods in relation to these outcomes should inform policy and practice.

A study in Thailand randomly assigned 71 sex establishments in 4 cities to one of two groups. In one group (34 sex establishments, 249 women), a choice was offered between male and female condoms (Fontanet *et al.*, 1998). The female condom could be used if clients refused or were unable to use a male condom. In the other group (37 sex establishments, 255 women), consistent use of male condoms was advocated. The proportion of unprotected sexual acts and the incidence of sexually transmitted diseases (gonorrhoea, chlamydial infection, trichomoniasis and genital ulcer disease) were measured over a 24-week period in each group. Although condom use was very high in both groups, a 17% reduction in the proportion of unprotected sexual acts was shown in the group afforded a choice between male and female condoms. There was also a 24% reduction in the weighted geometric mean incidence rate of sexually transmitted diseases

(STDs) in the “choice” group (2.81 infections per 100 person-weeks) compared to the male condom only group (3.69 infections per 100 person-weeks, $p=0.18$). The authors did note some limitations to the study. Almost half of the study participants were lost to follow-up after 3 months, but this was unrelated to group assignment. Reliance on coital log data could also be criticized, although inconsistent data were excluded from the analysis. Only 1.4% of coital logs contained such data (e.g. where the number of acts with and without a condom did not tally with the total number reported). A sensitivity analysis, in which such data were included, showed no effect on the results. Nonetheless, this study is important as it demonstrated a benefit (albeit a non-contraceptive benefit) from the provision of a free choice within a broadly-defined (barrier) method.

A study in Mexico randomly assigned 2107 family planning clients to a “standard practice” ($n=1033$) or a “choice and information” group ($n=1074$) (Lazcano Ponce *et al.*, 2000). In the “standard practice” group, providers chose the contraceptive method, based on their clinical examination and any chart review or verbal interaction with the client. In the “choice and information” group, women received a 20 minute one-on-one information session with a nurse, prior to physical examination and screening for STDs. This session focused on the advantages and disadvantages of the reversible contraceptive methods provided (condoms, pills and IUDs), STDs and their risk factors, with reference to the different contraceptives available. At the end of the session, women were asked to indicate their choice of contraceptive method on a confidential form. The authors concluded that “[p]roviding information about family planning methods, STD risk factors, and choice of contraceptive method to family planning clients may reduce the inappropriate and potentially harmful selection of IUDs as a contraceptive method and increase the selection of condoms for contraception in clinics providing these services, even where the IUD is presented as the most effective contraceptive method”. The value judgment implicit in this study design was clearly shown in the final line of the paper: “In addition, giving women information and choice increases women’s participation in their own reproductive health care”.

Exercising choice is dependent on the accurate provision of information, so as to ensure an informed choice. One study has randomly assigned 461 women to 3 groups in which alternative means of communicating relative contraceptive effectiveness were used (Steiner *et al.*, 2003). Three different tables were used to convey this information, showing “categories”, “numbers” or “categories and numbers”. Tables with categories of effectiveness (more effective, effective, less effective) communicated relative effectiveness better than tables with numbers (such as typical use rate of pregnancy). However, without access to numbers, participants grossly overestimated the absolute risk of pregnancy using contraceptives. Nonetheless, most participants in all 3 groups felt that their assigned table provided enough information to choose a contraceptive method. The means to ensure an informed choice should, therefore, be easily accessible. The means to determine the true efficacy of contraceptive methods, compared to no method at all, has also been described (Steiner *et al.*, 1998).

Apart from the two RCTs, in which the provision of choice was explicitly tested, a number of other RCTs have involved random assignment of women to alternative

contraceptive methods. Given recent interest in the female condom, acceptability studies using random assignment have been done. Two randomised crossover studies have addressed the acceptability of female and male condoms (Kulczycki, 2004) and two alternative female condoms (Smit *et al.*, 2006). The import of these studies for the question of choice is that both male and female condoms are associated with acceptable and less acceptable features by users. Kulczycki *et al.* noted: “that neither [male or female condoms] rated high on user satisfaction measures underscores the need for more barriers methods that women and men can use”.

RCT designs have been applied in comparing the acceptability of two COCs (Zichella *et al.*, 1999), the genital symptoms associated with the use of the vaginal ring versus oral contraceptives (Veres S, 2004), user satisfaction and continuation of the vaginal ring versus an oral contraceptive used immediately (Schafer *et al.*, 2006), cycle control, side effects and sexual satisfaction in users of the vaginal ring versus two COCs (Sabatini and Cagiano, 2006), the efficacy, compliance and user satisfaction associated with a transdermal versus an oral contraceptive (Urđl *et al.*, 2005), and the efficacy and cycle control of a transdermal versus an oral contraceptive (Audet *et al.*, 2001). These RCTs are important as exemplars of the range of outcomes measured, and thus considered important. Acceptability may be measured, for example, as impressions of cycle control (such as spotting) or subjective experience of adverse effects (such as breast tenderness). Zichella *et al.* (1999) noted that an active method of questioning elicited a higher number of clients reporting adverse effects that had previously been reported. They did, however, show that the acceptability of the two modern monophasic COCs tested was comparable. Sabatini and Cagiano emphasized that two issues were important determinants of “acceptability, compliance and continuation”; “poor cycle control and disturbance of sexual intercourse due to vaginal dryness and loss of desire”. While better cycle control was achieved with 20µg ethinyl estradiol COC and the vaginal ring than with the 15µg ethinyl estradiol variant, sexual desire and satisfaction were better with the vaginal ring. Schafer *et al.* (2006) also showed that vaginal ring users were highly satisfied with this method and continued its use. Urđl *et al.* (2004) had previously noted that users of the vaginal ring were likely to notice an increase in vaginal wetness and improved vaginal flora, compared to users of oral contraceptives. Although both once-weekly transdermal patches and COCs are hormonal methods that depend on regular use, RCTs have demonstrated differences in adherence. Under trial conditions, efficacy has been comparable. Audet *et al.* (2001) did, however, note that application site reactions, breast discomfort and dysmenorrhoea were more common with the patch group. In contrast, Urđl *et al.* (2005) noted improvements in premenstrual symptoms, physical and emotional well-being in patch users. These data were not, however, collected using intensive quality of life measures. Clients were, for example, asked at various time points whether their emotional well-being was much better, somewhat better, the same, somewhat worse or worse, compared to the pre-study period. Results were then dichotomized, with the proportion reporting “somewhat better” or “much better” presented.

5.2.3 Cohort studies

The most widely cited study concerning the impact of choice on contraceptive use is a prospective cohort study from Indonesia (Pariani *et al.*, 1991). Based on previous data that a large proportion of women attending family planning clinics claimed to have been denied their first contraceptive choice and that an even higher proportion subsequently ceased practising contraception, the authors set out to determine whether sustained contraceptive use was a product of the ability of women to choose their preferred method. In addition, they set out to determine whether concurrence in method choice between husbands and wives affected continuation. Of 2501 first-time users in a variety of purposively-selected settings who were interviewed at initiation, 1945 were re-interviewed after 12 months. Discontinuation rates were starkly different: 8.9% of those afforded their initial choice had discontinued use at 12 months, compared with 72.2% of those denied their choice. Although only 14% of respondents fell into the “choice denied” category, the impact on overall discontinuation was considerable. Husband-wife concurrence had a weak effect on discontinuation.

Over the period of one year, an Indian Council of Medical Research Task Force study offered 8077 women who had not expressed a preference for a particular method, a “balanced presentation of all available contraceptive methods” (Baveja *et al.*, 2000). The relative acceptance of different methods was measured, including the then new option of a hormonal implant (Norplant[®]). Although citing no experimental evidence, the authors stated that “[t]here is sufficient evidence to indicate that contraceptive prevalence increases as a variety of contraceptive options are provided to clients”. What the study did show was that women given different options could exercise these, often overriding provider biases. For example, while providers considered Norplant[®] to be the first choice for 35.6% of women, only 5.7% of women shared this view and only 4.5% eventually accepted this method.

A number of other cohort studies have tangentially addressed the issue of “choice” and are described here. Although only providing for 6 months’ follow-up, a study from Brazil specifically investigated the perceptions of 250 family planning presenters in relation to freedom of choice and the role of educational interventions and the consultation process on this freedom (Osis *et al.*, 2004).² Almost all of the women (99.6%) had already chosen a method before presenting to the clinic. This choice was made available to 90.0% of presenters, and 87.3% were still using that method 6 months later. The educational activity and consultation provided was regarded by 60.0% as having improved their degree of freedom to choose a method. However, it was also stated that 81.9% felt “very free to choose” anyway.

A prospective cohort design was employed within a participatory action research project in Brazil (Diaz *et al.*, 1999). The overall aim of the project was to model “a new and holistic approach to broadening women’s contraceptive choices”. It was thus an attempt to implement what was considered desirable, not an investigation of whether wider

² This full text of this paper was retrieved but not translated from the original Portuguese. An abstract in English was provided.

choice was *per se* desirable. The Brazilian constitution protects the rights of women to receive care in the public sector, but that right is often limited by the availability of such services. Of relevance to the issue of choice, it was noted that during the initial diagnostic phase of the project that “[f]amily planning existed at these facilities as a small, incidental part of gynecological care, for which providers had little preparation, **a limited range of technological options**, and very little time” (emphasis added). This study emphasized that systems improvements had to precede any attempt to broaden contraceptive options, at least where the baseline situation was so severely constrained. Nevertheless, it did show that a systems-wide renewal could be mediated through efforts to broaden choices. This was fundamentally different from the standard “method introduction” approaches used elsewhere. Choice was seen as fundamental to a patient-orientated quality of care. In addition, access to antenatal and general gynecological care was increased, an outcome in concert with the Cairo-mandated approach of implementing family planning within a philosophy and context of reproductive health. Such projects are usually limited by their relatively short duration and site specificity, so the sustainability of the approach modelled cannot be commented upon.

A cohort study in Zambia has demonstrated sustained use of the female condom among couples at risk of HIV (Musaba *et al.*, 1998). Although loss to follow-up was considerable (only 30 of 99 couples were followed up for 12 months), the authors still concluded that “[t]he addition of female condoms accompanied by appropriate counseling to the barrier method mix may reduce unprotected sex among couples at high-risk of HIV infection”.

The challenge of new method introduction in a free-choice environment was studied in Turkey (Say *et al.*, 2000). Only 7% of new users accepted an injectable progestin, and only 18.5% of these were still using the method at 12 months. The authors noted that, “although all the side effects were mentioned during the counselling sessions”, discontinuation might have been related to side effects such as amenorrhoea and spotting. A retrospective study has also looked at changes in contraceptive practices in Turkey over time (Baksu *et al.*, 2005). This was not a cohort study, but rather two cross-sectional studies of records from 1997 (n=2514) and 2002 (n=2268) from a single teaching hospital. Over that time period, use of IUDs and coitus interruptus declined, while use of OCs and condoms increased. Decreased use of IUDs and increased use of condoms was correlated with increasing education status of women. The authors reasoned that “more educated women may be aware of contraceptive options and therefore may understand better the health implications of the different methods”. Yet another cohort study in Turkey had previously shown that contraceptive uptake could be increased over time (Ertem *et al.*, 2001). Among the reasons for non-use were “misconceptions and concerns about health-related risks”. Analysis of retrospective data from two Turkish hospitals showed that women with a higher level of education had fewer pregnancies and living children and were more frequent users of COCs as well as irreversible methods (Ozalp *et al.*, 1999).

Retrospective methods have been used to construct contraceptive use histories for a large cohort of women in Malaysia over a considerable time period (DaVanzo *et al.*, 1989,

DaVanzo *et al.*, 1988). Although there was a dramatic increase in contraceptive prevalence from the mid-1940s to the mid-1970s (and a drop in total fertility), a key finding was that “[p]ersistence with a method was greater the less effective the method”. Put another way, individual couples’ contraceptive practices showed “considerable inertia”. The conclusion reached was that “different contraceptive methods should be available for choice”.

In order to understand reasons for the success of the Dutch contraception programme, a cohort of more than 4500 women aged 15-49 years was followed for 5 years (Van Lunsen *et al.*, 1994). Importantly, women were shown to “view their contraceptive choices as their own”. While they obtained most information on contraceptives (other than condoms) from their general practitioners, these providers were not considered to have a “normative, patronizing and/or moralizing attitude regarding sexuality or contraception”. Over time, increasing numbers of women (particularly teenagers) were seen to use a dual method, one for its contraceptive effect and a condom to prevent both pregnancy and STDs.

A retrospective chart review showed higher continuation rates for levonorgestrel implants than DMPA or OCs among adolescents in a large Midwestern US city (Zibners *et al.*, 1999). In another cohort study of 100 postpartum adolescents, 48 chose Norplant[®] (Polaneczky *et al.*, 1994). At follow-up (a mean of 15.5 months later), more implant users (95%) than OC users (33%) were still using the method chosen. Concern has been expressed that adolescent users of implants may not use condoms as much, putting themselves at greater risk of STDs. A 2-year prospective cohort study of 399 teenagers confirmed that implant users showed a significant reduction in condom use, but not an increase in self-reported incidence of STDs (Darney *et al.*, 1999). This was in line with the results of a study in 1072 new users of long-term contraceptives, defined as either implants or injectables (Cushman *et al.*, 1998). Condom use was shown to drop markedly in these women, but those at risk of STDs were more likely to continue to use condoms. Also from the US, a retrospective review of charts for 605 adolescents showed that Black race/ethnicity was an independent risk factor for the use of less effective barrier contraceptives (Raine *et al.*, 2002). The authors concluded that “[u]nderstanding how black adolescents make contraceptive choices is essential to helping them avoid unintended pregnancies”. A number of other cohort studies have addressed the problem of adolescent pregnancy. A Swedish cohort of 19-year-old women was followed for 3 years (Andersch and Milsom, 1982). Major causes of discontinuation were side-effects of the OC or fears of the effects of the OC. Notably, 37% of the cohort practised no contraception at all.

Cohort designs have been employed in a number of studies looking specifically at HIV-infected or at-risk women. HIV status has been shown to have an impact on contraceptive method choice (Lindsay *et al.*, 1995). Significantly, most repeat pregnancies among both seropositive and seronegative women in this inner city cohort were unplanned (90 and 82% respectively). Another US cohort of HIV infected at HIV at-risk youth showed similar results (Belzer *et al.*, 2001). The rates of unplanned pregnancies in both groups were described as “unacceptably high”.

Various country programmes, in both developed and developing countries, have reported on contraceptive use among cohorts of women. A 10-year cohort study of 22 714 women in Italy showed increasing use of OCs and decreasing use of IUDs (Monteporte *et al.*, 1995). While OCs were shown to be among the most popular contraceptive choices in Kenya, they were also associated with the highest discontinuation rates (Sekadde-Kigundu *et al.*, 1996). An earlier cohort study in two rural areas of Kenya had shown marked differences in use patterns but not fertility (Ferguson, 1992). Ferguson also noted that a variety of local conditions that could impact on fertility, such as differing rates of spousal separation at different times of the year. Extending contraceptive adoption would presumably require that such differences be taken into account. The differences in continuation rates for various contraceptive methods were assessed in a 3-year follow-up of a cohort of 1741 women in Iran, using historical data (Rakhshani and Mohammadi, 2004). Over 3 years, continuation varied from 78% for the levonorgestrel implant to 44% for DMPA. Overall 21.7% of women changed their contraceptive methods 1 to 3 times during the 3 years studied. The reasons for changing varied considerably, but for the levonorgestrel implant the major reason was recorded as side-effects. A cohort of 7199 women was followed for 5 years in New Zealand (Colli *et al.*, 1999). Broadly consistent, but considerable, rates of discontinuation were seen for OCs (42%), IUDs (44%) and DMPA (48%). In contrast with many other studies, irregular bleeding was not reported to be an important reason for discontinuing DMPA use. One-year follow-up of a cohort of contraceptive users in Benin showed that 42% were, by the end of the period at risk of becoming pregnant (Alihonou *et al.*, 1997). Discontinuation was particularly rapid in young women who had chosen to use OCs. Important data have been generated from the large Matlab cohort in Bangladesh (Bairagi *et al.*, 2000). Data from the 1978 to 1994 period showed that use-failure for OCs, IUDs, injectables and other reversible methods increased until 1988 but declined thereafter. Like in many developing country settings, injectable use is responsible for more than 50% of total use in Matlab. Failure with injectables is also low, but the authors of this study were at pains to point out that the experience in this one area was not representative of the whole country. Injectables are not widely used outside of Matlab, and contraceptive failure is a major problem with all other reversible methods (including traditional methods). In order to address high failure rates, the authors advocated “[s]ome change in the method mix”, but cautioned that the options offered would have to be culturally acceptable to Bangladeshi women. Cohort methods have also been used to address discontinuation in other traditional societies. A prospective study of 207 married working Muslim women was conducted in Jordan (Albsoul-Younes *et al.*, 2003). While effectiveness was the main reason for choosing among effective methods (IUDs and OCs), safety concerns were the main reasons for discontinuation. Critically, the main reason for using contraceptives was birth spacing. At a systems level, it has been assumed that contact by women in developing country settings with modern maternal and child health services should increase the prevalence of effective contraceptive use. This existence of this causal relationship was supported by empiric data from Morocco (Hotchkiss *et al.*, 1999). As 97% of women using a modern method were using an OC, the official Moroccan government policy was to “broaden the method mix”.

Cohort designs have also been applied to the study of particular methods. For example, a 2-year follow-up of 189 predominantly new users of injectable progestin-only contraceptives in South Africa showed continuation to be as low as 21% at the end of that period (Beksinska *et al.*, 2001). Breaks in use were attributed mostly to menstrual disturbances. An earlier cross-sectional survey in the same country had shown that compliance was a problem with both injectable and OC users (Beksinska *et al.*, 1998). Injectable users commonly cited menstrual disturbances as the reason for non-use. A Turkish cohort study followed 9262 users of DMPA over 5 years, showing a discontinuation rate of 71% (Aktun *et al.*, 2005). Again, the most commonly cited reason for discontinuation was menstrual disturbances. Analysis of menstrual diaries of Indian women participating in various clinical trials undertaken by the Indian Council of Medical Research showed that bleeding irregularities were associated with the use implants and progestin-only injectables, rather than with OCs or combined injectables (Datey *et al.*, 1995). Increased bleeding was also associated with copper IUD use, but decreased with time. It was, however, noted that women experiencing frequent or prolonged bleeding were more likely to discontinue use of the contraceptives that were those experiencing delayed bleeding episodes or oligomenorrhoea. Using data from 5 clinical trials, a group from the Pan American Health Organization showed that there were marked differences between individual women in terms of their acceptance of bleeding disturbances (Belsey, 1988). Counselling could make a difference, as DMPA users were more likely to tolerate far grater menstrual disturbance than were OC users (who may not have been warned of this possibility). Abandonment of OC use has also been linked to adverse effects (Huber *et al.*, 2006).

A Canadian study showed high acceptability of the transdermal patch (Weisberg *et al.*, 2005). Long-term acceptability, efficacy and safety of both two rod (Wan *et al.*, 2003) and single rod (Rai *et al.*, 2004, Zheng *et al.*, 1999) implants have been conducted over extended periods. High levels of acceptability have also been shown for the vaginal ring (Novak *et al.*, 2003) and the subcutaneous formulation of DMPA (Jain *et al.*, 2004). Beneficial effects of a new formulation COC (containing drospirinone and ethinyl estradiol) on fluid retention-related symptoms and general well-being (as measured by a standardized instrument) have also been demonstrated (Apter *et al.*, 2003). Prospective cohort studies have been used in introductory studies of a combined, monthly injectable in Mexico (Garza-Flores *et al.*, 1998) and other countries (Hall, 1994). The second of these showed wide differences in discontinuation rates, varying from 33.5% in Indonesia to 71.8% in Tunisia.

5.2.4 Cross-sectional studies

Numerous cross-sectional surveys have described contraceptive use patterns in a variety of settings. A small number of these have specifically looked at issues of choice, such as the reasons women give for making a particular choice.

A qualitative study in the United Kingdom reported that “young women’s decision making regarding hormonal contraceptives is not simply determined by the experience of adverse effects but reflects the meaning of unwanted effects in relation to underlying beliefs regarding the nature of hormones in contraceptives, ‘natural’ menses, menstrual

control and the importance of avoiding pregnancy” (Cheung and Free, 2005). By way of explanation, these authors offered the following examples: “When unwanted effects were experienced, women with no concerns about the nature of hormones tended to switch to other highly effective hormonal contraceptives. Those with underlying concerns regarding the nature of hormones returned to (inconsistent) condom use or stopped using contraceptives altogether”. While Cheung and Free (2005) saw such insights as necessary for effective service delivery, in terms of “tailored advice, interventions and contraceptives”, the last of these presupposes a range of options on offer. That adverse effects may drive decision-making has previously been shown by another UK study (Edwards *et al.*, 2000). Edwards *et al.* concluded that “[m]any women are more concerned about the adverse health effects associated with hormonal contraceptives than about effectiveness”. This study identified concerns about bleeding irregularities and weight gain as particularly important, but also noted that women tended to overestimate the risk of thrombosis associated with hormonal contraceptives.

Decision-making may, however, be different in different settings. For example, a cross-sectional study in HIV-positive Brazilian women showed that younger women were more likely to use contraceptive methods that preserved the option of child-bearing at a later stage (da Silveira Rossi *et al.*, 2005). Appropriate choices may be made by those at higher risk. For example, a study of contraceptive choices made by non-HIV-positive injecting drug users in France showed higher than expected condom use (Vidal-Trecan *et al.*, 2003). Dual use of condoms and hormonal methods has been shown, in a US setting, to be more likely among younger women, those with more than one sexual partner in the past year, and those highly motivated to avoid HIV/STDs (Harvey *et al.*, 2004). Similar factors were shown to predict choice of a female-controlled barrier method following an educational intervention aimed at 15-30-year-old women in San Francisco (Minnis and Padian, 2001). The diaphragm has also been considered as a female-controlled barrier method that may protect against STDs, and which is acceptable to some women (Bird *et al.*, 2004). Reasons for wanting and not wanting to use different barrier options may be affected by local practices, such as dry sex (Buck *et al.*, 2005). A US study showed that sexually-active adolescents were less resistant to using condoms, regardless of the availability of newer contraceptive methods (Grimley and Lee, 1997). Even in traditionally liberal societies, such as Sweden, adolescents may exhibit fear of hormonal contraceptives, which may affect their decision-making (Ekstrand *et al.*, 2005). Methods that are widely used in some settings may be rejected in others. For example, IUD use in the United Kingdom is less prevalent than in other settings and the decision not to use this method has been shown to be based on a wide variety of reasons, including beliefs that a “hidden” method may be “unreliable” (Asker *et al.*, 2006).

How counselling is implemented may impact on contraceptive use. Counsellors’ own personal experience may cloud the way they represent available choices (Bianchi-Demicheli *et al.*, 2006), and failure to take into account women’s intentions regarding pregnancy avoidance may lead to inappropriate choices being exercised (Petersen *et al.*, 2001).

5.2.5 Miscellaneous study designs

A pre-post design was used to explore barriers to female condom use among high-risk adolescents (Haignere *et al.*, 2000). Noting that, even after having received small-group instruction on female condom use, most (73%) of the 65 adolescents still preferred the male condom, the authors concluded that “[f]emale condoms should be offered to adolescents as an *additional choice* rather than as *replacements* for male condoms”.

Case-control methods have been used to investigate aspects of contraceptive “failure” (Saha *et al.*, 2004, van Bogaert, 2003). Van Bogaert (2006) used this method to investigate whether the free availability of contraception in South Africa affected the need for termination of pregnancy (TOP). While many potential biases and problems were identified with this study, it is important for the fact that 105/114 TOP seekers had discontinued previous contraceptive use because of side-effects. Case-control methods were used by Saha *et al.* (2004) to explore the reasons for pill failure in the Matlab area of Bangladesh. Among the reasons for failure noted was poor side-effect management leading to irregular use. Although the authors emphasized better training and communication aids as potential solutions, they did not consider how a wider choice of contraceptive methods might have addressed problems that may be unique to the oral contraceptive (such as the need to deal with missed pills).

One pharmacoeconomic analysis of contraceptives was retrieved (Chiou *et al.*, 2003). This study used a Markov model to compare effectiveness and costs of 9 contraceptive methods (other than vasectomy) available in the United States, from a health care services payer perspective. The LNG-20 IUS and the copper T 380A IUD dominated all reviewed methods except tubal ligation. The least expensive methods, on a 5-year cost/person basis, were the LNG-20 IUS, the copper T 380A IUD and the 3-month injectable. Given the high cost of unwanted pregnancies, longer-term methods with high effectiveness were expected to dominate. The authors tried to estimate whether the inclusion of newer methods, such as the transdermal patch and the monthly injectable, might have altered their results. Sensitivity analyses were performed using a range of effectiveness values for the OCs that would include values for the new methods (presumably with better adherence and hence effectiveness). No changes in the rankings were evident. If anything, this pharmacoeconomic analysis serves to emphasise how difficult it would be to apply such methods to deciding between options when taking into account a wide range of outcomes.

5.3 Does a policy of providing a wide range of contraceptive methods, as opposed to the provision of a limited range, improve maternal health and well-being (including the reduction of unintended pregnancies)?

Few studies were retrieved which specifically addressed the issue of whether increasing choice *per se* will improve maternal health and well-being (including the reduction of unintended pregnancies). That said, some of the data on differences in adverse effect data between and even within methods (see section 5.2) may have an ultimate impact on women’s health. For example, women who continue to use a method associated with

excessive bleeding may develop anaemia. The impact on quality of life may not have been directly measured, but is easily inferred.

Only 1 randomised controlled trial and 1 cohort study can be construed to have included an intervention based on the provision of an additional choice of contraceptive method, and to have measured the impact on well-being. These are summarised in Table 4.

5.3.1 Systematic reviews

No Cochrane or non-Cochrane systematic reviews have directly addressed this question.

5.3.2 Randomised controlled trials

As described above (see 5.2.2) a study in Thailand randomly assigned 71 sex establishments in 4 cities to one of two groups, and included a measure of well-being (incidence of STIs) (Fontanet *et al.*, 1998). The study showed that providing an additional barrier method (female condoms) within a commercial sex environment resulted in a reduction in the weighted geometric mean incidence rate of sexually transmitted diseases (STDs) in the “choice” group (2.81 infections per 100 person-weeks) compared to the male condom only group (3.69 infections per 100 person-weeks, $p=0.18$).

5.3.3 Cohort studies

The choice of contraceptive method was of fundamental importance in a cohort study which tried to identify the “components of a comprehensive, multidisciplinary, adolescent-oriented maternity program” to help teenage mothers delay subsequent pregnancies (Stevens-Simon *et al.*, 2001). The most profound effect was found to be the contraceptive choices made during the puerperium. Using a long-acting hormonal method (in this case Norplant[®] or DMPA) during this time was associated with pregnancy prevention during the first 2 post-partum years.

5.3.4 Cross-sectional studies

Women may have reasons to use a particular method, but also reasons for avoiding other methods. A cross-sectional survey in Turkey showed that women cited convenience and efficiency as reasons for using modern methods, but adverse experiences or concerns about other methods as reasons for choosing traditional methods (Bulut *et al.*, 1997). This study also looked at women’s self-reported health status. The majority (81%) reported at least one episode of ill-health in the 3 months preceding the interview. While menstrual disturbances were more likely to occur in users of hormonal methods, other perceived or diagnosed examples of reproductive ill-health were not related to contraceptive method choice. The authors, however, made this important statement: “Fear of side effects and perceptions of reproductive morbidity during contraceptive use can have a strong influence on contraceptive choice or continuation”. This again emphasizes the interlinked nature of these issues.

Table 4: Summary of evidence on effect of widened choice on maternal health and well-being (including the reduction of unintended pregnancies)

Author(s), date	Country/Population/ Setting	Study design	Outcomes	Comment
Systematic reviews				
No key studies retrieved				
Randomised controlled trials				
Fontanet <i>et al.</i> , 1998	Thailand; 4 cities	71 sex establishments assigned to a male or female condom group (34 establishments, 249 women) or male condom only (37 establishments, 255 women); measured proportion of unprotected sex acts and incidence of sexually transmitted infections (STIs) over 24 weeks. <i>Follow-up</i> every 14 days for 24 weeks	Decreased proportion of unprotected sex acts (5.9% vs. 7.1%, p=0.16); reduced incidence of STIs (2.81 vs. 3.69 per 100 person weeks, p=0.18)	Number of women in each establishment is small; use data based on fortnightly interviews and coital logs, with inconsistent data not recorded for analysis; statistically significant difference shown despite high prevalence of condom use (more than 97% in both groups); sample size achieved was less than that determined in the initial power calculation; high loss to follow up
Cohort studies				
Stevens-Simon <i>et al.</i> , 2001	Colorado, USA; urban teaching hospital	373 teenage mothers offered a comprehensive, multidisciplinary, adolescent-oriented maternity programme, including contraceptive choices; measured repeat adolescent pregnancy <i>Follow-up</i> 1 & 2 yrs	Failure to choose a long-acting implant was associated with a higher risk of repeat pregnancy (relative risk 8.89, 95% confidence interval 2.80 to 28.50); similar effect for not using an injectable (RR 2.30, 95% CI 1.60 to 3.29)	High loss to follow up (only 245/373 retained in the programme at 1 year and 191/373 at 2 years)

5.3.5 Miscellaneous study designs

No other studies were identified which directly addressed this question.

5.4 Other review articles

A large number of non-systematic review articles, commentaries and reports have touched on issues already covered in the “Background” section. For the sake of completeness, those retrieved but not mentioned elsewhere are cited here (Anonymous, 2004a, Anonymous, 2004b, Anonymous, No date-a, Azzarello and Collins, 2004, Barnett, 1995, Barnett, 1998, Barnett, 1999, Best, 1998a, Best, 1998b, Best, 1999, Blackburn *et al.*, 2000, Brache *et al.*, 2003, Butler, 2004, Calderoni and Coupey, 2005, Dhall, 1994, Family Health International, 2006, Family Health International, 1996, Family Health International, 1994, Family Health International, 2005, Finger, 2002, Freeman, 2004, Gallagher, 1998, Garza-Flores, 1998a, Garza-Flores, 1998b, Gebbie, 2003, Greenwell, 1996, Greydanus *et al.*, 2001, Gribble *et al.*, 2004, Griffin, 2005, Grimes, 2001, Hall, 1998, Hansen and Saseen, 2004, Hardjanti, 1995, Herndon and Zieman, 2004, Jakimiuk, 2002, Kaunitz, 2005, Kenya Ministry of Health, 2006, Miner, 2004, Pettinato and Emans, 2003, Pinter, 2002, Popov *et al.*, 1993, Reaves, 2002, Ross, 2002, Salem, 2006, Santhya, 2003, Shears, 2002, Shah, 1994, Upadhyay and Adhikary, 2005, Webb, 2002, Weisberg, 1994, Welner, 1999, Westhoff, 2005, Westhoff, 2001, WHO, 2002, WHO, 1999, WHO, 2004a, Zahradnik, 2005, Shah, 2003, Cates, 2005).

6. Conclusions

Not unsurprisingly, this systematic review has failed to find large quantities of high quality evidence that increasing choice has a direct impact on the contraceptive outcomes of interest. What evidence does exist is either dated (such as that provided by Jain, Pariani *et al.* and the Caldwells), on newer methods (such as the female condom, as in Fontanet *et al.*), the process of providing choice (such as that provided by Lazcano Ponce *et al.*) or from non-experimental studies (such as the cohort studies by Kalaca *et al.*, Baveja *et al.*, and Stevens-Simon *et al.*). It supports the contention that increased choice is associated with increased uptake and with better health outcomes (such as lower pregnancy rates and fewer STIs), and that women, given a choice, exercise it and continue use of their chosen contraceptives to a greater degree than those denied their choices. There is no evidence to the contrary. Nonetheless, a commitment to expanded choice is pervasive in the literature, and has informed global and national policies. Such an approach is consistent with a human rights and Essential Medicines approach.

It would be tempting to call for well-designed randomised controlled trials to inform future decision-making. A recent commentary by the Cochrane Fertility Regulation Group has noted the lack of good quality evidence in this field (Helmerhorst *et al.*, 2006). Of 32 systematic reviews conducted by this Group, only 5 have included firm conclusions. These authors have expressed confidence that future reviews will be based on RCT evidence that will become available. That may well be true in relation to studies that compare methods. The question must, however, be posed: will RCTs looking at the provision of increased contraceptive choice and measuring the impact on uptake, uptake, acceptability, adherence, continuation and satisfaction, the reduction of unintended pregnancy or improved maternal health and wellbeing, be possible in many settings? If not, is this a question that can be answered on the basis of existing evidence that choice matters to women, that methods vary considerably, and that the provision of contraception cannot be approached in the same way as the treatment of a chronic ailment? If not, should the totality of the evidence presented here, not just the specific studies highlighted, be considered?

In contrast, therefore, to other medicine selection issues, consideration has to be given to the changing nature of contraceptive choices over the 3 decades of a woman's reproductive life. Choices are made under particular circumstances and vary in differing social and cultural contexts. No contraceptive method is perfect and women need to make trade-offs among different methods, necessitating access to a range of methods. Unlike the choice of an antihypertensive or diabetic medicine, the choices of contraceptive methods may therefore represent a choice of the least unpleasant of a set of alternatives. Such realisations have informed, and should continue to inform, policy at the WHO, country and programme levels. Factors that have been identified as affecting method choice include age, gender, contraceptive intention (spacing versus limiting), lactation status, health profile, tolerance of side effects, and income. Contraceptive choice is also, in part, dependent on how effective the method is and continuation rates are generally higher with more effective methods. No "ideal" method mix has been recognised, but increasingly contraceptives which provide protection against unwanted pregnancies and

the acquisition of HIV and other sexually transmitted infections, and which protect future fertility, will be important as part of any method mix.

7. Acknowledgments

The assistance of Sarah Needham (Heilbrunn Department of Population and Family Health, Columbia University), Ashley Fox (Mailman School of Public Health, Columbia University) and Theresa Mofana (RHRU, University of the Witwatersrand) in searching the literature and identifying relevant information is gratefully acknowledged.

8. References

- ADINMA, J. I., AGBAI, A. O. & NWOSU, B. O. (1998) Contraceptive choices among Nigerian women attending an antenatal clinic. *Advances in Contraception*, 14, 131-45.
- AKTUN, H., MOROY, P., CAKMAK, P., YALCIN, H. R., MOLLAMAHMUTOGLU, L. & DANISMAN, N. (2005) Depo-Provera: Use of a long-acting progestin injectable contraceptive in Turkish women. *Contraception*, 72, 24-27.
- ALBSOUL-YOUNES, A. M., SALEH, F. & EL-KHATEEB, W. (2003) Perception of efficacy and safety as determinants for use and discontinuation of birth control methods in Muslim Jordanian women. *European Journal of Contraception & Reproductive Health Care*, 8, 156-61.
- ALIHONOU, E., CARRE, N., CAPOCHICHI, V. & THONNEAU, P. (1997) Contraceptive continuation and its determinants in Benin. *Contraception*, 55, 97-101.
- ANDERSCH, B. & MILSOM, I. (1982) Contraception and pregnancy among young women in an urban Swedish population. *Contraception*, 26, 211-9.
- ANONYMOUS (1980) User preferences for contraceptive methods in India, Korea, the Philippines, and Turkey. World Health Organization Task Force on Psychosocial Research in Family Planning and Task Force on Service Research in Family Planning. *Studies in Family Planning*, 11, 267-273.
- ANONYMOUS (2004a) FFPRHC Guidance (July 2004): Contraceptive choices for breastfeeding women. *Journal of Family Planning & Reproductive Health Care*, 30, 181-189.
- ANONYMOUS (2004b) FFPRHC Guidance (October 2004) Contraceptive choices for young people. *Journal of Family Planning & Reproductive Health Care*, 30, 237-251.
- ANONYMOUS (No date-a) Contraceptive technologies: how much choice do we really have? *Population Connection*.
- ANONYMOUS (No date-b) Overview: meeting needs through the life cycle. *Reproductive Health Outlook*. PATH.
- APTER, D., BORSOS, A., BAUMGARTNER, W., MELIS, G. B., VEXIAU-ROBERT, D., COLLIGS-HAKERT, A., PALMER, M. & KELLY, S. (2003) Effect of an oral contraceptive containing drospirenone and ethinylestradiol on general well-being and fluid-related symptoms. *European Journal of Contraception & Reproductive Health Care*, 8, 37-51.
- ASKER, C., STOKES-LAMPARD, H., BEAVAN, J. & WILSON, S. (2006) What is it about intrauterine devices that women find unacceptable? Factors that make women non-users: A qualitative study. *Journal of Family Planning & Reproductive Health Care*, 32, 89-94.
- AUDET, M. C., MOREAU, M., KOLTUN, W. D., WALDBAUM, A. S., SHANGOLD, G., FISHER, A. C., CREASY, G. W. & ORTHO EVRA STUDY GROUP (2001) Evaluation of contraceptive efficacy and cycle control of a transdermal contraceptive patch vs an oral contraceptive: a randomized controlled trial. *JAMA*, 285, 2347-2354.

- AZZARELLO, D. & COLLINS, J. (2004) Canadian access to hormonal contraceptive drug choices. *Journal of Obstetrics & Gynaecology Canada: JOGC*, 26, 489-500.
- BAIRAGI, R., ISLAM, M. M. & BARUA, M. K. (2000) Contraceptive failure: levels, trends and determinants in Matlab, Bangladesh. *Journal of Biosocial Science*, 32, 107-123.
- BAKSU, A., GUNES, G., AKI, G., TUYSUZ, F. & GOKER, N. (2005) Change in contraceptive choices and the effect of education on use of contraception at the family planning clinic of Sisli Etfal Training and Research Hospital, Istanbul, Turkey. *European Journal of Contraception & Reproductive Health Care*, 10, 98-104.
- BARNETT, B. (1995) Women's views influence contraceptive use. *Network* 16.
- BARNETT, B. (1998) Clients Prefer Method Choices *Network*, 19.
- BARNETT, B. (1999) Recent FHI Research: Pregnancy Checklist Improves Method Access *Network*, 19.
- BAVEJA, R., BUCKSHEE, K., DAS, K., DAS, S. K., HAZRA, M. N., GOPALAN, S., GOSWAMI, A., KODKANY, B. S., SUJAYA KUMARI, C. N., ZAVERI, K., ROY, M., DATEY, S., GAUR, L. N., GUPTA, N. K., GUPTA, R. N., SAXENA, N. C., SINGH, R., KUMAR, S., YADAV, S. C. & SAXENA, B. N. (2000) Evaluating contraceptive choice through the method-mix approach. An Indian Council of Medical Research (ICMR) task force study. *Contraception*, 61, 113-9.
- BEKSINSKA, M. E., REES, H. V. & SMIT, J. (2001) Temporary discontinuation: a compliance issue in injectable users. *Contraception*, 64, 309-13.
- BEKSINSKA, M. E., REES, V. H., NKONYANE, T. & MCINTYRE, J. A. (1998) Compliance and use behaviour, an issue in injectable as well as oral contraceptive use? A study of injectable and oral contraceptive use in Johannesburg. *British Journal of Family Planning*, 24, 21-23.
- BELSEY, E. M. (1988) The association between vaginal bleeding patterns and reasons for discontinuation of contraceptive use. *Contraception*, 38, 207-225.
- BELZER, M., ROGERS, A. S., CAMARCA, M., FUCHS, D., PERALTA, L., TUCKER, D. & DURAKO, S. J. (2001) Contraceptive choices in HIV infected and HIV at-risk adolescent females. *Journal of Adolescent Health*, 29, 93-100.
- BENSYL, D. M., IULIANO, D. A., CARTER, M., SANTELLI, J. & GILBERT, B. C. (2005) Contraceptive use - United States and territories, Behavioral Risk Factor Surveillance System, 2002. *Morbidity & Mortality Weekly Report Surveillance Summaries*, 54, 1-72.
- BEST, K. (1998a) Contraception Improves Employment Prospects. *Network*, 18.
- BEST, K. (1998b) Contraceptive Update: Menstrual Changes Influence Method Use *Network*, 19.
- BEST, K. (1999) Ways to Expand Contraceptive Choices. *Network*, 19.
- BIANCHI-DEMICHELI, F., PERRIN, E., DUPANLOUP, A., DUMONT, P., BONNET, J., BERTHOUD, M., KULIER, R., BETTOLI, L., LORENZI-CIOLDI, F. & CHARDONNENS, D. (2006) Contraceptive counselling and social representations: a qualitative study. *Swiss Medical Weekly*, 136, 127-34.
- BIRD, S. T., HARVEY, S. M., MAHER, J. E. & BECKMAN, L. J. (2004) Acceptability of an existing, female-controlled contraceptive method that could potentially

- protect against HIV: a comparison of diaphragm users and other method users. *Womens Health Issues*, 14, 85-93.
- BLACKBURN, R. D., CUNKELMAN, J. A. & ZLIDAR, V. M. (2000) Oral Contraceptives - An Update *Population Reports, Series A, Number 9*. Maryland, Population Information
- BONGAARTS, J. & JOHANSSON, E. (2002) Future trends in contraceptive prevalence and method mix in the developing world. *Studies in Family Planning*, 33, 24-36.
- BOONSTRA, H., DURAN, V., NORTHINGTON GAMBLE, V., BLUMENTHAL, P., DOMINGUEZ, L. & PIES, C. (2000) The 'boom and bust phenomenon': The hopes, dreams, and broken promises of the contraceptive revolution. *Contraception*, 61, 9-25.
- BORODITSKY, R., FISHER, W. A. & BRIDGES, M. L. (1999a) The 1998 Canadian Contraception Study. *Canadian Journal of Human Sexuality*, 8, 161-216.
- BORODITSKY, R., FISHER, W. A. & BRIDGES, M. L. (1999b) Changes in contraceptive use among Canadian women [1998 Canadian contraception study: Part 8]. *Canadian Journal of Human Sexuality*, 8, 203-205.
- BORODITSKY, R., FISHER, W. A. & BRIDGES, M. L. (1999c) Contraceptive attitudes and practices of Canadian women in their later reproductive years [1998 Canadian contraception study: Part 7]. *Canadian Journal of Human Sexuality*, 8, 199-202.
- BORODITSKY, R., FISHER, W. A. & BRIDGES, M. L. (1999d) Familiarity with, opinions about, and use of contraceptive methods among Canadian women [1998 Canadian contraception study: Part 2]. *Canadian Journal of Human Sexuality*, 8, 167-173.
- BORODITSKY, R., FISHER, W. A. & BRIDGES, M. L. (1999e) Fifteen-year Canadian contraceptive trends [1998 Canadian contraception study: Part 9]. *Canadian Journal of Human Sexuality*, 8, 207-211.
- BORODITSKY, R., FISHER, W. A. & BRIDGES, M. L. (1999f) Oral contraceptive use among Canadian women: practice and opinions [1998 Canadian contraception study: Part 4]. *Canadian Journal of Human Sexuality*, 8, 183-187.
- BRACHE, V., FAUNDES, A. & ALVAREZ, F. (2003) Risk-benefit effects of implantable contraceptives in women. *Expert Opinion on Drug Safety*, 2, 321-32.
- BRADY, M. (2003) Preventing sexually transmitted infections and unintended pregnancy, and safeguarding fertility: triple protection needs of young women. *Reproductive Health Matters*, 11, 134-141.
- BRAMBILA, C. & TARACENA, B. (2003) Availability and acceptability of IUDs in Guatemala . FRONTIERS Final Report. Washington, DC, Population Council.
- BROMHAM, D. R. (1996) Contraceptive implants. *BMJ*, 312, 1555-1556.
- BRUCE, J. (1990) Fundamental Elements of the quality of care: A simple framework. *Studies in Family Planning*, 21, 61-91.
- BUCK, J., KANG, M.-S., VAN DER STRATEN, A., KHUMALO-SAKUTUKWA, G., POSNER, S. & PADIAN, N. (2005) Barrier method preferences and perceptions among Zimbabwean women and their partners. *AIDS & Behavior*, 9, 415-22.
- BULUT, A., FILIPPI, V., MARSHALL, T., NALBANT, H., YOLSAL, N. & GRAHAM, W. (1997) Contraceptive choice and reproductive morbidity in Istanbul. *Studies in Family Planning*, 28, 35-43.

- BUTLER, P. A. (2004) Contraceptive methods - better information for a wider choice. IN KHANNA, J. (Ed.) *Progress in Reproductive Health Research*. Geneva, World Health Organization.
- CALDERONI, M. E. & COUPEY, S. M. (2005) Combined hormonal contraception. *Adolescent Medicine Clinics*, 16, 517-37.
- CALDWELL, J. C. & CALDWELL, P. (1992) What does the Matlab fertility experience really show? *Studies in Family Planning*, 23, 292-310.
- CATES JR, W. & STONE, K. M. (1992a) Family planning, sexually transmitted diseases and contraceptive choice: A literature update - Part I. *Family Planning Perspectives*, 24, 75-84.
- CATES JR, W. & STONE, K. M. (1992b) Family planning, sexually transmitted diseases and contraceptive choice: A literature update - Part II. *Family Planning Perspectives*, 24, 122-128.
- CATES, W., JR. (1996) Contraceptive choice, sexually transmitted diseases, HIV infection, and future fecundity. *Journal of the British Fertility Society*, 1, 18-22.
- CATES, W., JR. (2005) Review of non-hormonal contraception (condoms, intrauterine devices, nonoxynol-9 and combos) on HIV acquisition. *Journal of Acquired Immune Deficiency Syndromes*, 38, S8-S10.
- CATES, W., JR. & STEINER, M. J. (2002) Dual protection against unintended pregnancy and sexually transmitted infections: what is the best contraceptive approach? *Sexually Transmitted Diseases*, 29, 168-74.
- CHEUNG, E. & FREE, C. (2005) Factors influencing young women's decision making regarding hormonal contraceptives: a qualitative study. *Contraception*, 71, 426-431.
- CHIOU, C. F., TRUSSELL, J., REYES, E., KNIGHT, K., WALLACE, J., UDANI, J., ODA, K. & BORENSTEIN, J. (2003) Economic analysis of contraceptives for women. *Contraception*, 68, 3-10.
- COLLI, E., TONG, D., PENHALLEGON, R. & PARAZZINI, F. (1999) Reasons for contraceptive discontinuation in women 20-39 years old in New Zealand. *Contraception*, 59, 227-31.
- CROXATTO, H. B. & FERNANDEZ, S. D. (2006) Emergency contraception - a human rights issue. *Best Practice & Research in Clinical Obstetrics & Gynaecology*, 20, 311-322.
- CURTIS, K. & MARTINS, S. (2006) Progestogen-only contraception and bone mineral density: a systematic review. *Contraception*, 73, 470-487.
- CURTIS, K. M., CHRISMAN, C. E., MOHLLAJEE, A. P. & PETERSON, H. B. (2006) Effective use of hormonal contraceptives. Part I: Combined oral contraceptive pills. *Contraception*, 73, 115-124.
- CURTIS, K. M., CHRISMAN, C. E., PETERSON, H. B. & HEALTH, W. H. O. P. F. M. B. P. I. R. (2002) Contraception for women in selected circumstances. *Obstetrics & Gynecology*, 99, 1100-12.
- CUSHMAN, L. F., ROMERO, D., KALMUSS, D., DAVIDSON, A. R., HEARTWELL, S. & RULIN, M. (1998) Condom use among women choosing long-term hormonal contraception. *Family Planning Perspectives*, 30, 240-243.

- DA COSTA LEITE, I., GUPTA, N. & DO NASCIMENTO RODRIGUES, R. (2004) Female sterilization in Latin America: Cross-national perspectives. *Journal of Biosocial Science*, 36, 683-698.
- DA SILVEIRA ROSSI, A., FONSECHI-CARVASAN, G. A., MAKUCH, M. Y., AMARAL, E. & BAHAMONDES, L. (2005) Factors associated with reproductive options in HIV-infected women. *Contraception*, 71, 45-50.
- DANG, A. (1995) Differentials in contraceptive use and method choice in Vietnam. *International Family Planning Perspectives*, 21, 2-5.
- DARNEY, P. D., CALLEGARI, L. S., SWIFT, A., ATKINSON, E. S. & ROBERT, A. M. (1999) Condom practices of urban teens using Norplant contraceptive implants, oral contraceptives, and condoms for contraception. *American Journal of Obstetrics & Gynecology*, 180, 929-937.
- DATEY, S., GAUR, L. N. & SAXENA, B. N. (1995) Vaginal bleeding patterns of women using different contraceptive methods (implants, injectables, IUDs, oral pills)--an Indian experience. An ICMR Task Force Study. Indian Council of Medical Research. *Contraception*, 51, 155-65.
- DAVANZO, J., REBOUSSIN, D., STARBIRD, E., TAN, B. A. & HADI, S. A. (1989) Contraceptive method switching over women's reproductive careers: evidence from Malaysian life history data, 1940s-70s. *Journal of Biosocial Science - Supplement*, 11, 95-116.
- DAVANZO, J., STARBIRD, E., REBOUSSIN, D., TAN BOON, A. & ABDULLAH, S. H. (1988) Contraceptive method switching in Peninsular Malaysia: ethnic differences, 1940s-1970s. *Malaysian Journal of Reproductive Health*, 6, 1-21.
- DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS POPULATION DIVISION (2003) World Contraceptive Use 2003. New York, United Nations.
- DHALL, A. (1994) Contraceptives: choice for the millions? *Health for the Millions*, 2, 21-5.
- DIAZ, M., SIMMONS, R., DIAZ, J., GONZALEZ, C., MAKUCH, M. Y. & BOSSEMEYER, D. (1999) Expanding contraceptive choice: findings from Brazil. *Studies in Family Planning*, 30, 1-16.
- DIXON-MUELLER, R. & GERMAIN, A. (2006) Fertility Regulation and Reproductive Health in the Millenium Development Goals: The Search for a Perfect Indicator? *American Journal of Public Health*.
- DRAPER, B., MORRONI, C., HOFFMAN, M., SMIT, J., BEKSINSKA, M., HAPGOOD, J. & VAN DER MERWE, L. (2006) Depot medroxyprogesterone versus norethisterone oentane for long-acting progestogenic contraception. *Cochrane Database of Systematic Reviews*.
- EDWARDS, J. E., OLDMAN, A., SMITH, L., MCQUAY, H. J. & MOORE, R. A. (2000) Women's knowledge of, and attitudes to, contraceptive effectiveness and adverse health effects. *British Journal of Family Planning*, 26, 73-80.
- EKSTRAND, M., LARSSON, M., VON ESSEN, L. & TYDEN, T. (2005) Swedish teenager perceptions of teenage pregnancy, abortion, sexual behavior, and contraceptive habits--a focus group study among 17-year-old female high-school students. *Acta Obstetrica et Gynecologica Scandinavica*. 84(10):980-6, 2005 Oct., 84, 980-986.

- ERTEM, M., ERGENEKON, P., ELMACI, N. & ILCIN, E. (2001) Family planning in grand multiparous women in Diyarbakir, Turkey, 1998: The factors affecting contraceptive use and choice of method. *European Journal of Contraception & Reproductive Health Care*, 6, 1-8.
- FAMILY HEALTH INTERNATIONAL (1994) Maximizing access to quality family planning and reproductive health services Durham, NC, Family Health International.
- FAMILY HEALTH INTERNATIONAL (1996) Increasing Contraceptive Use in Bangladesh. Durham, NC, Family Health International.
- FAMILY HEALTH INTERNATIONAL (2005) Underused research findings, February 2005. Durham, NC, Family Health International.
- FAMILY HEALTH INTERNATIONAL (2006) Contraceptive method choice in Nepal and Mexico, October 1999. Durham, NC, Family Health International.
- FERGUSON, A. G. (1992) Fertility and contraceptive adoption and discontinuation in rural Kenya. *Studies in Family Planning*, 23, 257-67.
- FINGER, W. R. (1999) Unmet Need Affects Millions. *Network*, 19.
- FINGER, W. R. (2002) Choices Must Be Informed, Voluntary *Network*, 21.
- FISHER, W., BORODITSKY, R. & MORRIS, B. (2004a) The 2002 Canadian Contraception Study: part 1. *Journal of Obstetrics & Gynaecology Canada: JOGC*, 26, 580-90.
- FISHER, W., BORODITSKY, R. & MORRIS, B. (2004b) The 2002 Canadian Contraception Study: Part 2. *Journal of Obstetrics & Gynaecology Canada: JOGC*, 26, 646-56.
- FISHER, W. A. & BORODITSKY, R. (2000) Sexual activity, contraceptive choice, and sexual and reproductive health indicators among single Canadian women aged 15-29: Additional findings from the Canadian contraception study. *Canadian Journal of Human Sexuality*, 9, 79-93.
- FONTANET, A. L., SABA, J., CHANDELYING, V., SAKONDHAVAT, C., BHIRALEUS, P., RUGPAO, S., CHONGSOMCHAI, C., KIRIWAT, O., TOVANABUTRA, S., DALLY, L., LANGE, J. M. & ROJANAPITHAYAKORN, W. (1998) Protection against sexually transmitted diseases by granting sex workers in Thailand the choice of using the male or female condom: results from a randomized controlled trial. *AIDS*, 12, 1851-9.
- FOSTER, D. G., BLEY, J., MIKANDA, J., INDUNI, M., ARONS, A., BAUMRIND, N., DARNEY, P. D. & STEWART, F. (2004) Contraceptive use and risk of unintended pregnancy in California. *Contraception*, 70, 31-9.
- FREEMAN, S. (2004) Nondaily hormonal contraception: considerations in contraceptive choice and patient counseling. *Journal of the American Academy of Nurse Practitioners*, 16, 226-238.
- FRENCH, R., COWAN, C., MANSOUR, D., HUGHES, D., ROBINSON, A., GUILLEBAUD, J., SUMMERBELL, C., LOGAN, S. & PROCTOR, T. (2006a) Subdermal implantable contraceptives versus other forms of reversible contraceptives as effective methods of preventing pregnancy. *Cochrane Database of Systematic Reviews*, 1.
- FRENCH, R., VLIET, H. V., COWAN, F., MANSOUR, D., MORRIS, S., HUGHES, D., ROBINSON, A., PROCTOR, T., SUMMERBELL, C., LOGAN, S.,

- HELMERHORST, F. & GUILLEBAUD, J. (2006b) Hormonally impregnated intrauterine systems (IUSs) versus other forms of reversible contraceptives as effective methods of preventing pregnancy. *Cochrane Database of Systematic Reviews*, 1.
- FRENCH, R. S., COWAN, F. M., MANSOUR, D. J., MORRIS, S., PROCTER, T., HUGHES, D., ROBINSON, A. & GUILLEBAUD, J. (2000) Implantable contraceptives (subdermal implants and hormonally impregnated intrauterine systems) versus other forms of reversible contraceptives: two systematic reviews to assess relative effectiveness, acceptability, tolerability and cost-effectiveness. *Health Technology Assessment (Winchester, England)*, 4, 1-107.
- FU, H., DARROCH, J. E., HAAS, T. & RANJIT, N. (1999) Contraceptive failure rates: new estimates from the 1995 National Survey of Family Growth. *Family Planning Perspectives*, 31, 56-63.
- GALLAGHER, M. (1998) Introducing more contraceptive methods in Jordan. *AVSC News*, 36, 3.
- GALLO, M., GRIMES, D. & SCHULZ, K. (2006a) Skin patch and vaginal ring versus combined oral contraceptives for contraception. *Cochrane Database of Systematic Reviews*, 1.
- GALLO, M. F., GRIMES, D. A. & SCHULZ, K. F. (2006b) Cervical cap versus diaphragm for contraception *Cochrane Database of Systematic Reviews*.
- GALLO, M. F., GRIMES, D. A., SCHULZ, K. F., D'ARCANGUES, C. & LOPEZ, L. M. (2005) Combination injectable contraceptives for contraception. *Cochrane Database of Systematic Reviews*.
- GARZA-FLORES, J. (1998a) Cyclofem/Cyclo-Provera: emerging countries' perspective. *International Journal of Gynaecology & Obstetrics*, 62 Suppl 1, S31-6.
- GARZA-FLORES, J. (1998b) Reversible contraception: issues faced by emerging countries. *International Journal of Gynecology & Obstetrics*, 62, S37-S40.
- GARZA-FLORES, J., MORAKS DEL OLMO, A., FUZIWARA, J. L., FIGUEROA, J. G., ALONSO, A., MONROY, J., PEREZ, M., URBINA-FUENTES, M., GUEVARA, S. J., CEDENO, E., BARRIOS, R., FERMAN, J. J., MEDINA, L. M., VELAZQUEZ, E. & PEREZ-PALACIOS, G. (1998) Introduction of cyclofem once-a-month injectable contraceptive in Mexico. *Contraception*, 58, 7-12.
- GEBBIE, A. E. (2003) Contraception in the perimenopause. *Journal of the British Menopause Society*, 9, 123-128.
- GRADY, W. R., HAYWARD, M. D. & FLOREY, F. A. (1988) Contraceptive discontinuation among married women in the United States. *Studies in Family Planning*, 19, 227-235.
- GREASY, M., KLUGMAN, B., XABA, M., BOIKANYO, E. & REES, H. (1997) South African women's experiences of contraception and contraceptive services. IN BERER, M., COTTINGHAM, J. & RAVINDRAN, T. K. S. (Eds.) *Beyond acceptability: users' perspectives on contraception*. London, Reproductive Health Matters (for the World Health Organization).
- GREENWELL, K. F. (1996) Contraceptive method mix menu: Providing healthy choices for women. *World Health Statistics Quarterly*, 49, 88-93.

- GREYDANUS, D. E., PATEL, D. R. & RIMSZA, M. E. (2001) Contraception in the adolescent: an update. *Pediatrics*, 107, 562-73.
- GRIBBLE, J. N., JENNINGS, V. & NIKULA, M. (2004) Mind the gap: Responding to the global funding crisis in family planning. *Journal of Family Planning & Reproductive Health Care*, 30, 155-157.
- GRIFFIN, P. D. (2005) The World Health Organization initiative on implantation research. *Contraception*, 71, 235-8.
- GRIMES, D. (2001) Monthly combination injectable contraceptives. *Gynecol Endocrinol*, 15, 9-10.
- GRIMLEY, D. M. & LEE, P. A. (1997) Condom and other contraceptive use among a random sample of female adolescents: a snapshot in time. *Adolescence*, 32, 771-9.
- HAIGNERE, C. S., GOLD, R., MASKOVSKY, J., AMBROSINI, J., ROGERS, C. L. & GOLLUB, E. (2000) High-risk adolescents and female condoms: knowledge, attitudes, and use patterns. *Journal of Adolescent Health*, 26, 392-8.
- HALL, P. E. (1994) The introduction of Cyclofem into national family planning programmes: experience from studies in Indonesia, Jamaica, Mexico, Thailand and Tunisia. Task Force on Research on Introduction and Transfer of Technologies for Fertility Regulation, Special Programme of Research, Development and Research Training in Human Reproduction, World Health Organization, Geneva, Switzerland. *Contraception*, 49, 489-507.
- HALL, P. E. (1998) New once-a-month injectable contraceptives, with particular reference to Cyclofem/Cyclo-Provera. *International Journal of Gynaecology & Obstetrics*, 62, 43-56.
- HALPERN, V., GRIMES, D., LOPEZ, L. & GALLO, M. (2006) Strategies to improve adherence and acceptability of hormonal methods for contraception. *Cochrane Database of Systematic Reviews*.
- HANSEN, L. B. & SASEEN, J. J. (2004) New contraceptive options: patient adherence and satisfaction. *American Family Physician*, 69, 815-816.
- HARDJANTI, K. (1995) Contraceptive method-mix and family planning program in Vietnam. *Advances in Contraceptive Delivery Systems*, 11, 65-81.
- HARDON, A. (1997) Women's views and experiences of hormonal contraceptives: what we know and what we need to find out. IN BERER, M., COTTINGHAM, J. & RAVINDRAN, T. K. S. (Eds.) *Beyond acceptability: users' perspectives on contraception*. London, Reproductive Health Matters (for the World Health Organization).
- HARVEY, S. M., HENDERSON, J. T. & BRANCH, M. R. (2004) Protecting against both pregnancy and disease: predictors of dual method use among a sample of women. *Women & Health*, 39, 25-43.
- HATCHER, R. A., RINEHART, W., BLACKBURN, R., GELLER, J. S. & SHELTON, J. D. (2005) *The essentials of contraceptive technology*, Baltimore, MD, The INFO Project, The Johns Hopkins Bloomberg School of Public Health.
- HEISE, L. (1997) Beyond acceptability: reorienting research on contraceptive choice. IN BERER, M., COTTINGHAM, J. & RAVINDRAN, T. K. S. (Eds.) *Beyond acceptability: users' perspectives on contraception*. London, Reproductive Health Matters (for the World Health Organization).

- HELMERHORST, F. M., BELFIELD, T., KULIER, R., MAITRA, N., O'BRIEN, P. & GRIMES, D. A. (2006) The Cochrane Fertility Regulation Group: synthesizing the best evidence about family planning. *Contraception*, 74, 280-286.
- HENSHAW, S. K. (1998) Unintended pregnancy in the United States. *Family Planning Perspectives*, 30, 24-9.
- HERNDON, E. J. & ZIEMAN, M. (2004) New contraceptive options. *American Family Physician*, 69, 853-60.
- HOGERZEIL, H. (2006) Essential medicines and human rights: what can they learn from each other? *Bulletin of the World Health Organization*, 84, 371-5.
- HOTCHKISS, D. R., MAGNANI, R. J., ROUS, J. J., AZELMAT, M., MROZ, T. A. & HEIKEL, J. (1999) The effects of maternal-child health service utilization on subsequent contraceptive use in Morocco. *Journal of Biosocial Science*, 31, 145-65.
- HUBER, L. B., HOGUE, C., STEIN, A., DREWS, C., ZIEMAN, M., KING, J. & SCHAYES, S. (2006) Contraceptive use and discontinuation: findings from the contraceptive history, initiation, and choice study. *American Journal of Obstetrics & Gynecology*, 194, 1290-5.
- HUEZO, C. M. (1998) Current reversible contraceptive methods: a global perspective. *International Journal of Gynaecology & Obstetrics*, 62 Suppl 1, S3-15.
- JAIN, A. K. (1989) Fertility reduction and the quality of family planning services. *Studies in Family Planning*, 20, 1-16.
- JAIN, J., JAKIMIUK, A. J., BODE, F. R., ROSS, D. & KAUNITZ, A. M. (2004) Contraceptive efficacy and safety of DMPA-SC. *Contraception*, 70, 269-75.
- JAKIMIUK, A. (2002) A new highly effective subcutaneous contraceptive injection Presented at the 7th European Society of Contraception Congress, Genova, Italy. Department of Surgical Gynecology, University School of Medicine, Lublin, Poland.
- KALACA, S., CEBECI, D., CALI, S., SINAI, I., KARAVUS, M. & JENNINGS, V. (2005) Expanding family planning options: Offering the Standard Days Method to women in Istanbul. *Journal of Family Planning & Reproductive Health Care*, 31, 123-127.
- KAMAU, R. K., KARANJA, J., SEKADDE-KIGONDU, C., RUMINJO, J. K., NICHOLS, D. & LIKU, J. (1996) Barriers to contraceptive use in Kenya. *East African Medical Journal*, 73, 651-9.
- KATENDE, C. G., N; BESSINGER, R (2003) Facility-level Reproductive Health Interventions and contraceptive use in Uganda. *International Family Planning Perspectives*, 29, 130-137.
- KAUNITZ, A. (2005) Beyond the Pill: New data and options in hormonal and intrauterine contraception. *American Journal of Obstetrics and Gynaecology*, 192, 998-1004.
- KENYA MINISTRY OF HEALTH (2006) IUCD Brief 1: Expanding women's contraceptive choices. Durham, NC, Family Health International.
- KNODEL, J. A., P; DUNG, T AND VINH D (1995) Why Is Oral Contraceptive Use in Vietnam So Low? *International Family Planning Perspectives*, 21, 11-18.
- KOC, I. (2000) Determinants of contraceptive use and method choice in Turkey. *Journal of Biosocial Science*, 32, 329-342.

- KULCZYCKI A, KIM DJ, DUERR A, JAMIESON DJ, & MACALUSO M. (2004) The acceptability of the female and male condom: a randomized crossover trial. *Perspect Sex Reprod Health*, 36, 114-119.
- KUYOH, M. A., TOROITICH-RUTO, C., GRIMES, D. A., SCHULZ, K. F., GALLO, M. F. & LOPEZ, L. M. (2006) Sponge versus diaphragm for contraception. *Cochrane Database of Systematic Reviews*, 1.
- LAZCANO PONCE, E. C., SLOAN, N. L., WINIKOFF, B., LANGER, A., COGGINS, C., HEIMBURGER, A., CONDE-GLEZ, C. J. & SALMERON, J. (2000) The power of information and contraceptive choice in a family planning setting in Mexico. *Sexually Transmitted Infections*, 76, 277-81.
- LERMAN, C., MOLYNEAUX, J., MOELJODIHARDJO, S. & PANDJAITAN, S. (1989) The correlation between family planning program inputs and contraceptive use in Indonesia. *Studies in Family Planning*, 20, 26-37.
- LINDSAY, M. K., GRANT, J., PETERSON, H. B., WILLIS, S., NELSON, P. & KLEIN, L. (1995) The impact of knowledge of human immunodeficiency virus serostatus on contraceptive choice and repeat pregnancy. *Obstetrics & Gynecology*, 85, 675-679.
- MAGADI, M. A. & CURTIS, S. L. (2003) Trends and determinants of contraceptive method choice in Kenya. *Studies in Family Planning*, 34, 149-159.
- MAY, M. (2005) New Contraceptive Choices. *Population Reports*, . Maryland, The Info Project, Center for Communication Programs JHSPH.
- MINER, P. D. (2004) Contraceptive choices for females with congenital heart disease. *Progress in Pediatric Cardiology*, 19, 15-24.
- MINH THANG, N. & NGUYEN ANH, D. (2002) Accessibility and Use of Contraceptives in Vietnam. *International Family Planning Perspectives* 28, 214-219.
- MINNIS, A. M. & PADIAN, N. S. (2001) Choice of female-controlled barrier methods among young women and their male sexual partners. *Family Planning Perspectives*, 33, 28-34.
- MINNIS, A. M. & PADIAN, N. S. (2005) Effectiveness of female controlled barrier methods in preventing sexually transmitted infections and HIV: current evidence and future research directions. *Sexually Transmitted Infections*, 81, 193-200.
- MITCHELL, H. S. & STEPHENS, E. (2004) Contraception choice for HIV positive women. *Sexually Transmitted Infections*, 80, 167-173.
- MONTEPORTE, C. A., NAVA, C., CARNVALE, G. P., BAGLIANI, F. & D'ERRICO, G. (1995) Contraceptive choice in Vigevano, Italy, 1983-1993. *Advances in Contraception*, 11, 263-271.
- MUSABA, E., MORRISON, C. S., SUNKUTU, M. R. & WONG, E. L. (1998) Long-term use of the female condom among couples at high risk of human immunodeficiency virus infection in Zambia. *Sexually Transmitted Diseases*, 25, 260-264.
- NEWTON, J. (1998) Contraceptives: regional perspectives, issues, and unmet needs--the European perspective. *International Journal of Gynaecology & Obstetrics*, 62 Suppl 1, S25-30.

- NOVAK, A., DE LA LOGE, C., ABETZ, L. & VAN DER MEULEN, E. A. (2003) The combined contraceptive vaginal ring, NuvaRing: an international study of user acceptability. *Contraception*, 67, 187-194.
- ODDENS, B. J. (1997) Determinants of contraceptive use among women of reproductive age in Great Britain and Germany II: psychological factors. *Journal of Biosocial Science*, 29, 437-470.
- ODDENS, B. J. & LEHERT, P. (1997) Determinants of contraceptive use among women of reproductive age in Great Britain and Germany I: demographic factors. *Journal of Biosocial Science*, 29, 415-435.
- OSIS, M. J. D., DUARTE, G. A., CRESPO, E. R., ESPEJO, X. & PADUA, K. S. D. (2004) Escolha de métodos contraceptivos entre usuarias de um serviço público de saúde [Choice of contraceptive methods by women attending a public health clinic]. *Cadernos de Saude Publica*, 20, 1586-94.
- OYE-ADENIRAN, B. A., ADEWOLE, I. F., UMOH, A. V., OLADOKUN, A., GBADEGESIN, A., ODEYEMI, K. A. & EKANEM, E. E. (2005) Sources of contraceptive commodities for users in Nigeria. *Plos Medicine*, 2, 1145-1151.
- OZALP, S., YALCIN, O. T., HASSA, H., ERBAY, B. & DALAN, N. (1999) Factors affecting the contraceptive choice in a developing country. *International Journal of Gynecology & Obstetrics*, 65, 53-57.
- PARIANI, S., HEER, D. M. & VAN ARSDOL, M. D. (1991) Does choice make a difference in contraceptive use? Evidence from east Java. *Studies in Family Planning*, 22, 384-90.
- PARR, N. J. (2003) Discontinuation of contraceptive use in Ghana. *Journal of Health, Population & Nutrition*, 21, 150-7.
- PETERSEN, R., GAZMARARIAN, J. A., ANDERSON CLARK, K. & GREEN, D. C. (2001) How contraceptive use patterns differ by pregnancy intention: implications for counseling. *Womens Health Issues*, 11, 427-35.
- PETTINATO, A. & EMANS, S. J. (2003) New contraceptive methods: update 2003. *Current Opinion in Pediatrics*, 15, 362-9.
- PINTER, B. (2002) Continuation and compliance of contraceptive use. *European Journal of Contraception & Reproductive Health Care*, 7, 178-83.
- POLANECZKY, M., SLAP, G., FORKE, C., RAPPAPORT, A. & SONDEHEIMER, S. (1994) The use of levonorgestrel implants (Norplant) for contraception in adolescent mothers. *New England Journal of Medicine*, 331, 1201-6.
- POPOV, A. A., VISSER, A. P. & KETTING, E. (1993) Contraceptive knowledge, attitudes, and practice in Russia during the 1980s. *Studies in Family Planning*, 24, 227-35.
- POTTER, J. E. (1999) The persistence of outmoded contraceptive regimes: the cases of Mexico and Brazil. *Population and Development Review*, 25, 703-739.
- RAI, K., GUPTA, S. & COTTER, S. (2004) Experience with Implanon in a northeast London family planning clinic. *European Journal of Contraception & Reproductive Health Care*, 9, 39-46.
- RAINE, T., HARPER, C., PAUKKU, M. & DARNEY, P. (2002) Race, adolescent contraceptive choice, and pregnancy at presentation to a family planning clinic. *Obstetrics & Gynecology*, 99, 241-247.

- RAKSHSHANI, F. & MOHAMMADI, M. (2004) Contraception continuation rates and reasons for discontinuation in Zahedan, Islamic Republic of Iran. *Eastern Mediterranean Health Journal*, 10, 260-267.
- RAVINDRAN, T. K. S. & RAO, S. S. (1997) Is the diaphragm a suitable method of contraception for low-income women: A user perspectives study, Madras, India. IN BERER, M., COTTINGHAM, J. & RAVINDRAN, T. K. S. (Eds.) *Beyond acceptability: users' perspectives on contraception*. London, Reproductive Health Matters (for the World Health Organization).
- REAVES, N. D. (2002) Unresolved issues in contraceptive health policy. *Health Care for Women International*, 23, 854-60.
- ROSS, J. H., K; MUMFORD, E; EID, S (2002) Contraceptive Method Choice in Developing Countries. *International Family Planning Perspectives*, 28, 32-40.
- SABATINI, R. & CAGIANO, R. (2006) Comparison profiles of cycle control, side effects and sexual satisfaction of three hormonal contraceptives. *Contraception*, 74, 220-223.
- SAHA, U. R., KHAN, M. A., BEGUM, M. & BAIRAGI, R. (2004) Determinants of pill failure in rural Bangladesh. *Journal of Biosocial Science*, 36, 39-50.
- SALEM, R. (2006) New attention to the IUD: expanding women's contraceptive options to meet their needs. *Population Reports, Series B, No. 7*. Baltimore, MD, The INFO Project, Johns Hopkins Bloomberg School of Public Health.
- SANTHYA, K. G. (2003) Changing family planning scenario in India. An overview of recent evidence. New Delhi, India, Population Council.
- SAY, L., ORTAYLI, N. & NALBANT, H. (2000) Women's acceptance of an injectable progestin-only contraceptive in a free-choice environment in Turkey. *European Journal of Contraception & Reproductive Health Care*, 5, 68-70.
- SCHAFFER, J., OSBORNE, L., DAVIS, A. & WESTHOFF, C. (2006) Acceptability and satisfaction using Quick Start with the contraceptive vaginal ring versus an oral contraceptive. *Contraception*, 73, 488-92.
- SCOTT, A. & GLASIER, A. (2006) Evidence based contraceptive choices (In Press). *Best Practice & Research: Clinical Obstetrics and Gynaecology*, Epub.
- SEKADDE-KIGONDU, C., MWATHE, E. G., RUMINJO, J. K., NICHOLS, D., KATZ, K., JESSENCKY, K. & LIKU, J. (1996) Acceptability and discontinuation of Depo-Provera, IUCD and combined pill in Kenya. *East African Medical Journal*, 73, 786-94.
- SERBANESCU, F., MORRIS, L., STUPP, P. & STANESCU, A. (1995) The impact of recent policy changes on fertility, abortion, and contraceptive use in Romania. *Studies in Family Planning*, 26, 76-87.
- SHAH, I. (2003) Contraceptive use patterns in countries with different levels of HIV epidemic. *Journal of Acquired Immune Deficiency Syndromes*, 38, S5-S6.
- SHAH, I. H. (1994) The advance of the contraceptive revolution. *World Health Statistics Quarterly*, 47, 9-15.
- SHEARS, K. H. (2002) Increasing Contraception Reduces Abortion *Network*, 21.
- SIMMONS, R., HALL, P., DIAZ, J., DIAZ, M., FAJANS, P. & SATIA, J. (1997) The strategic approach to contraceptive introduction. *Studies in Family Planning*, 28, 79-94.

- SKIBIAK, J. M., T AND GETAHUN, H (2002) Expanding contraceptive choice in Ethiopia. *Sexual Health Exchange*.
- SKOUBY, S. O. (2004) Contraceptive use and behavior in the 21st century: a comprehensive study across five European countries. *European Journal of Contraception & Reproductive Health Care*, 9, 57-68.
- SMIT, J., BEKSINSKA, M., VIJAYAKUMAR, G. & MABUDE, Z. (2006) Short-term acceptability of the Reality polyurethane female condom and a synthetic latex prototype: a randomized crossover trail among South African women. *Contraception*, 73, 394-398.
- SNOW, R., GARCIA, S., KURESHY, N., SADANA, R., SINGH, S., BECERRA-VALDIVIA, M., LANCASTER, S., MOFOKENG, M., HOFFMAN, M. & AITKEN, I. (1997) Attributes of contraceptive technology: women's preferences in seven countries. IN BERER, M., COTTINGHAM, J. & RAVINDRAN, T. K. S. (Eds.) *Beyond acceptability: users' perspectives on contraception*. London, Reproductive Health Matters (for the World Health Organization).
- STASH, S. (1999) Explanations of unmet need for contraception in Chitwan, Nepal. *Studies in Family Planning*, 30, 267-287.
- STEINER, M. J., DALEBOUT, S., CONDON, S., DOMINICK, R. & TRUSSELL, J. (2003) Understanding risk: a randomised controlled trial of communicating contraceptive effectiveness. *American Journal of Obstetrics and Gynecology*, 102, 709-717.
- STEINER, M. J., HERTZ-PICCIOTTO, I., SCHULZ, K. F., SANGI-HAGHPEYKAR, H., EARLE, B. B. & TRUSSELL, J. (1998) Measuring true contraceptive efficacy. A randomized approach--condom vs. spermicide vs. no method. *Contraception*, 58, 375-8.
- STEVENS-SIMON, C., KELLY, L. & KULICK, R. (2001) A village would be nice but ...It takes a long-acting contraceptive to prevent repeat adolescent pregnancies. *American Journal of Preventive Medicine*, 21, 60-65.
- SULLIVAN, T. M., BERTRAND, J. T., RICE, J. & SHELTON, J. D. (2006) Skewed contraceptive method mix: why it happens, why it matters. *Journal of Biosocial Science*, 8., 501-21.
- SUNDBY, J. (2006) Young people's sexual and reproductive health rights. *Best Practice & Research in Clinical Obstetrics & Gynaecology*, 20, 335-368.
- THOMPSON, M. S. (1996) Contraceptive implants: Long acting and provider dependent contraception raises concerns about freedom of choice. *British Medical Journal*, 313, 1393-1395.
- TRUITT, S. T., FRASER, A., GALLO, M. F., LOPEZ, L. M., GRIMES, D. A. & SCHULZ, K. F. (2006) Combined hormonal versus nonhormonal versus progestin-only contraception in lactation. *Cochrane Database of Systematic Reviews*.
- TRUITT, S. T., FRASER, A. B., GRIMES, D. A., GALLO, M. F. & SCHULZ, K. F. (2003) Hormonal contraception during lactation: Systematic review of randomized controlled trials. *Contraception*, 68, 233-238.
- UNITED NATIONS POPULATION INFORMATION NETWORK (1994) Report of the International Conference on Population and Development, Cairo. New York, United Nations.

- UPADHYAY, U. D. & ADHIKARY, I. (2005) New contraceptive choices. *Population Reports - Series M, Special Topics*, 1-23.
- URDL, W., APTER, D., ALPERSTEIN, A., KOLL, P., SCHONIAN, S., BRINGER, J., FISHER, A. C. & PREIK, M. (2005) Contraceptive efficacy, compliance and beyond: factors related to satisfaction with once-weekly transdermal compared with oral contraception. *European journal of obstetrics, gynecology, and reproductive biology*, 121, 202-210.
- VAN BOGAERT, L. J. (2003) 'Failed' contraception in a rural South African population. *South African Medical Journal*, 93, 858-861.
- VAN LUNSEN, R. H. W., ARNOLDS, H. T. & VAN MARIS, M. G. M. (1994) Choices and changes in contraceptive behaviour; the role of information sources. *Patient Education & Counseling*, 23, 197-202.
- VERES S, M. L. B. B. (2004) A comparison between the vaginal ring and oral contraceptives. *Obstetrics and gynecology*, 104, 555-563.
- VIDAL-TRECAN, G., WARSZAWSKI, J., COSTE, J., BAJOS, N., DELAMARE, N., GRENIER-SENNELIER, C. & BOISSONNAS, A. (2003) Contraceptive practices of non-HIV-seropositive injecting drug users. *European Journal of Epidemiology*, 18, 863-869.
- VIJAYAKUMAR, G., MABUDE, Z., SMIT, J., BEKSINSKA, M. & LURIE, M. (2006) A review of female-condom effectiveness: patterns of use and impact on protected sex acts and STI incidence. *International Journal of STD & AIDS*, 17:652-659.
- WACKETT, J. (2002) Factors affecting Yukon teen pregnancy decline in the mid and late 1990s. *Journal of Obstetrics & Gynaecology Canada: JOGC*, 24, 889-893.
- WALSH, J. (1997) Contraceptive choices: Supporting effective use of methods. IN BERER, M., COTTINGHAM, J. & RAVINDRAN, T. K. S. (Eds.) *Beyond acceptability: users' perspectives on contraception*. London, Reproductive Health Matters (for the World Health Organization).
- WAN, L. S., STIBER, A. & LAM, L.-Y. (2003) The levonorgestrel two-rod implant for long-acting contraception: 10 years of clinical experience. *Obstetrics & Gynecology*, 102, 24-6.
- WEBB, A. (2002) What do women want? Counselling in contraception. *European Journal of Contraception & Reproductive Health Care*, 7, 150-4.
- WEISBERG, E. (1991) Contraceptive choices - turning back the clock. *Advances in Contraception*, 7, 115-127.
- WEISBERG, E. (1994) Practical problems which women encounter with available contraception in Australia. *Australian & New Zealand Journal of Obstetrics & Gynaecology*, 34, 312-5.
- WEISBERG, F., BOUCHARD, C., MOREAU, M., AUDET, M. C., MAWDSLEY, S., DATTANI, D., DINNIWELL, J., HORBAY, G. L. A. & GROUP, N.-C.-S. (2005) Preference for and satisfaction of Canadian women with the transdermal contraceptive patch versus previous contraceptive method: an open-label, multicentre study. *Journal of Obstetrics & Gynaecology Canada: JOGC*, 27, 350-359.
- WELNER, S. L. (1999) Contraceptive choices for women with disabilities. *Sexuality & Disability*, 17, 209-214.

- WELSH, M., STANBACK, J. & SHELTON, J. D. (2006) Access to modern contraception. *Best Practice & Research: Clinical Obstetrics and Gynaecology*, 20, 323-338.
- WESTHOFF, C. (2001) Criteria for appropriate birth control. *Gynecological Endocrinology*, 15, 19-22.
- WESTHOFF, C. (2005) Review of available contraceptives. *Journal of Acquired Immune Deficiency Syndromes*, 38, S3.
- WHO (1996) Improving access to quality care in family planning. Medical eligibility criteria for contraceptive use. Geneva, World Health Organization.
- WHO (1997) An assessment of the contraceptive method mix in Myanmar. Geneva, World Health Organization.
- WHO (1999) Expanding contraceptive choice. An assessment of reproductive health needs in Ethiopia. Geneva, World Health Organization.
- WHO (2002) Making decisions about contraceptive introduction - A guide for conducting assessments to broaden contraceptive choice and improve quality of care. Geneva, World Health Organization.
- WHO (2004a) Contraception. Issues in adolescent health and development. Geneva, World Health Organization.
- WHO (2004b) Medical Eligibility Criteria for Contraceptive Use. 3rd Edition. 3rd Edition ed. Geneva, World Health Organization.
- WULFF, M. & LALOS, A. (2002) Coitus-dependent and coitus-independent contraceptive methods in women and men. *European Journal of Contraception & Reproductive Health Care*, 7, 114-20.
- XIAO, Z. & LI, B. (1997) Contraceptive choice and reproductive health: a survey report in rural Hunan. *China Population Today*, 14, 13-4.
- XIAO, Z. & LI, B. (1998) Contraceptive choice and reproductive health -- a survey report on reproductive health in Hunan. *China Population Today*, 15, 3-5.
- ZAHRADNIK, H. P. (2005) Belara--a reliable oral contraceptive with additional benefits for health and efficacy in dysmenorrhoea. *European Journal of Contraception & Reproductive Health Care*, 10 Suppl 1, 12-8.
- ZHENG, S. R., ZHENG, H. M., QIAN, S. Z., SANG, G. W. & KAPER, R. F. (1999) A long-term study of the efficacy and acceptability of a single-rod hormonal contraceptive implant (Implanon) in healthy women in China. *European Journal of Contraception & Reproductive Health Care*, 4, 85-93.
- ZIBNERS, A., CROMER, B. A. & HAYES, J. (1999) Comparison of continuation rates for hormonal contraception among adolescents. *Journal of Pediatric & Adolescent Gynecology*, 12, 90-94.
- ZICHELLA, L., SBRIGNADELLO, C., TOMASSINI, A., DI LIETO, A., MONTONERI, C., ZARBO, G., MANCONE, M., PIETROBATTISTA, P., BERTOLI, G. & PERRONE, G. (1999) Comparative study on the acceptability of two modern monophasic oral contraceptive preparations: 30 mug ethinyl estradiol combined with 150 mug desogestrel or 75 mug gestodene. *Advances in Contraception*, 15, 191-200.