

**Measuring the Economic Costs of Unsafe
Abortion Related Morbidity and Mortality
in Pakistan:
A Review of Methodology and Approaches**

Collective for Social Science Research

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Measuring the Economic Costs of Unsafe Abortion Related Morbidity and Mortality in Pakistan: A Review of Methodology and Approaches

Introduction

According to the World Health Organization (WHO), “unsafe abortion refers to the termination of an unintended pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards, or both.”¹ The aim of this paper is to develop a robust and defensible methodology for measuring the economic costs of unsafe abortion related morbidity and mortality (UARMM) in Pakistan. Besides serving as the first and preliminary stage of survey design, it is expected that the analysis offered here will contribute to the wider literature on measuring the economic costs of UARMM.

Why measure economic cost?

UARMM is preventable. There are several possible alternatives to unsafe abortion including contraception, safe abortion, or taking a pregnancy to term. While there might be disagreements about which of these alternatives is a preferable one, any reduction in morbidity and mortality must be regarded as a desirable outcome – regardless of the position one takes in the ethical debate about abortion and its alternatives.

The main rationale for measuring the economic cost of anything is to compare alternative policy scenarios using a money-metric. The methodology adopted for measuring any cost, therefore, must begin with laying out the alternatives that are being compared. In this study it is assumed that policy-makers are interested in reducing morbidity and mortality due to unsafe abortion.

Pakistan, after all, is signatory to three very significant international documents that have set up a clear human rights framework within which induced abortion needs to be addressed at the national level. The state thus committed itself to upholding these rights and creating policies and programmes in adherence with its international commitments. Pakistan is signatory to the Universal Declaration of Human Rights, adopted by the General Assembly of the United Nations in 1948. The UDHR asserts that “All human beings are born free and equal in dignity and human rights.” [Article 1] It declares that all people are entitled to all the rights and freedoms set forth by this document without distinction of any kind, including sex. [Article 2] In 1994, at the International Conference on Population and Development, Pakistan signed the Platform for Action² that recognized reproductive rights as part of human rights:

These rights rest on the recognition of the basic right of all couples and individuals to decide freely and responsibly the number, spacing and timing of their children and to

¹ http://www.who.int/reproductive-health/unsafe_abortion/index.html

² For an analysis of Pakistan’s progress in implementing its ICPD commitments, see Khawar Mumtaz, 2004, *ICPD Ten Years On*, Shirkat Gah and ARROW, Lahore.

have the information and means to do so, and the right to attain the highest standard of sexual and reproductive health. It also includes their right to make decisions concerning reproduction free of discrimination, coercion and violence, as expressed in human rights documents.

[*Programme of Action of the International Conference on Population and Development*, Cairo 1994, paragraph 7.3]

The Platform of Action also recognized the health impact of unsafe abortion as a major public health concern; it called for women's access to reliable information and compassionate counseling in case of unwanted pregnancies, and asserted that abortions should be safe in cases where it is not against the law. It also called for a review of laws that contained punitive measures against women who have undergone illegal abortions. [ICPD PoA para #8.25] In 1996 Pakistan signed³ the Convention on the Elimination of All Forms of Discrimination Against Women, which declares that men and women should have: "The same rights to decide freely and responsibly on the number and spacing of their children and to have access to the information, education and means to enable them to exercise these rights." [CEDAW Article 16 (e)]

If unsafe abortion were preventable by administrative decree, measuring the economic cost of UARMM would inform us about the continuing economic burden to society of not issuing that decree. Cost measurement, in that case, will include all current economic consequences of UARMM. It will include actual costs of treatment, as well the economic implications of the lack of treatment. The methodology adopted in this case will need to ensure that all or at least all significant economic consequences of UARMM are included. The same would apply if UARMM were being considered as a sub-set of issues arising out of unmet need in family planning services. In this case the presumption is not that unsafe abortion will not disappear through administrative decree, but that it will be prevented through the provision of adequate family planning services.

The focus could be narrower, and cost measurement also more restricted, if the object were to simply find the lowest cost methods of dealing with UARMM once a case of unsafe abortion has actually occurred. Here, the economic consequences of existing treatment and non-treatment will be compared with those of alternative treatment or comprehensive coverage of treatment.

An alternative way of looking at the same problem is to ask about the net economic cost of reducing UARMM – say, by administrative decree, provision of adequate family planning services, or providing better post-abortion care in instances where unsafe abortion has already taken place. In this approach cost measurement will allow comparison – if comparison is required for arranging policy priority – between different types of expenditures on saving people from preventable morbidity and mortality. This can help to choose more efficient ways of reducing morbidity and mortality generally, and UARMM in particular.

³ Pakistan ratified CEDAW with a reservation on Clause 29 (para 1) pertaining to disputes between two or more state parties concerning interpretation or application of CEDAW. (Mumtaz 2004: 35)

Brighton papers

Measuring the economic costs of UARMM is an emerging area of empirical research. An important event in this regard was a meeting held at the Institute of Development Studies in Brighton, UK, where two papers on measuring the economic cost of UARMM were presented and discussed. One of these papers was later revised and published. The Brighton workshop can be taken, therefore, as a point of departure.

The brief of the Brighton papers was to measure the global economic cost of UARMM using existing empirical studies across various countries. Both papers developed their measurement around two components. The first component is an “event cycle” starting with an unwanted pregnancy and leading to an unsafe abortion. There are three possible end-points of the event cycle: full recovery, disability, and mortality. The event cycle can be refined further by including different levels of morbidity which may lead, eventually, to one of the three end-points. Abortion prevalence studies were used to estimate the prevalence of various events in the event cycle. Medical studies supplied information on the prevalence and duration of different levels of morbidity in various countries and regions.

The second component is a costing framework that identifies the costs associated with the treatment of various contingencies in the event cycle, and the economic impact of morbidity and premature mortality. Some aspects of the costing framework are relatively easier to measure empirically. The cost of treatment might be measured directly using actual costs per case, by type of case, or by applying the costs of recommended treatment packages for various types of morbidity in different countries. There can be different approaches for measuring even these seemingly straightforward costs; for example, is it correct to measure what is actually spent or what ought to be spent? In cross-country comparisons it is also relevant if the costs for treatment are borne by patients or health systems. In cases where the treatment is mostly privatized it can be assumed that the user fees and prices paid by patients fully reflect the direct economic cost of treatment. In public health systems or insured, subsidized or charity-sponsored institutions it can be harder to identify the specific costs associated with the treatment of unsafe abortion related morbidity.

Even while they pose challenges in correct identification and measurement, costs of treatment are among the less difficult costs to evaluate. UARMM, like any other health contingency has economic implications that go far beyond the costs of treatment. Some of these – such as transportation costs, and the opportunity cost of carers’ time – can still be thought of as extensions of the cost of treatment. How to measure the economic impact of mortality and morbidity? The most important question, of course, relates to the cost of premature death. The cost of mortality is, obviously, difficult to conceptualize, let alone specify and measure. The same is true perhaps to a lesser degree for non-treatment costs associated with a period morbidity.

In principle, the non-treatment costs of morbidity and mortality will include not only the loss in productivity of the patient, but other secondary economic implications including

the loss in productivity, increased burden of care responsibilities, and the psychological trauma suffered by the patient and her near ones. These things matter, even if they do so in unspecified ways that are hard to evaluate.

Outline of this review

The Brighton papers were focused on measuring the global economic impact of UARMM, and dealt with issues at a higher level of aggregation than is necessary for a national study. For the purposes of the present study it is both possible and essential to closely examine individual components of existing measurement approaches as they may apply to conditions in Pakistan. Four separate types of literature were reviewed for this paper: (a) medical and community studies on abortion in Pakistan, (b) abortion prevalence, (c) health economics, and (d) feminist economics. In addition this paper draws on key informant interviews with medical professionals and some patient case studies.

The reviews are organized along the main themes identified here. Section 1 reviews the event cycle using the findings of medical and community studies in Pakistan. Abortion prevalence studies and approaches to the measurement of the incidence of unsafe abortion are reviewed in Section 2. The costing framework is re-examined in Section 3 with particular attention to the classification of contingencies and alternatives. Finally, based on the preceding reviews, the methodology and approach to measurement for this study is proposed in Section 4.

Section 1. The Event Cycle

A. Framing the Event Cycle

Understanding the event cycle of unsafe abortion is the necessary prerequisite to developing a costing framework. The event cycle determines the costs at each outcome level, thereby impacting the final cost estimates for unsafe abortion. This section highlights the basic event cycle explored in the Brighton papers, as well as a revised cycle based on the literature review and an enhanced understanding of the factors relating to unsafe abortion specific to Pakistan.

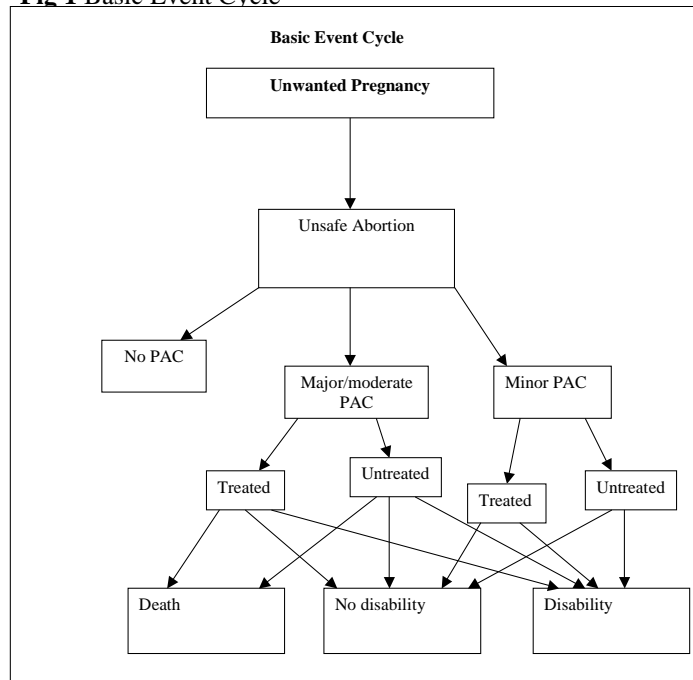
Basic Event Cycle: Brighton Papers

The basic event cycle introduced through the Brighton papers [see Figure 1] begins with an unwanted pregnancy,

followed by an unsafe abortion. The unsafe abortion can result in no post-abortion complications, minor complications, and major/moderate complications.

In cases where the unsafe abortion results in complications, there can be three final outcomes: full recovery, disability, and mortality. The probability of each of these varies with the severity of the complications and whether treatment is sought. The expected costs of each outcome were estimated in order to assess the micro-level costs of unsafe abortion.

Fig 1 Basic Event Cycle



Revised Event Cycle

In order to understand the context of unsafe abortion in Pakistan, we reviewed existing hospital-based studies from Pakistan and interviewed senior medical practitioners in the field of reproductive health. Since unsafe abortion is a difficult issue to observe due to its illicit nature, the best vantage point of observation of unsafe abortions is post-abortion complications that present in a hospital. Hence, medical studies and the interviews were used to further our understanding of the complexity of the unsafe abortion event cycle, as it exists in Pakistan, and to revise the event cycle of unsafe abortion. The research into the event cycle in Pakistan yielded some key aspects that were not included in the basic event cycle for induced abortion as explained in the Brighton work, but which do have a significant impact on the costing methodology. Moreover, the research highlighted that unsafe abortion is not only linked to induced abortion, but may be sought following a

missed or incomplete spontaneous abortion. (See Box 6 and Box 7 for case studies)

i) Nature of the pregnancy

Through our exploration of the literature, we identified the nature of the pregnancy as an important factor in the event cycle which may determine the abortion provider, the method of abortion, the level of complications, and the cost of the abortion itself.

Women who terminate pregnancies outside of a marital union are more likely to have higher costs associated with the abortion. The Population Council national survey (2004) found that the cost of an induced abortion could increase from two to twenty times if the pregnancy is extra-marital. Moreover, women who have induced abortions due to extra-marital pregnancies may be more likely to have serious complications, due to the difficulty in finding a safe abortion provider, while maintaining their privacy.

While there is not a lot of information about unwanted pregnancies and unsafe abortions that take place outside a marital union in Pakistan, a review of hospital-based studies shows that, while the majority of women have terminated pregnancies that occur within marriage, studies document that the termination of extra-marital pregnancies comprise from 7 to 32 percent of the total.[See Annex I, p.75] There is also some indication that there is a link between the methods used to terminate an unwanted pregnancy and the nature of that pregnancy such that women who terminate pregnancies outside of marriage are more likely to use methods such as instrumentation that pose a greater risk of PACs. [See Annex II, p.88]

ii) Alternative events

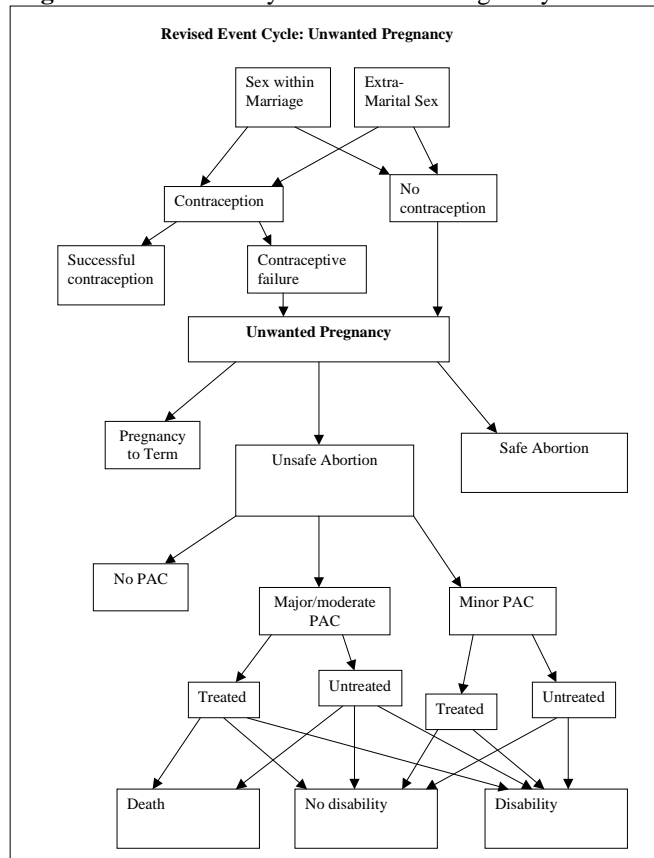
In order to cost unsafe abortion, it needs to be examined relative to contingent events that could prevent the pregnancy or the unsafe abortion. The only contingent event examined in the event cycle put forth by the Brighton papers is at the level of treatment of post-abortion complications following an unsafe abortion, where the alternatives are treatment or no treatment. However, in order to fully understand the event cycle of unsafe abortion in Pakistan, our literature review and key informant interviews indicated that it is important to include the alternative to the wanted pregnancy of contraceptive use (to include both successful contraception and contraceptive failure) and alternatives to the unsafe abortion.

In understanding the costing of alternative events to the unwanted pregnancy, contraceptive use is an important factor in the event cycle. Perceptions of contraception and its costs may be essential in determining whether an unwanted pregnancy takes place at all. In addition to contraceptive use, it is important to note the methods of contraception that are used. This is key not only in determining the costs of contraceptive use, but also in determining the effectiveness. The Population Council national survey included structured interviews with 448 married women who had recently experienced a spontaneous or induced abortion found that 52% reported using a method of contraception when they became pregnant. The two most common such methods were withdrawal and condom use. Thus, contraceptive failure seems to have a significant impact on the occurrence of unwanted pregnancies.

The other key contingent events that must be included in the event cycle are the alternatives to the unsafe abortion after the unwanted pregnancy has already taken place. These include carrying the pregnancy to term and seeking a safe abortion. These alternatives must be included in the event cycle in order to understand the costs of the alternatives and any financial and non-financial barriers that may exist in seeking them.

The revised event cycle (Figure 2) includes alternatives that can take place at various stages of the event cycle that are key in costing unsafe abortion in Pakistan. Contingent events can take place at three different levels: alternatives to the unwanted pregnancy, alternatives to the unsafe abortion, and alternatives to the adequate treatment of PACs.

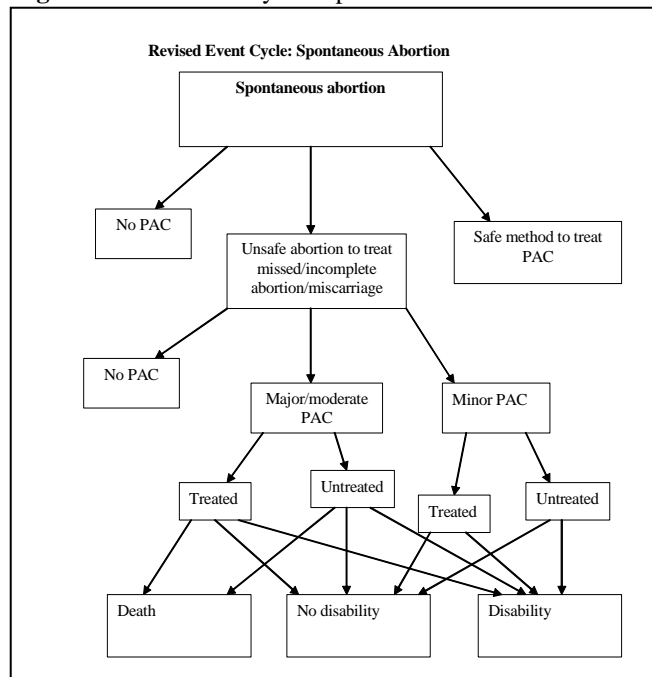
Fig 2. Revised Event Cycle: Unwanted Pregnancy



iii) Spontaneous abortion

Finally, a key finding through our literature review was the association between spontaneous abortion and unsafe abortion. (See Figure 3) Interviews with senior medical practitioners in the field of reproductive health found that unsafe abortion procedures are also commonly used in cases of missed or incomplete spontaneous abortion.⁴ Women go to unsafe abortion providers to seek the evacuation of the uterus of products of conception which, like unsafe induced abortion, may result in post-abortion complications. The reasons they use these providers is due to their

Fig 3. Revised Event Cycle: Spontaneous Abortion



⁴ Interview with Dr. Sadiqua Jafarey on June 18, 2008; Interview with Dr. Sikander Sohani on June 24, 2008; Interview with Dr. Razia Korejo on July 7, 2008.

proximity or reduced cost, not unlike reasons quoted by induced abortion seekers when they select a provider. Hence, we developed another event cycle which is not the result of an unwanted pregnancy but begins with a spontaneous abortion that may be treated by an unsafe abortion provider.

The story of spontaneous abortions becomes even more complicated when explored further. For example, an abortion can be caused by violence against a pregnant woman as well. The only research study to explore the health consequences of domestic violence on Pakistan women (Fikree and Bhatti 1999) was based on interviews with 150 women randomly selected from health facilities in the city of Karachi. Thirty-four percent of women (51/150) reported ever being physically abused, and 15% percent (21/150) reported ever being physically abused while pregnant. One-third (8/150) of the abused pregnant women reported a subsequent miscarriage. In short, this means that a significant proportion of pregnant women who reported violence said they lost a pregnancy as a result of it.

B. Sources of Research

Community Studies

There is a small set of community-based research into induced abortion. They are based on work in rural and urban Punjab and Sindh. One study is from urban Peshawar, and there are no published community studies from Balochistan. Comparison across community studies is difficult since they took place at different time periods and with varying research purposes and methodologies.

The first such published study was conducted in Lahore by the Maternity and Child Welfare Association of Pakistan (Awan, 1969). 1,447 respondents in an urban community were followed during their pregnancies; the study found that 5.7% of all pregnancies ended as induced abortions. Two other urban community studies in Lahore conducted by MCWAP, report a 4.9% and 4.2% rate of induced abortion out of all pregnancies followed. The later Karachi community studies noted that the abortion rate was underestimated in current research.

Box 1: Abortion Rate and Post-Abortion Complication Rate among Community Studies

Author	Study	Abortion Rate	PAC
(Lahore)			
Awan, 1969	1,447 women whose pregnancies were followed in urban community	5.7% pregnancies terminated (x/1447)	Not given
Maternity and Child Welfare Association, 1993	2,991 women whose pregnancies were followed in urban community	4.9% pregnancies terminated (149/2,991)	Not given
Awan and Parvez, 1999	1,576 women in 22 villages whose pregnancies were followed	4.2% pregnancies terminated (66/1,576)	Not given

Box 1 (cont)

Author	Study	Abortion Rate	PAC
Sheikh et al 2002	Random selection of 186 married ever gravid females from among peri-urban community in Lahore	<u>Total abortion rate:</u> 90/1000 pregnancies, or 419.35/1000 women of reproductive age group <u>Induced abortion rate:</u> 22.4/1000 pregnancies, or 96.77/1000 women of reproductive age	Not given
(Karachi)			
Fikree, Rizvi, Jamil and Hussain, 1996	Study of women in Orangi and Azam Basti slum settlements (1994)	11.7% abortions out of 283 pregnancies reported by 34 women; 41% of 34 women interviewed reported at least one induced abortion	53% (16) women mild to severe post-abortion illness 13.3% (4) smelly discharge 2 sepsis
(a) Jamil, 1998 (b) Saleem and Fikree, 2001 (c) Saleem and Fikree 2005	Cross-sectional survey 1,214 ever married women in 3 squatter settlements (1997)	0.86.8 total abortion rate; 25.5 per 1,000 induced abortion rate	68.5%, including heavy bleeding and fever
(a) Fikree, Saleem and Sami, 2002 (b) Fikree, Saleem and Sami, 2005.	Sampling of 500 men and 500 women in two urban low income settlements (Azam Basti and Chanesar Goth) (2001)	54 women, 23 men reported successful termination.	46.4% (25) women, 39.1% (9) men reported PAC, i.e. heavy bleeding and infection, and milder symptoms as well.
(Peshawar)			
Gilani and Azeem, 2005	100 married women in urban Peshawar who had induced abortion		45 reported complications

Medical Studies

There is a body of thorough medical research on unsafe abortion-related complications which are treated in hospital. Twenty-six medical studies based in major tertiary care hospitals in Peshawar, Lahore and Karachi, whose findings were published in academic journals, form the basis of our discussion here. Existing data from hospital-based studies is useful to lay out a preliminary profile of PAC, in terms of what kind of complications reach tertiary care facilities, how they are managed, mortality rates, patient profiles, and method/provider of induced abortion. Not all the studies, however, gave information pertaining to all of these categories, so Annexes have been prepared separately to present the data from all those studies reviewed which contain relevant data.

A study located in a tertiary care hospital in Hyderabad report a higher rate of unsafe abortion (6.42%) than in other medical studies, and researchers noted that the reason for this may be that the hospital received patients in serious conditions from throughout the

province of Sind, including its remotest areas, as well as private hospitals in the city. [Madhu Das and Srichand 2006] This suggests that there is some geographic variation in findings even among hospital studies.

C. Findings from the Literature

A close reading of this literature provides us with a wealth of information about certain components of the event cycle as illustrated below.

i) Unwanted Pregnancy

Medical studies inform us about why women patients who resorted to induced abortion did not want the index pregnancy. We can compare across studies the profile of these women and the reasons why they did not want another pregnancy. Community studies give us more contextualized information about the alternatives to unwanted pregnancy, and who are the women who seek induced abortion.

ii) Unsafe Abortion

Medical studies tell us about the methods and the service providers used by women to terminate pregnancy, usually leading to PACs. Community studies give us a broader view on the alternatives to unsafe abortion methods and providers, not necessarily leading to PACs.

iii) Major/Moderate PAC

Medical studies inform us about major and moderate post-abortion complications that are treated in hospital and their classification. However, we only have the limited time frame of the medical research studies within which to explore the issue of disabilities, yet the information is useful for the detail provided for our event cycle. Community studies give us insight into the alternatives to major/moderate PACs, i.e. mild or no complications.

iv) Treatment

Finally, the medical studies provide information on the management of these PACs, i.e. the treatment, details of which are essential to our long-term research goals. Community studies tell us a little bit about treatments sought by women which are not documented in the medical studies, and the alternatives to seeking treatment.

Outcomes: The studies provide us with outcomes only in the short term, such as morbidity or mortality reported while the patient is in hospital care. The community-based studies, however could give us a broader sense of outcomes in terms of long-term morbidities and full recoveries.

i) Unwanted Pregnancy

Alternatives: The alternative to the unwanted pregnancy itself includes the successful use of contraception leading to no pregnancy at all, or the non-use of contraception leading to a wanted pregnancy. We will be discussing the unwanted pregnancy based on either no contraceptive use or contraceptive failure.

Patient Profiles

Community Studies: The profile of women who sought to terminate their pregnancies, based on community studies, gives us the broader context in which to analyze post-abortion complications. The earliest study shows that abortion seekers were married, predominantly illiterate, and had been pregnant more than once. Almost 40% had been pregnant six or more times. (Awan, 1969) Research in low-income communities in Karachi reveals that women who sought abortion were married, and had three or more living children at the time of their first induced abortion. (Fikree, Rizvi, Jamil and Husain, 1996) Later research found that grand multigravidity (five or more pregnancies) was a strong predictor of induced abortion and that literate women were at a higher risk of seeking induced abortion. (Saleem, 1998) A survey of women who sought abortion at clinics in Karachi, Lahore and Peshawar, found that 91% of them were married, most had five or more children, and almost half were illiterate. (Rehan et al 2001) The Population Council survey of health professionals⁵ across Pakistan found that they reported the typical woman seeking an induced abortion is older than age 30, married, uneducated, and with five or more children. (Rashida et al, 2003)

Medical Studies: The profile of patients covered by the medical studies [See Annex I] however, shows that the average case is of a woman above age 25, often above age 30, who is grand multipara (i.e. has given birth five or more times). A ten-year review of 2,085 induced abortion cases in another Lahore hospital (Gul 2001) revealed that 35% of patients were ages 21-30 and 47% were ages 31-40. An Islamabad study (Saeed 2002) of 52 induced abortions found that 64% were ages 21-35, and 58% of women had more than five children, and 79% were poor. In Karachi as well, one study of 200 cases found half of the patients were ages 26-49 and almost half (40%) had more than five children. Where there is information on the socio-economic status of the patients, it appears that they are usually from a low-income group. For example, in a Lahore hospital study reviewing 156 induced abortion cases, 40% of the women were ages 25-30, 83% were poor, and 66% were grand multiparae. (Yusuf 1997)

The location of the hospital may have a role to play in attracting a particular type of patient, but this needs to be explored further. For example, the major hospital studies in Lahore and Karachi appear to be based on patients who are predominantly from a low socio-economic background.

Although most women profiled in these medical studies have terminated legal pregnancies, there are thirteen studies (out of 27 that have patient profile information) that provide some data on illegal pregnancies. In a study at JPMC 1999-2003 of 200 cases of induced abortion (Hussain et al 2004), although 106 women said they chose termination to limit their family size, 10 women admitted to an illegitimate pregnancy. The remaining studies document similarly small but significant proportion (ranging from 7 to 32 percent) of unmarried patients or illegitimate pregnancies among those surveyed.

⁵ This 2001 survey is based on the perceptions of 154 respondents, predominantly medical doctors and gynecologists practicing most often in clinical hospital settings located in urban areas. They represented all four provinces of Pakistan. (Rashida et al 2003)

Two studies do not explicitly state that there were unmarried patients among those surveyed, but suggest figures (25 and 5 percent respectively) based on their accounting of married patients. (Khanum and Mirza 2000, Siddique and Hafeez 2007) One study conducted on abortion patients who needed surgical intervention at a hospital in Rahim Yar Khan found that 25% of the 40 patients were unmarried.

Findings based on studies that provide information on severe PAC cases and also on abortion provider and method findings [See Annex II], indicate that there is a strong proportion of unsafe abortion providers as well as a 10 percent and 6 percent rate of illegal pregnancies among those surveyed (Naz and Begum 2004, Rehan 2003). The medical studies reviewed did not provide data consistently across all the patient profile, method and provider categories to allow us to conclude that illegal pregnancies were linked with the most unsafe methods of induced abortion, but further research is suggested to explore this linkage. Finally, though, it is reasonable to suspect that there will be some cases of illegal pregnancy among patients surveyed in most of the medical studies, but in a context where both patient and doctor understand the legal and social risks of documenting these pregnancies, the number is likely to be under-reported or not reported at all.

Reasons For Having Unsafe Abortion

Community Studies: The literature shows that contraceptive failure or non-use are the most common reasons that women seek induced abortions, and a lower rate of abortion can be linked with higher contraceptive use (Khanum and Mirza 2000, Saleem and Fikree 2005). In a Karachi-based study (Saleem and Fikree 2005) 40% of women were using some method of family planning before conceiving. A study of women seeking abortion in 32 clinics in Karachi, Lahore and Peshawar also found that a large number of women are using pregnancy termination as a form of contraception, including women who cited contraceptive failure as a reason for abortion. Out of all the clinics surveyed, only 22 percent met the WHO standard for safe termination of pregnancy. The Peshawar study found that women were undergoing induced abortion as a method of contraception, and a smaller number were citing their own poor health as a reason for termination. The study noted that women in more challenging circumstances were more likely to undergo repeat abortions, even though almost half had reported some form of complication due to terminations. (Gilani and Azeem 2005)

Other reasons for induced abortion, based on the community studies, included economic constraints, short pregnancy intervals among the women, extra-marital or pre-marital affairs. The rate of wanted pregnancies decreases with pregnancy rank. Women say they have completed their family size (MCWAP 1993) or they are too unhealthy, and the youngest child too small, to undergo another pregnancy to term. (Gilani and Azeem 2005) The Population Council conducted a set of community-based studies in rural/urban Punjab and Sindh, interviewing health service providers and individuals. It emerged that respondents viewed induced abortion as a cheaper and safer method than contraceptives to control fertility, terminated unintended and unwanted pregnancies, and space births. (Rahat et al 2003)

Another Population Council study based in one village in rural Punjab (Khan et al 2007) explored how women perceived their options for avoiding unwanted pregnancies and how they made their decisions. The study provided some useful insights. One, it found that couples assessed the desirability of a pregnancy after the fact, once conception had occurred. Two, women identify unwanted pregnancies as early as their second pregnancy, while for men it is later, and they pursue induced abortions even without their husbands' knowledge and consent. Three, unintended pregnancies are the result of non-use of contraception and failure of contraceptive methods. Finally, women base their decision on abortion based on factors such as economic status, their own poor health, and problems they have in rearing their children. Inability to develop a shared perspective with men on these issues often leads to unintended pregnancies.

Khan et al (2007) also made the important finding that peoples' views on induced abortion are more clearly against the practice when they are questioned in a public setting, whereas in private they may themselves pursue this option. While contraceptives are a more favored solution to an unwanted pregnancy, non-availability or ignorance of methods leads to a decision in favor of induced abortion.

There is also a pattern of women undergoing repeat abortions, and those that do so are more likely to report a more challenging family situation than first-time abortion seekers. For example, a study from Peshawar found that 15% of induced abortion PACs had repeat abortions. Researchers point to the inadequacies of service provision and the government population welfare programme in that province [Gilani and Azeem 2005]. Thus, it seems that in some cases, couples are not using contraception and, instead, are using abortion as a means of contraception. Almost three-quarters of health professionals surveyed by the Population Council nation-wide said that women were using a method of birth control at the time of the unwanted pregnancy. (Rashida et al 2003)

Medical Studies: The medical studies do not systematically investigate why women decided to terminate their pregnancies, but among almost one dozen studies of those reviewed there is some data on the subject. The reasons women do not wish to continue their pregnancies can be classified as follows:

- a) Desire to limit family size: patients are older, already have three or more children (of whom some may be older or married) and do not wish to have more.
- b) Desire to space births: the youngest child is too young and patient does not want another baby yet.
- c) Socio-economic: patient does not have the means to support another child in the family.
- d) Issues with husband: he may have taken the decision for termination, or there are marriage problems, or he has unexpectedly died.
- e) Illegal pregnancy: patient is unmarried, widowed, or divorced.
- f) No contraception: contraceptive failure or non-use of contraception.

It must be kept in mind a) that patients often do not wish to admit they have had an induced abortion and b) they may not be in a condition to give a detailed account of the

circumstances of their termination. Further, the general categories identified here are not clearly distinguishable from one another but rather they point to the kind of reasoning on the part of both medical researcher and patients as they try to understand how patients interpret their life circumstances and make decisions. The profile of patients covered by the medical studies, as discussed earlier, shows that the desire to limit family size, along with socio-economic concerns and possibly contraceptive failure may lie at the heart of why women have unsafe abortions.

The socio-economic reasons given by patients and investigators cover certain types of information available in the medical studies reviewed. This includes financial problems, inability to afford further children, inability to afford this pregnancy, poverty, and the inability of a working woman to take time off for another baby. In one study (Siddique and Hafeez 2007) of 59 induced abortions in a Lahore hospital, financial problems 40.6% and 30.57% cited inability to afford time off, and both of these findings can be termed socio-economic considerations. Poverty can also be a major reason why women choose induced abortion as a way to limit the number of children, but this fact may not emerge from the medical study itself.⁶

ii) Unsafe Abortion

Alternatives: After conception has already taken place, the alternatives to undergoing an unsafe abortion include carrying the pregnancy to term and undergoing a safe abortion. Data pertaining to safe abortion and carrying pregnancy was not reviewed for this concept paper, but will be discussed in the next analysis of secondary data. Both community and medical studies provide detail on unsafe abortion and its consequences.

Medical researchers agree that the incidence of illegal and unsafe abortion is underreported and medical studies do not reflect the full picture (Saeed 2002). One reason is that the reporting of spontaneous abortions in medical studies can include induced abortions, particularly those which present with incomplete evacuation and haemorrhage. (Bhutta et al 2003) One study on all abortions revealed how interlinked the reporting can be. In a study on all first trimester abortions, the prevalence of abortion increased with age (26-35) and parity (5 plus), a profile similar to that of the induced abortion cases examined in other studies. The most common type of abortion in this study was found to be incomplete abortion, and the second most common type (20.5%) was induced abortion. (Khaskheli 2002)

Providers

Community Studies: Abortion providers identified in community-based research include qualified doctors, Lady Health Visitors, nurses, paramedics, untrained dais, and even hakims. In Fikree et al (1996), when women in Karachi were asked whether cost of the skill of provider was the determining factor in their selection of an abortion provider, only 23.3% reported cost as a primary concern. While abortions were conducted on the

⁶ A leading reason given in the medical studies for terminating a pregnancy is “unwanted pregnancy”, which in itself tells us nothing about the factors that make a pregnancy unwanted.

premises of service-providers, it is significant that at least one study identified that half of induced abortions surveyed were conducted at the woman's house. (Sheikh et al 2002)

According to health professionals surveyed by the Population Council across Pakistan, poor women were most likely to go to a nurse, midwife, or Lady Health Visitor (98%) for an abortion, followed by dais (81%) and other practitioners. Non-poor urban women were said to be more likely to go to a doctor in a private or public facility. (Rashida et al, 2003) In Rahat et al (2003), private practitioners were reported to be the major provider of induced abortion, whether or not they were qualified. This study also reported the use of MVA among women.

Medical Studies: There is a range of abortion providers cited in these medical studies, including Lady Health Visitors (government-trained health workers), traditional birth attendants, doctors, nurses, and women themselves. Since the patients interviewed in these studies are all PAC cases in hospital, findings show that even with skilled abortion providers (doctors, LHVs and nurses) there are serious complications among women seeking abortion. In a ten-year review of 2,085 induced abortion cases in a Lahore hospital (Gul 2001), 41.39% of terminations were D&Cs conducted by untrained health personnel. In a retrospective analysis (Madhu-Das and Srichand 2006) of 32 induced abortion patients in a hospital in Hyderabad, 91.25% of terminations had been conducted by either a lady doctor or an LHV. The major role of nurses, doctors and LHVs in unsafe abortion is confirmed by other hospital studies as well, among them Hussain et al (2004) and Bhutta et al (2003).

Methods

Community Studies: Community studies give us some insight as to preferred methods among women in selected general populations. The Population Council survey of health professionals found that they reported the most commonly reported surgical methods for terminating pregnancies were dilatation and curettage (72%) and evacuation and curettage (32%). They also reported that after a D&C the next most common method was the use of a laminaria stick, followed by an IUCD, hormonal drugs/pills and hormonal drugs/intra-vaginal. (Rashida et al, 2003)

A study of married women who had an induced abortion and were living in urban Peshawar (Gilani and Azeem, 2005) found that the most common method used by women was instrumentation, followed by inter-vaginal drugs, and sticks. Almost half of them had complications in the form of haemorrhage, pelvic pain and menstrual irregularities. In one Lahore community study (Sheikh et al 2002) among the 18 women identified who had induced abortions, the methods of choice were instruments, vaginal medications, oral medications, and only one IUCD. The findings for community studies in Karachi are somewhat different. Data collected during 1997 revealed that D&C was the most successful method quoted among women in three squatter settlements (Saleem and Fikree 2001) followed by intravaginal placement of allopathic medications, sticks, and drips or injection. There was a high rate of PAC among these women (68.5% of 61 out of 89 women with successful termination), with over half reporting fever and heavy

vaginal bleeding. Data collected from 54 women in two squatter settlements in 2001, also in Karachi, shows that the successful method by far remains D&C or MVA, and that most women were seeking the services of doctors for their abortions. Nonetheless, there were 25 cases of PACs (as heavy vaginal bleeding or infection) among these women, for which treatment was most often sought from doctors at clinics. Community studies provide valuable information on how behaviors associated with unsafe abortion vary in different parts of the country.

Medical Studies: There is strong data on the type of abortion methods used by PAC cases in the medical studies reviewed. They are summarized below.

Box 2. Methods Used in Induced Abortion Based on Medical Studies Cited

Type of Method	Details of Method	Popularity of Method
Instrumentation	Vaginal sticks, laminaria tents, herbal sticks, cervical stick insertion, instrumentation of uterus, hairpin or knitting stick insertion, IUCD, intracervical catheter,	<ul style="list-style-type: none"> • Among septic abortion cases instrumentation and insertion of vaginal medicines were leading method used. • Instrumentation and the use of laminaria tents⁷ are leading methods found in induced abortion studies.
Evacuation of fetus	D&E, D&C, suction evacuation	<ul style="list-style-type: none"> • D&C and D&E leading or second most popular method. • These procedures are undertaken as the only method of termination, but also in combination with vaginal tablets and laminaria tents.
Tablets/Medication	Vaginal tablets, anal tablets, pessaries, herbal medicines	<ul style="list-style-type: none"> • Details (content and method of use) of medicines and injections used are not given. • Frequency varies across studies.
Other	Oxytocin agent or injection, indeterminate, cotton swabs soaked in drugs, vaginal potions, unspecified medication, warm oil, oral or injectable drugs, herbal medicines, indeterminate	<ul style="list-style-type: none"> • Details may reveal that methods overlap with tablets/medications. • Methods in this category can be as much as one-third or one-fourth most common method among cases surveyed.

These methods, in combination with the circumstances of their use and the training level of the abortion provider, have led to serious post-abortion complications.

iii) Major/Moderate PAC

Alternatives: For each unsafe abortion, there are three possible immediate outcomes, e.g. no post-abortion complications, major/moderate PACs, and minor PACs. The greatest

⁷ Laminaria tent is an instrument made of kelp or brown algae that is inserted into the vagina as a hygroscopic cervical dilator and inducer of labor. It is contraindicated during pregnancy. It may contribute to maternal and neonatal infection. The spontaneous uterine contractions that may be triggered by laminaria tents can result in fetal death. [www.drugs.com/npp/laminaria.html, accessed May 27, 2008]

amount of research is available on major/moderate PACs due to the medical literature.

Classification of PACs

Post-abortion complications can be classified in terms of severity: mild, moderate and severe. One useful method of categorization, as quoted in the international literature, is as follows:

Box 3 Categorization of Post-Abortion Complications by Severity

Severity Category	Symptoms	
Low	Temp $\leq 37.2C$ No clinical signs of infection No system or organ failure No suspicious findings on evacuation	and and and
Moderate	Temp 37.3-37.9C Offensive products Localized peritonitis	or or
Severe	Temp $\geq 38C$ Organ failure Peritonitis Pulse ≥ 120 Death Foreign body/mechanical injury on evacuation	or or or or or

Source: Vlassoff p.11, quoted from Rees et al, 1997, p.433.

Community studies: Community-based studies give us important information on PACs and health-seeking behavior that is not limited to major hospitals. Researchers found that women were aware of the risk of post-abortion complications, but in order to meet their goals of limiting family size they were willing to seek unsafe abortions and their related consequences. The PAC rate reported in a Karachi study was 68.5% (Saleem and Fikree, 2001) In the Peshawar study almost half of the surveyed women reported some PAC, yet researchers noted that women were undergoing repeat abortion and in the absence of quality family planning services it was used as a method of limiting family size. The most common method of unsafe abortion was instrumentation and a high rate of PACs was observed. (Gilani and Azeem 2005)

The types of PACs found included fever, heavy vaginal bleeding (Saleem and Fikree 2001), weakness, symptoms of infection, pelvic pain, menstrual irregularities (Gilani and Azeem 2005). Men and women reportedly differently their understanding of symptoms and infections in a Karachi study, and men were found to know more about the risk of PACs than women. (Fikree, Saleem and Sami 2002)

Medical Studies: The medical studies surveyed provide important details about the type of PACs that are treated in hospital in Pakistan. The findings have been organized into Box 4 on the following page, based on the PACs identified and the terms used for them in the medical studies. The severity rating is based on the format used above in Box 3.

Box 4. Summary of Types of PACs Based on Medical Studies of General Induced Abortions

Severity	Type of Complication
Mild	n/a
Moderate	Localized pelvic infection, pelvic inflammation, pelvic abscesses, Anemia, Retained products of conception
Severe	<u>Sepsis</u> : septicemia, septic shock <u>Peritonitis</u> : pelvic and/or abdominal
	<u>Visceral injuries</u> : Pelvic trauma: uterine perforation, cervical tears, vaginal tears, gangrene of uterus Bowel trauma: gut perforation, intestinal perforation, gut prolapse
	Renal failure, cardiac failure, pulmonary complications, DVT, jaundice and hepatic failure

A close look at eight studies based on particular PACs (e.g. septic abortion cases, and bowel or colonic injury) shows a strong association between unskilled abortion providers, methods and severe PACs. [See Annex II] In a study of 22 cases of bowel injuries due to induced abortion (Rehman et al 2007), 82% of the abortions had been performed by unskilled personnel using instrumentation (70%), inter-vaginal drugs (22%) and sticks (8%). The mortality rates among studies focusing on septic and bowel trauma cases was high, ranging from 6.25% to 18% of patients. In one study in Lahore (Ghazanfar and Ahmed 2002) based on 37 patients with colonic trauma, all the abortions were conducted by dais or LHVs using some method of instrumentation.

The association between methods, providers, and severe PACs still stands for the studies on general induced abortion cases as well. For example, in a study of 72 cases of PAC in a Lahore hospital (Najmi 1998), at a minimum estimate the actual methods used were “instruments” (64%), “herbal sticks” (8%) and “laminaria tents” (1%), bringing the proportion of unsafe methods used to at least 72% of the cases. Above three quarters of all the abortions were performed by LHVs and dais. There were four deaths among the cases, caused by multiple perforations, septicemia, renal shutdown and cardiac failure. In a Karachi hospital study (Bhutta et al 2003), 64 out of 93 induced abortion cases presented in hospital with septicemia, and 65% of the patients had used some form of “instrumentation” to end their pregnancies. Over half the abortion providers were nurses, LHVs, and dais. The fact that a strong proportion of doctors are also implicated in these studies, as abortion providers in cases that developed severe PACs, is a further cause of concern. In the Lahore study, 20% of the providers were doctors, and in the Karachi study, 30% were doctors. The mortality rate in these studies was 5.5% in the Lahore hospital and 10% for the Karachi hospital.

iv) Treatment

Alternatives: All levels of PACs can either be treated or not treated, and they will as a consequence have different outcomes. Community studies give us some insight into the rate of PACs among abortion-seekers, particularly rates of treatment sought. Medical studies give us information on moderate and severe PACs that were treated. Research on all levels of PACs that were not treated is inadequate.

Community Studies: In a Karachi community study (Fikree et al 2002) out of 25 women

with PACs, doctors were approached most often at clinics, and only two women sought treatment at hospitals, and one from a TBA. However, in an earlier community study (Saleem and Fikree 2001), there was a PAC rate of 68.5% (predominantly fever and heavy vaginal bleeding) for which 27.9% of women were admitted to hospital for more than 24 hours. According to Rahat et al (2003) women did not quickly seek treatment for perceived PACs, such as heavy bleeding, and septic abortions were often endured without timely medical intervention being sought. Most community-based studies did not give any information pertaining to treatment for complications.

Medical Studies: The treatment for PACs varies according to severity, and it is the most severe cases about which we have some clarity regarding the type of medical interventions provided in hospitals. A comprehensive list of all those interventions specifically discussed in the medical studies reviewed is given below in Box 5. Future research would need to indicate which type of health care provider/service could offer these interventions in Pakistan.

Box 5. PAC Management as Based on Medical Studies

I. Interventions and Investigations	4. Baseline Investigations
1. Patient resuscitation	5. Abdominal and/or pelvic ultrasound scan
2. Detailed general physical and system examination	6. X-ray of abdomen
3. Abdominal and bimanual pelvic exam	7. Needle aspiration through posterior fornix
II. Outpatient	
Medication and treatment to correct anemia, dehydration, pyrexia, infection	
III. Admission	
Patients w/ retained products of conception peritonitis, hemorrhage, coagulation disorders	
IV. Surgical Procedures	8. Bowel repair: resection or anastomosis
1. General anesthesia	9. Colostomy: involving ileum or jejunum or colon
2. Evacuation of uterus (D & C, D & E)	10. Bladder repair
3. Uterine repair	11. Colpotomy
4. Exploratory laparotomy	12. Hysterotomy
5. Peritoneal toilet	13. Hysterectomy: subtotal or total
6. Pelvic abscess drainage	14. Dialysis
7. Posterior fornix repair	

Source: All medical studies cited and Key Informant Interview with Dr. Luna Vellozo, June 19, 2008.

After the interventions listed above, there are follow-up visits required but no data on how many such visits are required for different interventions and whether these actually take place as recommended. For example, anemia is a common issue among PAC patients, in one study 70% of abortion cases were of women with hemoglobin less than 10g/dl. (Khaskheli 2002) Follow up care includes iron supplements, but studies have noted that treatment of anemia in PAC patients is particularly difficult. Stay in hospital will vary depending on the procedure; it can be as long as three months for patients who had colostomy followed by its reversal. For patients with renal dysfunction, sometimes dialysis may be required once after surgery and possibly a second time. For those patients who have surgical procedures, their management includes one or two follow-up visits after one month and then two months in the appropriate hospital departments, such as the gynecology or surgery units. The follow up visit is also used to advise patients on contraception. Doctors surveyed comment that behavioral and psychological symptoms of some patients need to be treated and such care is currently not offered in hospitals.

v) Outcomes

Alternatives: The three possible alternatives to the end of our event cycle are death, no disability, or disability. There is a limited amount of research that fully explores these possible outcomes, however medical studies give us a sense of mortality rates at least during the immediate post-abortion time period.

Morbidity and Mortality

Community Studies: Most studies did not give data on long-term morbidities or on mortalities associated with unsafe abortions. However, a Lahore study (MCWAP 1999) found two out of 66 induced abortion observed ended in death.

Medical Studies: Fourteen medical studies based on cases of general induced abortions and their complications were identified that gave figures of maternal mortality caused by complications of induced abortion. Septicemia was the leading cause of death in these studies, followed by gut perforations and other gut injuries.

With the exception of one study, all the Lahore medical studies (seven in number) present a 2-7 percent mortality rate. This includes one ten year study (4.17 mortality rate). The single study with a mortality rate beyond this range (Yusuf 1997) presents a 21.79% mortality rate out of 156 induced abortions. Another one year prospective study from the same hospital does not have a mortality rate finding. One important reason for this discrepancy could be that the Yusuf (1997) study is a retrospective examination of records to collect data on cases of suspected induced abortion. This begs the question, how is induced abortion recorded in hospitals, and are accurate records possible in a cultural and legal environment that inhibits women from confiding in medical professionals? Is it possible that retrospective examination of records is more realistic, or is it less accurate than prospective research? In those Lahore studies that present information on causes of death among PACs, septicemia is the leading cause of death followed by “visceral” injuries to the gut and bowel.

In four Karachi medical studies on general induced abortion PACs, the mortality rate is 9.5% to 14.28%. The causes of death are the same as those identified in other medical studies, i.e. septicemia, gut injuries, peritonitis, and organ failure. The two studies with figures from Hyderabad (Mumtaz 1999, Madhu-Das and Srichand 2006) do not allow us to arrive at any firm conclusions about the possible mortality rates of women in that part of Sindh province, because the first study is based on a one year patient case-load of only 11 women, and the other study is a retrospective analysis over a three year period of a fairly small number of PAC cases (32) as well. Out of the total of 43 deaths recorded, all from the same hospital, sepsis was the main cause of death, followed by the two mortalities due to hepatorenal failure.

The linkages between the severest complications and death rates are somewhat clearer when we look at studies based on specific PACs. In a review of 28 septic induced abortions in a Peshawar hospital (Naib et al 2004), the mortality rate was 14.28% (n=2)

and in a prospective study of 102 septic induced abortion cases over a one year period in a Lahore hospital (Naz and Begum 2004) the deaths were 11.6% (n=12). In a two year retrospective study at a hospital in Bahawalpur, out of a total of 32 patients having septic induced abortion with renal failure, there were only two deaths. These figures reconfirm that septic cases are a leading cause of death among PACs, but the Bahawalpur data suggests that cases treated in time may significantly reduce the mortality rate from this complication. Two studies (Ghazanfar and Ahmed 2002, Rehman et al 2007) based on colonic trauma and bowel injuries had high mortality rates (8.1% and 18.75%). The latter study, based on 22 patients presenting with bowel injuries in a Karachi hospital, makes the observation that six of the patients reported to hospital over nine days after the termination or injury.

Medical studies reviewed do not give data on long-term morbidity following unsafe abortions. However, doctors do make some observations that provide insight into what these sequelae would be. For example, secondary infertility, low birth weight babies, and genital tract infection, and chronic pelvic pain following an unsafe abortion are mentioned in Khanum and Mirza (2000) and Saeed (2002) as long-term complications. Patients do not necessarily report conditions such as anemia, genitourinary infections, secondary infertility and psychological disturbances. (Siddique and Hafeez 2007) Care for traumatized patients with vesico-vaginal fistulas or colostomies are needed, but not available. (Bhutta et al 2003)

Box 6. Case Study of PAC from Induced Abortion

Sadia, age thirty-five, and mother of seven (3 girls and 4 boys) is a resident of BG, Korangi, Karachi. Her husband is a security guard at a private firm and all seven of her children are enrolled in school. Her husband earns a salary of Rs.10, 000 per month which is hardly sufficient to maintain such a large family. They live permanently in Karachi, although her husband is originally from a village in Sindh.

Sadia has never used any method of contraception and never had a miscarriage. All her children were delivered at home with the help of her mother who is a *dai* (traditional birth attendant). After her sixth baby, Sadia did not wish to have anymore children but a few months later she found out that she was pregnant again and went ahead with the pregnancy.

About a year ago, she discovered that she was once again pregnant. This time, her husband felt that due to inflation and rising living costs it would be extremely difficult to raise another child and therefore she should abort the baby. Sadia was initially reluctant, but out of consideration of her husband's ailing health due to heart disease and the financial strain that the family would have to endure with an additional mouth to feed, she felt compelled to go along with his decision. Anticipating vehement opposition from her mother, Sadia shied away from telling her about the abortion.

Sadia was almost one and a half months pregnant when she decided to get the abortion. The procedure was performed at the home of a nurse from a local hospital. At first the nurse was apprehensive about performing the procedure, thinking that Sadia wanted to go ahead with the abortion without her husband's consent, but Sadia reassured her that her husband supported the decision.

Even though she had never visited a hospital nor consulted a family planning counselor, she knew where to get help because her sister-in-law had undergone an abortion earlier. It was performed by a nurse known as Dr Razia, who practiced at a private hospital and for her sister the procedure was quick and almost painless. Not aware of the potential problems caused by unsafe abortion, Sadia assumed that her abortion would also be performed in the same way. Unfortunately, Sadia's experience was extremely painful and the nurse used an instrument and her hands to 'clean' the uterus (*safai*). The entire procedure cost the respondent Rs. 1,500 and lasted two hours, which was much longer than what her sister-in-law had endured.

After the abortion Sadia experienced pain in the lower part of her abdomen, dizziness and heavy bleeding. This continued for two months. Initially, her situation was so bad that she had to change her sanitary pad after every half an hour. Desperate for relief, she visited the nurse who performed the abortion. The nurse gave Sadia three injections costing Rs. 120 each in three sittings, but the problem persisted. The transportation fare for the three times she visited the nurse by rickshaw was Rs. 180.

Box 6. (cont)

The respondent's husband was very worried about her frail condition, so he contacted one of his friends who was a doctor. The doctor prescribed some medicine, which brought about some improvement in her condition. However, she occasionally still felt dizzy, experienced foul smelling discharge and suffered from backaches which caused a lot of pain and discomfort. All of this was not only physically challenging but also psychologically disturbing for her.

Due to her weakness, Sadia remained bed-ridden for about three months after the abortion. Domestic responsibilities fell mostly upon the shoulders of her daughter who was in grade six, but Sadia's husband would also help out when he would come home from work. She still has not told her mother about the abortion, fearing condemnation from her relatives.

At the time of the interview Sadia was under the treatment of Dr Nusrat. She would visit the doctor at a hospital where the poor were not charged any consultation fee nor did they have to pay for medication. The respondent feels much better under Dr Nusrat's treatment, as her health has improved and the spells of dizziness have decreased.

Sadia was unaware of the complications associated with unsafe abortion. She had previously never visited a hospital nor consulted a doctor due to lack of information, therefore she did not know where safe abortions were performed. After her terrible experience with abortion she feels that if a woman has an unwanted pregnancy, she should not get the baby aborted, as it can be an extremely distressing experience. Sadia and her husband have decided not to have anymore children, although she still has not adopted any family planning practices. She said she will not opt for an abortion if she becomes pregnant again.

Estimated Expenditure of Induced Abortion and PAC Management	
Abortion Procedure	Rs. 1,500
Injections	Rs. 360
Transportation Fare	Rs. 180
Total Expenditure	Rs. 2, 040

Box 7. Case Study of PAC from Spontaneous Abortion

Riffat, age thirty-seven, and mother of five (one son and four daughters) is a resident of the NB, Korangi, Karachi. Her husband is the sole provider of the family and being a fisherman, he spends most of the week at sea on his personally owned boat. His weekly income ranges from Rs. 500 to Rs. 3000, depending on the type of season and catch. At the time of the interview the respondent's husband was unable to go out to sea due to government restrictions on fishing for the next two months. Her family originally traces its roots to Bangladesh, but they have been settled in Karachi ever since 1947.

Riffat initially said she had never used any method of contraception, however later she recalled that after her fourth child she had received a contraceptive injection from a Lady Health Worker (LHW) in Badar Town. Riffat had suffered from heavy bleeding until nine months after the injection. Desperate for relief, she paid about Rs. 900 of her husband's meager income on consulting a lady doctor, after which she recovered. This bad experience discouraged her from adopting this method of contraception again.

When Riffat was three months pregnant with her sixth child, she again experienced bleeding, after which she was rushed to the 'Maria Clinic' for an ultrasound that cost another Rs. 300. The ultrasound detected no movement of the fetus in the womb, which meant that the baby was no longer alive and had to be aborted. The next morning she discharged two blood clots, indicating that the fetus had been aborted. The ultrasonologist recommended that the procedure should be performed by Razia, a nurse at the clinic.

Upon approaching Nurse Razia in the evening, the respondent was first given a drip and then a medical abortion was performed by inserting a tablet into the vagina, due to which Riffat began to bleed heavily. This continued throughout the night. Nurse Razia had not used any instruments, nor had she used her hands to perform the abortion. The respondent not only had to pay Rs. 3000 to Razia for 'cleaning' her uterus ("*safai*"), but also spent about Rs. 1200 on medicines prescribed to help her stop the bleeding.

The medicines did not seem to be very effective, as Riffat continued to bleed after her return home and had to change sanitary pads after every half an hour. She had no one to help her with domestic responsibilities of cleaning, cooking, etc because her only daughter had been married off and she said it was not customary to make men do domestic chores. Riffat visited Nurse Razia again, hoping she would be able to put an end to her misery, but returned home in vain as the bleeding did not stop. She also experienced severe pain, dizziness and weakness. Upon seeing her helpless state, her sister-in-law took her in a rickshaw to visit Dr Aabida, the same doctor she had consulted after receiving the contraceptive injection. Dr Aabida performed a procedure on the respondent similar to the one Nurse Razia had performed, but she used her hands to clean out the uterus. The doctor said that she usually charged about Rs. 2000 for this procedure, but due to the respondent's dismal financial state she would charge only Rs. 1500. She also gave Riffat an injection and prescribed some oral medication which in total cost about Rs. 800. In addition, she instructed Riffat to continue to visit her in the next two days, which proved quite burdensome for the respondent's family as the cost of

Box 7. (cont)

medication and injections was about Rs. 1700 and an additional Rs. 400 was spent on arranging for blood.

The total transportation fare spent on one visit to Nurse Razia and three visits to Dr Aabida's clinic by rickshaw was Rs. 800. The respondent did not have anyone to console her in this difficult time because her husband was at sea and would only return once a week, thus the financial burden of treatment was borne with the meager resources he would bring home. The total expenditure on the abortion including medication, travel fare and the procedures performed by Nurse Razia and Dr Aabida was about Rs. 9700. Riffat's family was now placed under immense financial pressure. Fortunately, Riffat did not suffer from any further problem.

At the time of the interview, the respondent was once again pregnant. Despite her previous experience, she still wanted to have an abortion but her husband did not want her and the rest of the family to go through the same financial and psychological trauma again, so he did not permit it. The respondent said she would not go ahead with the abortion without her husband's consent, but still felt that the initial burden of paying for the procedure would be much less troublesome than bearing the responsibility of another child. In spite of her bad experience, Riffat was still not convinced that she should adopt family planning practices as her initial experience with the contraceptive injection seemed to have discouraged her. Moreover, she felt that society looks down upon those who adopt such practices.

Estimated Expenditure of Spontaneous Abortion Management	
Before Complication	
Ultrasound	Rs. 300
Abortion by Nurse Razia	Rs. 3,000
Medication prescribed by Razia	Rs. 1,200
Transportation fare (1day)	Rs. 200
Total	Rs. 4,700
After Complication	
Abortion performed by Dr Aabida	Rs. 1,500
Medication and Injections (3 days)	Rs. 2,500
Blood	Rs. 400
Transportation Fare (3 days)	Rs. 600
Total	Rs. 4,200
Total Expenditure	Rs. 9,700
Estimated Cost of Management of Side Effect of Injection	
Cost of Injection by Dr Aabida	Unknown
Consultation fee for Side Effect	Rs. 900
Total Cost	Rs. 900

Section 2. Abortion Prevalence

After clarifying the nature of the event cycle, it is time to turn our attention to the question of incidence of the PAC event. It was believed to be very important to have a reliable estimate of the incidence, particularly to gauge the macroeconomic costs. There are a number of sources of data for Pakistan that give a sense of the incidence of induced abortion. Community-based studies have attempted to identify the prevalence of induced abortion through community surveys in select sites. Medical studies also provide an overview of the incidence of induced abortion as a proportion of total abortion-related complications that present in hospitals. Finally, in 2004, the Population Council of Pakistan published a study estimating the nationwide incidence of induced abortion in Pakistan. This section will examine studies on abortion prevalence in Pakistan and explore their various approaches to measuring incidence.

A. Community Studies

Community studies use community-wide surveys to gauge the incidence of induced abortion in their research sites. The proportion of induced abortions to total pregnancies in these surveys range from 2.11-4.9%. It is important to note that these are estimates of induced, rather than unsafe, abortion. Moreover, given the sensitivity related to the topic of induced abortion, it is safe to assume that these figures under-report the prevalence of induced abortion. Finally, since these studies are concentrated in the Karachi and Lahore, these proportions probably do not hold for Pakistan as a whole. Still, given the dearth of data, community studies provide a useful first approximation of the incidence of induced abortion in Pakistan.

Box.1 Proportion of Induced Abortion to Total Number of Pregnancies as Found in Community-Based Studies

Study References and Research Period	Sampling Method	Proportion of Induced Abortion to Total Number of Pregnancies
(a). Saleem, Sarah. 1998. <i>Determinants of Unsafe Abortion in 3 Squatter Settlements of Karachi</i> ; (b) Saleem and Fikree. 2001. <i>Induced abortions in low socio-economic settlements of Karachi, Pakistan: rates and women's perspectives</i> ; (c) Saleem and Fikree. 2005. <i>The quest for small family size</i> . Karachi June-Aug 1997	Cross-sectional survey 1,214 ever married women in 3 squatter settlements in Karachi	2.11%
Sheikh et al 2002	Peri-urban community: Shah- Di-Khoi, Lahore 186 married, ever-gravid females were selected randomly from a population of 930	2.24%
Awan, A. & M. A. Parvez (1999). "Abortions in rural community." Lahore, July 1997-February 1999.	Longitudinal study. 4,133 married women of reproductive age from 22 villages. 1576 pregnant women followed.	4.2%
MCWAP (1993). "Reproductive morbidity in an urban community of Lahore."	Data collected on reproductive morbidity in an urban community of Lahore. 2991 pregnancies data studies	4.9%

B. Hospital-based Studies

Hospital-based studies provide an estimate of the proportion of abortion-related complications that result from induced rather than spontaneous abortion. For the studies in which this data is available, these range from 2.7-27%. As with community-based studies, it is safe to assume an underreporting of induced abortion relative to spontaneous abortion due to the stigma surrounding this issue. Moreover, hospital-based studies only include women who have sought treatment for PACs and therefore cannot be representative of the nation as a whole. Finally, the prevalence reported is only relative to the number of spontaneous abortions that result in hospitalization and therefore does not provide an understanding of the prevalence of induced abortion amongst all women.

Box 2. Overview of the proportion of abortion-related complications attributed to induced abortion

Study	Sampling Method	Proportion of Abortion-Related Cases Attributed to Induced Abortion
Population Council, “Unwanted Pregnancy and Post-Abortion Complications in Pakistan” <i>Population Council Research Report No. 19, 2003.</i>	Interviews of 328 women who visited 50 public health facilities and 10 NGOs for post-abortion complications. Respondents self-reported if the abortion was induced or spontaneous. ⁸	27%
RS Najmi. 1998. “Complications Attributed to Illicit Abortions”	Prospective study of 18,978 admissions to an ob/gyn ward in a hospital. Respondents were labeled as having an induced abortion if they self-reported this. <i>Prospective, Cross-Sectional Study</i>	3.6%
Mumtaz, Firdous. 1999. Maternal mortality in induced abortion.	Out of 400 women admitted to a hospital for abortion-related complications, respondents self-reported if the abortion was induced. <i>Prospective, Cross-Sectional Study</i>	2.7%
Sultana, Azra et al. 2000. Traditional birth attendants induced abortion-increased maternal morbidity and mortality	1152 women in the OPD with ob/gyn issues were interviewed, out of whom 384 had history of abortion. Respondents self-reported if they had an induced abortion. <i>Prospective, Longitudinal Study</i>	7.2%
N. Akbar et al. 2001. Recurrent induced abortion – Still a prevalent problem	431 patients with abortion related complications evaluated at the ob/gyn department of a hospital. Patients’ cases were reviewed and they were interviewed to determine whether they had had an induced abortion. <i>Prospective, Cross-Sectional Study</i>	9.5%
Asma Gul. 2001. Maternal morbidity and mortality associated with criminally induced abortion – A ten years review at Lahore general hospital, Lahore	The records of 15,267 patients admitted with abortion-related complications at an ob/gyn ward were examined. The method of abortion was determined through a detailed history of the patient and physical examination. <i>Retrospective Study.</i>	13.7%

⁸ Although the study included 448 women who were either seeking treatment for post-abortion complications or seeking an induced abortion, we have limited the analysis to the 328 women who were seeking treatment for post-abortion complications, as we are looking at the number of hospitalizations due to post-abortion complications.

Box 2. (cont)

Study	Sampling Method	Proportion of Abortion-Related Cases Attributed to Induced Abortion
S. Bhutta et al. 2003. "Surgical complications following unsafe abortion."	The cases of 1534 patients presenting with abortion as outpatients or in the emergency department were reviewed. Patients' records were examined and women were later interviewed to assess the number of induced abortions. <i>Prospective, Cross-sectional Study.</i>	6.1%
M. Hussain et al. (2004) "Alleged reasons and complications of induced abortion."	3473 patients with abortion-related complications were interviewed. Respondents self-identified whether they had had an induced abortion. <i>Prospective, Cross-Sectional Study</i>	5.8%
S. Siddique and M. Hafeez	468 patients admitted to an ob/gyn ward with post-abortion complications. Observational case series. Questionnaires were used for data collection to identify cases of induced abortion. <i>Prospective, Observational Study.</i>	12.6%
G. Saeed (2002). "Complications of Induced Septic Abortions and Risk Factors."	1700 patients admitted to hospital with amenorrhoea, with history of intervention with intent to terminate pregnancy. All spontaneous or hospital induced abortions were excluded from study. <i>Descriptive study, Cross-Sectional Study.</i>	3%
Madhu-Das & Srichand (2006). "Maternal Mortality and Morbidity due to induced abortion in Hyderabad."	Retrospective analysis of medical records to identify all patients with history of induced abortion within 40 days of termination. 32 out of 3015 total admissions were studied. <i>Retrospective, Cross-Sectional Study.</i>	6.4%
A.W. Yusuf (1997). "Criminal Abortion is a curse."	Retrospective study on all abortion cases admitted to unit II in a one year period. Records of 156 (26%) out of 600 women admitted to gyne. and obs. wards were examined. <i>Retrospective, Cross-Sectional Study.</i>	26%

C. Population Council Estimate

In 2004, the Population Council conducted a study to estimate the incidence of induced abortion in Pakistan. The study used indirect estimation techniques to arrive at a nationwide incidence of 890,000. Unlike the community and medical studies highlighted above, the study was groundbreaking since it provided an estimate that was applicable to the nation as a whole, rather than to select communities. Since this is the only national estimate of abortion incidence in Pakistan, we will spend some time exploring the methodology used in this estimate.

Overview of the Methodology

The study uses an indirect method to estimate the incidence of induced abortion that was pioneered by Singh and Wulf (1994) using hospital-based data on the number of patients being treated for abortion-related complications (both induced and spontaneous) as a

basis for the analysis. Using an estimate based on a nation-wide survey of health facilities, the authors find that 250,025 patients were hospitalized for abortions nationally in 2002. The data is then corrected to subtract an estimate of the number of spontaneous abortions that result in hospitalization and the number is then multiplied by a multiplier that estimates the number of induced abortion cases that do not result in hospitalization.

The incidence of induced abortion is determined as the residual resulting after the elimination of the number of spontaneous abortions that result in hospitalization. Spontaneous abortions are calculated using the methodology pioneered by Singh and Wulf (1994), which uses the proportion of abortion-related hospitalizations caused by spontaneous abortion in a California-based study to approximate a distribution of the number of live births that result in spontaneous abortions. Since the study is conducted using hospital-based data, it only accounts for spontaneous abortions that take place during 13 to 22 weeks of gestation⁹, as it assumes “early or first trimester spontaneous abortions do not result in medical complications serious enough to require hospital care.”(Population Council 2004: 54) Based on the California data, 3.41% of pregnancies that end in live births are estimated to result in miscarriages during 13 to 22 weeks of gestation. This proportion is applied to an estimate of the annual number of live births in Pakistan for 2001, yielding an estimate of 152,400 total late spontaneous abortions during that year.

In order to determine the number of hospital-based abortion cases that result in spontaneous abortions, the study expands on Singh and Wulf’s methodology of assuming that the proportion of women with late spontaneous abortion complications are hospitalized in the same proportion as that of women who give birth in hospitals. Nationally, 23% of women deliver at a health facility based on data from the *Pakistan Reproductive Health and Family Planning Survey 2000-2001*. Instead of applying this proportion to their estimate of second trimester spontaneous abortions, the authors increase the proportion to 35% “since a miscarriage may be perceived as an illness, and thus women may be more likely to seek modern medical care than would do so for a normal delivery.”¹⁰ (Population Council 2004:7) Based on this proportion, the study estimates that 53,300 spontaneous abortions result in hospitalization each year, leaving 196,700 abortion cases that result in hospitalization that are assumed to be induced. Thus, based on this model, 78.8% of all abortion-related hospitalizations in Pakistan are induced abortions.

This figure is then multiplied by a multiplier that is derived through interviews with a purposive selection of health professionals who were asked to estimate the abortion providers used by women of various socio-economic groups, the probability of experiencing complications based on the providers used, and the likelihood by socio-economic class that a woman will seek hospitalization for complications. The national-level multiplier that was arrived at based on this survey was 4.49, yielding an estimate of

⁹ There is a discrepancy between the report published by the Population Council and a paper written by the two of the report authors, which states that the miscarriages at 13-21 weeks are included as late term spontaneous abortions in the study.(Sathar, Singh and Fikree 2007)

¹⁰ Ibid. p. 55.

890,000 annual induced abortions in Pakistan.

Comparison of Results with Medical and Community-based Studies

A comparison with medical studies and surveys of patients at hospitals for abortion-related complications yields very different results. While the Population Council's estimate indicates that 78.8% of all abortion-related hospitalizations in Pakistan are due to induced abortions, these studies (see Box 2 above) indicate that this figure is significantly lower. Since the majority of studies rely on patients self-reporting on whether the abortion was induced or spontaneous, it is safe to assume that there will be a high number of patients who misreport induced abortion as spontaneous abortion. However, there is a significant difference between the proportions of abortion-related cases attributed to induced abortion in the medical studies (ranging from 2.7% to 27%) and the Population Council's estimate of 78.8%.

Similarly, the prevalence of induced abortion reported in community-based studies varies significantly from the Population Council's estimate. The Population Council (2004:7) estimates that one in six pregnancies (approximately 17%) result in abortion, while community studies suggest that induced abortions make up 2.11-4.9% of all pregnancies.

In order to understand the differences in the induced abortion figures suggested by medical and community-based studies and that suggested by the Population Council, we decided to explore the underlying assumptions of the Population Council's methodology further. Because it uses an indirect estimation technique, the assumptions are essential at arriving at an accurate estimate.

Exploration of the Assumptions of the Population Council Methodology

In order to understand potential reasons for departure between the Population Council estimate and those of hospital and community-based studies, we examine two major assumptions used in the study to estimate the number of induced abortion-related hospitalizations: 1) First-trimester spontaneous abortions do not result in hospital-based care and 2) 35% of late-term spontaneous abortions result in hospital-based care. If these assumptions under-state the prevalence of hospital-based care of spontaneous abortions, this will lead to an over-estimate of the incidence of induced abortion in Pakistan.

i) Exclusion of hospitalizations due to first-trimester spontaneous abortions

The assumption that first-trimester spontaneous abortions do not result in hospitalization may not be accurate. In their study on six Latin American countries, Singh and Wulf acknowledge that “[m]ost of the health professionals that participated in the abortion practice survey believed that a high proportion of women experiencing a spontaneous abortion would be hospitalized at all gestational ages.” However, they say that “[s]uch estimates are implausible, because if they were applied to actual population and birth estimates, the number of hospitalizations for complications of spontaneous abortion would be far in excess of the total women actually hospitalized for all abortions.” (1994:12) Thus, they propose that a minimum gestation age of 13 weeks is reasonable for hospitalization.

Evidence from Pakistan suggests that hospitalization does take place for complications related to first trimester spontaneous abortions. Since Pakistan's lacks an effective primary healthcare system, issues that would not result in hospital-based care in other countries result in treatment at tertiary care hospitals. Interviews with various medical practitioners indicate that a number of first trimester spontaneous abortions result in hospital-based care.¹¹ In fact, a senior doctor at the Jinnah Post-Graduate Medical Centre (JPMC) estimates that two-thirds of all spontaneous abortion cases seen at the hospital are those that happen between 10 to 12 weeks of gestation¹². Moreover, there is a high prevalence of anaemia in women in Pakistan with 70% of women having iron-deficiency anaemia during pregnancy¹³, which can increase the severity of complications associated with spontaneous abortion at any gestational age¹⁴. Thus, with more serious complications due to the anaemia, women may be more likely to seek hospital-based care due to first trimester spontaneous abortions. Since first trimester abortions are fairly common (80% of miscarriages occur during the first trimester¹⁵), even if a small proportion of these abortions result in hospital-based treatment for complications, this could result in a higher estimate of the number of spontaneous abortions that take place in Pakistan and, thus, a lower estimate of the incidence of induced abortion.

ii) Assumption that only 35% of late term spontaneous abortions result in hospitalization

The assumption of the study that only 35% of late term spontaneous abortions result in hospitalization is based on the statistic that 23% of deliveries in Pakistan take place in health facilities. The use of hospital-based deliveries to proxy for the number of women who seek hospital-based treatment for complications from spontaneous abortion was first put forth by Singh and Wulf (1994) in a study on Latin America. In Latin America, hospital-based deliveries are the norm; the proportion of deliveries attended by trained medical personnel is 54.6% in Peru, 73.6% in Mexico, 80.6% in Columbia, 84.7% in Brazil, 92.4% in the Dominican Republic, and nearly all deliveries in Chile.¹⁶ The assumption that this can serve as a proxy for women's health-seeking behaviour in countries where hospital-based deliveries are the norm is more reasonable than in a country where less than a quarter of deliveries take place in health facilities. The *Pakistan Demographic and Health Survey* found that 57% of women who did not deliver their baby in a health facility did not do so because they did not think that it was necessary. (2008: 115) Thus, delivery in a health facility in Pakistan may not reflect health seeking behaviour, but rather perceptions of the safety of home-based deliveries.

While the authors do increase the estimate from 23% to 35% to account for the fact that spontaneous abortion may be seen as an illness unlike normal childbirth, the rationale for this level of inflation is unclear. It is therefore difficult to know whether this inflation is sufficient.

¹¹ Interview with Dr. Sadiqua Jafarey, NCMNH, on June 18, 2008; Interview with Dr. Razia Korejo, JPMC, on July 7, 2008

¹² Interview with Dr. Razia Korejo.

¹³ Ministry of Health, National MNCH Program. *Pakistan's Maternal and Child Health Policy and Strategic Framework (2005-2015)*. Government of Pakistan

¹⁴ Interview with Dr. Sadiqua Jafarey.

¹⁵ Puscheck, Elizabeth E. and Pradhan, Archana, "First Trimester Pregnancy Loss," *eMedicine*, Updated 2006, <http://www.emedicine.com/med/topic3310.htm#section~Introduction>

¹⁶ Singh and Wulf 1994.

Moreover, since the study approximates the number of induced abortions as the residual after subtracting the estimate of spontaneous abortions that result in hospitalization, it is important to examine the rate of hospitalization that the study implies for complications related to induced abortion. The study estimates that 196,700 complications due to induced abortion result in hospitalization each year, which is 22% of the total estimate for the incidence of induced abortion. However, not all induced abortions are unsafe, and not all unsafe abortions result in complications. Benson and Crane (2005) estimate that 45% of all unsafe abortions result in complications, 26% of which are serious and 19% are minor.¹⁷ Although only serious complications should require hospital-based treatment, even if we assume that 45% of all induced abortion in Pakistan result in complications (this too is an overestimate as the figure for induced abortion also includes safe abortions), this means that 400,500 induced abortions result in complications annually. Thus, the 196,700 complications from induced abortion that result in hospitalizations, based on the Benson and Crane estimate, represent 49.11% of the total complications from induced abortion. If we apply Singh, Wulf, and Jones' (1997: 63) estimate that 29% of women who have an abortion in Afghanistan, Pakistan, and Iran have a complication, this implies that 76.21% of women with post-abortion complications seek hospitalization. Both of these figures imply that a greater proportion of women seek hospitalization from complications due to induced abortion than do for late-term spontaneous abortion. This seems unlikely since one would expect that more women would seek hospital-based treatment for spontaneous abortion than for induced abortion given the illicit nature of induced abortion, the fact that unsafe abortions are more likely to take place amongst women with limited access to safe healthcare, and that there is a significant social emphasis on child-bearing in Pakistan, which would imply greater care for women who are at risk of pregnancy loss.

D. Implications

Since the Population Council study uses indirect techniques to estimate the incidence of induced abortion in Pakistan, if the number of hospitalisations due to spontaneous abortion is under-estimated due to the assumptions explored above, this can significantly impact the results. Since the number of induced abortion-related hospitalisations in subjected to a multiplier of 4.9, the level of underestimation of spontaneous abortion will overstate the estimate of incidence of induced abortion by a factor of nearly five.

In order to illustrate the variations that may exist if the estimate of the number of hospitalizations due to spontaneous abortions is corrected, below are some adjusted estimates of the incidence of induced abortions, after adjusting the spontaneous abortion estimate. We have used three methodologies to revise the estimates. The first methodology uses the proportions of hospitalizations due to induced abortions reported in hospital-based studies to derive the estimate, while the second uses the methodology derived by the Population Council, using alternate assumptions about the complications due to spontaneous abortion that result in hospital-based treatment. Finally, the third

¹⁷ As cited in Vlassof, Michael, "Economic Impact of Unsafe Abortion-Related Morbidity and Mortality: Evidence and Estimation Challenges," 2007, Unpublished.

methodology applies the number of abortions as a proportion of the number of pregnancies found in community-based studies to the total number of pregnancies in Pakistan to arrive at an estimate of the incidence of induced abortion in Pakistan.

Revised Estimates Based On the Proportions of Hospitalizations Due to Spontaneous Abortions Based on Hospital-Based Studies

As pointed out above, the Population Council's proposed proportions of spontaneous versus induced abortions that result in hospitalizations varies greatly from those suggested by the hospital-based studies conducted in Pakistan. Thus, we propose four estimates based on varying assumptions.

i) Assume the average proportion of induced versus spontaneous abortions as seen in hospital-based studies

The average proportion of hospitalizations due to post-abortion complications that are attributed to induced abortion in the studies highlighted in Box 2 is 10.3%. If we assume that this proportion is representative of the reality, then 10.3% of the 250,025 total hospitalizations estimated by the Population Council is 25,773 hospitalizations that are attributed to induced abortion. When we apply the Population Council's multiplier of 4.49 to this estimate, we get an incidence of 115,723 induced abortions taking place in Pakistan on an annual basis.

ii) Increase the average proportion of induced versus spontaneous abortions as seen in hospital-based studies by assuming that 10% of hospitalizations due to induced abortion are misreported as spontaneous abortions

Since the average proportion of hospitalizations due to post-abortion complications that are attributed to induced abortions may be an understated figure due to the under-reporting of induced abortions, we assume that an additional 10% of post-abortion complications are due to induced abortions but are not reported in the studies. Thus, we assume that 20.3%, instead of 10.3%, of total post-abortion hospitalizations are due to induced abortions. Applying this to the estimate of 250,025 abortion-related hospitalizations, we find that 50,776 women are hospitalized due to complications from induced abortion each year. Applying the multiplier of 4.49, we estimate that the incidence of induced abortion in Pakistan is 227,984.

iii) Assume the highest proportion of induced versus spontaneous abortions as seen in hospital-based studies

Since induced abortion is thought to be underreported, we assume that the proportion of induced versus spontaneous abortions that result in hospitalization is the highest proportion stated in the studies outlined in Table 1 above. Thus, we use the Population Council's proportion of 27% of hospitalizations being attributed to induced abortion, resulting in 67,507 hospitalizations being attributed to induced abortion. In applying the Population Council's multiplier to this figure, we estimate that 303,105 induced abortions take place in Pakistan each year.

iv) Increase the highest proportion of induced versus spontaneous abortions as seen in hospital-based studies by assuming that 10% of hospitalizations due to induced abortion

are misreported as spontaneous abortions

In looking at the highest estimate of the proportion of induced versus spontaneous abortion that result in hospitalization, due to the under-reporting of induced abortion, we assume that an additional 10% of post-abortion complications are due to induced abortions but are not reported. Thus, we assume that 37% of post-abortion complications that result in hospitalization, or 92,509 cases, can be attributed to induced abortion. After applying the Population Council's multiplier to this figure, we find that there are 415,367 induced abortions conducted in Pakistan each year.

Revised Estimates Based on Alternate Assumptions Using the Population Council's Methodology

We also revised the estimate by using a set of assumptions based on our critique of the Population Council's estimate, while using the same methodology used by the Population Council.

i) Assume that 20% of first trimester 35% of second trimester spontaneous abortions result in hospital-based treatment

In the critique above, we established that in Pakistan there is significant evidence that women with first trimester spontaneous abortions do seek hospital-based care. Thus, in this estimate we assume that along with the 35% of second trimester spontaneous abortions assumed in the Population Council estimate, 20% of first trimester spontaneous abortions result in hospital-based treatment. To derive this, we used the estimate that 10-15% of confirmed pregnancies end in spontaneous abortion¹⁸ and that 84.8% of pregnancies end in live births. Thus, if we estimate that 12.5% of pregnancies end in spontaneous abortion, we find that 658,787 spontaneous abortions occur annually in Pakistan. Since 80% of spontaneous abortions occur during the first trimester, i.e. before 12 weeks, (Puscheck, Elizabeth E. & Pradhan, Archana 2006) we estimate that 527,029 first trimester miscarriages take place each year in Pakistan. If we assume that 20% of these result in hospital-based treatment, we have 105,406 hospitalizations due to first trimester spontaneous abortion. We add the Population Council's estimate that 35%, or 45,720, of second trimester spontaneous abortions result in hospitalizations to get a total of 158,746 hospitalizations due to spontaneous abortions in Pakistan each year. If we subtract this amount from the total number of hospitalizations due to abortion-related complications, we get 91,279 hospitalizations that we can attribute to induced abortion. After applying the Population Council's multiplier of 4.49 to this estimate, we get a total of 409,843 induced abortions that occur in Pakistan each year.

ii) Assume that 20% of first trimester 50% of second trimester spontaneous abortions result in hospital-based treatment

In the critique above, we highlighted why the assumption of 35% of second trimester spontaneous abortions seems understated. Thus, we now assume that 50% of these result in hospitalization. In following the methodology highlighted above, this results in a revised estimate of 307,202 induced abortions that occur each year in Pakistan.

¹⁸ Merck Manuals, "Spontaneous Abortion," *Merck Manuals: Online Medical Library*, <http://www.merck.com/mmpe/print/sec18/ch263/ch2631.html>

Revised Estimates Based Proportion of Induced Abortion to Total Pregnancies Seen In Community-Based Studies

Finally, we attempted to calculate the incidence of induced abortion by applying the proportions of induced abortion to total numbers of pregnancies in community-based surveys. There have been a limited number of community-based surveys specifically looking at the topic of induced abortion. The proportion of induced abortions to total pregnancies in these surveys range from 2.11-4.9%. Taking the average value of these studies and given that 84.8% of pregnancies result in live births, we derive the proportion of induced abortions to live births and apply it to the estimate of live births in Pakistan to get an incidence of 177,214 induced abortions.

Table 1: Estimates for the Incidence of Induced Abortion in Pakistan

Estimates	Incidence
Estimate 1: Population Council of Pakistan, 2004	890,000
<i>Revised estimates based on the proportions of hospitalizations due to spontaneous abortions based on hospital-based studies</i>	
Estimate 2: Assume the average proportion of induced versus spontaneous abortions as seen in hospital-based studies	115,723
Estimate 3: Increase the average proportion of induced versus spontaneous abortions as seen in hospital-based studies by assuming that 10% of hospitalizations due to induced abortion are misreported as spontaneous abortions	227,984
Estimate 4: Assume the highest proportion of induced versus spontaneous abortions as seen in hospital-based studies	303,105
Estimate 5: Increase the highest proportion of induced versus spontaneous abortions as seen in hospital-based studies by assuming that 10% of hospitalizations due to induced abortion are misreported as spontaneous abortions	415,367
<i>Revised estimates based on alternate assumptions using the Population Council's methodology</i>	
Estimate 6: Assume that 20% of first trimester 35% of second trimester spontaneous abortions result in hospital-based treatment	409,843
Estimate 7: Assume that 20% of first trimester 50% of second trimester spontaneous abortions result in hospital-based treatment	307,202
<i>Revised estimates based proportion of induced abortion to total pregnancies seen in community-based studies</i>	
Estimate 8: Assume the average proportion of induced abortion to total pregnancies in community-based studies	177,214

Section 3. Costing Framework

A. Brighton Papers

The Brighton papers adopt a range of costing frameworks that correspond with different aspects of the economic costs of UARMM. The costs identified and measures in these papers are summarized in Box 1.

Box 1: Summary of costing framework of Brighton papers

	Vlassoff	Anonymous
Health system/public sector	<ol style="list-style-type: none"> 1. PAC treatment using range of “cost per case” estimates from existing health system studies (4 estimates) 2. PAC treatment using WHO MBP “cost per case” (4 estimates) 	<ol style="list-style-type: none"> 1. PAC treatment using “cost per case” from IPAS SAVINGS model 2. Indirect cost of burden to health system – mentioned not measured 3. Indirect cost of loss of (public) investment in women’s human capital – mentioned not measured
Individuals/households	<ol style="list-style-type: none"> 3. Patients’ out-of-pocket expenses including treatment, transport and others 4. Patients’ and carers’ indirect cost due to loss of productivity during treatment and convalescence 5. Indirect costs of orphanhood, psychological effects – mentioned not measured 	<ol style="list-style-type: none"> 4. Out-of-pocket costs, including funeral expenses 5. Patients’ and carers’ indirect cost due to loss of productivity due to mortality, treatment and convalescence 6. Loss of productivity due to long-term disability 7. Indirect costs of orphanhood, psychological effects – mentioned not measured
Economy	6. Economic cost of M and M using life tables and macro ratio	8. Adds up all of the above

Source: Vlassoff (2008) and Anonymous (2007).

There are several common features in the two papers. Both of them identify three comparable loci of costs. Vlassoff focuses on health systems, households and the national economy. The anonymous paper looks at the public sector (in effect public health systems) and households, and adds up the costs to the economy as a sum of the costs to the public sector and households.

Treatment Costs of PACs

Health system or public sector costs of PAC treatment occupy a central place in both the studies. Vlassoff (2008) uses a detailed South African study on the costs of PAC treatment (Kay et al 1997) in order to construct a range of “top down” cost estimates

for all countries using various assumptions.¹⁹ The key data requirements are the prevalence of PACs and the incidence of different types of PACs by severity. Anonymous (2007) concludes on the basis of a literature review that country estimates of health systems costs are so disparate – even between similar countries – that it is impossible to work from these with any confidence. Differences between countries in health system costing and accounting practices are the main reasons for these disparate estimates that are difficult to reconcile. Anonymous (2007) therefore comes to the conclusion that it is safest to use a “bottom up” approach using the “cost per case” of a standard care package and applying it to secondary data on incidence. Vlassoff (2008) also uses a “cost per case” approach as an alternative to the “top-down” approach based on Kay et al (1997).

The two studies make their choices concerning the costing of PAC treatment on the practical grounds of data availability and consistency. This must not detract us from the fact that there are more fundamental methodological issues at stake:

- a) A costing approach based on a prescribed package measures the cost of prescribed rather than actual treatment.
- b) Health systems typically allocate available resources to patients according to some explicit or implicit rationing rules and practices. These rules or practices imply that resources used up for a PAC might have been deployed for other treatment. The health system cost of a PAC, therefore, might be measured in terms of other treatment not provided.
- c) Cost estimates based on a prescribed package do not specify if part or any of the cost is actually borne by the patient or her family. In other words, a “bottom up” approach includes all treatment costs by definition, regardless of who bears that cost. These cannot, strictly speaking, be regarded as health system costs.

The correct use of a bottom-up approach, therefore, is to use it for estimating the social cost of providing prescribed treatment to any given number of cases. If the objective were to estimate the cost of providing standard treatment to all PAC – including those currently untreated – the cost per case ought to be applied to the estimated number of PACs and not only those PACs that are actually observed in hospital-based studies. Vlassoff (2008) does this for one of his estimates, but provides that as an alternative to other estimates that are based on actually hospitalised PACs. The choice between actually treated cases and all cases requiring treatment is also, in reality, a methodological one based on the motivation behind the measurement.

Costs to Households and Individuals

Costs to households and individuals are enumerated separately from health system/public sector costs by both Vlassoff (2008) and Anonymous (2007). Some direct treatment costs are included here too – and in the case of Vlassoff (2008) these are based on survey-based estimates. Other direct costs relate to out-of-pocket expenses of travelling.

¹⁹ The Kay et al (1997) study includes PACs from incomplete abortions – suggesting that in terms of medical procedures and costs induced abortion PACs are indistinguishable from PACs arising from spontaneous abortions or miscarriages.

The main economic burden on households and individuals, however, is in the form of “indirect” costs. These are economic costs that are not directly quantified in monetary terms. The most important among these include loss in productivity due to morbidity and premature mortality, time lost during illness, convalescence, and recovery, and the demands on the time of carers. Other costs that are mentioned but not measured relate to the impact of maternal morbidity and mortality on children’s welfare.

Vlassoff (2008) and Anonymous (2007) identify three main elements in measuring the indirect cost to individuals and households of lost productivity due to unsafe abortion.

- a) Extent of time lost – due to illness and recovery, morbidity and mortality
- b) Economic value of lost time
- c) Calibrating time loss due to morbidity

Medical studies – and the event cycle – provide information on the extent of time and its severity. The standard method for measuring time lost due to premature mortality is to compare the age at death with the expected life expectancy of a person with similar demographic characteristics as the patient.

In order to measure the economic value of lost time several variants of an average wage have been used. These measures are justified on the grounds that the prevailing wage rates assign the appropriate economic value of a worker’s time. A broader perspective acknowledges that the prevailing wage rate is, at best, the marginal product of labour, and the true economic value of lost time should include labour’s sub-marginal contribution to total output. Measures such as average national income incorporate a broader measure of the economic cost of lost time.

National Economy

Vlassoff (2008) uses a macroeconomic approach to measuring the overall economic impact of unsafe abortion, while Anonymous (2007) aggregates up the various components of economic costs to the public sector and households into a measure of total economic cost. The former approach relies on existing cross-country statistical analyses that measure the historical effect of changes in health conditions (notably mortality) on national income. Estimates of morbidity and mortality due to unsafe abortion can be used to “read off” the overall economic impact. The latter method – of aggregating up from specific cost centres - is closer to a national income accounting approach. Neither of the two approaches is without their own drawbacks. The main problem with the first approach is that the statistical relationship between health outcomes and macroeconomic indicators is imprecise and non-linear. The latter approach could be more precise but less inclusive – given the complexity of economic interactions and accounting approach can realistically incorporate only a small subset of costs associated with UARMM.

B. Need for a Consistent Framework

The main problem with both of the Brighton papers – differences between them notwithstanding – is that they fail to start from a consistent economic framework for measuring costs. Both papers assume – incorrectly – that it is possible estimate the costs of UARMM by simply identifying and valuing the resource implications (direct

and indirect) of different segments of the event cycle. Choice of method in using “top down” or “bottom up” approaches to measuring treatment costs, counting actual hospitalized PACs versus all treatable PACs, and the macroeconomic versus national income accounting methods in estimate overall economic costs, cannot be made in an *ad hoc* manner. Decisions about these choices must reflect a prior understanding of what is being measured and for what purpose.

There are two key differences between an accounting framework – such as the one used by the Brighton papers – and an economic framework to cost measurement. First, the economic cost of any good, event or process is measured in relation to an alternative – all costs are, therefore, opportunity costs. Second, there can be differences in costs faced by various economic agents depending on their precise position with respect to a good, event, or process, and these disparate private costs coincide only exceptionally with the notion of a social cost. The social cost is a construct that is supposed to capture the cost to society of a good, event or process.

There are further implications of these two basic principles that affect the way in which any costs could be actually measured. Most systems of cost measurement rely on the (often unstated) assumption that the prevailing market price is a reasonable guide to the social value of a good, event or process. The theory that allows this broad assumption is based on the premise of well-informed individual choice over a set of distinct alternatives. The market price represents aggregation across diverse and numerous individual choices, and under certain assumptions, approximates to social value. Standard methods for calculating national income, for example, compute value added at market prices. Keeping in mind these basic features of an economic approach, it is possible to lay out a costing framework.

Cost of What?

There are many different ways of conceptualizing the economic costs of UARMM. The event cycle – as elaborated in Section 1 - sets out all of the possible alternative or contingent events and processes with which unsafe abortion could be compared. The simplest approach and one that seems to be implicit in the Brighton papers is to assume that the entire event cycle is preventable, and that we are interested in the economic costs of not preventing it. It is also possible, however, to take the view that each segment of the event cycle represents a set of contingent events. Once an unsafe abortion has taken place, for example, there can be a complete recovery, chronic morbidity, or mortality. Mortality rates from unsafe abortion might be reduced through improved PAC care. Chronic morbidity of some types can be treated with a high probability of success. The cost of reducing mortality could be measured in terms of the resources required to improve PAC care to a certain point. The cost of reducing chronic morbidity, likewise, can be measured in terms of resources required for treatment. It is also possible to focus on the provision of safe abortion services – for measuring the cost of preventing UARMM once a decision has been taken to terminate an unwanted pregnancy. Finally, under the assumption that the vast majority of induced abortions arise from unwanted pregnancies, it can be argued that the provision of adequate contraceptive and family planning services is the cost of preventing most induced abortions.

There is a clear difference in the above examples, in the cost of the event cycle or any segment of it, and the cost of preventing the event cycle or any of its segments. These

two dimensions have no obvious connection with one another, and should, in fact, always be measured separately. The main methodological distinction between the two types of costs is in their respective approaches to morbidity and mortality. The former need not ascribe a money value to morbidity and mortality – something that is always going to be a challenging proposition. The latter ought to be mostly about putting a pecuniary value to morbidity and mortality. There is, however, an important correspondence between the two types of costs. If unsafe abortion is mostly preventable, then the economic cost of UARMM is, in effect, the economic consequence of not preventing it.

Finally, it is worth recalling that in standard economic modelling, comparison of costs (or prices) between two alternatives is used to interpret behavioural attributes of individuals or groups of individuals. Individuals “reveal” their preferences between alternative goods, events or processes through their “choices”. According to this choice-theoretic framework, people weigh up the costs and benefits of using contraception versus not using contraception, carrying an unwanted pregnancy to term versus terminating it, using unsafe versus safe induced abortion, and so on. The question of who chooses, for whom, and on the basis of what information and constraints, is of course critical to transposing the choice-theoretic framework into the setting of reproductive health. But this perspective is a crucial one in the definition and measurement of economic costs of UARMM – if only to show its limitations in this setting.

Cost to Whom?

Three types of cost-centres are self-evident: national economy, health systems and individuals and households. Policy-makers may want to know the impact of UARMM on the national economy, and the boost to national income that might be expected from reducing or eradicating UARMM. If it were possible to eliminate UARMM by a simple act of policy – say through making induced abortion legal – then the cost to the national economy is simply the cost of not changing the law. National income is measured using standard national income accounts – and Pakistan is no exception in this case. Studies of diseases such as malaria and HIV/AIDS have attempted to estimate the impact of morbidity and mortality on national income and growth.

i) National economy

The Brighton papers are implicitly interested in the impact of unsafe abortion on national income. The anonymous paper attempts to estimate the cost of unsafe abortion by measuring individual segments in the event cycle and then adding up the total cost. Vlassoff (2008) does not aggregate costs but uses stand alone estimates not of unsafe abortion but UARMM by applying the incidence of UARMM to statistically-derived ratios of the impact of demographic variables on national income. This method is examined in greater detail below.

The adding up method of Anonymous (2007) is flawed on two grounds. First, while it is true that medical expenditure on a PAC arises, ultimately, from an unsafe abortion, it is not clear if that spending reduces national income by a corresponding amount. In fact, from a purely accounting viewpoint, a rupee spent on treating a PAC adds as much or as little to the national income as a rupee spent on any other treatment or activity, as long as the goods and services purchased using that rupee are

priced at their social value. It might be argued that in the absence of unsafe abortion the money saved on treating PACs could be spent on other goods and services – say the treatment of other illnesses, or on investments that would have a greater impact on value added in the economy. This would depend, of course, on the system for allocating health expenditures.

Second, if adequate resources are spent on treating PACs – which is clearly the implication of “bottom up” package costs of treatment – then UARMM will surely be lower than if PACs were not treated adequately. Treating PACs thus reduces the economic burden of morbidity and mortality. There is double-counting of cost of PAC treatment costs are included without acknowledging the reduction in morbidity and mortality that meeting such costs will naturally entail.

Loss of productivity due to illness, treatment, morbidity and premature mortality is an apparently less problematic area of cost. If a woman (and her carers) have to reduce their time spent on productive activities due to illness (or caring for an ill person), this surely is a loss to the national economy. Likewise premature mortality reduces the number of productive person years, thus having a negative impact on national income. Investment in human capital is also lost through morbidity and premature mortality.

ii) Health systems

The Brighton papers have attempted to enumerate the accounting costs of PAC treatment to health systems. Some of the estimates in these studies are based on actual costs per PAC, while others apply the cost of prescribed treatment packages (WHO MBP and SAVINGS) to the number of PACs. These two types of estimates measure very different things. The former measures the actual cost to health systems of treating PACs that present themselves for treatment while the latter are the costs of treating PACs to a prescribed standard.

The measurement of actual health system cost can have several motivations, depending on our prior understanding of financing arrangements in the system. An extreme but trivial way of reducing PAC treatment cost would be to stop treating PACs. This will have implications for morbidity and mortality and the economic costs of such morbidity and mortality. It will be an empirical question if the economic cost of increased morbidity and mortality would be higher than the cost savings from stopping PAC treatment. It is obvious that reducing the economic cost of treatment cannot be the sole or even the primary motivation for estimating this cost.

The health system cost of treating PACs can tell us something about savings to the health system of reducing the number of PACs. Depending on the internal financial arrangements of the health system, this can tell us one of two things. First, if health system budgets are determined on a historical basis – as they mostly are in Pakistan – any savings made in treating PACs can be diverted to other treatment. This is based on the warranted assumption that public health services are highly rationed in Pakistan. Second, if health system budgets are demand-responsive the saving will be passed on to taxpayers. This is likely to be the case in Pakistan where public health services are in short supply.

If health system finances are not demand-responsive it is more appropriate to ask how given resources could be used more effectively for meeting desired health outcomes. The cost is measured then not in pecuniary terms but with reference to health outcomes – say life years saved. The Global Burden of Disease and Disease Control Priorities studies have produced detailed methodologies for analysing the efficiency of achieving health outcome improvements. These approaches are reviewed further below.

iii) Individuals and households

Economic costs of unsafe abortion to individuals and households include treatment expenses, the opportunity cost of patients' and carers' time, and the loss of productivity due to morbidity and premature mortality. While the individual and household level of analysis appears to be the simplest one – because the identity of the cost centre is clearly identified – it poses some of the most complex problems of measurement.

The first issue, in the economic framework, is that of agency. Under assumptions of rational choice, individuals choose their course of action after weighing up costs and benefits. Retaining these assumptions implies that individuals choose unsafe induced abortions over alternatives such as carrying a pregnancy to term, contraception and safe induced abortions because of lower relative costs. For individuals who end up having unsafe induced abortions, the *ex ante* net cost of unsafe abortion, therefore, is lower than the cost of its alternatives. This line of reasoning is moderated, but only partly, if the argument is restated in terms of expected costs – given that the *ex post* cost will always be higher because there is a positive probability *ex ante* that an unwanted pregnancy will not occur and thus the need for an induced abortion will not arise.

There are many reasons to doubt the usefulness of the rational choice framework in the assessment of economic costs of unsafe abortion. The empirical literature, however, has not addressed these reasons explicitly. It is important to do so, because various aspects of the rational choice assumptions have been found wanting – and these have distinct implications for our understanding of the event cycle, and policy routes to reducing UARMM.

Induced abortion is seen as a response to the unmet need for contraception. For there to be a substantial “unmet need” over time, there must be factors that inhibit the expression of demand for contraceptive services. The two dominant explanations are asymmetric information and absence of agency. Couples may not have the information necessary to make informed choices about fertility, or women may not have agency over their choices even if they were well-informed. Similar alternative explanations – or deviations from the rational choice framework – exist for the “choice” between safe and unsafe service providers, seeking PAC treatment, and other segments of the event cycle.

Nearly all of the reasons for abandoning the rational choice world – and thus interpreting unsafe abortion as a costly event *ex ante* – cast questions about the informed choice of couples and the agency of women. If the former set of explanations (informational constraints) dominate regardless of questions about women's agency it could be argued that households are making ill-informed choices

about the costs and benefits of various alternatives. If the latter explanations (women's restricted agency) dominate then the household ceases to be an interesting cost centre. Instead of measuring the cost of UARMM to households the focus must shift to agents within households – namely women and men.

Shifting the focus from households to individuals leads to further complexities in dealing with the economic costs of mortality. One method widely used in the literature for estimating the economic costs of premature mortality is to measure the loss in productivity for a household or the national economy of one premature death. This is clearly an accounting rather than economic approach to valuing the burden of premature death, and can provide only a lower bound estimate. A household has many other reasons to value the life of a member besides her contribution to its overall income. In the case of an individual herself, the problem of attaching a pecuniary value to her own life in terms of her loss of income is clearly absurd. It is not absurd, however, for an individual to weigh up the resource implications of changing the probability of death from a particular cause. As the “value of life” literature (reviewed below) shows individuals and organizations routinely assign economic value to life – or more precisely changing the probability of death.

Policy – and hence motivations for cost measurement – has different roles under conditions of informational constraints and women's restricted agency. In the former case policy-makers may want to use cost measurement to create greater awareness of the costs of alternative choices with respect to fertility and reproductive health. Greater awareness might lead to fewer couples “choosing” unsafe abortion. Improvements in service delivery might be counter-productive, however, in terms of incentives for choosing induced abortion over other means of attaining fertility control.

If the restriction of women's agency is the main reason for the “choice” of unsafe abortion over other alternatives, policy has an altogether different role. In this case costs of UARMM are located with individuals rather than households. Households are willing, in this case, to bear economic losses (as well as imposing them on the economy as a whole) because these are borne disproportionately by women whose choice is, in any case, restricted. The role of policy – and cost measurement – in this case is to act independently of households and directly with individuals (women) to protect the latter and to prevent the loss of overall national income.

C. Selected Issues in Measurement

Macroeconomic Approaches

Diseases such as malaria and HIV/AIDS which have a large demographic impact have aroused interest in the measurement of the macroeconomic impact of health status. The WHO's Macroeconomics and Health study (Sachs et al 2001) has been an influential document in this respect. Sachs et al (2001) provide a detailed review of the impact of excess morbidity and premature mortality due to health contingencies on national income. It is argued that for most developing countries excess morbidity and premature mortality will have a negative impact on national income. Besides losses in productivity a range of possible factors – such as loss in future income, loss of human capital investments, and low savings and investments – are identified as contributing to the negative impact. Reductions in morbidity and premature

mortality, therefore, are likely to contribute to increases in national income and income growth.

While it is relatively simple to show that there would be an inverse relationship between morbidity and mortality and national income, the same is not trivially true for the macroeconomic variable of greater interest – namely per capita national income. Sachs et al (2001) reason that the loss of a person year will result in higher proportionate loss to the economy – thus concluding that morbidity and mortality reduction will lead to an increase in per capita income.

Empirical work that can help resolve this issue has arisen not in health economics, but in the literature on the sources of growth. There is a statistical relationship between high levels of per capita national income (and growth) and good (and improving) health outcomes, as measured by life expectancy at birth (LEB), adult survival rate (ASR) and other indicators of morbidity and mortality. This does not, however, indicate the direction of causality. A number of careful econometric analyses of long term differences in national income and economic growth (and growth convergence and deviation) between countries have used health outcome indicators as explanatory variables. These studies have attempted to establish an empirical causal relationship between health outcomes and macroeconomic indicators.

Sachs et al. (2001) interpret the results of these studies to argue that a 1 per cent improvement in LEB translates into a 0.04% per cent improvement in per capita GDP. Other micro-level studies cited by Sachs et al (2001) suggest that an additional life year correspond with three times the annual earnings. Among the Brighton papers, Anonymous (2007) does not concur with this assumption. It assumes a one-to-one relation between a year of life and annual market earnings. An extra year of life is assumed equal to the value of the GNP per capita. Vlassoff (2008) uses estimates from Bloom et al (2005) and Weil (2005). Vlassoff (2008) follows Bloom's calculation that "...each extra surviving adult in a group of 1000 boosts income per capita by 0.119 per cent".

Improvements in health, as measured by the number of life years saved, or improvements in LEB or ASR are incorporated in these models in several ways. One key mechanism is human capital. Production function models include the effects of health through their labour component. Human capital enhances the effective value of labour; and this cannot be measured simply using changes in the size of the workforce. Changes in health indicators are proxies for changes in human capital. Another argument connects changes in health outcomes to national income through the route of changes in savings and investment. For instance, a population undergoing improvements in LEB from low initial levels is likely to increase its overall propensity to save and invest.

Bhargava et al (2001) comprehensively model the effects of health on economic growth. Multiple cross-country regressions are used to study the interaction between changes in ASR and growth in GDP per capita. And this relation depends on the levels of GDP per capita, i.e., at low levels of GDP per capita, incremental changes in ASR are positively correlated with GDP per capita growth rates. At higher levels of GDP per capita, the relation tapers; in fact, it even turns negative at a later stage. The economic intuition is that in countries with high GDP levels and high levels life

expectancy, marginal gains in life expectancy will add to rather than reduce the dependency ratio in the population. The paper estimates that for the poorest countries, a 1 per cent growth in ASR improves GDP per capita by 0.05 per cent. Using the estimates provided by Barghava et al (2001) Pakistan currently stands above the poorest countries and here a 1 per cent growth in the ASR would lead to a 0.02 per cent increase in GDP per capita. Jamison et. al. (2003) conducted a similar study which estimates the contribution of health improvements to economic growth over a given period of time. The paper concluded that a one per cent change in ASR induces a 0.019 per cent improvement in GDP per capita. Similarly, Bloom et. al. (2001) used LEB as a proxy for health, estimating that a 1 year improvement in LEB leads to a 4% growth in GDP levels.

In order to use the estimated relationship between ASR or LEB and macroeconomic outcomes in order to “read off” the economic impact of UARMM it is first necessary to convert morbidity and mortality effects (or their expected improvements) into a composite demographic indicator such as ASR or LEB. Arriaga (1984) delineates the method of applying these estimates to data; life table functions are identified as a necessary tool. Life tables are country-specific tables which provide real (or in some cases, estimates) data about the number of births, deaths, the death rate, the adult survival rate for each age-group in a population. Certain further assumptions are required about the demographic profile of UARMM incidence, in order to obtain ASR or LEB impacts. The ASR or LEB impact thus obtained could be used to estimate the macroeconomic impact.

Macroeconomic approaches to estimating the economic cost of UARMM will involve the following steps:

- Incidence and demographic profile of UARMM in the country
- Conversion of UARMM into LEB or ASR using life tables
- Apply existing econometric estimates of LEB/ASR marginal effects on national income variable to Pakistan data

The above review suggests that estimating the macroeconomic impact of UARMM is likely to be imprecise. It is based on the historical relationship between health outcomes and economic growth across countries and over long periods of time. Careful econometric studies have pointed out that the relationship is non-linear and non-monotonic – in other words where exactly a country is on the curve depends on a number of historical and economic circumstances. It cannot be taken for granted that there will necessarily be an inverse relationship between UARMM and economic growth – even though in Pakistan the indications are in that direction.

Health System Approaches

i) Burden of disease

The Global Burden of Disease (GBD) and Disease Control Priority (DCP) studies provide an integrated method for cost estimation that is useful for the determination of policy priorities and health system financing. After identifying several clusters of diseases and health contingencies – including accidents, injuries, violence, and suicide – that add up to 135 major causes of death, the disease burden method estimates the

contribution of each condition to aggregate mortality and morbidity.²⁰ Age-specific cause of mortality data are used to compute the deficit in the number of life-years in a population compared with a notional upper bound in life expectancy. Any population with an average life expectancy of less than the upper bound will have some deficit from the benchmark, and the cause of death data are used to attribute the burden of this deficit across various diseases and health contingencies.

A key innovation of the GBD and DCP studies was to also propose a method for combining the effects of morbidity into an overall measure of disease burden. This was done by estimating the number of life-years during which a person lived with a particular disease or condition – i.e. disability – and assigning a weight between 0 and 1 to represent the level of functioning with the disability compared with healthy functioning. These weights have been assigned through detailed processes of expert consultation for each cluster of diseases and health contingencies. An alternative interpretation of the disability weight is to think of it as representing a measure of a life year lost due to a particular disease or contingency. The composite measure is known as a Disability Adjusted Life Year or DALY. A DALY is the sum of Years of Life Lost (YLL) and Years of Life Disabled (YLD).

It is possible to calculate the total burden of disease in a population using this method, and to ascribe the contribution of various diseases and contingencies to this overall burden of disease. The GBD and DCP studies also propose intervention packages for addressing various diseases and contingencies, and estimate costs of providing these packages. With this information it is possible to prioritise health system expenditures in order to address policy objectives more efficiently. If the policy objective were to reduce the total number of DALYs in a population, the correct response would be to find those diseases and intervention packages where the highest number of DALYs could be saved at the lowest cost.

The GBD project lists abortion as part of six clusters of “cause categories” under maternal conditions.²¹ The other five conditions are maternal haemorrhage, maternal sepsis, hypertensive disorders or pregnancy, obstructed labour, and “other maternal conditions”. The abortion category in GBD refers to two sequelae: episodes of unsafe abortion (termination of a pregnancy either by persons lacking the necessary skills or in an environment lacking the necessary standards or both), and infertility or failure to conceive following unsafe abortion.

The detailed DCP studies provide part of the technical background for the GBD project.²² The maternal conditions identified for detailed analysis in GBD/DCP are those which together account for over three-quarters of global maternal mortality. Unsafe abortion is one of these, but spontaneous abortion is not singled out in the GBD/DCP studies for detailed consideration. Our review of the unsafe abortion event cycle (based on medical studies and key informant interviews in Pakistan) suggests that this might be an empirically significant omission – and hence a caveat in the application of an unmodified GBD/DCP approach to conditions in Pakistan.

²⁰ Murray et al (2001).

²¹ Murray et al (2001).

²² Graham et al (2006). While the GBD project has had a close institutional affiliation with the WHO many of the regional estimates are reported with reference to WHO regions. The DCP studies, however, report data for regions that are closer to the definitions used by the World Bank and other development organizations.

The DCP chapter on maternal conditions identifies risk factors and proposes cost-effective interventions for dealing with each of the main sequelae. Three generic “pathways” are proposed for maternal conditions: preventing pregnancy, preventing complications and preventing death and disability from complications. Of these three DCP focuses attention on the first and the last – arguing that there is relatively little reliable information about the potential morbidity and mortality benefits of preventing complications, it is asserted that the main course of action should be to “maintain normality” and on good quality care in general.²³ For countries like Pakistan where a large part of the maternal health deficit is thought to emanate from the generally poor health conditions of women, and the absence of good routine health monitoring (and ante-natal care) this omission too might be of some significance.

The prevention of pregnancy is dealt with in a separate chapter of the DCP on contraception.²⁴ This chapter acknowledges upfront the conceptual difficulties involved in thinking of contraception as a health intervention:

The use of modern contraception to prevent pregnancies is a unique health intervention because, in many ways, it is not a health intervention at all. In general, couples in sexual relationships use contraception because, at the time the decision is made, one or both members do not wish to conceive a child, rather than because they wish to become healthier or to prevent a risk to health.²⁵

The study, however, acknowledges that contraception does have health consequences – both positive and negative. Three types of rationale – demographic, fertility, and human rights – are mentioned. The first rationale – national or global demographic objectives – is hard to defend if individual agency is to be preserved while constructing an economic cost argument. The second and third rationales open up the possibility of framing the motivation of cost measurement in terms of individuals’ “unmet need”. If individuals are not informed well enough about their fertility choices, or if women have limited agency in controlling decisions about their fertility, then there is a strong case for considering the costs and benefits of contraception as a health intervention.²⁶ Given the high rates of infant and maternal mortality in Pakistan, the health benefits of contraception are likely to be high even if the “unmet need” argument is discounted. There is also, clearly a link with reducing the demand for induced abortion and hence UARMM.

The DCP economic analysis of maternal health intervention focuses mostly on the third pathway – preventing death and disability from complications. “Emergency obstetric care” is the broad rubric under which a range of cost-effective interventions are proposed. Basic emergency obstetric care (BEmOC) as recommended by WHO and UNFPA, and endorsed by DCP consists of six procedures: (a) antibiotics (b) oxytocics (c) manually removing placenta (d) anticonvulsants (e) carrying out instrumental delivery, and (f) removing retained product of conception. Comprehensive emergency obstetric care (CEmCO) additionally involves blood transfusion and caesarian section. Early rounds of DCP recommended BEmCO,

²³ Graham et al (2006), p 509.

²⁴ Levine et al (2006).

²⁵ Levine et al (2006), p 1075.

²⁶ In the GBD/DCP studies this is done by estimating the dollar cost of saving a DALY, YLL or YLD. In a country with very high infant and maternal mortality rates every birth averted will automatically translate into large gains in terms of DALYs, YLLs and YLDs saved, even if averting the birth itself is not seen as a health “benefit”.

while later studies argued for upgrading the intervention to CEmCO. The key difference between the two is the addition of trained medical staff at the health facility.²⁷

For morbidity, or the cost of disability that is used to estimate DALYs, the burden of disease literature identifies two specific conditions associated with unsafe abortion: infertility, and pelvic inflammatory disease (PID). As in other forms of morbidity these disabilities are assigned weights representing their respective distances from good health and mortality. The variable years of life with disability (YLD) measures the number of years of life “lost” due to disability due to impaired functioning. The cost-effectiveness part of the disease burden project estimates the cost of reducing YLDs and DALYs through treating these two conditions. While the treatment of PID is relatively cost-effective, the same is not true of infertility. The two Brighton papers have followed the burden of disease literature and also focused on these two conditions.

In the case of Pakistan the morbidity analysis of the UARMM in the GBD/DCP project may need to be modified in a number of ways. First, it appears from secondary literature, unsafe abortion a high proportion of PAC cases are high parity pregnancies. The disability weight of infertility might be relatively low or even zero in these cases. Second, it is likely that many of the PAC cases undergo relatively long periods of morbidity prior to eventual recovery. Other forms of morbidity, therefore, might need to be considered in addition to the two identified by GBD/DCP (or in place of infertility) to address the specific conditions of the country.

Summing up, it is clear that the burden of disease approach to cost measurement is a valuable one for prioritizing health system expenditures. Apart from some of the specific limitations of this approach as it might be applied to Pakistan that have been highlighted above, there are three more generic qualifications that warrant mention.

First, there is nothing “objectively” right or wrong in the overall approach of measuring the burden of disease using unique cause of death and morbidity data. This approach is based on the untested assumption that there is normative agreement in health policy-making that the only goal of health systems is to increase the length of a life. Compounding this normative goal with subjective “disability weights” dilutes any “objectivity” claim even further. In fact, it is possible to think of multiple social, economic, political, and cultural criteria other than simply lengthening a (disability-free) life which might guide health policy-making and priorities. The example of contraception is a useful one to see the ambiguities and subjective judgements that are inherent to the exercise. Health policy-making is supposed to maximize the length of existing lives but not the total volume of life years in a country – if the latter were the case then there would be no justification of measuring “births averted” as a policy objective. These issues are mentioned here not by way of initiating an ethical or epistemological debate, but to simply point out that the burden of disease approach while being valuable is not as comprehensive, objective, or straightforward as it might first appear.

²⁷ Graham et al (2006), p 526.

Second, more operationally, assigning a unique cause of death or morbidity is critical for the empirical coherence of the burden of disease approach. In actual fact even the clinical causes of death and morbidity might be multi-dimensional. This becomes all the more relevant in those cases such as unsafe abortion where social factors might be important in the choices that lead to morbidity or mortality outcomes. Assigning unique causes might be necessary for generating an unambiguous ranking of burden and cost-effectiveness, but can lead to highly inappropriate policy decisions.

Third, there are likely to be important positive externalities in the provision of interventions across diseases, causes of death and sequelae. This might lead to an overestimation of the cost of saving DALYs through the provision of some interventions. As our review of the unsafe abortion event cycle has shown, there is a close relation between the treatment needs of unsafe induced abortion and spontaneous abortion. The presence of upgraded facilities, say to CEmCO standards as recommended by DCP will help to reduce UARMM but also morbidity and mortality due to spontaneous abortion.

ii) Financing arrangements and rationing

The measurement of economic cost in the GBD/DCP project is motivated by the health system efficiency gains in reducing the burden of disease measured in terms of DALYs. An alternative approach is to start from the way in which health systems actually prioritize their resource allocations rather than taking a view on the acceptability of DALYs reduction as the only objective of a health system. An understanding of how health systems actually allocate resources is necessary for working out the marginal impact of policy changes.

Two questions are important to begin with. First, on what basis are financial allocations made? Second, how are health system resources rationed? In Pakistan, as in most developing countries there are many factors other than stated priorities in deciding financial allocations. Budgetary exercises normally start from past precedence. There is, in any case, a great deal of path dependence, as past expenditures have created legal obligations that must be fulfilled. Deviations from trend in terms of resource quantum as well as priorities are only partially related to singular policy goals.

What is perhaps more important for a particular contingency such as UARMM is what happens at the health facility level. Given that there is generally excess demand for public health services, particularly for hospital care, how treatment is actually rationed between cases is an important determinant of the marginal effect of having more or less UARMM. Similarly the impact of any intervention aimed at specifically reducing UARMM, or expanding treatment for PACs can be better understood through knowledge of existing explicit or implicit rationing rules. Key informants express the view that induced unsafe abortion PACs “take up” resources that could otherwise be used for the treatment of spontaneous abortions. The opportunity cost of UARMM, therefore, is less treatment and higher morbidity and mortality from other maternal conditions.

Individuals and Households

i) Economic value of life

Perhaps the most challenging aspect of measuring the cost of a health contingency is to place an economic value on human life. As shown above, the cost (or benefit) of life years to the national economy have been measured as statistical relationships without getting into the difficult theoretical discussion of how a life or life year is to be valued. In the case of health systems, the question is posed in its inverse form – what is the most efficient way of saving life years or disability adjusted life years. In the case of individuals, it has been harder to completely defer the conceptual question to empirical analysis. Staunch defenders of the individual rational choice paradigm are keen to avoid the conclusion that the method works only within certain conditions – and that some key parameters such as the construction and agency of individuals must be determined exogenously.

Three types of approaches have been used in the literature on the economic valuation of life. The human capital approach (reviewed in Landefeld and Seskin 1982) places value on life on the basis of the quality and quantity of human capital endowed in an individual; for instance, the level of education, skills, experience, job achievements, age, physical fitness, etc. The value of a life year of a 45-year old astrophysicist, for instance, would be different from that of an 18-year old house maid. This approach is found wanting because it represents a significant divergence from choice-theoretic approach. It measures up the “inputs” of what might go into making a life valuable, but does not address value itself.

The second, or the willingness-to-pay approach, comes closer to the idea of “revealed preferences” (Viscusi, 1993 and Moore and Viscusi, 1988). Wages (or earnings) between similar individuals within an industry facing different levels of statistical risks of accident are compared. The differences then depict the individual’s discount rate. This labour market model accounts for age, risk levels, compensation variables, job characteristics, and most importantly, the individual’s risk preference rate. Similarly, actuarial studies estimate the insurance premiums people are willing to pay to ameliorate the effects of some risks.

A close variant of this willingness-to-pay approach can be found in project analysis. All projects dealing with safety, or the probability of injury or death, put an economic value to life; health and safety measures are typically geared to measurable changes in the statistical probability of an accident. Such design features have resource implications, and it would be possible in general to keep reducing the probability of an accident at a cost. A number of studies estimate the implicit social value of life that is “revealed” through project design decisions.²⁸ Most are conducted in developed countries with high levels of adherence to safety rules, where project design decisions can be tracked to specific safety requirements.

Finally, another approach that focuses on revealed preferences uses individual utility functions and inter-temporal elasticities of substitution to construct “survivor functions” (Murphy and Topel 1991, and Becker et al 2003). Data requirements include past consumption levels and implicit discount rates. These models are used to

²⁸ See Viscusi (1993) for a review of empirical studies.

estimate how much individuals value living today compared to, say, ten years later. Combined, this analysis helps determine how much an individual would monetize a forgone or saved year of life.

“Revealed preference” approaches to measuring the economic value of life have several important limitations. Most of the empirical insights depend on assumptions regarding individuals’ risk aversion. What is considered to be the implicit value of life to an individual might easily be interpreted as his or her attitude towards risk. An individual who enjoys taking risks (risk-taker) will demand a lower premium for a hazardous job compared with a risk-averse individual. Since there is no direct way of measuring risk-aversion, it will be impossible to separate out idiosyncratic attitudes to risk from a pecuniary valuation of life.

Unsurprisingly, empirical studies show a wide variation in the implicit value of life across different types of projects and situations. For instance, the implicit value of life – or the marginal cost of saving a life – is very high in the airline industry compared with, say, road or rail transport. Even within one country (United States) and one industry (airline) values of life varied widely. The estimates ranged from US \$ 600,000 in Kniesner and Leeth (1991) that uses the National Traumatic Occupational Fatality Survey, to US \$ 16.2 million in Moore and Viscusi’s (1991) analysis of the NIOSH-Structural Integrated Life Cycle Model.²⁹

ii) Limitations of economic value of life approaches

There are many conceptual reasons too why micro-based measurement of the economic value of life is problematic. Economic analysis presumes rather than explains a construction of agents and agency – or individuals and their utility functions. The individual-based rational choice model is increasingly used to endogenously explain the existence of social institutions, suggesting that it is possible to reduce exogenous explanatory variables to a few core behavioural ones.³⁰ But even these ambitious attempts are premised on the existence of rational agents.

Behavioural models in which one of the outcomes is that an agent will cease to exist are far more demanding in terms of complexity – as they will have to include a wide range of psychological factors that are themselves understood imprecisely - to be of much empirical use in cost measurement. There might be complex psychological, sociological and political reasons why the implicit value of life in the airline industry in the US was much higher than other industries. Similarly, the reasons for a person’s willingness to adopt a relatively low-pay profession with a high risk of premature death – such as military service – are also complex and not easily explained with reference to individual advantage alone. If the individual utility function has to be stretched to include unmeasurable intangibles such as gratification from group solidarity or social recognition, we are effectively back in the domain of other disciplines such as psychology, social psychology and behavioural science. Cost measurement, clearly, has limited scope in these cases.

²⁹ Viscusi (1993).

³⁰ It is not a coincidence that some of the most incisive work on the economic value of life has been done by Gary Becker who has been an influential advocate of pushing the frontiers of rational choice models into areas formerly considered the domains of sociology and psychology.

A practical problem in interpreting these models – even if the analytical complexity could somehow be bridged – is that they assume both information and agency. Both these assumptions are routinely violated in countries like Pakistan for women making decisions about fertility and health-seeking behaviour. In fact the low implicit economic value of women revealed by actual fertility and health-seeking behaviour might be a good index for measuring the gap in information and agency. An important insight of feminist (and neo-Marxian) economics holds that even if information and agency were unconstrained at any given moment in time, preferences or utility itself is adaptive of long-standing relations of power. Women’s choices about health-seeking behaviour might still undervalue their own health – even if they were well-informed and could exercise choice – because they have internalized low expectations for themselves.³¹

iii) Households or individuals

It was argued in section 2.2 above that before measuring cost it will need to be decided whether (or to what extent) households or individuals are the relevant cost centres. It was argued there that to the extent that households are welfare units and not simply sites of power hierarchies, it will make sense to analyze costs at the household level. Then any policy interventions or advocacy aimed at the household level could be guided by cost measurement. If the household is not a defensible welfare unit then the analysis of cost must move to the level of the individual. The extent to which the household or the individual is the relevant cost centre, and welfare or decision-making unit is an empirical question that must be investigated as part of the study of cost measurement.

The review of the economic value of life literature has shown, however, that there are serious conceptual and empirical difficulties in any approach to cost measurement that attempts to place an economic value on life – either one’s own or that of someone else. This means that whether we take the household or the individual as the welfare unit, it is not defensible to convert the cost of mortality into a resource or money metric. Health system approaches that keep health outcomes and economic resources on separate sides of an analytical divide are based on sounder concepts. These approaches attempt to estimate and compare resource costs of reducing DALYs (or increasing life years) but do not make any attempt to value DALYs savings in monetary terms. UARMM has resource implications for a household or individual – but these resource implications need to be interpreted with greater care.

While the economic value of life approach is inappropriate for cost measurement, it does offer insights into one dimension of decision-making about seeking health and contraceptive services. A revealed preference perspective can be a useful in probing the nature of choice along the event cycle. Other conditions being equal, the choice of an apparently more costly alternative – costly in terms of the probability of morbidity and mortality – should be an anomaly. If women are seen to be “choosing” unsafe abortion over other alternatives there could be several possibilities, including:

- The risk from unsafe abortion is actually smaller or comparable, ex ante, than the risk from alternatives.

³¹ Sen (1985) argued that once we accept the possibility of adaptive preferences it becomes essential to refer to standards of well-being that are “external” to the individual agent. In other words, a person’s own subjective valuation of her well-being can be trumped by socially-imposed minimum standards.

- The risk from unsafe abortion is perceived to be smaller or comparable than the risk from alternatives.
- There are other constraints – such as financial resources or social limitations – that override the use of other alternatives.
- Decision-making does not account of women’s welfare/health outcomes.

Estimates of the cost of individual segments of the event cycle or the cost of preventing certain contingencies can help in building up a better understanding of decision-making behaviour, and thus, derivatively, of the importance of women’s agency and their welfare considerations in decision-making.

For households, the economic cost of UARMM includes not only the cost of a particular segment of the event cycle – its treatment or prevention – but also the cost in terms of income foregone of household members due to care responsibilities, morbidity or mortality. To the extent that the household can be seen as a relevant cost centre, the measurement of this cost can be used to gain greater clarity about the nature of decision-making, informational availability and constraints, and possible openings for policy intervention for creating incentives for choices that promote women’s health.

Conclusion

Organizing the literature reviews around the event cycle and the costing framework respectively, provided important insights into factors contributing to UARMM and the relevance of cost measurement. This section sums up the conceptual discussions and literature reviews of Sections 1, 2 and 3 to draw conclusions for the measurement of the economic costs of UARMM in Pakistan. The findings are summarized here under two forward-looking themes: emerging research questions, and empirical strategies.

A. Emerging Research Questions

The methodology of measuring the economic cost of UARMM is closely related to the purpose of cost measurement. Measurement has to be premised on the underlying principle that economic cost of something is always understood in terms of an alternative consequence. There are broadly two approaches available for the measurement of the economic costs of UARMM. First, what are the overall costs of UARMM to the national (or global) economy, and second, what are the cost-effective ways of reducing UARMM.

Overall Costs of UARMM to National Economy

There are several reasons for wanting to measure the overall cost of UARMM to the national economy. If it can be argued that there are swift administrative ways of drastically reducing the burden of UARMM the overall cost measures the loss incurred by the national economy of not taking those administrative measures. Cost measurement can also be helpful in order to come up with a “headline” number that could be used to attract popular attention, or the attention of policy-makers.

“Headline” numbers, however, have their drawbacks too. As shown in Section 3 above, consistent methodology for measuring the overall cost of UARMM to the national economy is based on two sets of parameters that are themselves measured imprecisely. The first of these is the incidence of UARMM – which is very expensive to measure with any degree of accuracy. The second is the relationship between morbidity and mortality and macroeconomic variables, which has been estimated variously using cross-country data. These results too are highly contingent on estimation techniques, and specific choices of data and econometric modeling. “Headline” numbers of the overall economic cost of UARMM, therefore, are relatively easy to compute, but relatively difficult to defend convincingly. Such estimates will be made using existing secondary sources – under a range of scenarios – but cannot be used for anything more than very general advocacy.

Cost-Effective Routes to Reducing UARMM

A less eye-catching but more defensible use of the economic approach to unsafe abortion is to identify cost-effective routes for reducing UARMM for focused policy advocacy. Moving away from a macro perspective both allows and requires greater consideration of the specific factors that shape outcomes that might be of interest. The review of the medical studies and other material in Section 1 showed that UARMM can and should be examined as a complex event cycle rather than a simple discreet condition. Analysis of the event cycle proved invaluable in unraveling the various routes to UARMM, as well as the distinct points where the event cycle might be

interrupted or modified. Similarly, the critical review of the costing literature in Section 3 highlighted the role of economic analysis in explaining choices, or in dealing with the consequences of these choices.

Policy Implications of Cost Measurement

There are three areas where cost measurement has significant policy implications:

- i) Family planning and sexual and reproductive health interventions
- ii) Behavioural change
- iii) Agency change

i) FP/SRH interventions

There are several points along the event cycle where FP/SRH interventions can help to reduce UARMM through preventing the demand for induced abortions, preventing unsafe abortions, reducing the number PACs arising from unsafe abortions, and reducing the number of PACs that end in morbidity and mortality. The event cycle allows inferences about the impact of alternative FP/SRH interventions on overall UARMM. The cost of reducing UARMM, and comparing the cost-effectiveness of different interventions in reducing UARMM can be measured through evaluating and comparing the accounting costs of these interventions.

ii) Behavioural change

The review of the costing framework revealed that UARMM might be reduced through the modification of individual, couple, household, or health system behaviour. Behavioural change, as distinct from change in agency (discussed below), can occur through changing the relative costs and benefits associated with particular choices, and through overcoming informational constraints. It was also suggested in the review of the event cycle that people “choose” between various alternatives along the event cycle leading up to UARMM. These choices are partly governed by perceptions of the relative costs and risks between alternatives. For example, a woman might “choose” an unsafe abortion provider because of the prohibitive out-of-pocket cost of a safe abortion on the one hand, and the relatively high health costs of taking the pregnancy to term on the other. The provision of low-cost safe abortion might change her perception of the relative financial costs. Similarly, improvements in overall maternal health might induce better health-seeking behaviour with respect to an unwanted pregnancy. Moreover, recourse to unsafe induced abortion is partly driven by the absence of information on safer available alternatives, and behavioural change might be promoted through better access to information.

iii) Agency change

There are critical points along the event cycle that require a choice to be made: to have sex (within or outside marriage), to use contraception, to keep or abort an unwanted pregnancy, how to go about exercising that decision, and whether or not to treat a PAC. These choices are so important to the life and welfare of a woman, that they can be termed “strategic life choices”. In one of the most influential contributions to the theory of women’s empowerment, Kabeer writes, “empowerment refers to the process by which those who have been denied the ability to make strategic life choices acquire such an ability.” (1999: 19-20) This theory recognizes that women will not have the ability to make such choices in patriarchal societies around the world, and that they may only play a small role in these decisions while husbands, mothers-in-law or other individuals will dominate the process. In order for a woman

to have the ability to exercise choices she will need to have *resources* (material, human and social), *agency* (the ability to define one's goal and act upon them) and *achievements* (outcomes of choice which will further her future ability to make choices). In the context of women's reproductive health decision-making, we can safely state that in Pakistan women have weak access to the *resources* that enable them to make critical decisions in this event cycle and severely restricted *agency* to determine all matters pertaining to their reproductive and sexual health. What would their choices be like if they did exercise agency, and what would be the outcomes for the event cycle of unsafe abortion?

Even before we attempt to answer this question, we know that women's empowerment would transform her sexual and reproductive life, with major consequences for the household and society as well. In a scenario where a woman does not have forced sex, can negotiate the use of contraceptives, can change her mind about pregnancy even if she does conceive, and has access to existing health and safe abortion services along with the power and means to use this services, the likelihood of PACs will be negligible. Our challenge, as researchers, is to examine how women's agency could be increased through changes in the policy environment, service infrastructure, and gender relations.

B. Empirical Strategies

Refine and Improve Our Understanding of the Event Cycle

This literature review has offered us the opportunity to expand and develop on the concept of an event cycle, first used in the Brighton Papers, and it will remain in use as we start our preliminary fieldwork and proceed with the survey design. During this literature review we prepared a revised event cycle (see Box 1) based on the empirical work that has taken place and on the necessity to include contingent events in our understanding of how a PAC develops. Thus, we have included some events prior to the unwanted pregnancy, such as contraceptive use/non-use and whether the conception took place within marriage or not. Information on these events and contingencies emerged in empirical studies on unsafe abortion in the medical literature. Another finding from the literature review and interviews with key informants was that there is an overlap between this revised event cycle and a similar series of events that take place when a woman has a spontaneous abortion. The overlap occurs at the level of the unsafe service provider, from where a chain of events is begun that may lead to a PAC, the need for treatment, chronic illness, and possibly death of a woman.

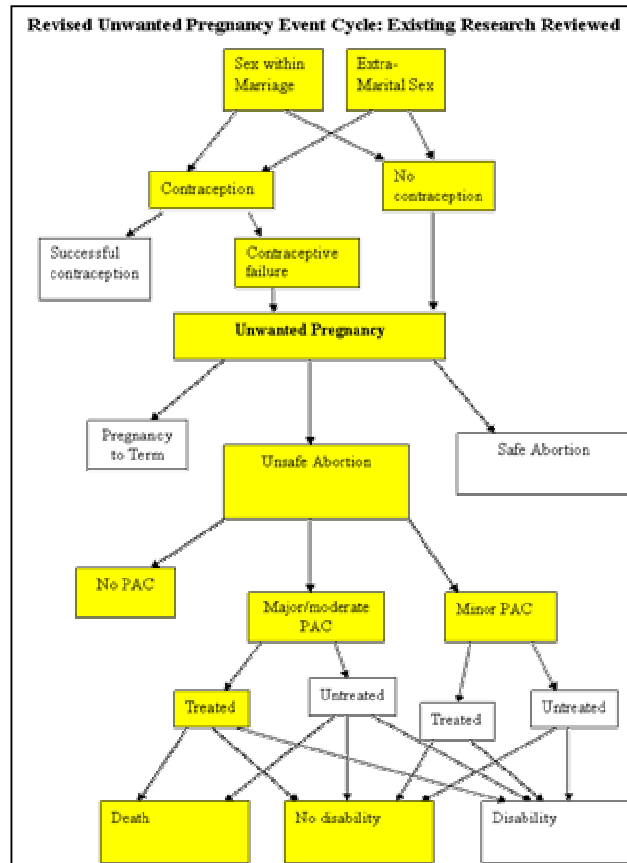
Some parts of this revised event cycle reviewed in this paper through existing medical and community-based research are:

- sex within marriage/extra-marital sex,
- contraception/no contraception,
- wanted/unwanted pregnancy (the former offers us the link to spontaneous abortion),
- unsafe abortion,
- major/moderate PACs,
- no PAC or minor PAC,

- treatment for major/moderate PACs,
- outcomes such as death, disability, and no disability.

The other parts of the event cycle (not highlighted) are those for which research has yet to be identified or conducted. We will need to explore more fully, through field work if possible as well as further literature review, the dimensions of extra-marital sex and how that impacts the options for contraception and safe/unsafe abortion for a woman. We also need to study existing reproductive health and demographic literature to uncover how decision-making about contraceptive use and even contraceptive misuse impact the event cycle. Through the community studies we have learned that women are not fully informed about the risks of unsafe abortion, and there is also a proportion of women who have unsafe abortions followed by only minor or no PACs at all. Preliminary fieldwork will explore this part of the event cycle to see under what circumstances this takes place. Finally, there are long-term disabilities beyond chronic PID and secondary infertility that women may be left with after an unsafe abortion, such as fistulae, and further research needs to establish what these are in the Pakistani context.

Fig. 1 Revised Unwanted Pregnancy Event Cycle: Existing Research Reviewed



Other parts of the event cycle will need to be explored in the next phase of our research through preliminary fieldwork or further literature review if possible. The area where we expect to find existing research is on spontaneous abortion, and these findings will enable us to assess more fully the details of the overlap in the event cycles of induced and spontaneous abortion, and decide how to explore this further through field work. Next, we need to find out more about how a woman assesses her options (or not) when she has an unsafe abortion, as opposed to a safe abortion or carrying her pregnancy to term. This will necessitate qualitative field research based on case studies, and it will also require expanding the event cycle to include more detail about these other two options, after identifying types of services and costs associated with them.

Analysis of Demand for FP/SRH Services

The demand side of FP/SRH services needs to be analyzed carefully – using the event cycle and the costing framework – to arrive at a better understanding of individual and/or household choices. Conventional demand analysis focuses on the effect of price and income variation on consumption. In the case of FP/SRH services, however, price and income effects are mediated by informational and agency

constraints. Costs, moreover, are not only financial, but include health outcomes for women. Statistical analysis based on existing secondary data (such as the *Pakistan Demographic and Health Survey*) will be augmented with more micro-level individual case-based empirical work on:

- Household/individual behaviour, choices along event cycle
- Costs and incidence of cost

Measuring Accounting Costs of Various FP/SRH Interventions

The economic costs of reducing UARMM are measured by estimating the accounting costs of various FP/SRH interventions along the event cycle. Estimating these accounting costs and taking into consideration the marginal effect of an increase in provision on the probability of a particularly segment of the event cycle provides the basis for distinguishing between alternative policy options. Cost-effective ways of reducing UARMM can be found by comparing the marginal impact of resources expended on alternate interventions.

Two types of empirical approaches are necessary:

- Consultation with service providers (focusing on Packard partners)
- Hospital/facility-based survey

Consultation with service providers will help to build up a preliminary picture of the range of accounting costs and marginal effects. A hospital/facility-based survey will be used to obtain more reliable estimates.

Analysis of Actual Supply of FP/SRH Services

The actual supply of FP/SRH services (similar to other health services) is governed by formal and informal institutional arrangements in hospitals and health facilities. Key informant interviews suggest that induced abortion crowds out PACs arising from spontaneous abortion from health facilities. This implies that health facilities operate implicit rationing or queuing systems. The health systems costs of UARMM, therefore, are in terms of care not provided to other patients. There are also important issues of unequal power relations – between patients and service providers - in access to FP/SRH services. Qualitative health facility surveys will be used to determine the nature of effective rationing or other modalities for allocating scarce resources within hospitals.

* * *

As this study proceeds into its second stage, it will be guided by the research questions and empirical strategies discussed above. It is expected that the tools for answering these questions and the strategies to be employed in a future survey will be finalized based on exploratory fieldwork and analysis of existing secondary data in the months ahead.

List of Key Informant Interviews

1. Dr. Sadiqua Jafarey, National Committee for Neonatal and Maternal Health, June 18, 2008, Karachi.
2. Dr. Luna Vellozo, National Committee for Maternal and Neonatal Health, June 19, 2008.
3. Dr. Sikander Sohani, Aahung, June 24, 2008, Karachi.
4. Mohsina Bilgrami, Insha Hamdani, Marie Stopes Society Pakistan, June 26, 2008, Karachi
5. Dr. Razia Korejo, Jinnah Post-Graduate Medical College, July 7, 2008, Karachi

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Annex I: Patient profiles based on all medical studies

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital Status
1. Zaidi, Mastoor, Jaffry & Parveen 1993	81 women with a history of illegally induced abortion were included in the study. 1 ST study (prospective): Jan. 1977 to Sep. 1978 2 nd Study (retrospective): Nov. 1990 to Oct. 1991	Dept. of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Center.	Ages 15-25: 34 (42%) 26-35: 42 (52%) 36-45: 5 (6%)	Less than 8 weeks: 33 (41%) 9-14 weeks: 28 (35%) 15-20 weeks: 13 (16%) More than 20 weeks: 7 (9%)	0 children: 9 (11%) 1-4 children: 35 (43%) Greater than 5 children: 37 (46%)			5 (6%) nulliparous women were unmarried
2. Tayyab & Samad 1996.	37 patients identified with illegally-induced abortions—were interviewed & examined. Jan. 1992 to Dec. 1994	Unit II, Dept. of Obstetrics and Gynaecology, Civil Hospital Karachi.	Ages 15-24: 6 (16%) 25-34: 29 (78%) 35-44: 2 (6%)	13-20 weeks: 13 (35%) More than 20 weeks: 2 (5.4%)	0 children: 3(8%) 2-5 children: 6 (16%) Greater than 5 children: 28 (76%)			

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital Status
3.Yusuf 1997	156 induced abortions retrospective of one year period admissions	Lady Willingdon Hospital., Lahore	Ages 25-30: 58 (40%)		Grand multipara: 103 (66%)	Poor: 130 (83%) Non-Lahori Villagers/Townsmen: 78 (50%)		
4. Najmi 1998	72 induced abortions July 1992-June 1996	Sir Ganga Ram Hospital, Lahore	Ages Less than 20: 6 (8%) Ages 21-35: 48 (66.67%) Ages 36-39: 13 (18.06%) Ages greater than 40: 5 (7%)	Up To 12 weeks: 39 (54%), 13-16 weeks: 18 (25%), 17 weeks or more: 15 (21%)	0 children: 3 (4%) 1-4 children: 35 (49%), 5-7 children: 27 (38%), 8 or More: 7 (10%)	Poor: 36 (50%), Lower Middle: 25 (35%), Upper Middle: 11 (15%)	Previous Abortions 0: 25 (35%), 1: 29 (40%), 2-4: 18 (25%)	

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
5. Chohan et al. 1999.	50 patients presenting with history of induced abortion 1998 – year long	Lady Willingdon Hospital, Lahore.	Ages Less than 20: 6, (12%), 21-25: 13 (26%), 26-30: 19 (38%), 31-35: 3 (6%), Greater than 35: 9 (18%)	Less than 12 weeks: 37 (74%), 12-24 weeks: 13 (26%)	Less than 3 children: 13 (26%), 3-5 children: 33 (66%), Greater than 5 children: 9 (18%)	---		
6. Mumtaz 1999	11 induced abortion Nov1996- Oct1997	Liaquat Medical. College, Jamshoro, Hyderabad	Ages 15-19: 3 (27%) Ages 20-25: 3 (27%) Ages 26-35: 5 (46%)	Less than 8 Weeks: 8 (73%) Greater than 8 Weeks: 3 (27%)	0 Children: 3 (27%) 1-4 Children: 2 (18%) Greater than 5: 6 (55%)			Unmarried: 3 (27%)

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
7. Khanum and Mirza 2000	89 induced abortions retrospective study July 1999- June 2000	Jinnah Hospital, Lahore	Mean age 31 yrs.	12 Weeks: 72 (81%)	Greater than 4: 67 (75%)		Previous History Of Induced Abortion: 10 (11%). Using Contraceptive: 29 (33%)	Married: 67 (75.3%)
8. Sultana et. al. 2000	Total cases: 384; 28 induced abortion cases May 1999- May2000	Abbasi Shaheed Hospital, Karachi	Majority of induced abortions were from ages 25-35		Majority of patients had 2-9 children		Spontaneous: 260 (68%), Missed Abortion: 96 (25%), Induced Abortion: 28 (7%)	

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
9. Rehan et. al. 2001	Women seeking abortion interviewed: 452 cases. Oct-Dec 1997	32 clinics in three provincial capitals of the country.	Ages Less than 20: 15 (3%), 20-24: 53 (12%), 25-29: 98 (22%), 30-34: 121 (27%), Greater than 35: 165 (37%); mean age: 32.3+- 7.5 years	1-4 weeks: 211 (47%), 5-8 weeks: 183 (40%), 9-12 weeks: 38 (8%), 13-16 weeks: 12 (3%), Greater than 16: 8 (2%)	0 children: 39 (8%), 1 children: 5 (1%), 2 children: 26 (6%), 3 children: 53 (12%), 4 children: 53 (12%), 5, children: 83 (18%), Greater than 5: 193 (43%)		Contraception Failure: 92 (20%). Accompanied by husbands (87%), Husband paid for abortion 93.6%	Married: 413 (91%), Unmarried: 39 (9%)
10. Akbar et. al. 2001	41 induced abortion Jan 1999-Dec 1999	Jinnah Hospital, Allama Iqbal. Medical. College, Lahore	Ages late teens: 11 (27%), Ages 20-40: 30 (73%)	Less than 12: 32 (78%), Greater than 16: 9 (22%)	Nullipara: 6 (15%), Primagravidas: 3 (7%) Greater Than 4: 32 (78%)			Married: 37 (90%), Unmarried: 4 (10%)

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
11. Gul 2001	2,085 induced abortions over ten years	Lahore General Hospital, Lahore	Ages 12-20: 196 (9%) Ages 21-30: 732 (35%), Ages 31-40: 986 (47%), Ages 41-45: 171(8%)	Less than 6 Weeks: 752 (36%), 7-12 Weeks: 1113 (53%)	Nullipara: 375 (18%)			
12. Chaudhry & Iqbal 2001	32 cases having septic induced abortion with renal failure (oliguria). Jan. 1995 - Dec. 1997	Department of Gynecology and Obstetrics, BV hospital, Bahawalpur.	Ages 16-20: 7 (22%), 21-30: 14 (44%), 31-40: 11 (34%),		1-2 children: 9 (28%), 3-5 children: 15 (47%), 5 children and above: 8 (25%)			

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
13. Sheikh et al. 2002	From 930 ever-married females, 186 selected; 78 had abortion history, out of which 18 were induced. May-July 2000	A peri-urban community: Shah-di-Kot, Lahore.	All ever-gravida females; of reproductive ages 15-45	4-8 weeks: 9 (50%), 9-12 weeks: 6 (33%), 13-16 weeks: 2 (11%), 17-20 weeks: 1 (6%), 21-24 weeks: nil, 25-28 weeks: nil	Average Fertility <i>per woman</i> : 4.3 children		Contraceptive users: 7 (%) Non-users: 11 (%) Females using abortion as a measure of contraception: 12 (66.6%)	All married: 18 (100%)
14. Saeed 2002	52 induced abortions, descriptive study Dec 1999-Dec 2000	Federal. Government Services Hospital., Islamabad	Ages 21-35: 33 (64%), Ages 36-40: 10 (19%)		0 Children: 2-5 Children: 16 (31%), Greater Than 5 Children: 30 (58%)	Poor: 41 (79%), Lower Middle: 9 (17%), Upper Middle: 2 (4%)	21 (40%) had contacted a doctor or family planning staff about pregnancy	
15. Ghazanfar & Ahmed. 2002	37 patients identified with induced abortion. April 2000-April 2001	General. Surgical. Unit of Mayo Hospital, Lahore	Ages 15-25: 9 (24%), 26-35: 23 (63%), Above 36: 5 (14%); Mean age 27.5,			Poor: 22 (60%), Middle-Class: 13 (35%), Upper-Class: 2 (5%)		

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
16.Khaskheli. 2002	240 cases of abortion—all types. Jan 1995 to Dec. 1996	Liaquat Medical. College Hospital, Hyderabad	Ages Under 20: 25 (10%), 20-25: 38 (16%), 26-30: 55 (23%), 31-35 60 (25%), 36-40: 45 (19%), Greater than 40: 17 (7%)	Less than 8 weeks: 65 (27%), 8-12 weeks: 122 (51%), 13-20 weeks: 53 (22%)	0-1 children: 25 (11%), 2 children: 42 (18%) , 3 children: 53 (22%), 4 children: 52 (22%), 5 children and above: 68 (28%)			
17. Bhutta et. al. 2003	93 induced abortions Jan 1997-Sep 1998	JPMC, Karachi	Ages 26-35: 47 (51%)	Less than 8 Weeks: 40 (43%), 9-14 Weeks: 36 (39%) 15-20 Weeks: 13 (14%), Greater Than 20 Weeks: 4(4%)				Unmarried 9 (10%), Married Grand Multipara: 47 (50%), Nullipara: 13 (14%)

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
18. Korejo et. al. 2003	57 induced abortion review of patient cases Jan 1997 - Sep 1998	JPMC, Karachi, Jan 1999-2001	Ages 21-30: 48 (84%)	Less Than 8 or Under in 20 Weeks: 20 (35%), Less Than 22 Weeks: 4 (7%)		All were from low socioeconomic status	No previous use of contraception: 43 (76%) Husbands' support for termination: 29 (51%) Voluntary termination 26: (46%)	Unmarried: 4 (7%), Grand multipara: 24 (42%)
19. Naib, Jamila et. al., 2004.	28 septic induced abortion cases over one year (2001-2)	Khyber Teaching Hospital. Peshawar	Age 15-25: 5 (18%), 26-35: 8 (28%), 36-45: 15 (54%)		1-5 children: 6 (22%), 5-8 children: 8 (29%), 8-10 children: 9 (32%), 10-15 children: 5 (18%)			

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
20. Tabassum et. al. 2004	40 patients; those who had abortions at periphery needed general surgical intervention in form of laparotomy. July 2001- August 2004	Surgical. Unit I, Sheikh Zayed Hospital., Rahim Yar Khan	Ages 15-25: 10 (25%), 26-35: 8 (20%), 36-45: 22 (55%)				Previous Abortions: 10 (25%), Laporotomy: 27 (68%)	Unmarried: 10 (25%), Married: 30 (75%)
21. Ashraf et. al. 2004	168 induced abortions Jan-Dec 2003	Lahore General. Hospital, Lahore	Ages Below 20: 12 (7%), 20-30: 96 (57%), 30-40: 60 (36%)	Less than 6 weeks: 24 (14%), 7-12 weeks: 96 (57%), Greater than 12 weeks: 48 (29%)	0 children: 12 (7%), 1-4 children: 48 (29%), Greater than 5 children: 108 (64%)			

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
22. Hussain et. al. 2004	JPMC 1999-2003, 200 cases identified induced abortion	JPMC, Karachi	Ages 26-40: 100 (50%), 15-25: 80 (40%) Above 40: 20 (10%)		Greater than 3 children: 56 (28%), 3-5 children: 64 (32%), Greater than 5 children: 80 (40%),			Illegitimate pregnancy: 10 (5%)
23. Ali, Naqvi, Zahoor & Choudhry 2004	21 patients were included in the study after illegal instrumentation of uterus for abortion January 2002 to October 2004	North Surgical Ward, Mayo Hospital, Lahore.	Ages 12-19: 4(16%) Ages 20-30: 11(52%) Ages 31-40: 6(29%)					Married: 15 (71%) Unmarried: 6(29%)

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital. Status
24. Madhu-Das and Srichand 2006	Retrospective analysis of 32 induced abortion patients 2001-4	Liaquat University Hospital, Hyderabad	Ages Less than 20: 9 (28%), 20-40: 21 (66%), Greater than 40: 2 (6%)		0 children: 9 (28%), 2-4 children: 4 (13%). Greater than 5 children: 19 (59.37%)			
25. Siddique and Hafeez 2007	59 induced abortions admitted Aug2001- July 2002	Jinnah Hospital, Lahore	Ages 25-34: 44 (73%); mean age was 29 years	Less than 6 weeks: 14 (24%), 6-8 weeks: 21 (36%), 9-12 weeks: 13 (22%), 13-20 weeks: 9 (15%), Greater than 20 weeks: 2 (3%)	Greater than 4: 30 (50%); mean was 4 children		Using contraception before conceiving: 32 (54%), <i>Not</i> using contraception before conceiving: 27 (45.8%). Directly related to education especially secondary educational level.	Married: 56 (94.9%)

Study	Cases	Hospital.	Patient Profile					
			Age	Gestation	Parity	Social. Status	Family Planning History	Marital Status
26. Gilani and Azeem 2005	100 married women living in urban Peshawar with induced abortions were interviewed	Khyber Teaching Hospital, Peshawar			1-4 children: 15 (15%), Greater than 5: 85 (85%)		Knowledge of contraceptives: 60 (60%), Use of contraceptive: 80 (80%), Conception despite use of contraceptives: 20 (20%), Repeated induced abortions: 15 (15%)	Unmarried, Nullipara: 3 (27%)
27. Rehman et al. 2007	22 patients with bowel injuries (due to induced abortion) studied. Dec. 2002 -Dec. 2005	Department of Gynecology and Obstetrics, Civil Hospital, Karachi,	Ages ranged from 14-41; mean age 26.86 years	6-8 weeks: 7 (32%), 9-10 weeks: 7 (32%), 11-12 weeks: 5 (23%), 12-14 weeks: 3 (13%),	Most women had 5 or more children.			Married: 15 (68%), Unmarried: 7 (32%)

Annex II: Abortion Providers, Methods and Reasons—in Medical Studies Based on Severe Post-Abortion Complications

Study	Abortion Provider	Abortion Method	Reasons
1. Rehan and Inayatullah 2001			Too Many Children: 291(64.4%), Contraceptive Failure: 92 (20.3%), Premarital Affairs: 39 (1.3%), Medical Reasons: 24 (5.4%), Extramarital Affairs: 6 (1.3%)
2. Sheikh et.al. 2002	Dais: 11 (61%), LHV: 5 (28%), Doctor: 2 (11%)	Instruments: 8 (44%), 6 Vaginal Meds: 6 (33%), 3 Oral Meds: 3 (17%), IUCD: 1 (6%).	
3. Ghazanfar and Ahmed 2002	Dais, LHVs	Instrumentation	
4. Rehan 2003			Unwanted Pregnancy: 58 (55%), Contraceptive Failure: 25 (24%), Medical Reasons: 16 (15%), Premarital Affairs: 5 (5%), Extra Marital Affair: 1 (1%).
5. Naz and Begum 2004	Unqualified and Unskilled Personnel		Unmarried: 10 (10%), Complete Family: 39 (38%), Small Last Born: 14 (14%), Failure Of Contraception: 12 (12%), Contraceptive Unaware: 22 (21%), Marital Disharmony: 5 (5%)
6. Ali, Naqvi, Zahoor & Choudhry 2004	6 were treated by lady doctors: 28.6% Mostly carried out by dais, nurses or LHVs who were not designated workers.		
7. Gilani and Azeem 2005	Doctor/ Family Planning Staff: 35 (35%), Unqualified and Unskilled Personnel: 65 (65%)	Instrumentation 70 (70%), Inter Vaginal Drugs: 22 (22%), Sticks: 8 (8%)	Completion Of Family Size: 78 (78%), Poor Maternal Health Or Last Child Too Young: 22 (22%)
8. Rehman et.al. 2007	Doctors: 4 (18%), Unqualified and Unskilled Personnel: 18 (82%)		