



Antenatal Care: Old Myths, New Realities

MAQ Exchange

22-1

Suggested activity. Prior to the interactive presentation, divide the participants into two debating teams. Ask each team to:

- Brainstorm and list on a flipchart all the antenatal care practices they consider to be essential. Teams should be prepared to explain why the items they have listed are essential to antenatal care. (15 minutes)
- Read the other team's flipchart and decide what items your team feels do not belong on the other team's list (i.e., items the other team has listed that are not really essential in antenatal care). (5 minutes)
- Debate with the other team about why they think these antenatal care practices are not essential and also about what items (if any) they feel are missing from the other team's list. (10 minutes)



Traditional Antenatal Care What it looks like

- ◆ Originated from models developed in Europe in early decades of the century
- ◆ Ritualistic rather than rational
- ◆ Emphasis of visits is on frequency and numbers, rather than on essential goal-directed elements

Source: Villar and Bergsjö 1997.

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Slides 2-17 Interactive presentation (20 to 25 minutes)

The core of these early European models has developed or changed very little despite the increase in medical and midwifery knowledge.

To a large extent, developing countries have adopted the antenatal (ANC) model of developed countries with little or no adjustment for endemic diseases or epidemiological considerations.

Visits are often irregular, with long waiting time, little feedback to (or real communication with) mothers and little or no communication with obstetrical or labor units.

Source: Villar J and P Bergsjö. 1997. Scientific basis for the content of routine antenatal care. *Acta Obstetrica et Gynecologica Scandinavica* 76(1): 1-14.



No longer recommended

- ◆ Numerous routine visits
 - ◆ Burden to health system
 - ◆ Reduction in the number of visits does not seem to affect maternal and perinatal outcomes



Source: Villar et al 2001.

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Burden to health system

Numerous routine visits deplete human and system resources so that care may not be available for those with complications or emergencies, and the provider may not have sufficient time left to offer counseling, birth planning, etc.

Source: Villar J et al. 2001. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *The Lancet* 357(9268): 1551-1564.

See optional slide 19 for details about a study of a reduced visits program in Zimbabwe.



No longer recommended

The Risk Approach

- ◆ Kasongo, Zaire Study
 - ◆ 71% of women who did develop obstructed labor were not predicted
 - ◆ 90% of women identified as “at risk” did not develop obstructed labor

Source: Kasongo Project Team 1984.

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Kasongo, Zaire Study

•3,614 multiparous pregnant women at antenatal clinics in Kasongo, Zaire, were screened during a 5-year period for risk of developing obstetric complications.

Of course, screening is still recommended (i.e., screening for hypertensive disease by taking blood pressure, screening for syphilis by doing reactive protein reagent (RPR), screening for HIV through voluntary counseling and testing.

This, however, is screening to **detect** a problem rather than screening to **predict** a problem.

Source: The Kasongo Project Team. 1984. Antenatal screening for fetopelvic dystocias. A cost-effective approach to the choice of simple indicators for use by auxiliary personnel. *Journal of Tropical Medicine and Hygiene* 87(4): 173-183, in *Safe Motherhood Programs: Options and Issues*. Maine D. 1991, pp. 31-33. Center for Population and Family Health. Columbia University: New York.

See optional slide 20 on guidance for screening.



Problems with the Risk Approach

- ◆ **Poor predictive value** – Does not distinguish those who will develop complications from those who will not.
- ◆ **Consumes scarce resources** – Many women categorized as “high risk” never develop complications but consume scarce resources.



Problems with the Risk Approach *continued*

- ◆ **False security** – Many women categorized as “low risk” do develop complications but are never told how to recognize or respond to them.
- ◆ **Diverted resources** – Away from the improvement of services for all women

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See optional slides 21-23 for additional information about problems with the risk approach in predicting complications (e.g., postpartum hemorrhage, pregnancy-induced hypertension).



Lessons from Risk Approach

- ◆ **Every** pregnant woman is at risk of complications and must have access to quality maternity care.
- ◆ Even low-risk women may develop complications.
- ◆ No amount of screening will separate out those women who will need emergency care from those who will not need such care.



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Every woman needs access to quality maternity care; every woman needs to be cared for by a skilled attendant.



No longer recommended

- ◆ Routine/ritual measurements and examinations
- ◆ Height

Source: Hofmyer GJ 1989; Carroli, Rooney and Villar 2001.

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Maternal Height

Height is probably the most widely used screening test for disproportion.

Hofmyer reviewed studies from around the world and concluded that, though small foot size, very young age and short stature are correlated with the risk of cephalopelvic disproportion (CPD), they are poor discriminatory tools.

Source: Hofmyer GJ. 1989. Suspected fetopelvic disproportion, in *Effective Care in Pregnancy and Childbirth*. Chalmers I, M Enkin, and MJNC Keirse (eds), pp. 493-498. Oxford: Oxford Univ. Press: Oxford, UK.

The performance of maternal height depends on the cut-off point. (*Shorter height* will result in fewer in the group, more specificity and less sensitivity. *Higher height* will result in less specificity and more sensitivity. Maternal height will vary between populations and probably within populations over time with cohort changes in average height. One of the weaknesses of maternal height in predicting CPD is that it is a factor both for the mother having a small pelvis **and** for having a low birthweight baby.

[Effectiveness of clinical pelvic measurement in predicting CPD has not been shown. Also, significance of non-engagement of the fetal head near term (particularly among women of African descent) is not clear.] Source: Hofmyer GJ. 1989.

The best test of pelvic capacity is labor. Source: Carroli G, C Rooney and J Villar. 2001. How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence, in *Paediatric and Perinatal Epidemiology* 15 (Supp.1): 1-42.

Use of a partogram is appropriate to identify the woman with CPD during labor.



No longer recommended

- ◆ Routine/ritual measurements and examinations
- ◆ **Ankle edema**

Source: Enkin M et al 2000.

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Ankle edema

Dependent edema is common in normal pregnancy, with 50 to 80% of pregnant women reporting edema during pregnancy.

Actually hypertension with edema is associated with lower fetal death than hypertension without edema.

Dependent edema in pregnancy is common and does not define a group at risk.

Source: Enkin M et al. 2000. *A Guide to Effective Care in Pregnancy and Childbirth*, 3rd ed, p. 71. Oxford University Press: Oxford, UK.



No longer recommended

- ◆ Routine/ritual measurements and examinations
- ◆ **Fetal position below 36 weeks**



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Fetal position below 36 weeks

- Fetal position is not stable or significant before 36 weeks.
- Fetal position before 36 weeks will not influence care. (No reason to do anything about a malpresentation before 36 weeks).



Recommended Birth Preparedness, including Complication Readiness

- ◆ **Preparing for Normal birth**
 - ◆ **Skilled attendant**
 - ◆ **Place of delivery**
 - ◆ **Finance**
 - ◆ **Nutrition**
 - ◆ **Essential items**
- ◆ **Readiness for Complications**
 - ◆ **Early detection**
 - ◆ **Designated decision maker(s)**
 - ◆ **Emergency funds**
 - ◆ **Communication**
 - ◆ **Transport**
 - ◆ **Blood donors**

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Planning and preparation for mother, family, community and skilled care provider

Individual birth plans will be shaped by the culture, socioeconomic, and geographical situation of the family as well as by the needs and condition of the individual client.

See optional slides 24-25 for details about the need for birth preparedness based on a study in Nepal.



Recommended

- ◆ Goal-directed visits by skilled provider
- ◆ WHO recommends four focused visits as sufficient for normal pregnancy



Sources: Villar and Khan-Neelofur 2001; WHO 1996.

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Emphasis is on quality, rather than quantity of visits.

Skilled provider – A review in the Cochrane database of 3 randomized controlled trials of routine antenatal care provided by midwives compared with shared care led by obstetricians found all 3 similar in terms of clinical efficacy and perception of care (women's satisfaction). Source: Villar J, D Khan-Neelofur. 2001. Patterns of routine antenatal care for low-risk pregnancy (Cochrane Review), in *The Cochrane Library*, Issue 1. Oxford: Update Software.

Midwife-managed care, as opposed to obstetrical-led care, has similar, or in some instances, more favorable outcomes (also reduction in cost).

The number of visits recommended by WHO for routine care (no complications) is **four**. Source: World Health Organization (WHO). 1996. *Antenatal Care: Report of a Technical Working Group*. WHO: Geneva, Switzerland.

1st visit – before 4 months (as early as possible in pregnancy)

2nd visit – 6 to 7 months

3rd visit – 8 months

4th visit – 9 months

Follow-up visit



Recommended

- ◆ Counseling
 - ◆ Nutrition
 - ◆ Family planning
 - ◆ Breastfeeding
 - ◆ Danger signs
 - ◆ HIV/STIs



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STIs = Sexually Transmitted Infections

See optional slides 26-29 for details about nutrition requirements, family planning, breastfeeding and danger signals.



Recommended

- ◆ Detection and management of existing diseases and conditions
 - ◆ HIV – Voluntary counseling and testing
 - ◆ STIs, including syphilis
 - ◆ Tuberculosis
 - ◆ Malaria

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Sources: Ahmed Y et al. 1999. A study of maternal mortality at the University Teaching Hospital, Lusaka, Zambia: The emergence of tuberculosis as a major non-obstetric cause of maternal death. *International Journal of Tubercular Lung Disease* 3(8): 675-680; Figueroa-Damian R and JL Arredondo-Garcia. 2001. Neonatal Outcome of Children Born to Women with Tuberculosis. *Archives of Medical Research* 32(1): 66-69.

See optional slides 30-32 for details about the benefits of HIV voluntary counseling and testing.

See optional slides 33-35 for details about the need for antenatal syphilis screening and treatment.

See optional slide 36 for details about tuberculosis.



Recommended

- ◆ Detection and management of complications
 - ◆ Severe anemia
 - ◆ Vaginal bleeding
 - ◆ Pre-eclampsia/eclampsia
 - ◆ Malpresentation after 36 weeks

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See optional slides 37-38 for details about severe anemia.

See optional slide 39 for details about vaginal bleeding.

See optional slide 40 for details about pre-eclampsia/eclampsia.



Recommended

Prevention

- ◆ For all women
 - ◆ Tetanus toxoid
 - ◆ Iron and folate supplementation
- ◆ In select populations
 - ◆ Malaria - intermittent preventive treatment
 - ◆ Routine hookworm treatment
 - ◆ Iodine supplementation
 - ◆ Vitamin A supplementation

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See the following optional slides for details:

Optional slide 41, tetanus toxoid

Optional slide 42, iron deficiency

Optional slide 43, iron folate supplements

Optional slide 44, malaria in pregnancy

Optional slides 45 and 46, treatment of malaria during pregnancy

Optional slide 47, hookworms in pregnant women

Optional slide 48, iodine deficiency and supplementation

Optional slides 49 and 50, vitamin A supplementation



Antenatal Care: Best Practices

Not recommended

- ◆ Numerous routine visits
- ◆ High-risk approach
- ◆ Routine measurement:
 - ◆ Height
 - ◆ Fetal position before 36 weeks
 - ◆ Ankle edema

Recommended

- ◆ Focused antenatal visits by skilled provider
- ◆ Birth preparedness and complication readiness planning
- ◆ Counseling for family planning, breastfeeding, danger signs, HIV/STIs and nutrition
- ◆ Detection and management of co-existing conditions and complications
- ◆ Tetanus toxoid
- ◆ Iron and folate
- ◆ In selected populations
 - ◆ Malaria preventive treatment
 - ◆ Helminth presumptive treatment
 - ◆ Iodine
 - ◆ Vitamin A



Optional Slides

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Slides 19–50 are optional slides that may be used to supplement the presentation.



Study of Reduced Visits Program in Zimbabwe

Interpretation: An antenatal care program that emphasizes a specific goal or purpose for each visit rather than a targeted number of visits (even though the total number of visits may be reduced) can be introduced without adverse effects on the main intermediate outcome pregnancy variables that are the most important determinants of perinatal morbidity and mortality.

Source: Munjanja, Lindmark and Nyström 1996.

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Zimbabwe Study

A randomized clinical trial, conducted over a 2-year period, followed 15,532 women (9,394 women participated in a new program in which visits were fewer but goal-oriented, and 6,138 women participated in a standard/traditional program).

Women in the new program (i.e., those who had fewer, but more focused visits (4 versus 6) had:

- Significantly fewer referrals for pregnancy-induced hypertension (PIH)
- Significantly fewer referrals for severe hypertension or eclampsia during labor
- Significantly lower risk for preterm delivery

There were no other significant differences between the two groups in other major indices of pregnancy outcome, including antenatal referrals for other causes, labor referrals, obstetric interventions, low birthweight, and perinatal and maternal mortality and morbidity. **No increase in missed complications or emergency interventions was observed.**

Source: Munjanja SP, G Lindmark and L Nyström. 1996. Randomised controlled trial of a reduced-visits programme of antenatal care in Harare, Zimbabwe. The Lancet 348(9024): 364-369.



Guidance for Screening

- ◆ Certain maternal conditions are amenable to treatment, and the consequences of lack of treatment are substantial.
- ◆ It is not so important, however, to screen for a condition which
 - ◆ Is not a major problem
 - ◆ Has no consequences on the outcome of pregnancy, or
 - ◆ Is so common that presumptive treatment is more appropriate (mild anemia, malaria in certain areas)

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Previous Postpartum Hemorrhage

- ◆ Previous postpartum (PPH) not reliable in predicting risk of PPH in next pregnancy
- ◆ In an audit reported in the *British Medical Journal*, Chng et al found that although previous PPH was associated with a relative risk of 1.6 of recurrence, only 6.3% of those with “risk for PPH” suffered PPH in the index delivery.

Source: Chng, Hall and MacGillivray 1980.

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Source: Chng PK, MH Hall and I MacGillivray. 1980. An audit of antenatal care: The value of the first antenatal visit. *British Medical Journal* 281(6249): 1184-1186, in *Antenatal Care and Maternal Health: How Effective Is It? A review of the evidence*. Rooney C. 1992, p 17. WHO: Geneva, Switzerland.



History of Pregnancy-induced Hypertension

- ◆ Multiparas with a history of pregnancy-induced hypertension (PIH) are more likely than multiparas without a history of PIH to develop PIH again.
- ◆ Women with a family history of obesity are more likely to develop PIH.
- ◆ Nulliparas are twice as likely to develop PIH as are multiparas.
- ◆ Yet none of these factors alone or in combination can confidently predict who will develop PIH—neither can socioeconomic class or any dietary factors.

Source: Rooney 1992.

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Source: Rooney C. 1992. *Antenatal Care and Maternal Health: How effective is it? A review of the evidence*, p. 20. WHO: Geneva, Switzerland.



Complications Cannot Be Reliably Predicted

- ◆ No formula or scoring system can reliably distinguish those who will develop complications from those who will not.

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The source listed below discusses the difficulties in implementing an effective risk scoring system.

Source: Rooney C. 1992. *Antenatal Care and Maternal Health: How effective is it? A review of the evidence*, pp. 12-16. WHO: Geneva, Switzerland.



Complication Readiness is Key to Survival

Nepal Study

- ◆ **Less than 50% of families** of women who died in pregnancy, delivery or postpartum, **recognized the problem.**
- ◆ 36% decided within 2 hours to seek care and get transport.
- ◆ 15% decided in 2 to 23 hours to seek care and get transport.
- ◆ **29% made the decision and arranged transport 1 to 8 or more days after** recognition of a life-threatening complication.

Source: MOH, Nepal 1998.

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Note: Optional slides 24 and 25, if used, should always be used together.

In Nepal, a recent study showed that **less than 50% of families** of women who died in pregnancy, delivery or postpartum, **recognized the problem.** In rural situations in the developing world, as many as 12 to 15 hours may elapse between the decision to seek treatment and the beginning to travel towards that treatment.

Source: Ministry of Health (MOH). His Majesty's Government of Nepal. 1998. *Maternal Mortality and Morbidity Study*, p. 29. MOH: Kathmandu, Nepal.

This same study in Nepal found that of those families who did decide to seek care, 36% decided within 2 hours to seek care and get transport; 15% decided in 2 to 23 hours to seek care and get transport; while **29% made the decision and arranged transport 1 to 8 or more days after** recognition of a life-threatening complication.

Source: Ministry of Health (MOH). His Majesty's Government of Nepal. 1998. *Maternal Mortality and Morbidity Study*, p. 31. MOH: Kathmandu, Nepal.



Complication Readiness is Key to Survival *continued*

- ◆ The interval from onset to death for antepartum hemorrhage can be approximately 12 hours.
- ◆ The interval from onset to death for postpartum hemorrhage can be two hours.
- ◆ The hours required for making arrangements (which could have been made prior to the emergency) may define the line between survival and mortality.

Sources: Maine 1991; MOH, Nepal 1998.

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Note: Optional slides 24 and 25, if used, should always be used together.

Life-depleting hours can be lost from the time a complication that needs treatment is recognized through the time arrangements have been made for all the elements that must be in place for the woman to reach help. Considering that the interval from onset to death for antepartum hemorrhage can be approximately 12 hours, while the **interval from onset to death for postpartum hemorrhage can be two hours, the hours required for making arrangements (which could have been made prior to the emergency) may define the line between survival and mortality.**

Sources: Maine D. 1991. *Safe Motherhood Programs: Options and Issues*. Center for Population and Family Health, p. 42. Columbia University: New York; Ministry of Health (MOH), His Majesty's Government of Nepal. 1998. *Maternal Mortality and Morbidity Study*, pp. 27-28. Kathmandu, Nepal.

Birth planning and complication readiness **prior** to the development of a complication is key to survival.



Nutrition Requirements

Good antenatal nutrition includes:

- ◆ Meeting the caloric needs
- ◆ Eating foods which supply specific micronutrients
- ◆ Providing micronutrient supplementation

An underweight mother increases the likelihood of a low birth weight (LBW) baby; low iron intake contributes to anemia.

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Family Planning

- ◆ **Clients should know**
 - ◆ What family planning (FP) methods are options postpartum
 - ◆ How to access FP services
 - ◆ What FP services are available

- ◆ **Family Planning** should include use of condoms for dual protection.

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Pregnancy is a time when mothers and families are

- Thinking about the demands of a growing family
- Often feeling overwhelmed
- Want to care adequately for the child they're expecting but realize that another child on top of this one might strain family resources and so jeopardize the welfare of this child



Breastfeeding

Mothers need to

- ◆ Understand the benefits of breastfeeding
- ◆ Become comfortable and familiar with the idea of breastfeeding
- ◆ Understand “exclusive” breastfeeding
- ◆ Know to expect (and demand) “immediate” breastfeeding



Danger Signals

- ◆ Families of pregnant women need to know how to recognize the signs of complications as well as what to do and where to get help
- ◆ In Nepal, less than 50% of families of women who **died** recognized the problem.

Source: MOH, Nepal 1998.

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Source: Ministry of Health (MOH). His Majesty's Government of Nepal. 1998. *Maternal Mortality and Morbidity Study*, p. 29. MOH: Kathmandu, Nepal.



HIV: Voluntary Counseling and Testing

- ◆ **Voluntary HIV counseling and testing** should be available to every pregnant woman--for public health reasons as well as for the benefit to the individual woman.
- ◆ Pre and post-test counseling is an essential part of managing HIV in pregnancy.

Source: WHO and UNAIDS 1999.

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Source: WHO and UNAIDS. 1999. HIV in Pregnancy: A Review, pp. 27-31. Geneva, Switzerland.



Benefits of Voluntary HIV Counseling and Testing

- *If the HIV test is positive, the woman can get early counseling and treatment*
- *Allows appropriate follow-up and treatment of child*
- *Enables a woman to make decisions regarding continuation of the pregnancy and future fertility*
- *May allow the institution of anti-retroviral (ARV) therapy*

Source: WHO and UNAIDS 1999.

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Source: WHO and UNAIDS. 1999. *HIV in Pregnancy: A Review*, pp. 27-31. Geneva, Switzerland.



Benefits of Voluntary HIV Counseling and Testing

continued

- Provides the opportunity to implement strategies that attempt to prevent transmission to the child
- Can inform partner and enable him to get counseling and testing
- Women can take precautions to prevent transmission to partners
- *If the HIV test is negative*, the woman can be guided in appropriate HIV prevention

Source: WHO and UNAIDS 1999.

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Source: WHO and UNAIDS. 1999. *HIV in Pregnancy: A Review*, pp.27-31. Geneva, Switzerland.



Syphilis

- ◆ Maternal-fetal transmission may be as high as 80%.
- ◆ Incidence of adverse effects on the fetus/infant due to untreated maternal syphilis reported in some studies was:
 - ◆ Spontaneous abortion – 20%
 - ◆ Perinatal death – 30%
 - ◆ Congenital syphilis – 25%

Source: WHO 1991.

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Source: World Health Organization Programme of Maternal and Child Health and Family Planning Unit. 1991. *WHO Consultation on Maternal and Perinatal Infections, 28 November – 2 December 1988 report*. WHO/MCH/91.10. WHO: Geneva, Switzerland.



Syphilis *continued*

- ◆ A study in Zambia found syphilis to be the single most common cause of fetal wastage. The adverse outcomes of syphilis were halved by a fairly incomplete program of screening and treatment.

Sources: Hira et al 1990; Tinker and Koblinsky 1993.

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Sources: Hira SK et al. 1990. Syphilis intervention in pregnancy: Zambian demonstration project. *Genitourinary Medicine* 66(3): 159-164; Tinker A and MA Koblinsky. 1993. *Making Motherhood Safe*, pp. 99-100, World Bank: Washington, DC.



Syphilis *continued*

- ◆ Even where prevalence is relatively low (i.e., as in most industrialized countries) an antenatal syphilis screening program is a cost-effective intervention.
- ◆ Initiation of treatment should occur at the same visit as the screening.

Source: Wang and Smaill 1989.

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Source: Wang E and F Smaill. 1989. Infection in pregnancy, in *Effective Care in Pregnancy and Childbirth*. Chalmers I, MW Enkin and MJNC Keirse (eds), pp.534-564. Oxford University Press: Oxford, UK.



Tuberculosis

- ◆ Infants born to women with tuberculosis (TB) have an increased risk of morbidity and mortality in the neonatal period.

Source: Figueroa-Damian and Arredondo-Garcia 2001.

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Source: Figueroa-Damian R and JL Arredondo-Garcia. 2001. Neonatal outcome of children born to women with tuberculosis. *Archives of Medical Research* 32(1): 66-69.



Severe anemia

- ◆ Mild or moderate anemia is not correlated with adverse pregnancy outcomes
- ◆ Severe anemia, however, (hgb <7 g/dL or hct <20%) is associated with increased preterm delivery, inadequate intrauterine growth, increased perinatal mortality and increased maternal mortality.

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Sources: The LINKAGES Project. 2000. *Maternal Nutrition: Issues and Interventions*. A computer-based slide presentation for advancing maternal nutrition. Academy for Educational Development: Washington, DC; Stoltzfus RJ and ML Dreyfuss. 1998. *Guidelines for the Use of Iron Supplements to Prevent and Treat Iron Deficiency Anemia*. INACG/WHO/UNICEF: Washington, DC.



Severe anemia *continued*

- ◆ Providers can screen for anemia by
 - Hemoglobin (hgb) by thin film/smear
 - Hematocrit (hct) test
 - Hemoglobin Color Scale, or
 - Clinical observation of the inferior conjunctiva of the eye, the nail beds and the palm. If any of these are pale, the woman is severely anemic.

Other symptoms include shortness of breath and signs of heart failure.



Vaginal Bleeding

Most commonly caused by

- ◆ Abortion (threatened, inevitable, incomplete), hydatidiform mole or ectopic in early pregnancy
- ◆ Abruptio or placenta previa in later pregnancy
- ◆ Cervicitis anytime during pregnancy



Pre-Eclampsia/Eclampsia

- ◆ Hypertension, proteinuria and edema are signs, not diseases. These signs can be used for screening (although few sites have urine dipsticks).
- ◆ Chronic hypertension without proteinuria is not correlated with poor pregnancy outcome.
- ◆ 50 to 80% of pregnant women have dependent edema; 85% of women with pre-eclampsia/eclampsia have edema. Although dependent edema is normal in 50 to 80% of women, generalized edema is not.

Sources: Carroli, Rooney and Villar 2001; McDonagh 1996; Enkin et al 2000.

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Sources: Carroli G, C Rooney and J Villar. 2001. How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence, in *Paediatric and Perinatal Epidemiology* 15 (Supp.1): 1-42; McDonagh M: 1996. Is antenatal care effective in reducing maternal morbidity and mortality? *Health Policy and Planning* 11(1): 1-15; Enkin M et al. 2000. *A Guide to Effective Care in Pregnancy and Childbirth*, 3rd ed, p. 71. Oxford University Press: Oxford, UK.



Tetanus Toxoid

- ◆ **Tetanus toxoid is**
 - ◆ An effective, stable, cheap toxoid which has been available for > 50 years and is produced in many developing countries.
 - ◆ Effective in preventing neonatal tetanus (NNT), which causes approximately half a million deaths/year) and maternal tetanus, which is estimated to cause 30,000 deaths annually.

Sources: Fauveau V et al 1993; Bennett JV 2000.

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Sources: Fauveau V et al. 1993. Maternal tetanus: Magnitude, epidemiology, and potential control measures. *International Journal of Gynecology and Obstetrics* 40(1): 3-12; Bennett JV. 2000. Memo from author, *The role of topical antimicrobials*, to persons interested/involved in control of neonatal tetanus (NNT), 14 February.



Iron Deficiency

- ◆ Globally among all populations, iron deficiency (and its manifestation in anemia) is the single most prevalent nutrient deficiency condition. The World Health Organization (WHO) estimates put anemia prevalence at 52% among pregnant women.

Source: MotherCare, John Snow, Inc. 2000.

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Source: MotherCare, John Snow, Inc. (JSI). September 2000. *Issues in Programming for Maternal Anemia*. MotherCare/JSI: Arlington, Virginia.



Iron Folate Supplements

- ◆ The International Nutritional Anemia Consultative Group, WHO and UNICEF have endorsed the following guidelines:
 - All women should consume daily iron folate supplements for 6 months during pregnancy.
 - Where anemia prevalence is <40%, women should receive supplements of 60 mg iron and 400 micrograms of folate
 - In areas where anemia prevalence is high among pregnant women ($\geq 40\%$), women should continue the same dosage for 3 months into postpartum.

Sources: Stoltzfus and Dreyfuss 1998; McDonagh 1996.

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Sources: Stoltzfus RJ and ML Dreyfuss. 1998. *Guidelines for the use of iron supplements to prevent and treat iron deficiency anemia*. INACG/WHO/UNICEF: Washington,DC; McDonagh M: 1996. Is antenatal care effective in reducing maternal morbidity and mortality? *Health Policy and Planning* 11(1): 1-15.



Malaria

- ◆ **Malaria** – pregnancy is associated with increased susceptibility to *P. falciparum*
- ◆ The case fatality rate for cerebral malaria in pregnant women approaches 50%.

Source: Looareesuwan S et al 1985, in WHO 1991.

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Source: Looareesuwan S et al. 1985. Quinine and severe falciparum malaria in late pregnancy. *The Lancet* 2(8445): 4-8, in *WHO Consultation on Maternal and Perinatal Infections, 28 November – 2 December 1988 report*. World Health Organization Programme of Maternal and Child Health and Family Planning Unit. WHO/MCH/91.10. 1991, pp.45-53. WHO: Geneva, Switzerland.



Malaria *continued*

- ◆ The Cochrane database reviewed 15 trials and concluded that drugs given routinely during pregnancy for malaria reduce the incidence of low birth weight and anemia.



Malaria *continued*

A Kenya trial shows that intermittent treatment with SP (sulphadoxine-pyrimethamine) is safe and effective for:

- ◆ Preventing malaria in the mother
- ◆ Preventing harmful consequences to the fetus that may result from placental malaria

Source: Parise et al 1998.

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Source: Parise ME et al. 1998. Efficacy of sulfadoxine-pyrimethamine for prevention of placental malaria in an area of Kenya with a high prevalence of malaria and human immunodeficiency virus infection. *American Journal of Tropical Medicine and Hygiene* 59(5): 813-822.



Hookworms can contribute significantly to anemia

- ◆ Hookworms are estimated to infect 1 billion people worldwide, including approximately 44 million pregnant women. Prevalance rates vary from 10 to 20% in dry areas to more than 80% in rural areas in the wet, humid tropics.
- ◆ From an analysis of studies in Nepal (pregnant women) and Zanzibar (non-pregnant women), it is estimated that eradication of hookworms in the study population could prevent 41 to 56% of moderate to severe anemia.

Source: Stoltzfus RJ et al 1997.

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Source: Stoltzfus RJ et al. 1997. Hookworm control as a strategy to prevent iron deficiency. *Nutrition Reviews* 55(6): 223-232.



Iodine

- ◆ Iodine deficiency is associated with neonatal deaths, stillbirths and abortions. Iodine deficiency during pregnancy, when severe, will result in growth retardation, brain damage, mental retardation, increased perinatal mortality and other defects.
- ◆ Iodine supplementation is a very low-cost, effective nutritional intervention.
- ◆ Iodizing salt is an effective public health measure for preventing iodine deficiency

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Source: The LINKAGES Project. 2000. *Maternal Nutrition: Issues and Interventions*. A Computer-based slide presentation for advancing maternal nutrition. Academy for Educational Development: Washington, DC.



Vitamin A

- ◆ Can be found in foods such as carrots, eggs, fish oil, liver and broccoli
- ◆ High doses of vitamin A can be unsafe during the first two months of pregnancy, but it is safe to give as much as 10,000 IU daily at any time during pregnancy

Sources: Nutrition and Micronutrients in Pregnancy; IVACG 1998

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Sources:

Nutrition and Micronutrients in Pregnancy: Advances in Maternal and Neonatal Health.

<http://www.reproline.jhu.edu/english/2mnh/2ppts/nutrition/nutrnpng.htm>;

International Vitamin A Consultative Group (IVACG). 1998. *IVACG Statement: Safe Doses of Vitamin A During Pregnancy and Lactation*. IVACG: Washington, DC.



Vitamin A *continued*

- ◆ In Nepal, Vitamin A supplementation of 23,300 IU on a weekly basis to nearly 45,000 women of reproductive age over a 3.5 year period was associated with a 40% decrease in maternal mortality.

Source: Nutrition and Micronutrients in Pregnancy

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Source: Nutrition and Micronutrients in Pregnancy: Advances in Maternal and Neonatal Health.
<http://www.reproline.jhu.edu/english/2mnh/2ppts/nutrition/nutrnpng.htm>