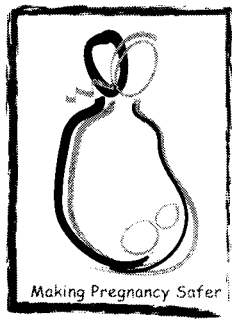





WHO Antenatal Care Randomized Trial: Manual for the Implementation of the New Model



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*UNDP/UNFPA/WHO/World Bank Special Programme of Research,
Development and Research Training in Human Reproduction*
Department of Reproductive Health and Research 
Family and Community Health
World Health Organization, Geneva, 2002

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Preface

Most of the antenatal care models currently in use around the world have not been subjected to rigorous scientific evaluation to determine their effectiveness. Despite a widespread desire to improve maternal care services, this lack of “hard” evidence has impeded the identification of effective interventions and thus the optimal allocation of resources. In developing countries, routinely recommended antenatal care programmes are often poorly implemented and clinical visits can be irregular, with long waiting times and poor feedback to the women.

To address this paucity of information, the UNDP/UNFPA/WHO/World Bank Special Programme for Research, Development and Research Training in Human Reproduction (HRP) implemented a multicentre randomized controlled trial that compared the standard “Western” model of antenatal care with a new WHO model that limits the number of visits to the clinic and restricts the tests, clinical procedures and follow-up actions to those that have been proven by research evidence to improve outcomes for women and newborns. The results of this trial showed that there were no significant differences between the new and standard model in terms of severe anaemia, pre-eclampsia, urinary-tract infections or low-birth-weight infants. Similarly, there were no significant differences in secondary outcomes for either women or infants, including the rates of eclampsia and maternal and neonatal death.

This manual describes the basic component of the new WHO antenatal care model. It provides detailed instructions on how to conduct the four-visit schedule of the basic component of the new WHO model. It includes a classifying form for easy assessment of a woman’s eligibility for the basic component, and provides a checklist of activities that are to be performed throughout the four-visit schedule.

It is important to emphasize that the basic component of the new WHO antenatal care model is intended only for the management of pregnant women who do not have evidence of pregnancy-related complications, medical conditions or major health-related risk factors. For the management of women who have such conditions, health providers are advised to follow the recommended established procedures of their clinic or hospital. The clinics or hospitals that do not have established procedures for women with such conditions, or that wish to update the ones they currently have, can use *The WHO Reproductive Health Library* to identify evidence-based interventions.

Lastly, in line with WHO's commitment to the principles of evidence-based medicine, this manual will be updated periodically to include any pertinent scientific evidence that becomes available.

1. Introduction

The consequences of failing to provide good maternal and perinatal care can be seen in the disturbing statistics of maternal and neonatal morbidity and mortality for developing countries. Traditionally, antenatal care (ANC) programmes have been recommended for developing countries along the lines of those used in developed countries, with only minor adjustments for local conditions. Many of the components of these antenatal programmes have not been subjected to rigorous scientific evaluation to determine their effectiveness. Despite a widespread desire to improve maternal care services, the lack of “hard” evidence has impeded the identification of effective interventions and thus the optimal allocation of resources. In developing countries these programmes are often poorly implemented and clinical visits can be irregular, with long waiting times and poor feedback to the women.

To address this paucity of information, the UNDP/UNFPA/WHO/World Bank Special Programme for Research, Development and Research Training in Human Reproduction (HRP) implemented a multicentre randomized controlled trial that compared the standard “Western” model of antenatal care with a new WHO model that limits the number of visits to the clinic and restricts the tests, clinical procedures and follow-up actions to those that have been shown to improve outcomes for women and newborns. The results of the trial showed that there were no significant differences between the new and standard model in terms of severe anaemia, pre-eclampsia, urinary-tract infections or low-birth-weight infants. Similarly, there were no significant differences in secondary outcomes for either women or infants, including the rates of eclampsia and maternal and neonatal death. Moreover, both the women and providers were generally satisfied with the new WHO model.

This manual is one component of the global WHO effort to improve maternal health and should be used in conjunction with other WHO materials on maternal health. It describes the basic component of the new WHO antenatal care model. It includes only those evaluations and interventions that have been proven to be effective in randomized controlled trials. It provides detailed instructions on how to conduct the four-visit schedule of the basic component of the new WHO antenatal care model. While some of the evaluations and interventions may be undertaken by formally trained midwives, nurses and medical assistants, other elements require the skills of a qualified physician for execution and interpretation. This, of course, does not preclude the active participation of obstetricians and gynaecologists in the implementation of the new WHO model at any point during a patient’s pregnancy (1). Therefore, in this manual the term health care provider is used as a generic term for the implementation of the basic component of the manual.

References to specific tests and procedures in the manual may be followed by the abbreviation “[RHL]” or “[CL]”. These abbreviations refer to *The WHO Reproductive Health Library* and *The Cochrane Library*, respectively. These abbreviations are intended to refer the reader to more in-depth information about specific topics in those electronic databases. For example, when a health practitioner is determining uterine height values during the first visit of the basic component, “[RHL]” following the text indicates that additional information on this topic is available in The WHO Reproductive Health Library.

IMPORTANT NOTE

It is important to note that the basic component of the new WHO model is intended only for the management of pregnant women who do not have evidence of pregnancy-related complications, medical conditions or major health-related risk factors. For the management of women who have such conditions, health providers are advised to follow the recommended established procedures of their clinic or hospital for medical or pregnancy-related conditions; detailed instructions on how to manage these pregnant women are not given here. It is recommended that all clinics and hospitals should have a special protocol for medical and pregnancy-related conditions. Where such established procedures do not exist, local health authorities are advised to develop them. Authorities, hospitals or clinics wishing to prepare such protocols are referred to a summary of evidence related to antenatal care and perinatal health published in references 2, 3, and 4 as well as the extensive literature available in RHL (5) and CL (6). As RHL and CL are updated every year, they can be used to keep the protocols up to date. It is important to recognize that a functioning health system—with locally organized systems for logistics and supplies—would be needed for the successful implementation of this model.

2. Evidence

This section presents a summary of the design of the WHO antenatal care randomized trial (7) and its main results. Also summarized are the results from a 2001 systematic review of the available scientific evidence on models of ANC (including the model tested in the WHO antenatal care randomized trial) that had a lower number of antenatal visits than the standard model (8, 9).

2.1 The WHO multicentre trial

The hypothesis tested was that a new WHO model of antenatal care—based upon components scientifically proven to improve maternal, perinatal, and neonatal outcomes—would be as effective as the standard model in terms of specified maternal and perinatal end-points among singleton pregnancies, cost, and acceptability to women and providers (7, 10).

Fifty-three antenatal care clinics (in Rosario, Argentina; Havana, Cuba; Jeddah, Saudi Arabia; and in the province of Khon Kaen, Thailand) were randomly assigned to provide either the new WHO model or the standard model currently in use. Twenty-seven clinics provided the new WHO model and 26 clinics provided the standard model. In total, 24 678 women were enrolled over an 18-month period between 1996 and 1998. Women enrolled in the new WHO model were classified on the basis of their obstetric and clinical histories. Those who did not require special treatment or assessment were offered the basic component of the new WHO model, while those deemed at higher risk were given the usual care for their condition. Throughout the trial, an independent data-safety monitoring committee reviewed monthly any incidents of maternal or fetal death, or eclampsia (11). This committee decided also to review any primary outcomes of the new WHO model that differed from those of the standard model by more than 20%. Rules for withdrawal of clinics for non-compliance or low recruitment rates were also adopted, but none of the 53 clinics were withdrawn during the study (11).

In the standard model currently in use, women made visits to the clinics once a month for the first six months of pregnancy, once every 2–3 weeks for the next two months, and then once a week until delivery. In this scenario, a woman would have about 12 visits to the clinic during her pregnancy. In the standard model women were routinely screened with urinary tests for proteinuria and infections, and with blood tests for syphilis, haemoglobin measurements and blood-group typing (12).

In the new WHO model, women were evaluated on their first visit to the clinic to see if they required special care for existing medical conditions. Those requiring special care were not eligible for the basic component of the new

Best reproductive health practices

WHO model; they received treatment for their specific condition but were still included in the intervention group. Women considered not to be at-risk or having existing medical conditions were offered the basic component of the new WHO model. Activities in the basic component of the new WHO model included: screening for health conditions likely to increase the risk of specific adverse outcomes; therapeutic interventions known to be beneficial; and alerting pregnant women to emergencies and instructing them on appropriate responses. Clinics employing the new WHO model were provided with the resources necessary to implement these activities.

The primary maternal outcome monitored was a maternal morbidity index which included proteinuric pre-eclampsia or eclampsia up to 24 hours of delivery; severe postpartum anaemia (<90 g/l of haemoglobin); and treated urinary-tract infection or pyelonephritis. For fetuses, the outcome was low birth weight (<2500 g). The trial also examined the cost-effectiveness of the new WHO model as well as women's and providers' evaluations (7, 10). Health providers' costs per pregnancy were calculated for clinics in Cuba and Thailand, as were the costs borne by women associated with attending the clinics (13). The views of women and providers about the new WHO model were assessed by closed-ended questionnaires. In total, 790 women in the new WHO model and 748 women in the standard model were assessed (14).

Women attending clinics randomized to the new WHO model had a median of five visits while those in the standard ANC model had a median of eight visits. Although women in the new WHO model were referred to higher levels of care more often than those in the standard model (13.4% vs. 7.3%), the rates of hospital admission, diagnosis and length of stay were similar between groups. The rates of low birth weight (LBW), severe postpartum anaemia and urinary-tract infections were similar between the two groups. Pre-eclampsia was slightly more frequent in women in the new WHO model, 1.7% versus 1.4%, but pregnancy-induced hypertension was lower (3.4% versus 5.0%) as was hypertension with referral or treatment (2.3% versus 3.9%). The rates for eclampsia and hospital admissions for pre-eclampsia were similar in both groups. The upper 95% confidence interval of the adjusted odds ratio for LBW was 1.15, implying that with 95% confidence, the risk of LBW is not increased by more than 15%. There were minimal differences between groups for several maternal, fetal and neonatal secondary outcomes of morbidity and mortality. Subset and efficacy analyses did not suggest any pattern in favour of either model.

Women in both arms of the trial were, in general, equally satisfied with the care received, although women in the new WHO model expressed some concern with the timing of visits. Providers did not show any important resistance to the new WHO model. The evaluation of the economics of the new WHO model showed that there is no cost increase and in some settings the new

WHO model decreased cost. Interpretation of the findings was that providing routine ANC following the new WHO model should produce similar maternal and perinatal outcomes as the standard model currently in use. The new WHO model may be implemented without major resistance from women and providers and may reduce cost (7).

2.2 The WHO systematic review of randomized controlled trials

A systematic review of randomized controlled trials that evaluated the effectiveness of different models of antenatal care was conducted by WHO in 2001 (8, 9). This review sought to test the hypothesis that an ANC model with a reduced number of visits, with or without goal-oriented clinical tests and interventions, was as effective as the standard model in terms of clinical outcomes, perceived satisfaction and costs. For women, the outcomes selected for comparison were pre-eclampsia, urinary-tract infection, postpartum anaemia and maternal mortality. Low birth weight and perinatal mortality were chosen as fetal and neonatal outcomes. Measures of women's satisfaction with care and cost-effectiveness were also considered.

Seven randomized controlled trials were identified in which a model based on a reduced number of antenatal visits was compared to the standard "Western" model. A total of 57 418 women had participated in these studies: 30 799 in the intervention group, of whom 26 619 had been followed-up through the entire pregnancy, and 26 620 in the control group, of which outcome data were available for 25 821. There was no difference between the two models with respect to pre-eclampsia, urinary-tract infection, postpartum anaemia and maternal mortality. Also, with respect to low birth weight and perinatal mortality the two models were similar. Some women in the studies, especially those in developed countries, expressed dissatisfaction with the reduced number of antenatal visits. The cost of the models with a reduced number of antenatal visits was equal to or less than the standard model.

Based on these results (8, 9) and the results of the WHO antenatal care randomized trial (7), it was concluded that models with a reduced number of antenatal visits could be introduced—in both developed and developing countries—into clinical practice without any risk of adverse consequences to the woman or the fetus.

3. Principles underlying the new WHO antenatal care model

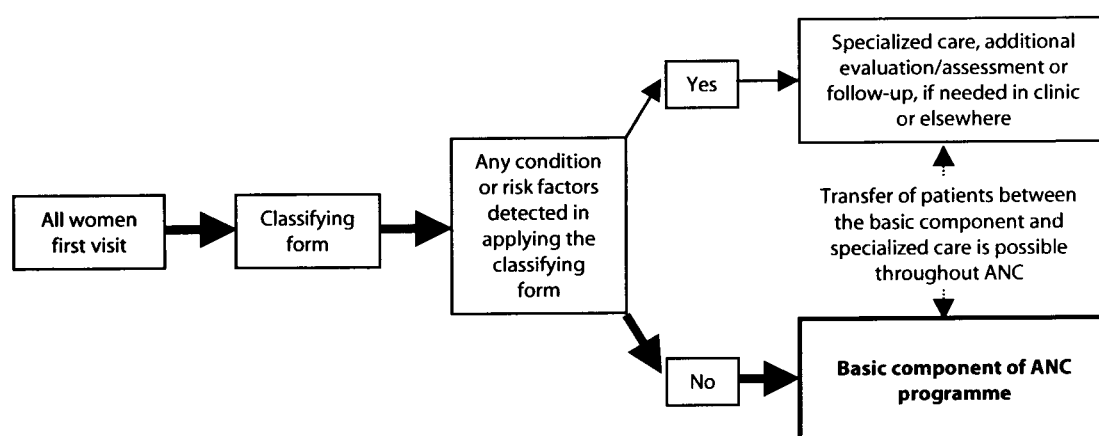
The new WHO antenatal care model tested in the randomized controlled trial was based on the following principles:

1. An antenatal care model should include a simple form that can be used easily to identify women with special health conditions and/or those at risk of developing complications; such women need to be referred to a higher level of care.
2. The identification of women with special health conditions or risk factors for complications should be done very carefully. Such women should be referred to higher levels of care only when the higher levels of care are known to have the expertise to deal with their specific health care needs.
3. Health care providers should make all pregnant women feel welcome at their clinic. The opening hours of clinics providing ANC should be as convenient as possible for women to come to the clinic. It has been shown that the number of women seeking antenatal care at clinics increases proportionally with increases in hours of operation of those clinics. Health care providers should make every effort to keep their appointments with women in order to reduce patient waiting time. However, women who come without an appointment should not be turned away even when there is no emergency. As far as possible, any required interventions (for treatment) or tests should be done at the women's convenience, for example, on the same day of the woman's visit.
4. Only examinations and tests that serve an immediate purpose and that have been proven to be beneficial should be performed. If, for example, there is justification for performing a specific test only once during pregnancy, it should be performed at the most appropriate time, i.e. when an intervention is possible in case the test result is abnormal.
5. Whenever possible, rapid and easy-to-perform tests should be used at the antenatal clinic or in a facility as close as possible to the clinic. When test results are positive (e.g. positive for syphilis), treatment should be initiated at the clinic the same day.

4. Overview of the new WHO antenatal care model

At the outset, the new WHO antenatal care model segregates pregnant women into two groups: those eligible to receive routine ANC (called the **basic component**); and those who need special care based on their specific health conditions or risk factors (Figure 1). Pre-set criteria are used to determine the eligibility of women for the basic component. The women selected to follow the basic component are considered not to require any further assessment or special care at the time of the first visit regardless of the gestational age at which they start the programme. The remaining women are given care corresponding to their detected condition or risk factor. The women who need special care will represent, on average, approximately 25% of all pregnant women initiating antenatal care.

Figure 1: The new WHO antenatal care model



It is likely that clinics will already have some sort of risk-scoring form that attempts to identify pregnant women at risk of complications in pregnancy or childbirth. This form will have to be replaced by the **classifying form** (Figure 2) of the new WHO model. This classifying form is used at the first antenatal visit to the clinic to decide which women will follow the basic component of the new WHO model and which will require special care. The format of the form can be adapted to the format of medical records in use in the clinic, but its contents should remain unchanged. The form contains 18 checklist questions that require binary responses (yes/no). They cover the patient's obstetric history, their current pregnancy and general medical conditions. Women who answer 'yes' to any of the 18 questions would not be eligible for the basic component of the new WHO antenatal care model; they should receive care corresponding to the detected condition.

Figure 2: CLASSIFYING FORM

Criteria for classifying women for the basic component of the new antenatal care model

Name of patient: _____	Clinic record number:	<table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> <td style="width: 12.5%;"></td> </tr> </table>								
Address: _____	Telephone:	_____								
INSTRUCTIONS: Answer all of the following questions by placing a cross mark in the corresponding box.										
OBSTETRIC HISTORY	No	Yes								
1. Previous stillbirth or neonatal loss?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
2. History of 3 or more consecutive spontaneous abortions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
3. Birthweight of last baby < 2500g?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
4. Birthweight of last baby > 4500g?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
6. Previous surgery on reproductive tract? (Myomectomy, removal of septum, cone biopsy, classical CS, cervical cerclage)	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
CURRENT PREGNANCY	No	Yes								
7. Diagnosed or suspected multiple pregnancy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
8. Age less than 16 years?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
9. Age more than 40 years?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
10. Isoimmunization Rh (-) in current or in previous pregnancy?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
11. Vaginal bleeding?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
12. Pelvic mass?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
13. Diastolic blood pressure 90mm Hg or more at booking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
GENERAL MEDICAL	No	Yes								
14. Insulin-dependent diabetes mellitus?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
15. Renal disease?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
16. Cardiac disease?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
17. Known 'substance' abuse (including heavy alcohol drinking)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
18. Any other severe medical disease or condition?	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Please specify _____ _____										
A "Yes" to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care model.										
Is the woman eligible?	(circle) NO	YES								
If NO, she is referred to _____										
Date _____	Name _____	Signature _____								
(staff responsible for ANC)										

It is possible that a woman who is initially referred to a higher level of care because of a condition identified in the classifying form is subsequently considered suitable to follow the basic component of the new WHO model. In such a situation, the woman would have to undergo all the activities included in the basic component that correspond to her fetus's gestational age. In addition, she would have to undergo all activities that she missed owing to her late entry into the basic component that were not performed during her visit(s) to the higher level of care.

The activities included in the basic component fall within three general areas:

- screening for health and socio-economic conditions likely to increase the possibility of specific adverse outcomes;
- providing therapeutic interventions known to be beneficial; and
- educating pregnant women about planning for safe birth, emergencies during pregnancy and how to deal with them.

The activities distributed over the four visits are presented in the **basic component checklist** (Figure 3). This checklist should be used to record tests and interventions performed at each ANC visit and should be incorporated into the medical records for each patient. The items in the list should be checked off as each listed activity is completed. From the checklist any health provider can determine quickly whether the recommended activities have been performed for each visit. Results of tests or treatments recommended should be recorded in the clinic's medical records as is normally done. The checklist is not intended to replace the clinic's medical records. Rather, it is designed to serve as a reminder of the activities that have been and must be performed. Therefore, there is no need to change the existing system for keeping medical records in the clinic. Services considering revising their records could incorporate the checklist within their home-based ANC card as well.

Every effort should be made by staff to ensure that clinics providing ANC according to the new WHO model can implement all the recommended activities. For example: multiple dipsticks for urine tests should be available at all clinics that do not have the means to carry out a routine urine culture; iron and folic acid tablets should be available to be given at low cost or free of charge to all women; antibiotic treatment (perhaps also given free of charge) should be provided to women detected with any condition that requires such treatment, e.g. asymptomatic bacteriuria or sexually transmitted infections. Other documents are being prepared to help achieve the implementation of these recommendations.

Women with risk factors for complications during delivery only (e.g. previous caesarean section) or those with a history of intrapartum complications, but with otherwise normal pregnancies, should follow the basic component of the

Figure 3: New WHO antenatal care model basic component checklist

Note: Mark the activities carried out as appropriate (unshaded boxes). (Use the closest gestational age at the time of visit.)

Name of patient _____ Address & telephone No. _____

Clinic record No. _____

FIRST VISIT for all women at first contact with clinics, regardless of gestational age. If first visit later than recommended, carry out all activities up to that time DATE: / /	Visits			
	1 st <12 wks	2 nd	3 rd	4 th
Classifying form which indicates eligibility for the basic component of the programme				
Clinical examination				
Clinically severe anaemia? Hb test				
Ob. exam: gestational age estimation, uterine height				
Gyn. exam (can be postponed until second visit)				
Blood pressure taken				
Maternal weight / height				
Rapid syphilis test performed, detection of symptomatic STIs				
Urine test (multiple dipstick) performed				
Blood type and Rh requested				
Tetanus toxoid given				
Fe / Folic acid supplementation provided				
Recommendation for emergencies / hotline for emergencies				
Complete antenatal card				
SECOND VISIT and SUBSEQUENT VISITS DATE: / /	Gestational age – approx. # of weeks			
		26wks	32wks	38wks
Clinical examination for anaemia				
Ob. exam: gestational age estimation, uterine height, fetal heart rate				
Blood pressure taken				
Maternal weight (only women with low weight at first visit)				
Urine test for protein (only nulliparous women / women with previous pre-eclampsia)				
Fe / Folic acid supplementation given				
Recommendation for emergencies				
Complete antenatal card				
THIRD VISIT: add to second visit DATE: / /				
Haemoglobin test requested				
Tetanus toxoid (second dose)				
Instructions for delivery/plan for birth				
Recommendations for lactation / contraception				
FOURTH VISIT: add to second and third visits DATE: / /				
Detection of breech presentation and referral for external cephalic version				
Complete ANC card, recommend that it be brought to hospital				

Staff responsible for antenatal care: Name _____

Signature _____

new ANC model. However, in such cases the place of delivery should be selected carefully; arrangements should be made in advance to ensure that appropriate facilities for delivery and possible complications will be available and that the woman will be able to reach them in a timely manner.

When necessary, women enrolled in the basic component of the new WHO model can be referred for specialized care, such as nutritional or psychiatric advice. It is considered that the basic component schedule will not need to be lengthened to accommodate these women. If such specialized care is necessary, the provision and format of such support should be left to specialists in these areas, while the women continue to follow the activities of the basic component.

5. The basic component of the new WHO antenatal care model

5.1 The first visit

5.1.1 General information

Ideally, the first visit should occur in the first trimester, around, or preferably before, week 12 of pregnancy. However, regardless of the gestational age at first enrolment, all pregnant women coming to the clinic for ANC will be enrolled and examined according to the norms for the first, and subsequent, visits. The first visit can be expected to take 30–40 minutes. As said before, here the emphasis is on determining patients' medical and obstetric history with a view to collecting evidence of the woman's eligibility to follow the basic component of the new WHO model. On average, approximately 75% of women are expected to follow the basic component. At this visit, while the case history conforms to, and even exceeds, traditional standards, the elements of the physical and biochemical examinations are fewer and less resource demanding than those commonly recommended in standard programmes.

Certain factors, such as a strenuous workload, can identify women who may be at risk for pregnancy complications. Work that is physically hard, requires lengthy standing positions, or entails exposure to teratogenic agents (heavy metals, toxic chemicals, ionizing radiation) could adversely affect maternal and neonatal outcomes. Women should be advised about these concerns and provided with the required documentation to reduce work if their jobs entail any of these elements. Other problems that need to be identified and for which support should be provided include: poverty, young age of the mother, women suffering domestic or gender-based violence, and women living alone.

Pregnancy tests should be provided at the clinic to those women who, during their first trimester, request reassurance that they are pregnant if there are no signs or symptoms of pregnancy. In countries where abortion is legal, women may request a pregnancy test if they are planning an abortion and do not trust a negative clinical judgement. Ideally, any specific test, treatment or follow-up should be performed at the ANC clinic, rather than at a referral facility.

Only one routine vaginal examination during pregnancy is recommended. This includes taking a sample for Pap smear [RHL] if the patient has not had it done elsewhere during the past two years. Identification and treatment of symptomatic sexually transmitted infections (STIs) should be done concomitantly [RHL]. The vaginal examination could be postponed until the second visit if the doctor or midwife feel that the woman or her partner would not accept this during the first visit. If vaginal examination is not at all accepted in routine ANC, referral for this procedure should be restricted to women with

a history of second trimester miscarriage, preterm birth, or symptoms of vaginal bleeding, discharge and/or abdominal pain.

In women who report bleeding in the present pregnancy, vaginal examination to determine the cause may be performed at the clinic during the first trimester only. Referral of the patient to a higher level of care should only be done at the physician's discretion. After the first trimester, vaginal examination in women who report bleeding should not be done at the clinic; instead, the patient should be immediately referred to a hospital to exclude placenta praevia or other pathology.

Routine iron supplementation should be given to all women [RHL]. Therefore, haemoglobin should be determined only at 32 weeks (the third visit) unless there are clinical signs of severe anaemia: pale complexion, fingernails, conjunctiva, oral mucosa, tip of tongue, and shortness of breath.

Individual interaction between the patient and health care provider is an essential element of the new ANC model. As the basic component of the new WHO model includes only four visits, sufficient time must be made during each visit for discussion of the pregnancy and related issues with the patient. Instruction should include general information about pregnancy and delivery as well as any specific answers to the patient's questions. Information conveyed in these visits should focus on signs of pregnancy-related emergencies and how to deal with them, i.e. if the patient is experiencing vaginal bleeding, who she should call and where she should go for assistance.

Written instructions should accompany all verbal advice. Simple written instructions in the local language should be available, even for illiterate women as family members or neighbours can often read. When necessary, materials appropriate for an illiterate audience should be available, such as simple pictures and diagrams describing the advice given at each visit.

Access to care in case of need is an essential element of the new WHO antenatal care model. Women who are following the basic component of the new WHO model may express anxiety because of the longer than expected spacing between visits [RHL]. Written and oral information should be provided to women regarding where to go and whom to contact, on a 24-hour basis, in case they have concerns or emergencies. If available, telephone numbers should also be provided. Women should be informed that available evidence demonstrates that the new WHO model is unlikely to jeopardize their health or that of their fetuses and that they may contact their health service provider at any time.

5.1.2 Content of the first visit

a) *Obtain information on:*

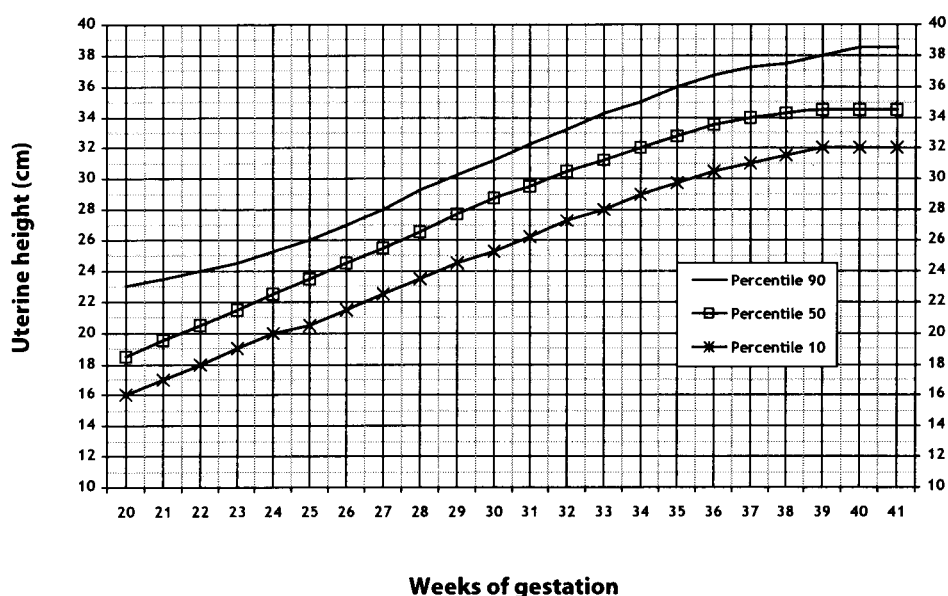
- Personal history (the following information has been found to be useful)
 - ▶ Name.
 - ▶ Age (date of birth).
 - ▶ Address and telephone number.
 - ▶ Marital status.
 - ▶ Tobacco use (smoking or chewing habit) or use of other harmful substances?
 - ▶ Housing: type, size, number of occupants.
 - ▶ Sanitary conditions: type of toilet, source of water.
 - ▶ Electricity or source of heating and lighting?
 - ▶ Cooking facilities?
 - ▶ Literate?
 - ▶ Educational level: primary, secondary, university.
 - ▶ Economic resources: employed? (salaried work or short-term?)
 - ▶ Type of work and position of patient and husband.
- Medical history
 - ▶ Specific diseases and conditions:
 - tuberculosis, heart disease, chronic renal disease, epilepsy, diabetes mellitus
 - STIs
 - HIV status, if known
 - other specific conditions depending on prevalence in study site (for example, hepatitis, malaria, sickle cell trait)
 - other diseases, past or chronic; allergy(-ies)
 - operations other than caesarean section
 - blood transfusions. Rhesus (D) antibodies
 - current use of medicines - specify
 - period(s) of infertility: when? duration, cause(s).
- Obstetric history
 - ▶ Number of previous pregnancies.
 - ▶ Date (month, year) and outcome of each event (live birth, stillbirth, abortion, ectopic, hydatidiform mole). Specify (validate) preterm births and type of abortion, if applicable and possible.
 - ▶ Birth weight (if known).
 - ▶ Sex.
 - ▶ Periods of exclusive breast-feeding: When? For how long?
 - ▶ Special maternal complications and events in previous pregnancies; specify which pregnancy (-ies), validate by records (if possible):
 - recurrent early abortion
 - induced abortion and any associated complications
 - thrombosis, embolus
 - hypertension, pre-eclampsia or eclampsia

- placental abruption
- placenta praevia
- breech or transverse presentation
- obstructed labour, including dystocia
- third-degree tears
- third stage excessive bleeding
- puerperal sepsis
- gestational diabetes.
- ▶ Obstetrical operations:
 - caesarean section (indication, if known)
 - forceps or vacuum extraction
 - manual/instrumental help in vaginal breech delivery
 - manual removal of the placenta.
- ▶ Special perinatal (fetal, newborn) complications and events in previous pregnancies; specify which pregnancy(-ies), validate by records (if possible):
 - twins or higher order multiples
 - low birth weight: <2500 g
 - intrauterine growth retardation (if validated)
 - rhesus-antibody affection (erythroblastosis, hydrops)
 - malformed or chromosomally abnormal child
 - macrosomic (>4500g) newborn
 - resuscitation or other treatment of newborn
 - perinatal, neonatal or infant death (also: later death)
 - history of present pregnancy
 - date of last menstrual period (LMP); certainty of dates (by regularity, accuracy of recall and other relevant information)
 - habits: smoking/chewing tobacco, alcohol, drugs (frequency and quantity)
 - any unexpected event (pain, vaginal bleeding, other: specify)
 - history of malaria attacks.

b) Perform physical examination

- Check for signs of severe anaemia: pale complexion, fingernails, conjunctiva, oral mucosa, tip of tongue and shortness of breath.
- Record weight (kilograms) and height (metres) to assess the mother's nutritional status (15).
- Measure blood pressure.
- Chest and heart auscultation.
- Measure uterine height (in centimetres) [RHL]. A chart should be used to determine uterine height (Figure 4 is an option if local standard chart is unavailable) [RHL].
- Consider vaginal examination (using a speculum), especially if any of the conditions listed under "Assess for referral" below are positive and indicate the need for performing a pap smear.

Figure 4: Uterine height values by weeks of gestation



Source: reference 16

c) Perform the following tests:

- Urine: multiple dipstick test for bacteriuria and test for proteinuria to all women [RHL].
- Blood: syphilis (rapid test) result while waiting in the clinic. If positive, treat [CL].
- Blood-group typing (ABO and rhesus) [CL].
- Haemoglobin (Hb): only if there are signs of severe anaemia.

d) Assess for referral

- Determine the expected date of delivery based on LMP and all other relevant information. Use 280-day rule (LMP + 280 days). Some women will refer to the date of the first missed period when asked about LMP, which may lead to miscalculation of term by four weeks.
- Determine whether the woman is eligible for the basic component of the new WHO model or if she is in need of special care and/or referral to a specialized clinic or hospital (use the classifying form, Figure 2).
- If the following conditions are diagnosed, proceed as recommended:

- ▶ Diabetes: refer; must have continued higher level care.
- ▶ Heart disease: refer; continue according to severity and specialist's advice.
- ▶ Renal disease: refer; continue according to specialist's advice.
- ▶ Epilepsy: give advice on continued medication.
- ▶ Drug abuse: refer for specialized care.
- ▶ Signs of severe anaemia and Hb <70 g/l: Increase iron dose [RHL], or refer if shortness of breath.
- ▶ HIV positive: counsel on safe sex practices as well as on risk to the baby and partner(s), and refer for treatment and prevention of mother-to-child transmission of HIV [RHL].
- ▶ Family history of genetic disease: refer.
- ▶ Primigravida: give advice on the benefits of institutional delivery.
- ▶ Previous stillbirth: refer; continue according to specialist's advice.
- ▶ Previous growth-retarded fetus (validated IUGR): refer to higher level of care and continue according to specialist's advice.
- ▶ Hospital admission for eclampsia or pre-eclampsia: refer; continue according to specialist's advice [RHL].
- ▶ Previous caesarean section: stress hospital delivery.
- ▶ High blood pressure (>140/90 mm Hg): refer for evaluation [RHL].
- ▶ Body Mass Index (BMI) (weight in kg/height m)²: refer for nutritional evaluation if BMI <18.5 or \geq 32.3 kg/m². Please note that these cut-off points may require local validation [RHL].
If a local weight-for-height reference chart is available, it can be incorporated into the clinical procedures. If this is not the case, pre-pregnancy maternal weight (using local cut-off points) is recommended for evaluation of the patient's nutritional status during the first antenatal visit.

e) Implement the following interventions:

- Iron and folate supplements to all women: one tablet of 60-mg elemental iron and 250 micrograms folate one–two times per day. If Hb <70 g/l: double the dose [RHL].
- If rapid test for syphilis is positive: treat [CL].
- Tetanus toxoid: first injection.
- In malaria endemic areas: sulfadoxine/pyrimethamine, three tablets once in second trimester and repeat in third trimester (check current recommendations for timing and dosage).
- Refer high-risk cases, according to diagnosis(es) made in Assess for referral above.

f) Advice, questions and answers, and scheduling the next appointment

- Give advice on safe sex. Emphasize the risk of acquiring or transmitting HIV or STIs without the use of condoms [CL].
- Advise women to stop the use of tobacco (both smoking and chewing), alcohol and other harmful substances [RHL].
- Advise on breast-feeding [CL]:
 - ▶ when to stop breast-feeding previous child.
 - ▶ when to begin breast-feeding the expected child.
- Give advice on whom to call or where to go in case of bleeding, abdominal pain and any other emergency, or when in need of other advice. This should be confirmed in writing in the antenatal card.
- Request the woman to record when she notes the first fetal movement.
- Give advice on birth plan, including special transport to delivery institution.
- Questions & answers: time for free communication.
- Advise the woman to bring her partner (or a family member or friend) to later ANC visits so that they can be involved in the activities and can learn how to support the woman through her pregnancy.
- Schedule appointment: second visit, at (or close to) 26 weeks: state date and hour. This should be written in the woman's antenatal card and in the clinic's appointment book.

g) Maintain complete records

- Complete clinic record.
- Complete home-based record [CL] or antenatal card. Give the record or ANC card to the patient and advise her to bring it with her to all appointments she may have with any health services.

5.2 The second visit

5.2.1 General information

The second visit should be scheduled close to week 26. It is expected to take 20 minutes. The examinations and tests are restricted to measuring blood pressure and uterine height, and performing a multiple dipstick test for bacteriuria. Testing for proteinuria should only be performed for nulliparous women and those women with a history of hypertension or pre-eclampsia/eclampsia. A blood test should be performed to determine haemoglobin if clinically indicated. Referral based on updated risk assessment is restricted to those who have developed significant signs or symptoms since the first visit. Depending on the symptoms and signs, a visit sooner than the regular third visit could be arranged for some women. Note that an unexpectedly large uterus (discovered through abdominal palpation and uterine height measurement) may indicate twins or a pathological condition and the woman should be evaluated at a higher level of care.

5.2.2 Contents of the second visit

a) Obtain information on:

- Personal history
 - ▶ Note any changes since first visit.
- Medical history
 - ▶ Review relevant issues of medical history as recorded at first visit.
 - ▶ Note intercurrent diseases, injuries, or other conditions since first visit.
 - ▶ Note intake of medicines, other than iron, folate.
 - ▶ Iron intake: check compliance.
 - ▶ Note other medical consultations, hospitalization or sick-leave in present pregnancy.
- Obstetric history
 - ▶ Review relevant issues of obstetric history as recorded at first visit.
- Present pregnancy
 - ▶ Record symptoms and events since first visit: e.g. pain, bleeding, vaginal discharge (amniotic fluid?), signs and symptoms of severe anaemia.
 - ▶ Other specific symptoms or events.
 - ▶ Note abnormal changes in body features or physical capacity (e.g. peripheral swelling, shortness of breath), observed by the woman herself, by her partner, or other family members.
 - ▶ Fetal movements: felt? Note time of first recognition in medical record.
 - ▶ Check-up on habits: smoking [CL], alcohol, other.

b) Perform physical examination

- Measure blood pressure.
- Uterine height values: record on graph (Figure 4).
- Generalized oedema.
- Other alarming signs of disease: shortness of breath, coughing, other.
- Vaginal examination: do only if not done at first examination. If patient is bleeding or spotting, do not perform vaginal examination; refer to hospital.

c) Perform the following tests:

- Urine: repeat multiple dipstick test to detect urinary-tract infection; if still positive after being treated at the first visit, refer to hospital [RHL]. Repeat proteinuria test only if woman is nulliparous or if she has a history of hypertension, pre-eclampsia or eclampsia in a previous pregnancy. Note: all women with hypertension in the present visit should have a urine test performed to detect for proteinuria.
- Blood: repeat Hb only if Hb at first visit (taken on medical indication) was below 70 g/l or signs of severe anaemia are detected on examination.

d) Assess for referral

- Reassess whether the woman can still follow the basic component of the new WHO model, based on evidence since first visit and observations at present visit.
- Unexpected symptoms: refer as required.
- Hb <70 g/l at first and present (second) visit: refer.
- If bleeding or spotting: refer as required.
- Evidence of pre-eclampsia, hypertension and/or proteinuria: refer to higher level of care or a hospital.
- Suspicion of fetal growth retardation (uterine height values below the 10th percentile—Figure 4): arrange referral to hospital for evaluation.
- Woman does not feel fetal movement: use hand-held Doppler for detection of fetal heart sound; if negative, refer to hospital.

e) Implement the following interventions:

- Iron: continue, all [RHL]. If Hb is <70 g/l, increase dosage of Fe. If with clinical symptoms of anaemia, refer.
- If bacteriuria was treated at first visit and test is still positive, refer [RHL].

f) Advice, questions and answers, and scheduling the next appointment

- Repeat all the advice given at the first visit.
- Questions & answers: time for free communication.
- Give advice on whom to call or where to go in case of bleeding, abdominal pain or any other emergency, or when in need of other advice. This should be confirmed in writing (e.g. on the antenatal card), as at first visit.
- Schedule appointment: third visit, at (or close to) 32 weeks.

g) Maintain complete records

- Complete clinic record.
- Complete home-based record or antenatal card. Give the record or ANC card to the patient and advise her to bring it with her to all appointments she may have with any health services.

5.3 The third visit**5.3.1 General information**

The third visit should take place in or around week 32 and is expected to take 20 minutes. If the second visit was missed, the third visit should also include all the activities of the second visit and the length should be extended as needed. The examinations and tests are restricted to measuring blood pressure, uterine height, performing a multiple dipstick test to detect bacteriuria, and haemoglobin for all. Testing for proteinuria should only be performed for nulliparous women and those with a history of hypertension, pre-eclampsia or eclampsia. Special attention should be directed toward discovery of twins during the external abdominal examination and uterine height measurement.

Referrals are based on symptoms and findings which require special intervention. For example, high haemoglobin (Hb >130 g/l) in absence of other symptoms may mean poor fetal growth, warranting an extra visit at week 36 to evaluate fetal growth or the need for referral. If at the same time, the uterine height distance is below expected or indicative of poor growth as evidenced by the chart curve, referral or hospitalization is indicated.

Some women will go into labour and deliver before the next scheduled visit. Therefore, extra attention must be paid in providing instructions and advice in the event labour starts (e.g. what to do in the event of abdominal pain or leaking of amniotic fluid)) and to ensure they have a skilled attendant for the birth. Written instructions should reconfirm the verbal advice, and plans for getting to a hospital should be reviewed.

The woman should also be encouraged to discuss birth spacing and contraceptive options with her partner and be encouraged to leave the ANC clinic with her preferred method of choice [RHL]. Waiting for a postpartum visit to talk about contraception may be too late! Still, the importance of a postpartum visit, including recommendations for lactation and contraception [RHL], should be stated in order to ensure that the woman is seen at the clinic within one week of delivery.

5.3.2 Contents of the third visit

a) Obtain information on:

- Personal history
 - ▶ Note any changes or events since second visit.
- Medical history
 - ▶ Review relevant issues of medical history as recorded at first and second visits.
 - ▶ Note intercurrent diseases, injuries or other conditions since second visit.
 - ▶ Note intake of medicines other than iron and folate.
 - ▶ Iron intake: compliance.
 - ▶ Note other medical consultations, hospitalization or sick-leave in present pregnancy.
- Obstetric history
 - ▶ Review relevant issues of obstetric history as recorded at first visit and as checked at second.
- Present pregnancy
 - ▶ Symptoms and events since second visit: abdominal or back pain (preterm labour?), bleeding, vaginal discharge (amniotic fluid?). Other specific symptoms or events.
 - ▶ Changes in body features or physical capacity, observed by the woman herself, her partner or other family members.
 - ▶ Fetal movements.
 - ▶ Check-up on habits: smoking, alcohol, other.

b) Perform physical examination

- Measure blood pressure.
- Uterine height values: record on graph (Figure 4).
- Palpate abdomen for detection of multiple fetuses.
- Fetal heart sounds: hand-held Doppler required only if no fetal movements are seen, the woman feels less fetal movement or if she requests it.
- Generalized oedema.
- Other alarming signs of disease: shortness of breath, cough, etc.
- If bleeding or spotting: refer.
- Breast examination.

c) Perform the following tests:

- Urine: repeat multiple dipstick test to detect urinary-tract infection; if still positive after being treated at a previous visit, refer to special unit in the clinic or a hospital. Repeat proteinuria test only if the woman is nulliparous

or she has a history of hypertension, pre-eclampsia or eclampsia in a previous pregnancy.

- Blood: Hb to all women.

d) Assess for referral

- Reassess risk based on evidence since the second visit and observations made at present visit.
- Unexpected symptoms: refer as required.
- If bleeding: refer as required
- Evidence of pre-eclampsia, hypertension and/or proteinuria: refer to special unit in the clinic, or a hospital.
- Suspicion of fetal growth retardation (uterine height values below expected or indicative of poor growth as evidenced by the chart curve): refer.
- Suspicion of twins: refer for confirmation and arrange delivery.
- If Hb continuously <70 g/l: refer.
- If Hb >130 g/l: new appointment no later than 36 weeks to check fetal growth, blood pressure, and the possibility of proteinuria. If at the new appointment abnormalities are detected in either fetal growth or blood pressure or if proteinuria is found: refer.

e) Implement the following interventions:

- Iron: continue, all. If Hb <70 g/l, refer.
- Tetanus toxoid: second injection.

f) Advice, questions and answers, and scheduling the next appointment

- Repeat advice given at first and second visits.
- Give advice on measures to be taken in case of (threatened) labour.
- Questions & answers: time for free communication.
- Reconfirm written information on whom to call and where to go in case of emergency or any other need.
- Plans to ensure transport is available in case of need during labour.
- Provide recommendations on lactation, contraception and the importance of the postpartum visit.
- Schedule appointment: fourth visit, at (or close to) 38 weeks.

g) Maintain complete records

- Complete clinic record.
- Complete home-based record or antenatal card. Give the record or ANC card to the patient and advise her to bring it with her to all appointments she may have with any health services.

5.4 The fourth visit

5.4.1 General information

The fourth should be the final visit of the basic component and should take place between weeks 36 and 38. At this visit, it is extremely important that women with fetuses in breech presentation should be discovered and referred for obstetric evaluation and external cephalic version [RHL]. An external cephalic version should be attempted at the hospital, but when pelvic-cephalo disproportion is suspected, elective caesarean section should be considered. All information on what to do, whom to call, and where to go (which health facility) when labour starts or in case of other symptoms should be reconfirmed in writing and shared with the patient, family members and/or friends of the patient.

Women should be advised that if they have not delivered by the end of week 41 (complete 41 weeks or 290 days) they should be advised to go directly to the hospital/maternity centre for evaluation and possible induction of labour by the best method available. This is recommended considering the unproven benefit of all methods of fetal surveillance for post-term pregnancy commonly used in prolonged pregnancies. The number of women who will not have delivered by the end of week 41, and to whom this would apply is estimated at between 5% and 10%. Although routine induction is not always recommended, available evidence demonstrates that induction of labour after 41 completed weeks is not associated with any major risks. Rather, it reduces the risk of meconium-stained amniotic fluid and perinatal death and does not increase caesarean section rates even in women with an unfavourable cervix [CL]. Furthermore, it could reduce the overall caesarean section rates if induction is correctly performed. The ANC clinic should coordinate this protocol with its referral hospitals. These referral centres should expect these consultations and treat women according to the protocol agreed upon by the ANC clinic and the referral centre.

The antenatal card should be completed during the fourth visit and returned to the woman. A copy should be also sent to the hospital where the delivery is planned. During this visit patient's should be again informed of the benefits of lactation and contraception, as well as the availability of contraceptive methods at the postpartum clinic.

5.4.2 Content of the fourth visit

a) Obtain information on:

- Personal information
 - ▶ Note any changes or events since the third visit.

- Medical history
 - ▶ Review relevant issues of medical history as recorded at first three visits.
 - ▶ Note intercurrent diseases, injuries or other conditions since third visit.
 - ▶ Note intake of medicines other than iron and folate.
 - ▶ Iron intake: compliance.
 - ▶ Note other medical consultations, hospitalization or sick-leave in present pregnancy, since the third visit.
- Obstetric history
 - ▶ Final review of obstetric history relevant to any previous delivery complications.
- Present pregnancy
 - ▶ Symptoms and events since third visit: pain, contractions (preterm labour?), bleeding, vaginal discharge (amniotic fluid?). Other specific symptoms or events.
 - ▶ Changes in body features or physical capacity, observed by the woman herself or by her partner, or other family members.
 - ▶ Fetal movements.

b) Perform physical examination

- Measure blood pressure.
- Uterine height values: record on graph.
- Check for multiple fetuses.
- Fetal lie, presentation (head, breech, transverse).
- Fetal heart sound(s): use hand-held Doppler only if no fetal movements are seen, the woman feels less fetal movement or if she requests it.
- Generalized oedema.
- Other signs of disease: shortness of breath, cough, etc.
- If bleeding or spotting: refer to hospital.

c) Perform the following tests:

- Urine: repeat multiple dipstick test to detect urinary-tract infection; if still positive after being treated at a previous visit, refer to hospital. Repeat proteinuria test only if the woman is nulliparous or she has a history of hypertension, pre-eclampsia or eclampsia in a previous pregnancy.

d) Assess for referral

- Reassess risk based on evidence since third visit and observations made at present visit.
- Unexpected symptoms: refer as required.
- If vaginal bleeding: refer.
- Evidence of pre-eclampsia: refer to special unit in the clinic or a hospital.
- Suspicion of fetal growth retardation [RHL] (uterine height values below expected): refer.

- Suspicion of twins: arrange for hospital delivery.
 - Suspicion of breech presentation: refer to evaluate external cephalic version. Hospital delivery mandatory.
- e) Implement the following interventions:*
- Iron: continue, all.
- f) Advice, questions and answers, and scheduling the next appointment*
- Repeat the advice given at previous visits.
 - Give advice on measures to be taken in case of the initiation of labour or leakage of amniotic fluid.
 - Give advice on breast-feeding.
 - Questions & answers: time for free communication.
 - Reconfirm written information on whom to call and where to go (place of delivery) in case of labour or any other need.
 - Schedule appointment: if not delivered by end of week 41 (state date and write it in the ANC card), go to hospital for check-up.
 - Schedule appointment for postpartum visit. Provide recommendations on lactation and contraception.
- g) Maintain complete records*
- Complete clinic record.
 - Complete home-based record or antenatal card. Give the record or ANC card to the patient and advise her to bring it with her to the hospital or to any additional appointments she may have with any health services.

5.5 The postpartum visit

Although a postpartum visit is universally recommended, it is seldom done in most developing countries. The importance of this visit should be stressed as short birth intervals and pregnant women with ages of less than 20 or more than 30 years have been demonstrated in developing countries to increase the risk of intrauterine growth retardation and prematurely born infants. The determinants of some pregnancy outcomes and the benefits of antenatal care may be seen only when they are part of a comprehensive programme for the postnatal period which includes a postpartum visit.

A special effort should therefore be made to schedule such a visit. It is expected that a good patient-provider relationship during antenatal care will contribute to better compliance. The visit should take place within one week of delivery and include activities aimed at the prevention of future unplanned pregnancies [CL]; reinforcement of breast-feeding [CL]; complete tetanus immunization for late attendants to ANC; and folate supplementation for women with previous neuro-tubal defective infants [CL]; continuation of iron supplementation for women who are anaemic, or with heavy blood loss in labour; prevention of infection; and finally planning any continued postnatal

surveillance, if required. No routine vaginal examination is recommended; it should only be conducted if there are clinical indications.

6. Late enrolment and missed visits

It is very likely that a good number of women will not initiate ANC early enough in pregnancy to follow the full basic component of the new WHO model presented above. As stated before, these women, particularly those starting after 32 weeks of gestation, should have in their first visit all activities recommended for the previous visit(s), as well as those which correspond to the present visit. It is expected, therefore, that a late first visit will take more time than a regular first visit.

Attendance on the part of the patient is a critical element of the basic component of the new WHO model, yet it is inevitable that some appointments will be missed. A formal system should be organized by clinics to determine the reason or reasons for missed appointments. The patient should be traced and another visit arranged, when appropriate. A visit after a missed appointment should include all the activities of the missed visit(s), as well as those that correspond to the present visit.

7. Special recommendations

7.1 Twins

Twin pregnancies pose serious risks to the woman and the fetuses. The risk of stillbirth is ten times higher in each twin fetus than in a singleton fetus. Neonatal mortality is also higher, mainly because 50% of twins are born preterm and many are growth retarded. Twin fetuses may suffer from discordant growth and twin-to-twin transfusion syndrome, sometimes in combination. These and other complications are more often seen in monozygotic twins. Triplets and higher order multiples are increasingly vulnerable. Women carrying twins more often develop anaemia, pre-eclampsia, hyperemesis and polyhydramnios, and will experience more peripartum complications. With advancing pregnancy they will be increasingly burdened by physical work. Sick-leave will relieve them of undue strain, but bed rest has not been shown to be beneficial [CL].

In the basic component of the new WHO antenatal care model, uterine height is the measure most likely to raise suspicion of twin pregnancy, besides abdominal palpation. Conception via in vitro fertilization (IVF) and embryo transfer increases the risk, but those women using such methods are more likely to seek care elsewhere.

As soon as a twin (or higher order) pregnancy is diagnosed or suspected, the woman should be referred to a specialist and no longer follow the basic component. Ideally, referral centres should be equipped with an ultrasound scanner for diagnosis and monitoring. Further antenatal care should be as advocated by the specialist obstetrician. Provision of care may then be shared between the primary care and referral centres.

Advice is crucial for women pregnant with twins. Preparing for labour and delivery at the hospital should involve prior contact with the obstetrical unit to prepare a plan for adequate and immediate transportation in case of labour or complications (e.g. passage of amniotic fluid or bleeding), and to emphasize that birth is likely to be preterm. The woman should note telephone numbers and her husband or relatives should be given appropriate advice, both verbally and in written form. Sick-leave during the third trimester should be considered, especially for women with physically strenuous work.

7.2 Spacing between visits

Timing of and spacing between the visits in the basic component were decided empirically based upon the results of the WHO antenatal care randomized controlled trial (7) [RHL].

Pregnancy-related disorders can begin any time between visits to the clinic, and intercurrent diseases may occur throughout pregnancy. It is considered that asymptomatic disorders occurring between the scheduled visits will not cause harm that could otherwise be alleviated. Such conditions, e.g. pre-eclampsia or impaired fetal growth, will be diagnosed or suspected at the next regular visit and dealt with appropriately. As previously stated, the pregnant woman should repeatedly be advised to seek care in case of unexpected symptoms, and be guaranteed easy 24-hour access to help and guidance, ideally from the ANC clinic. If this meets with practical obstacles outside of the clinic's working hours, the patient should be told where to seek help and provided with addresses and telephone numbers of other facilities, where appropriate. The husband, other family members or friends should receive the same information.

Pregnant women should be encouraged to seek ANC as early as possible and be given an appointment without undue delay. Disseminating the benefits of ANC should be a community commitment; they can be promoted through leaflets, newspapers, local radio or word of mouth. Some tests and interventions at the first visit must commence early to be fully effective (e.g. iron supplementation, treatment of syphilis, and malaria prophylaxis in endemic areas), and pregnancy dating may be more reliable if done early.

8. Conclusion

The results of the WHO antenatal care randomized trial and the systematic review of the scientific evidence on models of antenatal care utilizing a reduced number of visits, justifies the introduction of the new WHO model for general use. The new WHO model of antenatal care is not associated with increased risk for either women or infants. Additionally, it reduces the time and resources necessary for ANC by limiting the number of visits, clinical procedures and follow-up actions to those that have been proven to be effective in promoting positive maternal and neonatal outcomes.

It has been shown that the new WHO model is generally accepted by users and providers, does not increase cost, and in some settings decreases the costs associated with antenatal care services. Although providers are unlikely to achieve actual cost savings, resources such as staff and buildings, and the time of women and families, will be freed for extension of the service into more effective care provision or other activities.

In developing countries, the goal should be to extend antenatal coverage to all pregnant women using the model outlined in this manual. Certainly, all activities of the basic component should be available, including referral to specialized care for women with complications or emergencies. The new WHO model should also be supplemented with specific interventions (such as malaria control programmes or mother-to-child transmission of HIV prevention programmes) where needed.

In developed countries, each activity included in standard antenatal care should be scrutinized or tested for evidence of its effectiveness before being retained in the standard model. If this strategy is systematically applied, a simpler model with a reduced number of visits will be identified.

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Appendix

WHO Antenatal Care Trial Research Group

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