

We have invited select authorities to present background information on challenging clinical problems and practical information on diagnosis and treatment for use by practitioners.

Prediction and Early Detection of Preterm Labor

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Studies of cervical sonography, fetal fibronectin, and uterine contraction monitoring during pregnancy have improved our understanding of how preterm labor occurs, but their use in practice remains uncertain. This article reviews the use of these tests to improve the accuracy of diagnosis of preterm labor and to estimate the likelihood of preterm birth in women with historical risk factors. Because the clinical criteria for a diagnosis of preterm labor are inaccurate until labor is well established, over-diagnosis is common. A cervical length measurement of more than 30 mm or a negative fibronectin obtained from a patient with possible preterm labor can avoid over-diagnosis and unnecessary treatment. There is no role for routine use of either cervical sonography or fibronectin to screen pregnant women for preterm birth risk, but women thought to be at increased risk may be reassured by negative test results. Uterine contraction monitoring has low sensitivity for detecting women at risk of preterm birth. Current use of cervical length and fetal fibronectin in pregnancy is limited to situations where a negative result can avoid unnecessary interventions. (Obstet Gynecol 2003;101:402–12. © 2003 by The American College of Obstetricians and Gynecologists.)

Early detection of pregnant women who will deliver before term has been sought as an avenue to reduce the occurrence of prematurity-related perinatal morbidity and mortality. Preterm birth is associated with 75% of perinatal morbidity and mortality for infants born without congenital anomalies. Sequelae of preterm birth include cerebral palsy, developmental delay, visual and hearing impairment, and chronic lung disease. The rates

of preterm and low birth weight deliveries have actually increased in recent years despite widespread efforts to address the problem.

In 1997, 11.4% of births in the United States occurred before 37 weeks, up from 11.0% in 1996. The rate has increased by 20% since 1981, due in part to the increased number and rate of preterm births among multiple gestations. The rate of preterm birth in 1997 was 10.0% for singletons, 54.9% for twins, and 93.6% for higher order multiples. About 40% of preterm births follow preterm labor and 35% result from preterm prematurely ruptured membranes. The remaining 25% are due to medical or obstetric conditions such as hypertension, antenatal hemorrhage, or intrauterine growth restriction.¹

Early detection of preterm labor is difficult because initial symptoms and signs are often mild and may occur in normal pregnancies. Thus, many healthy women will report symptoms during routine prenatal visits, whereas others destined for preterm birth may dismiss the early warning signs as normal in pregnancy. The traditional criteria for preterm labor (persistent contractions accompanied by progressive cervical dilatation and effacement) are most accurate when contraction frequency is six or more per hour, cervical dilatation is 3 cm or more, effacement is 80% or more, membranes rupture, or bleeding occurs.^{2,3} When lower thresholds for contraction frequency and cervical dilatation and effacement (eg, cervical "change" by digital examination) are used, both sensitivity and positive predictive value for true preterm labor decline, and the rate of false positive diagnosis rises to as much as 40%.⁴ Other means have consequently been sought to detect preterm labor early. These include digital and ultrasound examination of the cervix, outpatient monitoring of uterine contractions, and detection of biochemical markers of preterm labor in blood, saliva, and cervicovaginal secretions. These tests have been evaluated as 1) means of identifying women with increased risk of preterm birth before clinical signs

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or symptoms occur and 2) part of the diagnostic process in women who present with possible preterm labor. The performance of each test varies according to its use to predict preterm birth in women without symptoms, or to detect preterm labor accurately in women with symptoms. This difference, a common source of confusion, occurs because the predictive value of any test always varies according to the prevalence of the condition or disease in the population. The term “population” refers not only to demographic characteristics or historical risk factors for preterm birth, but also to the presence or absence of symptoms.

PATHOPHYSIOLOGY OF PRETERM BIRTH

Preterm birth is the ultimate result of several different pathways that culminate in the initiation of labor before 37 weeks' gestation. It is useful to place preterm births in two broad categories—those that are obstetrically *indicated* (ie, when preterm delivery serves to benefit the mother or fetus) and those that are *spontaneous* (ie, when preterm delivery occurs in the apparent absence of maternal or fetal jeopardy).⁵ Because the clinical presentations may overlap, these categories should be kept in mind during the clinical evaluation of women with signs or symptoms of preterm labor. What is the cause of preterm contractions? Does the cause of labor carry a risk for mother or infant? Sometimes the answer is readily apparent—for example, when maternal bleeding from a possible abruption accompanies contractions. In others, the cause of labor is not evident initially, but may become so when the labor is difficult to stop or fetal status is compromised. This review will focus on spontaneous preterm birth.

Recent studies of the epidemiology and pathophysiology of preterm birth have identified four pathways leading to preterm labor and delivery⁶:

- 1) inflammation
- 2) decidual hemorrhage
- 3) uterine over-distention
- 4) premature activation of the normal physiologic initiators of labor

Inflammation is more often associated with preterm births before 32 weeks, whereas decidual hemorrhage may occur at any time. Uterine over-distention may accompany multifetal gestation, polyhydramnios, or a uterine anomaly. Premature activation of the normal maternal-fetal hypothalamic-pituitary-adrenal axis is typical of preterm labor after 32–34 weeks. Much of the data that underlie these observations have come from studies of markers for preterm delivery such as cervical ultrasound images,^{7–9} fetal fibronectin,^{8–10} the thrombin cas-

cade,^{11,12} and maternal salivary estriol¹³ measured in asymptomatic women with and without risk factors for preterm birth.

Ultrasound images of the cervix in pregnancy have shown that cervical effacement begins weeks before delivery, at about 32 weeks for term births and as early as 16–24 weeks for preterm births. Effacement begins at the internal cervical os and proceeds caudad through a process called funneling.¹⁴ This process is often well established before the external os dilates. Ziliani et al¹⁴ described the appearance of cervical effacement as seen by transvaginal sonography as a progression of the letters T, Y, V, and U to denote the relationship of the cervical canal to the lower uterine segment. Their concept is depicted in modified form in Figure 1.

The length of the cervical canal measured by ultrasound in the second and early third trimester ranges from 10 to 50 mm, the median (50th percentile) length is 35 mm, the tenth percentile is 25 mm, and the 90th is 45 mm.⁷ The risk of spontaneous preterm birth increases as the length of the cervix decreases across the entire range of cervical length. A cervical length at 22–24 weeks that is below 25 mm (the tenth percentile) is associated with a more than six-fold increase in preterm birth before 35 weeks relative to women whose cervical length is above the 75th percentile (Figure 2).⁷ Some of the range of cervical length is thought to be simply biologic. In other cases, women may experience early effacement or shortening as the result of inflammation due to hemorrhage or infection or, less commonly, to biophysical effects of uterine distention or subclinical contractions.^{8,9} This scenario is particularly associated with preterm births before 30–32 weeks, is more often followed by long-term morbidity for the infant, and is more likely to recur in subsequent pregnancies.⁸

Fibronectin, an extracellular matrix protein, acts as the “glue” that attaches the fetal membranes to the underlying uterine decidua.¹⁵ Fibronectin is often found in the cervicovaginal secretions before 16–18 weeks of pregnancy, and again at the end of normal pregnancy as labor approaches. It is not normally present in cervicovaginal secretions between 22 and 37 weeks. Fibronectin found in cervicovaginal secretions after 22 weeks is a marker of disruption of the decidual-chorionic interface, and has been associated with a six-fold increased risk of preterm birth before 35 weeks and a 14-fold increased risk of preterm birth before 28 weeks.^{8,10} Although fibronectin in the cervicovaginal secretions between 14 and 22 weeks has been considered to be normal, levels of fibronectin of 50 ng/mL or more in the early second trimester have been associated with an increased risk of preterm birth before 28 weeks.¹⁶ In contrast, preterm births after 32 to 33 weeks have been associated with

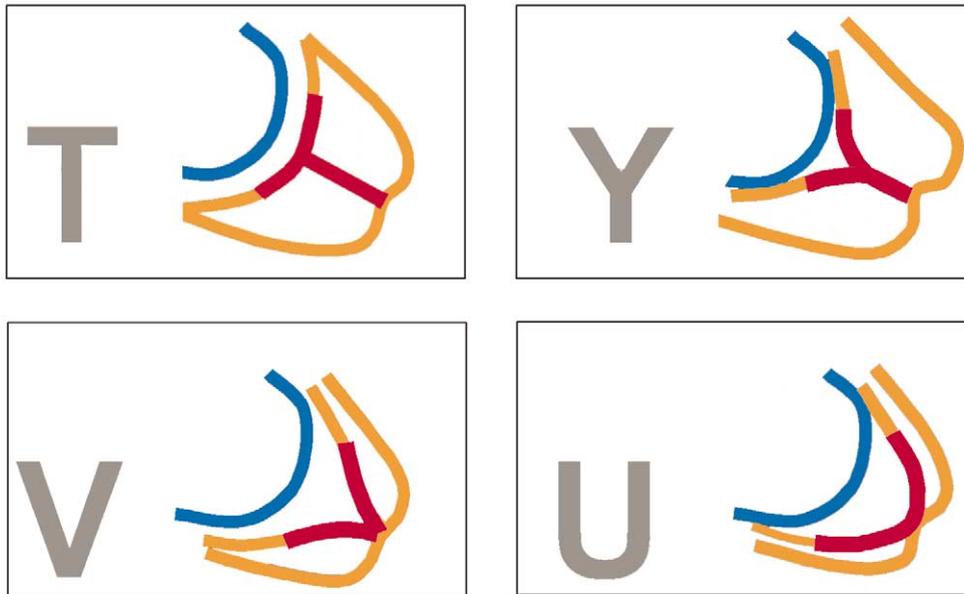


Figure 1. Schematic to display the process of cervical effacement as it proceeds from the internal os, caudad toward the external os, as seen on transvaginal sonography. The letters T, Y, V, and U depict the relationship between the lower uterine segment and the cervical canal. Gray, cervical configuration; blue, fetal head; orange, cervix; red, cervical change. (Modified with permission from Zilianti M, Azuaga A, Calderon F, Pages G, Mendoza G. Monitoring the effacement of the uterine cervix by transperineal sonography: A new perspective. *J Ultrasound Med* 1995;14:719–24. Copyright © 1995 American Institute of Ultrasound in Medicine.)

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self-reported contractions⁸ and with a rise in maternal excretion of estriol, an indicator of increasing maturation of the fetal hypothalamic-pituitary-adrenal axis.¹³

Although studies of uterine contractions, fibronectin, and digital and ultrasound assessment of the cervix have contributed to an expanded understanding of the pathways to preterm birth, use of these tests in clinical practice is still in its infancy. This review addresses the current status of tests for preterm birth in clinical practice: How can tests to predict preterm delivery be helpful in clinical care? Testing might identify a group of women who could be treated to prevent or reduce the likelihood of preterm birth. Unfortunately, no such screening and intervention has yet been found to be consistently effective. Uterine contraction monitoring to identify and treat women with increased contractions,¹⁷ cervical sonography to select women for cerclage,¹⁸ and fetal fibronectin screening to choose women for antibiotic treatment¹⁹ have all failed to reduce the rate of preterm birth in prospective, randomized trials. That there are observational studies to the contrary only confirms the impression that the pathophysiology of spontaneous preterm birth is more complex than can be explained by a single risk factor or test. Someday, a test or panel of tests may

be found that not only identifies a high proportion of women destined for preterm birth²⁰ but also is linked to an effective intervention to reduce the risk. Until then, is there any role for testing for preterm birth?

There are at least two broad areas where testing might be helpful in clinical practice today. The first is in women with symptoms of preterm labor, where early diagnosis is important but notably inaccurate. In some cases, testing these patients with fibronectin and/or cervical sonography can be helpful in improving the accuracy of diagnosis among women with symptoms and the appropriate application of acute interventions such as antenatal steroids or maternal transfer to a tertiary center. The second area is the management of pregnancies with historical risk factors for preterm birth (eg, multiple gestation or a history of preterm birth). This article will review the rationale for testing in these two situations.

EVALUATION OF PATIENTS WITH SYMPTOMS AND SIGNS OF PRETERM LABOR

The goal of early diagnosis of preterm labor in symptomatic women is the appropriate application of three ante-

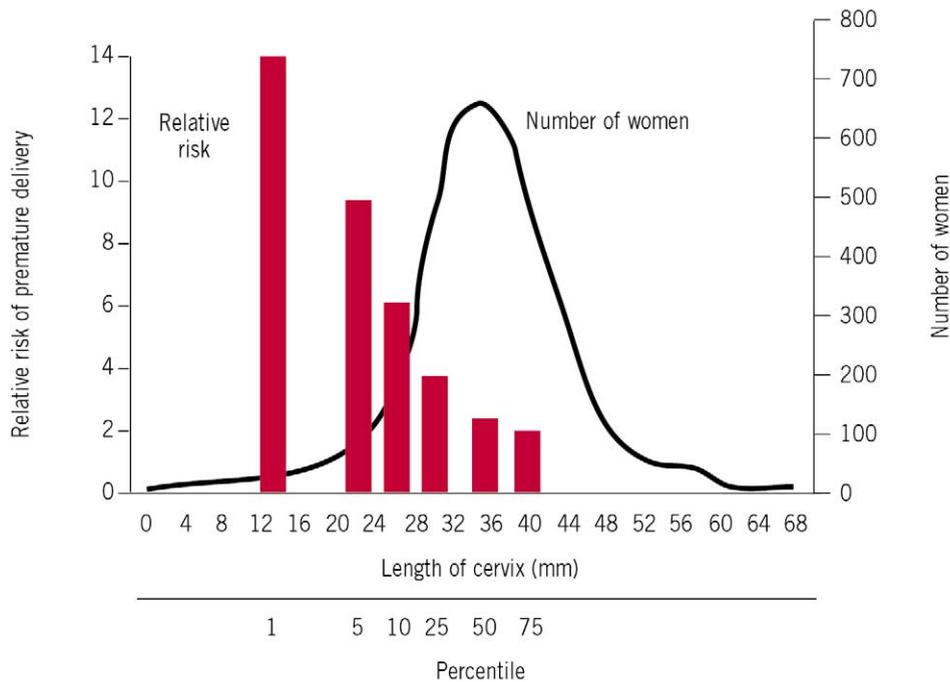


Figure 2. Distribution of subjects among percentiles for cervical length measured by transvaginal ultrasonography at 24 weeks' gestation (*solid line*) and relative risk of spontaneous preterm delivery before 35 weeks' gestation according to percentiles for cervical length (*bars*). The risks among women with values at or below the first, fifth, tenth, 25th, 50th, and 75th percentiles for cervical length are compared with the risk among women with values above the 75th percentile. (Modified with permission from Iams JD, Goldenberg RL, Meis PJ, Mercer BM, Moawad A, Das A, et al. The length of the cervix and the risk of spontaneous preterm delivery. *N Engl J Med* 1996;334:567-72. Copyright © 1996 Massachusetts Medical Society. All rights reserved.)

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natal interventions that are recognized to reduce perinatal morbidity and mortality:

- 1) transfer of women with preterm labor to a facility with a neonatal intensive care unit
- 2) administration of glucocorticoids to the mother
- 3) treatment of women in preterm labor with antibiotics effective against the group B β -hemolytic streptococcus

Tocolytic drugs have been shown to prolong pregnancy for 2-7 days when given to women with symptoms of preterm labor,²¹ a delay sufficient to allow maternal transfer and treatment with antenatal steroids. Because tocolytic medications can have significant side effects, accurate diagnosis is important to avoid the risks and costs of unnecessary treatment.

The twin hallmarks of preterm labor are persistent uterine contractions accompanied by cervical effacement and dilatation. These criteria have suboptimal sensitivity and specificity^{4,22} because of the common occurrence of symptoms and signs of early preterm labor in normal pregnancy, and the imprecision of digital examination of

the cervix.²³ The practice of initiating tocolytic drugs for contraction frequency without any additional diagnostic criteria results in unnecessary treatment of women who do not actually have preterm labor.²⁴ Several recent studies^{2,3,25} have found that the best clinical predictors of preterm delivery within 24 hours to 7 days in women with preterm labor symptoms are

- 1) initial cervical dilatation of 3 cm or more
- 2) cervical effacement of 80% or more
- 3) vaginal bleeding
- 4) ruptured membranes

Though specific, these signs often occur too late to allow effective intervention.²⁶ Contraction frequency is a common initial complaint. The most commonly used clinical threshold for contraction frequency is four or more per hour. The sensitivity of this contraction threshold for delivery within 7-14 days of presentation is approximately 50-60% in women whose cervical dilatation is less than 3 cm.^{27,28} Cervical length measurements with ultrasound and detection of fetal fibronectin in cervical



Figure 3. Transvaginal ultrasound image of the cervix obtained from a woman with symptoms of preterm labor. The image supports a diagnosis of preterm labor because of the length (23 mm) and the Y-shaped appearance of the cervix.

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secretions have been studied as methods to improve diagnostic accuracy in this setting.

Cervical Ultrasound in Women With Symptoms

Studies of transvaginal cervical sonography have reported different thresholds depending on the patients studied (symptoms versus no symptoms) and the goal of the analysis (accurate detection of preterm labor in women with symptoms versus prediction of preterm birth in asymptomatic outpatients). In symptomatic women, the optimal threshold to exclude a diagnosis of preterm labor is 30 mm.^{29–34} A cervical length of 18–20 mm has optimal positive predictive value in

this setting (Figure 3). Because cervical effacement occurs slowly and often precedes clinically evident preterm labor, a cervical length less than 20 mm does not always indicate the presence of preterm labor, but a length of more than 30 mm reliably excludes preterm labor if the examination is done properly (Figure 4). Excessive pressure on the vaginal probe, failure to empty the maternal bladder, and use of transabdominal sonography are all associated with falsely long measurements and should be avoided.^{35,36} Multiple dimensions of the cervix have been measured, including the presence and size of a funnel at the internal os,



Figure 4. Transvaginal ultrasound image of the cervix obtained from a woman with symptoms of preterm labor. The image excludes a diagnosis of preterm labor because of the length (38 mm) and the T-shaped appearance of the cervix.

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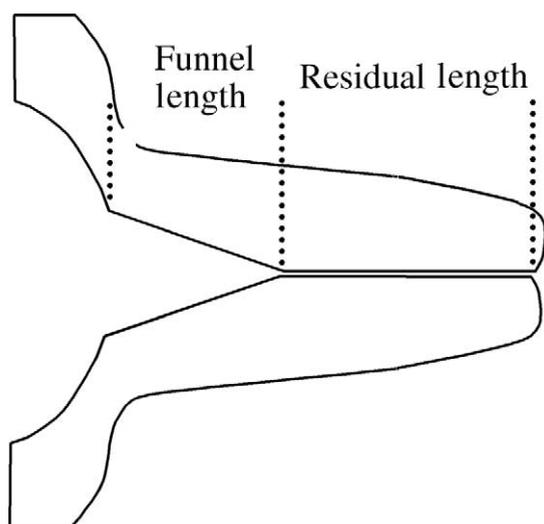


Figure 5. Diagram of a sagittal view of the cervix by transvaginal ultrasonography indicating the appropriate measurement of the cervical length as the residual length. *Iams. Early Detection of Prematurity. Obstet Gynecol 2003.*

the length of the closed or residual portion of the cervix, and the total (funnel length plus length of the closed portion). The residual closed portion is the most reliably measured and is the most consistently correlated with the duration of pregnancy (Figure 5). Funneling, though sometimes a dramatic process when viewed in real time, is a transient process that, to be clinically significant, must be associated with a residual length that is “short” (ie, less than 25 mm). A false or pseudofunnel may occur when the lower uterine segment contracts to form a funnel above a cervix of normal length. This phenomenon has no clinical significance. Transvaginal images are preferred because transabdominal imaging of the cervix requires at least some urine in the maternal bladder that exerts an unpredictable effect on the measured length of the cervix.³⁵

Fetal Fibronectin in Women With Symptoms

A positive fibronectin test (50 ng/mL or more) in a patient with symptoms suggestive of preterm labor has been associated with an increase in the likelihood of birth before 34 weeks and birth within 7–14 days of the test.^{27,28} However, the positive predictive value for delivery within a week was just 18% in data combined from several studies.¹ Given the ~40% rate of false positive diagnosis of preterm labor based on contraction frequency and cervical change by digital examination, the clinical value of the test in symptomatic women is primarily its high negative predictive value. In this respect,

the fibronectin test can perform a function similar to cardiac enzymes in the evaluation of chest pain, as a test to avoid over-diagnosis and unnecessary treatment. Several studies have evaluated the performance of fibronectin in women with possible preterm labor. In one study, admissions for preterm labor, duration of hospitalization, and use of tocolytic medication all were reduced without affecting neonatal outcome.³⁷ In another, fibronectin was not useful when cervical dilatation was 3 cm or more, but in women with cervical dilatation less than 3 cm, a negative test was associated with a 90% reduction in maternal transfer to a tertiary care facility.³⁸ A review of multiple studies of fibronectin testing using likelihood ratios found benefit only for a negative test result in women with symptoms before 34 weeks’ gestation.³⁹ These reports indicate that to be clinically useful in the diagnosis of preterm labor the test must be rapidly available, and the clinician must be willing to act on a negative test result by not initiating treatment. It is not clear how a positive result should affect clinical management, but there is evidence that a positive fibronectin test can improve diagnostic sensitivity. Among 235 women with symptoms of preterm labor but no cervical change, the fibronectin assay was positive in 20%. These women were significantly more likely to deliver preterm infants who experienced morbidity or mortality than women with a negative test.⁴⁰

When fibronectin was compared with a contraction frequency of four or more per hour, cervical dilatation of more than 1 cm, vaginal bleeding, and the clinician’s diagnosis of preterm labor in symptomatic women with cervical dilatation less than 3 cm to predict birth within 1 week, the addition of the fibronectin assay improved both sensitivity and specificity (data combined from Iams et al²⁷ and Peaceman et al²⁸). Fibronectin would appear to be a useful test in women with symptoms when the following conditions occur:

- 1) Symptoms occur between 24 and 34 weeks’ gestation.
- 2) Membranes are intact and cervical dilatation is less than 3 cm.
- 3) Results are available within a few hours (less than 6–8 hours in most settings, perhaps longer in remote sites).
- 4) The clinician is willing to rely on a negative result by not initiating treatment.

Combined use of fibronectin and cervical sonography in the evaluation of symptomatic women has been evaluated in two studies. One found the tests to be complementary in improving the accuracy of diagnosis⁴¹; the other found that the combination was not superior to either test alone.⁴²

The Ohio State University Protocol. At The Ohio State University Medical Center, we obtain a swab for fibronectin at the time of the initial speculum examination of women with possible preterm labor. Once ruptured membranes have been ruled out, digital examination is performed. When the cervix is 80% or more effaced or 3 cm or more dilated in the presence of regular contractions, the diagnosis of preterm labor is established without any additional testing. Contraction frequency alone is insufficient to establish a diagnosis of preterm labor. The focus of the diagnosis is evaluation of the cervix. If the cervix is less than 80% effaced, transvaginal sonography is performed after the patient voids. If the cervix is more than 30 mm in length, preterm labor is very unlikely.^{29–33} A cervical length of less than 20 mm together with regular contractions confirms a diagnosis of preterm labor.³⁴ We use the fibronectin test when the clinical and sonography data are equivocal (eg, dilatation 2 cm and cervical length between 20 and 30 mm) or in conflict (eg, the cervix is less than 3 cm dilated, has “changed” by digital examination, but the length by ultrasound is 35 mm). Women who present with mild symptoms and few contractions but whose cervical examination reveals advanced effacement (ie, a length less than 20 mm before 32 weeks’ gestation) are observed until a fibronectin result is returned. Those with a positive fibronectin are treated with antenatal corticosteroids but usually do not receive tocolytics unless contraction frequency increases to six or more per hour. The fibronectin swab must be obtained before the digital and ultrasound assessment of the cervix because a pelvic examination within 24 hours invalidates the fibronectin result, as does coitus within 24 hours. We believe this algorithm is consistent with the current literature in four important respects:

- 1) It is grounded in the latest information about the pathophysiology of spontaneous preterm birth.
- 2) Although based on the traditional diagnostic criteria of contractions and cervical change, the protocol addresses the importance of accurate diagnosis and the high false positive rate of these criteria when used alone.
- 3) It relies on consistent findings from the literature that preterm birth is very unlikely (97–99%) in women with symptoms, intact membranes, and cervical dilatation of less than 3 cm
 - a) before 34 to 35 weeks when transvaginal cervical length exceeds 30 mm (the 25th percentile) and
 - b) within 14 days when the fetal fibronectin is negative
- 4) It recognizes the low positive predictive value of both tests, and uses them more to exclude than to establish the diagnosis of preterm labor. It avoids an algorithm for women with positive tests because there is no

evidence-based guideline for management of these patients.

An Alternate Protocol for Diagnosis of Preterm Labor. The above protocol may be easily adopted when the equipment and personnel needed to perform speculum examinations and cervical sonography are continuously available within the hospital. Alternate protocols are appropriate for hospitals without the appropriate personnel and/or equipment, once ruptured membranes have been excluded by a speculum examination. One such protocol has been studied prospectively in a trial that randomly assigned 179 women with preterm contractions to one of three arms: observation alone, observation plus intravenous hydration, or observation plus a single 0.25-mg dose of subcutaneous terbutaline. The terbutaline group spent less time in triage at a lower cost, without any adverse effect on the outcome of pregnancy.⁴³ Women enrolled had intact membranes and cervical dilatation and effacement of less than 1 cm and less than 80%, respectively. This trial suggests that a single dose of subcutaneous terbutaline could be an efficient way to select women with symptoms for further evaluation (eg, a cervical ultrasound examination) before a decision about tocolysis is made.

PREDICTION OF PRETERM BIRTH IN WOMEN WITHOUT SYMPTOMS

Prediction of preterm birth is a logical goal, provided it can meet the criteria required of any screening program:

- 1) A screening protocol should be efficient—that is, have high sensitivity, high negative predictive value, and low cost.
- 2) An effective prophylactic intervention or treatment for individuals with a positive test should be available.

Unfortunately, protocols to screen for preterm birth do not fulfill either of these prerequisites. Neither an efficient screening protocol nor an effective intervention to prevent or reduce the rate of prematurity has yet been identified. Screening has been attempted with numerical scoring systems, microbiologic tests, uterine contraction monitoring, digital and ultrasound examinations of the cervix, and fetal fibronectin assays of cervicovaginal secretions. Prematurity prophylaxis has been attempted with patient education, bed rest, antibiotics, tocolytics, nutritional supplements, cervical cerclage, and social support, all without consistent evidence of benefit. One recent study evaluated uterine contraction monitoring, digital examination of the cervix (Bishop score), transvaginal ultrasound measurement of cervical length, and

Table 1. Prediction at 22–24 Weeks of Spontaneous Preterm Birth Before 35 Weeks' Gestation

Test	Sensitivity (%)	Specificity (%)	Predictive value	
			Positive (%)	Negative (%)
Multiple PTL symptoms	50.0	63.5	21.4	86.4
Uterine contractions $\geq 4/h$	6.7	92.3	25.0	84.7
Bishop score ≥ 4	32.0	91.4	42.1	87.4
Cervical length ≤ 25 mm	40.8	89.5	42.6	88.8
Fibronectin ≥ 50 ng/mL	18.0	95.3	42.9	85.6

Data from Iams et al.⁴⁴

fetal fibronectin at 24, 28, and 32 weeks in women with historical risk factors for preterm birth to predict preterm birth before 35 and 37 weeks.⁴⁴ In this study, cervical examination, by either ultrasound (cervical length 25 mm or less) or Bishop score (4 or greater), was the most sensitive; contraction frequency and fibronectin were less predictive (Table 1).⁴⁴ No test had a sensitivity of more than 40%.

Thus, current data do not support routine screening of pregnant women for prematurity risk, regardless of the test chosen or the population tested. However, there are instances where testing can be clinically helpful, and others where testing for prematurity has entered clinical practice, albeit prematurely. For example, selective application of prematurity tests for women with clinical risk factors may have value when the test is used to *avoid* treatment. Three situations illustrate their potential use:

- 1) When a negative test result can avert a planned intervention such as the routine recommendation for reduced activity for women with multiple gestation, widely practiced despite a lack of supporting data. Studies of cervical sonography in twins show that spontaneous preterm birth is rare when a cervical length of 35 mm or more is present at 24 weeks' gestation.⁴⁵ Fibronectin was less predictive of preterm birth in twins than in singletons when studied at 24–28 weeks in asymptomatic women.⁴⁶
- 2) When a test result can be used to help determine the appropriate timing for antenatal corticosteroids or to avoid treatment entirely. A recent study of 189 at-risk pregnancies has highlighted the difficulty in recognizing the "right" time to give steroids based on clinical criteria (Mercer BM, Egerman R, Beazley D, Sibai BM, Carr TM, Sepesi J. Weekly antenatal steroids in women at risk for preterm birth: A randomized trial [abstract]. *Am J Obstet Gynecol* 2001;184:S6). Only a third of preterm infants received a single course of steroids within 7 days of preterm delivery. In the current climate of concern about timely and repetitive administration of steroids,⁴⁷ the ability to provide patient-specific risk assessment using cervical length

and/or fibronectin could be helpful. The recurrence risk of preterm birth has been shown to vary considerably according to the length of the cervix and the presence of fibronectin in cervicovaginal secretions (Figure 6).⁴⁸ For example, among women with a prior preterm delivery tested at 24 weeks in a subsequent pregnancy, the chance of another preterm birth was 7% in women with a negative fibronectin and cervical length of more than 35 mm, versus 64% when both fibronectin and cervical length tests were positive.⁴⁸ Until more definitive information about the benefits and/or risks of repeated courses of antenatal corticosteroids is available, this information could be helpful in making decisions about antenatal steroid treatment in selected circumstances (eg, a woman at 28 weeks' gestation with a history of preterm birth and symptoms of possible preterm labor).

- 3) Whether women with a history of early preterm birth may benefit from a cerclage in subsequent pregnancies is an open question. A randomized trial has shown that women with a history of preterm birth before 32 weeks whose cervical length remained

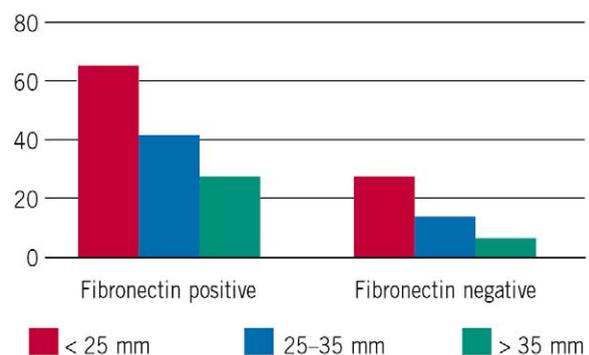


Figure 6. Risk of recurrent preterm birth in women with a prior preterm birth, according to their cervical length and fibronectin test results at 24 weeks in a subsequent pregnancy. Data from Iams et al.⁴⁸

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above 25 mm between 18 and 26 weeks had a rate of preterm birth of just 3.4%, versus 10% for women treated with a prophylactic cerclage.⁴⁹ Once again, a test for preterm birth appears to have clinical value primarily for its ability to identify women who do not need to be treated, rather than to select those who do.

Abdominal Versus Vaginal Sonography of the Cervix

Another application for transvaginal cervical sonography has recently emerged from a recommendation by the American College of Radiology that the cervix and lower uterine segment be imaged as part of every obstetric ultrasound examination in the second trimester.⁵⁰ The American College of Radiology guideline specifically mentions a search for funneling and/or a short cervix (less than 30 mm). This has resulted in an increasing number of apparently normal pregnant women who present to the obstetrician for further evaluation, sometimes with an accompanying report recommending consideration of cervical cerclage. There have even been legal actions brought against obstetricians who have not intervened in response to the report. Remarkably, this has occurred despite the poor reproducibility of transabdominal sonography of the cervix^{35,51} and the absence of any data to support an intervention such as cerclage or bed rest. In this uncertain situation, the American College of Radiology recommends (and I agree) that the obstetrician should obtain a transvaginal ultrasound measurement of the cervix with an empty bladder. A measurement of more than 25 mm in a patient without symptoms and a negative risk history allows the obstetrician to reassure the patient that the risk of preterm birth is not increased. The American College of Radiology uses 30 mm as the threshold of reassurance. When a cervical length of 25 mm or less is obtained, it may be appropriate to obtain a fetal fibronectin. This opinion is based, paradoxically, on data from a study of cervical length and fibronectin measured in asymptomatic low-risk women⁵² that found both tests to have low sensitivity for preterm birth in low-risk pregnancies. Despite the poor sensitivity of either test alone, the positive predictive value for preterm birth at less than 35 weeks was 50% when an asymptomatic low-risk patient had *both* a positive fibronectin *and* a cervix of less than 25 mm. In the absence of data about how best to manage these pregnancies, education about the signs and symptoms of preterm labor, more frequent visits, and consideration of antenatal corticosteroids seems reasonable.

SUMMARY

New tests for preterm birth have contributed new and important information about the pathways to preterm

birth. Their use in clinical practice is currently appropriate in women with symptoms of preterm labor to exclude that diagnosis, with safety for both the mother and the fetus. Their use in asymptomatic women is similarly limited to the selected situations described above. Use of these tests to screen for risk of preterm birth should be deferred until a successful program of prophylaxis has been reported.

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