Routine cervical length screening reduces the incidence of preterm birth

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Introduction

Preterm birth (PTB) remains a major cause of perinatal morbidity and mortality. Premature birth in the United States accounts for 35% of deaths in the first year of life. The Institute of Medicine's Committee on Understanding Premature Birth and Assuring Healthy Outcomes estimated the annual economic burden associated with preterm birth in the United States for the year 2005 to be at least $26.2 billion. Medical care services comprised $16.9 billion while maternal delivery costs comprised $1.9 billion. Longer term costs included $611 million for early intervention services and $1.1 billion for special education services. The committee estimated that lost household and labor market productivity comprised $5.7 billion. While approximately 20% of preterm births are indicated preterm births due to medical or obstetrical complications that jeopardize the health of the mother or the fetus the majority of preterm births are spontaneous preterm births that occur as a result of spontaneous preterm labor or preterm rupture of fetal membranes before the onset of labor.

Potential interventions for reducing the incidence of spontaneous preterm birth can be classified as primary (aimed at all women), secondary (aimed at eliminating or reducing risk in women with a previous preterm birth), or tertiary (aimed at preterm infants). Primary among such interventions are progesterone prophylaxis and cervical cerclage.

A prior history of preterm birth is a major risk factor for preterm birth; however, many women who deliver preterm do not have history of prior preterm births nor any of the other risk factors for preterm birth (see Table 1). A statistically significant inverse relationship between midtrimester cervical length (CL) measured by transvaginal ultrasound (TVU) and the risk of preterm birth has been demonstrated in several studies. The risk for preterm birth associated with a cervical length below the 10th percentile (25mm) at 18 to 24 weeks is between 25 and 30%, and the risk associated with a cervical length at or below the 3rd percentile (15mm) is 50%. (TVU) has been suggested as a useful tool to identify patients at risk for preterm birth and, thereby, offering the opportunity for primary prevention of preterm labor (PTL).

Table 1: Risk factors for spontaneous preterm birth :

- Reproductive history (previous spontaneous preterm birth and use of assisted reproductive technologies)
- Antepartum bleeding, rupture of membranes, cervical/uterine factors (cervical insufficiency, uterine anomalies, fibroids, and excisional cervical treatment for cervical intraepithelial neoplasia)
- Fetal/intrauterine factors (multifetal gestation, fetal anomaly, and polyhydramnios)
- Infection (chorioamnionitis, bacteruria, periodontal disease, current bacterial vaginosis with a prior preterm birth)
- Demographic factors (low socioeconomic status, single marital status, low level of education, First Nations ethnicity, or maternal age < 18 years or > 35 years)
- Lifestyle issues (cigarette smoking, illicit drug use, stress, physical abuse)
- Inadequate prenatal care, low pre-pregnancy weight and poor weight gain in pregnancy.

Intervention

At our organization we have instituted a policy of routine cervical length screening via transvaginal ultrasound. This policy has allowed us to identify patients at risk for preterm birth and institute appropriate preventative strategies.

Screening of the cervical length is begun between 16 and 24 weeks. If the cervix measures more than 35 mm, the exam is repeated every 2 to 3 weeks until 32 weeks' gestation. A cervical length of 35 to 25 mm is managed with weekly or biweekly follow-up to monitor the length of the cervix over time. If the cervical length is less than 25 mm, the choice of therapy depends on gestational age and provider assessment.
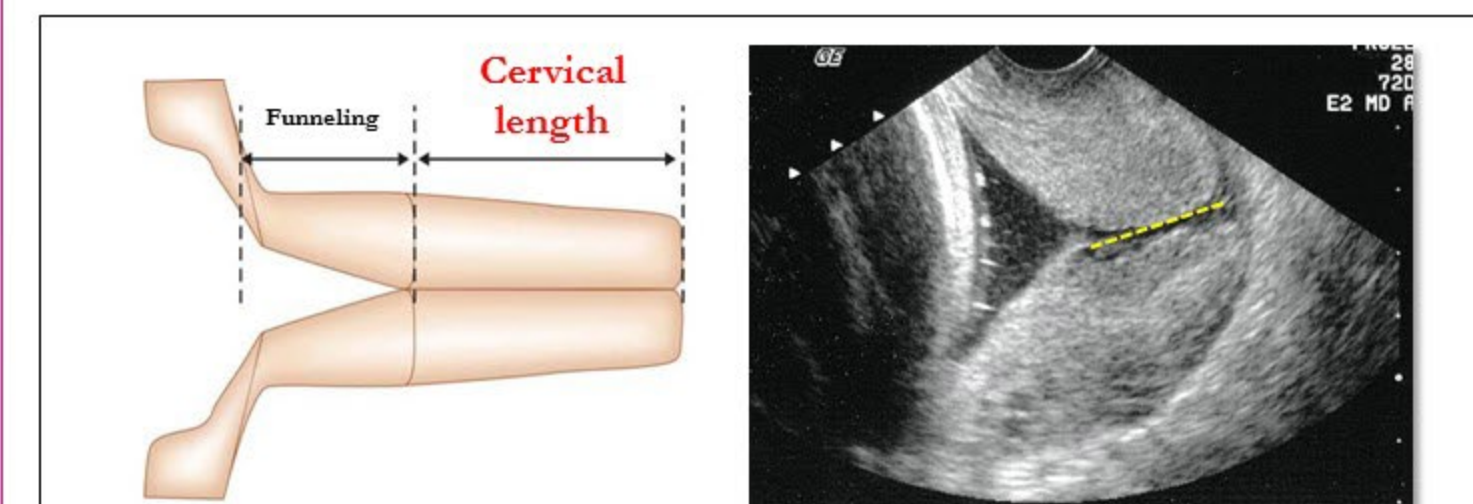

Figure 1: Transvaginal measurement of cervical length

Results

Table 2: Distribution of births born preterm, (prior to 37 completed weeks of gestation): Garden Ob/Gyn final data for 2014 (Total births 1,319)

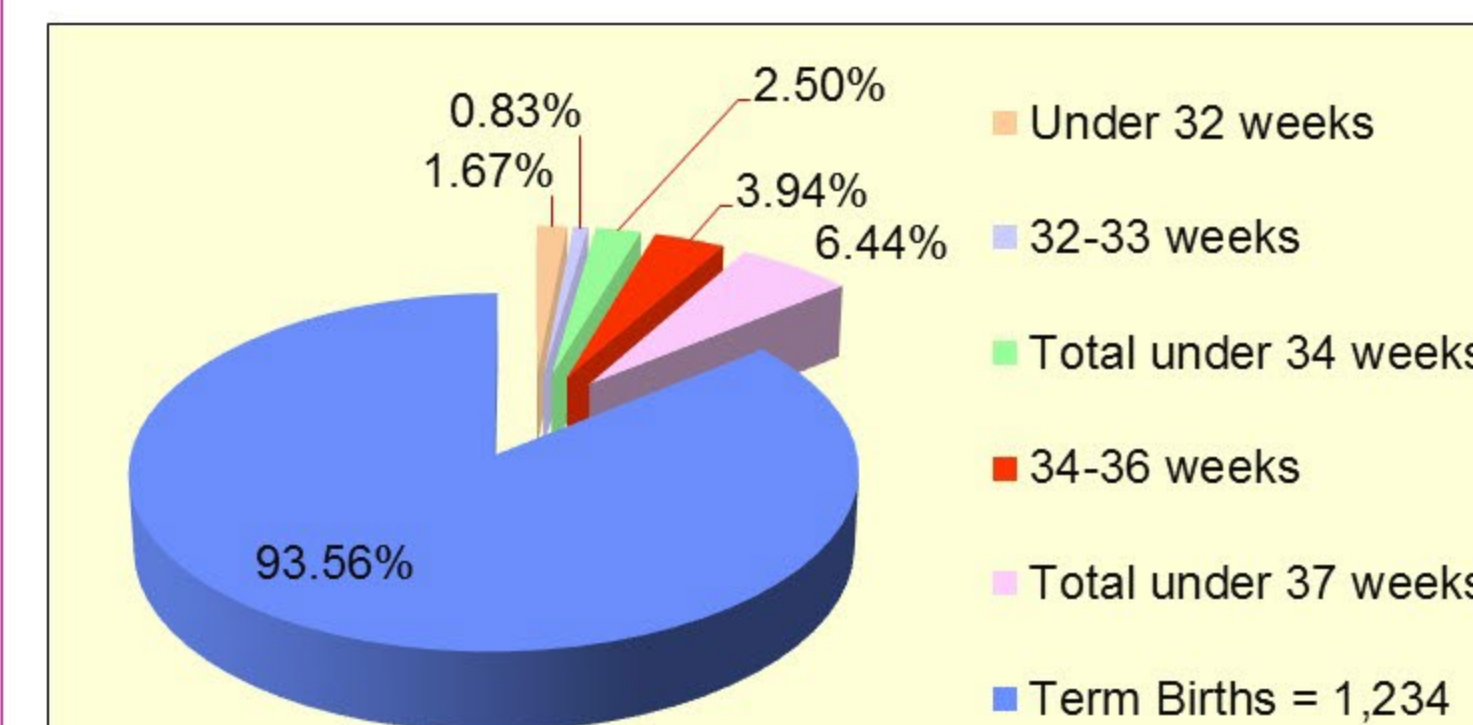| Gestational age	No.	Percent
Under 32 weeks	22	1.67
32-33 weeks	11	0.83
Total under 34 weeks	33	2.50
34-36 weeks	52	3.94
Total under 37 weeks	85	6.44

Figure 2: Distribution of births born preterm (prior to 37 completed weeks gestation): Garden Ob/Gyn final data 2014 (Total births = 1,319)

National Data

As of 2014 the National Center for Health Statistics has transitioned to a new standard for estimating the gestational age of a newborn. The new measure, the obstetric estimate of gestation at delivery (OE), has replaced the measure based on the date of the last normal menses (LMP). The obstetric estimate of gestation is defined as ''the best obstetric estimate of the infant's gestation in completed weeks based on the birth attendant's final estimate of gestation.'' This change was made because of increasing evidence of the greater validity of the OE compared with the LMP-based measure. The 2014 preterm birth rate for the U.S. (based on the OE) was 9.57% (Table 3).

Table 3: Distribution of births born preterm, (prior to 37 completed weeks of gestation): U.S. final data 2007 and 2013 and preliminary data 2014 (Total births 3,985,924)

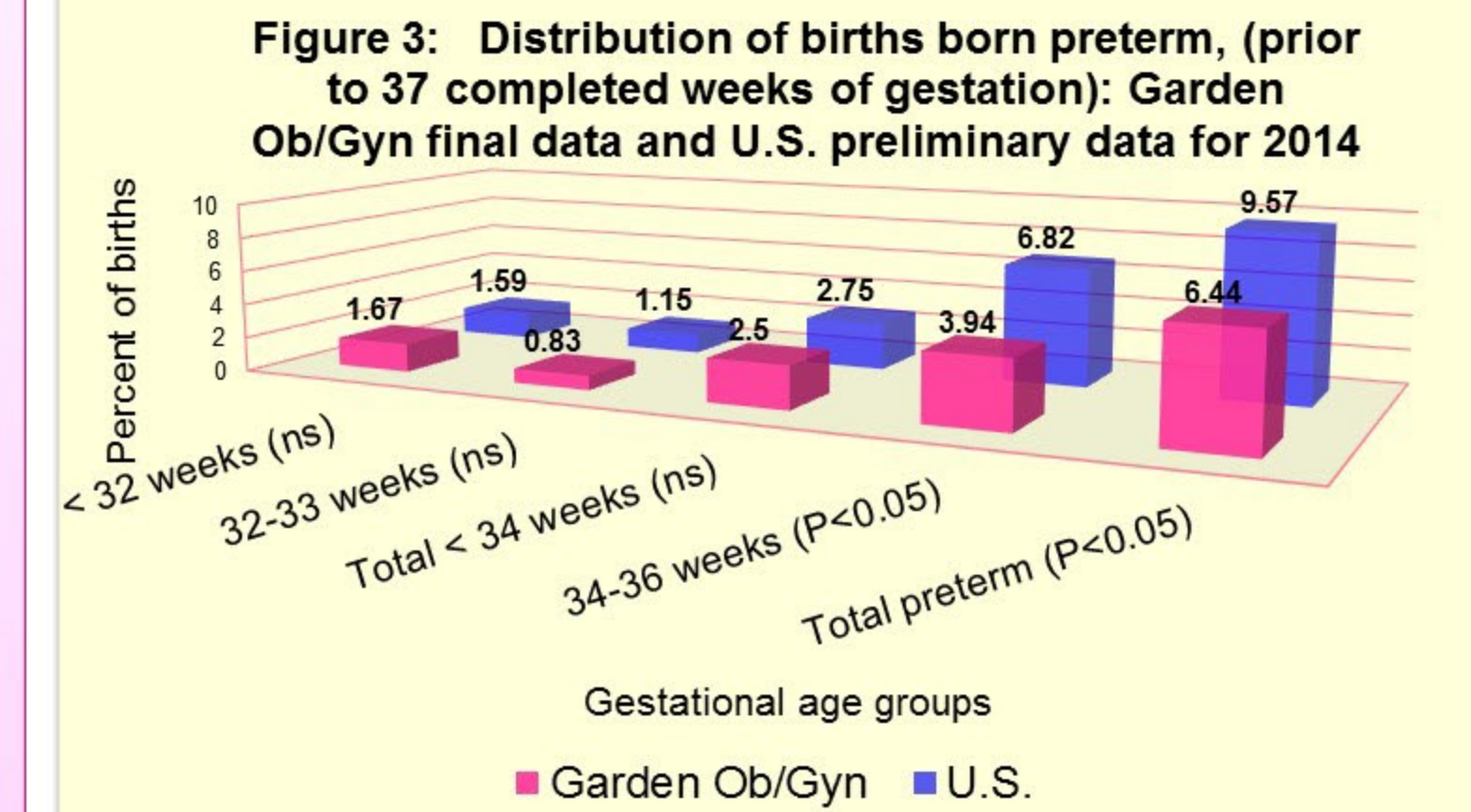| Gestational age | Percent | | |
	2014	2013	2007
Under 32 weeks	1.59	1.62	1.71
32-33 weeks	1.15	1.17	1.22
Total under 34 weeks	2.75	2.79	2.93
34-36 weeks	6.82	6.83	7.51
Total under 37 weeks	9.57	9.62	10.44

Discussion

We used a Z test for two population proportions to test if the preterm birth rate of our patients was significantly different than that reported for the entire U. S. population in 2014. As can be seen by tables 2 and 3 and figure 3, our patients had a significantly reduced rate of preterm birth (6.4% vs the National rate of 9.6%).

The costs associated with preterm birth are vast and place a significant financial burden on society. In 2007 the Institute of Medicine reported that the annual costs associated with preterm births exceed $26 billion.

Universal cervical length screening by TVU has not been universally adopted despite having been demonstrated to be cost effective by cost-effectiveness analysis studies. The most recent report of the FIGO Working Group on Best Practice in Maternal–Fetal Medicine published in January, 2015, recommends that cervical length measurement should be performed in all pregnant patients at 19–23 6/7 weeks of gestation using transvaginal ultrasound. They further recommend that women with a short cervix (<25 mm) diagnosed in the mid-trimester be offered daily vaginal micronized progesterone treatment.

Our policy of universal cervical length screening confirms its effectiveness in reducing preterm births. If such a strategy were universally adopted the result would be a reduction in the incidence of preterm births and a reduction in the incidence of infant morbidity and mortality associated with preterm births, thereby reducing the economic burden. We therefore support the implementation of universal cervical length screening by TVU.

Figure 3: Distribution of births born preterm, (prior to 37 completed weeks of gestation): Garden Ob/Gyn final data and U.S. preliminary data for 2014

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Acknowledgements