



Original article

Use of a Prenatal Risk Screen to Predict Maternal Traumatic Pregnancy-Associated Death: Program and Policy Implications

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ABSTRACT

Background: Motor vehicle crashes, homicide, suicide, and drug abuse are among the leading causes of pregnancy-associated deaths. To prevent such deaths, identifying women for intervention is required. The universally offered Florida Healthy Start Prenatal Risk Screen was evaluated to identify women at increased risk for traumatic pregnancy-associated death.

Methods: Florida's Enhanced Maternal Mortality Reporting Database for 1999 through 2005 was linked with Florida's Healthy Start Prenatal Risk Screen to identify traumatic pregnancy-associated death as the outcome. Distribution of Healthy Start risk scores among women who died were compared with the screened population. Traumatic death estimates per 100,000 births were drawn for each risk score, along with estimates of the relative risk (RR) of traumatic death for each score. The RR of women with scores greater than or equal to 4 were compared with the risk of women scoring 0 to 3.

Findings: Almost 20% of the 620,959 women who did not die of traumatic death had a risk score of 0, compared with only 3% of the 144 women who did die of traumatic death. As risk scores increased, the chance of traumatic deaths sharply increased. A woman with a score of 4 had 11.78 times (confidence interval [CI], 4.63–29.69) the risk of traumatic death compared with a woman with a risk score of 0.

Conclusions: The implementation of prenatal risk screening to identify women at increased risk for traumatic pregnancy-associated death would help to ensure that policies to reduce infant risk factors also address maternal risk factors.

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Introduction

Over the last century, maternal mortality has significantly decreased in the United States and in many other countries (Chang et al., 2003). Although the reduction in rates of maternal deaths from pregnancy-related causes seems to have leveled off

(Hoyert, 2007), maternal deaths from traumatic causes now account for about 4.6% of all maternal deaths (Mirza, Devine, & Gaddipati, 2010). Traumatic causes of death include motor vehicle crashes, homicide, suicide, accidental poisoning, and other types of injuries. The rate of traumatic deaths among pregnant and recently pregnant women, combined with the historical decline in pregnancy-related causes of death, has led to a shift in the proportion of deaths within this population from pregnancy-related to traumatic causes (Romero & Pearlman, 2012).

Traumatic causes of death are often excluded from maternal death reviews because they are not considered to be directly related to the pregnancy. For this same reason, they are also not

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generally included in standard definitions and measurements of maternal mortality. As the proportion of traumatic causes of maternal death increases, exclusion of these women from maternal mortality review hinders accurate estimate of risks; it also delays effective interventions (Horon, 2005; Horon & Cheng, 2011).

Trauma has now emerged as a leading cause of pregnancy-associated death. One study of deaths among pregnant and postpartum women in Cook County, Illinois, found that 46% died from traumatic causes, compared with 32% from pregnancy-related causes (Fildes, Reed, Jones, Martin, & Barrett, 1992). A similar study in New York City attributed 39% of pregnancy-associated deaths to trauma (Dannenberg et al., 1995). A statewide study in Georgia on traumatic pregnancy-associated death had comparable results, finding that 35% of pregnancy-associated deaths were attributable to traumatic causes (Dietz, Rochat, Thompson, Berg, & Griffin, 1998). Figure 1 displays the top 10 causes of pregnancy-associated death in Florida, ranked by pregnancy-associated maternal mortality ratio, for the years 1999 through 2005. The top four causes are traumatic in nature (Hernandez, Sappenfield, & Burch, 2009). In Florida, motor vehicle accidents, homicide, accidental poisoning, and suicide are the leading causes of traumatic pregnancy-associated death.

Kavanaugh and colleagues recently documented the relationship between psychosocial risk factors (such as substance abuse, mental illness, and domestic violence) and traumatic pregnancy-associated deaths in Virginia (Kavanaugh et al., 2009). They found that the pregnancy-associated maternal mortality ratio for women experiencing one or more psychosocial risk factors was 17.1 deaths per 100,000 live births, compared with the overall pregnancy-related mortality ratio of 11.8 deaths per 100,000 reported for the U.S. population between 1991 and 1999 (Chang et al., 2003). Substance abuse contributed to 29% of all cases, mental illness to 17%, and domestic violence to 14%. Unintentional injuries, which included unintentional overdoses and motor vehicle crashes, were the most common cause of traumatic pregnancy-associated death among women with one or more risk factors, followed by homicide and suicide.

The American College of Obstetricians and Gynecologists (2006) recommends psychosocial screening for all women seeking prenatal care, regardless of social status, educational level, or race/ethnicity. Multiple studies on traumatic pregnancy-associated death also recommend the use of some form of psychosocial screening as an essential component of comprehensive medical care for women both during and after

pregnancy (e.g., Krulewicz, Pierre-Louis, de Leon-Gomez, Guy, & Green, 2001; Martin, Beaumont & Kupper, 2003; Parsons & Harper, 1999; Shadigian & Bauer, 2005). Many of the psychosocial risk factors associated with adverse fetal and birth outcomes, such as substance abuse, domestic violence, and mental illness, are also associated with an increased risk of traumatic pregnancy-associated death (Behrman & Butler, 2007). In Florida, there is no standardized screening tool for identifying women at an increased risk of traumatic pregnancy-associated death. However, Florida statute requires that all prenatal care providers offer a risk screen to women at the first prenatal care visit and again at the time of childbirth (Florida Statute 383.14). This screen includes demographic as well as environmental and social factors to identify women at risk for preterm delivery (Table 1).

Florida's Healthy Start program was created in 1991 by the state legislature with the goal of reducing preterm birth and other high-risk conditions. The program provides services to pregnant women and mothers with newborns that include mental health care, substance abuse counseling, care coordination, infant safety education, breastfeeding support, smoking cessation, and interconceptional care (Clark, Watson, Thompson, & Sappenfield, 2006). The statute requires obstetric providers to complete the risk assessment of demographic, environmental, and psychosocial factors so that women can be referred to appropriate health, education, and social services. Many of the risk factors identified through the use of this screening tool are also risk factors associated with traumatic pregnancy-associated death. A risk score of 4 or greater is used by prenatal care providers to identify women and infants eligible for Healthy Start services. Services include psychosocial, nutritional, and smoking cessation counseling. In addition to these services, childbirth education, breastfeeding education, and parenting education are delivered through home visitation.

The Florida Department of Health contracts with 33 Healthy Start Coalitions to administer these services. The coalitions comprise both public and private providers. Florida's statewide, decentralized approach is distinct from the federal Healthy Start initiative which also started in 1991 and targets specific communities with large disparities in infant birth outcomes (Taylor & Nies, 2012). Three counties in Florida (Hillsborough, Duval, and Pinellas) have been recipients of federal Healthy Start funding from the Maternal and Child Health Bureau. An evaluation of the federal Central Hillsborough County Healthy Start program in Tampa, Florida, found that program participants had lower odds of low birth weight and preterm birth compared with non-participants (Salihu, Mbah, Jeffers, Alio, & Berry, 2009). This evaluation examined the impact of local pre- and post-natal risk reduction services to women in four East Tampa zip codes who had completed the Healthy Start prenatal risk screen. The present study does not distinguish women who received Healthy Start services through their participation in one of Florida's three federal Healthy Start initiatives; nor were data available about the type of services received by Healthy Start-screened women.

Because certain conditions that place a woman at risk for adverse infant birth outcomes are likely to also put her at risk of traumatic death, we hypothesized that the prenatal risk screen might also be useful to identify risk of traumatic pregnancy-associated death. The purpose of this study was to evaluate the potential use of the Florida Healthy Start Prenatal Risk Screen as a tool to identify women at increased risk for traumatic pregnancy-associated death.

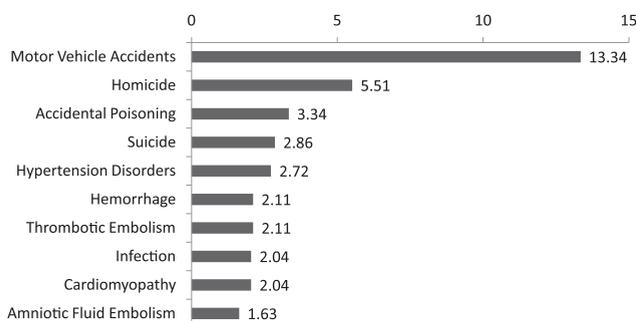


Figure 1. Top 10 causes of pregnancy-associated death in Florida, excluding natural causes ranked by maternal mortality ratio.

Table 1
Florida Healthy Start Prenatal Risk Screening Factors and Risk Scoring Points

	Answers	Points
Questions answered by patient		
Your age	(in years)	<18 = 1 point or > 39 = 1 point
Your race	Black/White/other	Black = 2 points*
Are you married?	Yes/No	No = 1 point
Have you graduated from high school or received a GED?	Yes/No	No = 1 point
Your weight before pregnancy.	(in pounds)	<110 = 1 point
Do you have any problems which prevent you from keeping your health care or social services appointments?	Yes/No	Yes = 1 point
Have you moved more than 3 times in the last 12 months?	Yes/No	Yes = 1 point
Do you feel unsafe where you live?	Yes/No	Yes = 1 point
Do you or any member of your household go to bed hungry?	Yes/No	Yes = 1 point
In the last 2 months, have you used any form of tobacco?	Yes/No	Yes = 1 point
In the last 2 months, have you used drugs or alcohol (including beer, wine, mixed drinks)?	(a) earlier, (b) later, (c) not at all, (d) no change	Yes = 1 point
If you could change the timing of this pregnancy, would you want it	(a) earlier, (b) later, (c) not at all, or (d) no change	(c) Not at all = 1 point
Questions answered by health care provider		
Did patient's last pregnancy result in a miscarriage, stillbirth, a baby less than 5 1/2 pounds, a baby born more than 3 weeks early, or a baby that stayed in the hospital after the patient went home?	Yes/No	Yes = 1 point
Does patient have any illness that requires continuing medical care?	Yes (specify illness)/No	Yes = 1 point
Trimester of entry at first prenatal visit	First/second/third	Second trimester = 1 point

Points are totaled for each respondent. A total score of 4 or more is considered a positive screening.

* Black race is scored 2 points because the risk of adverse birth outcome (low birth weight <2000 g and preterm delivery <34 weeks) is double that observed in women of any other race in Florida. In April 2007, Florida revised its Healthy Start Prenatal Risk screen. A copy of the current screen is available at: http://www.doh.state.fl.us/family/mch/hs/english_prenatal_screen.pdf.

Methods

Cases of pregnancy-associated death were identified by the Florida Department of Health's enhanced maternal mortality report surveillance system. Four identification criteria were used in an attempt to maximize the identification of pregnancy-associated deaths within the state: 1) The death certificate response to the question, "Was the woman pregnant within the past year?" was marked, "yes"; or 2) the *International Classification of Diseases*, Tenth Revision (ICD-10) code indicated a death classified as being owing to causes related to, "Pregnancy, Childbirth, and the Puerperium" (O00–O99); or 3) there was a matching fetal birth or death record on file for the woman within 365 days before her death; or 4) there was a matching Healthy Start Prenatal Screen on file for the woman within 365 days before her death. This method of pregnancy-associated death identification is among the most comprehensive in the United States (Burch, Noell, Hill, & Delke, 2012; King, 2012).

The next step in the enhanced maternal mortality surveillance system is to review the maternal death certificates of all identified pregnancy-associated deaths and assign them to one of three categories based on the primary cause and manner of death. The first category, *pregnancy-related death*, is defined as, "a pregnancy-associated death resulting from 1) complications of the pregnancy itself, 2) the chain of events initiated by the pregnancy that led to death, or 3) aggravation of an unrelated condition by the physiologic or pharmacologic effects of the pregnancy that subsequently caused death" (Watson, Thompson, Burch, & Sappenfield, 2008, p. 3). The second category, *possible pregnancy-related death*, is defined as, "a pregnancy-associated death where determination of the death could not be conclusively classified as either related or not related to the pregnancy" (Ibid). The third category, *not pregnancy related*, is defined as, "the death of a woman, while pregnant or within one year of termination of pregnancy, from a cause deemed unrelated to pregnancy" (Ibid).

Traumatic pregnancy-associated deaths are not typically abstracted for review by the multidisciplinary maternal mortality surveillance team. The Florida Department of Health provided the Family Data Center at the University of Florida with a file containing information on traumatic pregnancy-associated deaths that occurred between the years of 1999 and 2005.

Data on the Healthy Start Prenatal Risk Screen was requested from the Florida Department of Health for this study. During the study period, there were 1,542,055 births. Of those, 404,788 women did not have a recorded screen, leaving 1,137,267 women screened. Reasons women were not screened included lack of prenatal care, refusing the offered screening test, and provider not offering the screen at the prenatal visit or at the time of birth. In cases of successive deliveries by the same woman during the study period, only the most recent screen was retained, leaving 674,875 screens. This nonduplication of cases was intended to capture the screens performed closest to the time of maternal death, thereby maintaining a consistent methodology of one observation per death. Records with missing values on any Healthy Start risk screen question were deleted ($n = 53,772$), leaving 621,103 complete records for analysis. Table 2 compares the proportions of sociodemographic characteristics among women who were and were not screened.

The traumatic pregnancy-associated death data set was then linked with the Healthy Start Prenatal Risk Screen data set to identify women who had died of traumatic causes within 1 year of the termination of their pregnancy. The unmatched records and records with invalid social security numbers ($n = 142,747$) were linked, allowing for 60% of previously unmatched records to be linked based on multiple matching entries on common demographic fields such as date of birth, race, and zip code. A traumatic death indicator was then created within the Healthy Start Prenatal Risk Screen data set to allow for the identification of traumatic death as an outcome. Table 3 compares the proportions of sociodemographic characteristics among Healthy

Table 2
Comparison of Women Who Delivered in Florida, 1999–2005: Screened and Not Screened by Healthy Start

Demographic Characteristic	Percentage of Women Screened by Healthy Start	Percentage of Women Not Screened by Healthy Start
Maternal age*		
<20	14.2	7.7
20–34	74.7	72.8
>35	11.1	19.4
Maternal race*		
White	69.4	77.0
Black	25.4	17.9
Other	5.2	5.1
Marital status*		
Married	53.5	70.7
Not married	46.5	29.3
Maternal education*		
High school graduate—yes	39.5	53.0
High school graduate—no	60.5	47.0

* Indicates chi-square test determined that the proportions in the levels of the demographic characteristic were statistically different in the two groups.

Start-screened women who died traumatically and unscreened women who died traumatically.

The Healthy Start Prenatal Risk Screen score was calculated for each woman by summing the points recorded for the 15 risk factors. Black race is scored 2 points because the risk of adverse birth outcome (low birth weight [$<2,000$ g] and preterm delivery [<34 weeks]) is double that observed in women of any other race in Florida (Simmons, Thompson, & Graham, 2003). With Black race receiving 2 points, the highest possible score is 16. No subjects had scores more than 13 and no traumatic deaths were observed among women who scored 10 or more. Comparison of groups was therefore restricted to subjects with scores less than or equal to 9. The number of traumatic pregnancy-associated deaths per 100,000 at risk was estimated for each of the 10 risk groups corresponding to scores 0 to 9. Relative risks (RR) along with their confidence intervals (CI) were estimated for comparing risks between the following subgroups: 1) Pregnant women in each of the nine risk groups with risk scores between 1 and 9 were compared with those with risk

Table 3
Comparison of Women Who Died Traumatically in Florida, 1999–2005: Screened and Not Screened by Healthy Start

Demographic Characteristic	Percentage of Women Who Died Traumatically and Screened by Healthy Start	Percentage of Women Who Died Traumatically and Not Screened by Healthy Start
Maternal age (yrs)*		
<20	33.0	19.7
20–34	53.9	51.1
>35	13.2	29.3
Marital status*		
Married	23.0	55.3
Not married	77.0	44.7
Maternal education*		
High school graduate—yes	53.4	62.8
High school graduate—no	46.6	37.2

Records received from the Florida Department of Health's enhanced maternal mortality report surveillance system did not contain information about decedents' race.

* Indicates chi-square test determined that the proportions in the levels of the demographic characteristic were statistically different in the two groups.

score 0; 2) pregnant women in each of the nine risk groups were compared with those in the next lower risk group; and 3) pregnant women with risk scores of 4 or higher were compared with those with risk scores of 0 to 3. Those RRs were compared with the current use of this screen to identify risk of adverse fetal and infant outcomes. CIs were calculated at the 95% confidence level using the delta method for estimating the standard errors (Agresti, 1990). This study was approved by the Institutional Review Boards of the Florida Department of Health and the University of Florida.

Results

Between 1999 and 2005, there were 620,959 women who completed the Healthy Start Prenatal Risk Screen and 144 experienced a pregnancy-associated traumatic death. Figure 2 shows contrasting distributions of screen scores for women who suffered traumatic death versus women who did not. Almost 20% of the 620,959 women who did not die of traumatic death had a risk score of 0, compared with only 3% of the 144 women who did die of traumatic death. Fifty-six percent of the women who died of trauma had a risk score greater than or equal to 4, compared with 28% of women who did not die of trauma. Figure 3 shows an increase in predicted traumatic deaths per 100,000 births and a corresponding increase in RR as Healthy Start Risk Scores increase. Table 4 shows the number of predicted pregnancy-associated traumatic deaths per 100,000 births for risk scores between 0 and 9. For example, among 100,000 pregnant women with a risk score of 4, we can expect 47.88 traumatic deaths (CI, 45.59–50.28). The graph in Figure 3 shows a dramatic increase in predicted traumatic deaths per 100,000 births as Healthy Start Risk Scores increase.

Because a risk score of 4 is an important cutoff for referral to services, we show in Table 5 that a woman with a score of 4 has 11.78 times (CI, 4.63–29.69) the risk of traumatic death compared with a woman with a risk score of 0. Table 6 shows that the estimated RR and its 95% CI for a pregnant woman with a given score (s) compared with a woman with the next lower score ($s - 1$). With a score of 4, a woman has a predicted risk of traumatic death 1.79 times that of a woman with score of 3 (CI, 1.11–2.89).

The RR of pregnancy-associated traumatic death for a pregnant woman with risk score of 4 or more was calculated to be 3.27 (CI, 2.35–4.56) compared with women who scored 0 to 3. This RR is nearly double that reported for a Healthy Risk Prenatal

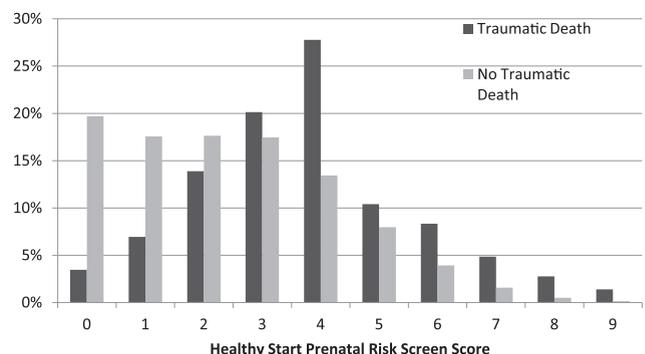


Figure 2. Distribution of risk scores on the healthy start prenatal screen.

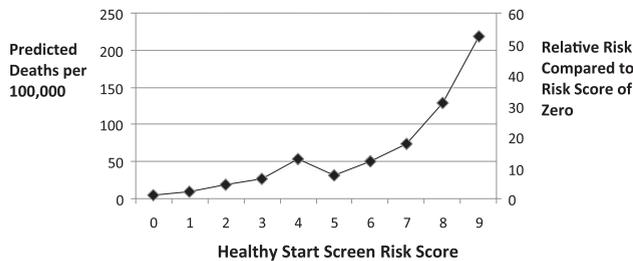


Figure 3. Predicted traumatic deaths per 100,000 births and corresponding relative risk.

Risk Screen of 4 or greater to predict adverse birth outcome (RR, 1.77; Clark & Thompson, 2004).

In addition to its efficacy in identification of risk for infant mortality (Florida Department of Health, 2010) and low birth weight (Thompson, 2011), the Florida Healthy Start screen seems to be useful for the identification of women at increased risk of traumatic death. It is likely that, because this screen includes similar questions to prenatal risk screens used in other states, the findings from this study may be generalized to other providers whose screens assess the 15 risk factors named herein.

Discussion

The strength of this study is that it uses a large, administrative dataset to analyze an instrument that is required by statute to be used to screen every pregnant woman. A limitation of the study is that it is retrospective, and benefits to women of interventions resulting from the screening are speculative. It is currently unknown to what extent interventions intended to reduce prematurity also have beneficial effects on mothers' risks of traumatic death. Indeed, because the services provided to eligible mothers vary depending on capacity of local service providers, it is a limitation of this study to associate any specific service provided to women with their outcome in terms of maternal death.

Pregnancy-associated traumatic death is a rare event. In Florida, the incidence is 24 traumatic deaths per year on average. Although not all women participate, Medicaid beneficiaries are more likely to complete the Healthy Start Screen (Florida Department of Health, 2007). However, the highest risk group of all—women who deliver without receiving any prenatal care—were, by definition, unscreened.

A comparison of the proportions in the sociodemographic characteristics of women who were screened and not screened indicated that the two groups differed in their sociodemographic characteristics (Table 2). Women who were not screened were less likely to be teenagers, more likely to be married, and more likely to be high school graduates. Then, a comparison of the proportions in the sociodemographic characteristics of unscreened and screened women who died of trauma revealed

the same differences. Unscreened women suffering traumatic death were less likely to be teenagers, more likely to be married, and more likely to be high school graduates.

Although all women in Florida are offered the Healthy Start Screen, providers are more likely to obtain patient permission to screen when they perceive that women would qualify for and benefit from Healthy Start services. These findings illustrate the importance of universal screening for risk. Providers cannot tell by looking at their patients who might benefit from screening and services. Indeed, it is interesting to speculate whether some of the unscreened women's deaths might have been prevented if referral for Healthy Start services had been made.

Implications for Practice and Policy

A majority of pregnant and postpartum women are seen repeatedly by doctors or other healthcare professionals during the course of their pregnancy and in the postpartum period. These visits create a unique opportunity for the detection of risk factors and subsequent, appropriate interventions to reduce them. Intimate partner violence, prescribed or recreational drug use or misuse, motor vehicle safety including use of seat belts and avoiding texting and driving are potential issues that could be addressed during prenatal and postpartum care. The implementation of prenatal risk screen to also identify women at increased risk for traumatic pregnancy-associated death would help to ensure that appropriate referrals are made for the protection of both mother and baby.

Women in Florida who score 4 or more on the Healthy Start Prenatal screen are offered home visitation services by a nurse. Acceptance of offered services is not required, but those who do accept receive a series of visits where health and social needs are addressed. Although it is unknown whether services offered in hopes of improving infant outcomes actually improved maternal outcomes, it is plausible that involvement in prenatal health promotion activities lowers the risk of traumatic death. For example, women who do not feel safe at home are further screened and referred for services if they are victims of intimate partner violence. Intimate partner violence threatens the well-being of infant and mother equally. Women needing safe housing may be assisted in relocating to housing for which they qualify. Safer housing for infants is likely to benefit mothers as well. Women with insufficient food to meet their families' nutritional needs receive assistance and encouragement to breastfeed. Women with medical complications of pregnancy receive support ensuring access to follow-up visits and recommended therapies. Women who smoke are assisted with access to smoking cessation support. Most important, at-risk women develop a relationship with the home visitation provider.

The strength of the Healthy Start program resides in the trusting relationship built between a nonjudgmental provider and client or patient. When developed, a strong and long-

Table 4
Predicted Number of Traumatic Deaths per 100,000 Pregnancies and 95% Confidence Interval

Risk Score	0	1	2	3	4	5	6	7	8	9
No. of deaths	4.09	9.17	18.27	26.76	47.88	30.35	49.07	71.84	126.14	215.05
Upper confidence limit	6.05	11.15	20.15	28.63	50.28	34.58	57.77	95.03	205.78	571.79
Lower confidence limit	2.76	7.54	16.56	25.01	45.59	26.63	41.68	54.31	77.33	80.88

Table 5
Relative Risks and 95% Confidence Intervals for Subjects in Specified Risk Categories Compared with Zero

Healthy Start Score	1	2	3	4	5	6	7	8	9
Relative risk	2.24	4.47	6.55	11.78	7.43	12.01	17.58	30.87	52.63
Upper confidence limit	6.57	11.91	16.92	29.69	20.44	34.09	55.39	114.92	270.96
Lower confidence limit	0.77	1.68	2.54	4.63	2.7	4.23	5.58	8.29	10.22

lasting relationship offers opportunities to emphasize public health measures that may reduce pregnancy-associated maternal mortality owing to trauma. Historically, these relationships were created between the patient/client and the provider during a home visit, but equally effective relationships may be created at other sites, such as work, faith-based institutions, or community centers. Because Healthy Start services continue after the baby is born, the provider may model parenting behavior to the benefit of the mother and other family members. The provider can also be vigilant in assessing for postpartum depression (which may lead to accidental drug overdose or suicide). Risk reduction services could be expanded to include educational interventions that may limit the possibility of traumatic injury to mothers. For example, providers can remind mother to fasten her seatbelt, use a child car seat, and avoid cell phone or text messaging while driving. The provider may also provide counseling on the dangers of drinking and driving, or getting into a car with an impaired driver. These safety reminders could also become part of office care delivered during pregnancy and postpartum visits.

Physicians and other women's health professionals are a vital link to resources such as Healthy Start. If the results of the Healthy Start screen became an additional vital sign recorded at the first prenatal visit, addressing the social determinants of health would become an essential part of women's health care (Halfon, Larson, & Russ, 2010). Obstetric visits can and often do extend beyond medical care to address underlying psychosocial issues and risks. In the case of pregnant women, some traumatic pregnancy-associated deaths may be preventable if providers are aware of the double utility of the Florida Health Start Prenatal Risk Screen. Programs and policies that currently focus on infant outcomes could, in the future, address more broadly the life course outcomes of women and children. Because the Healthy Start Prenatal Risk Screen has elements that identify both mother and infant at risk for premature mortality, the overlap in risk factors is noteworthy. Indeed, a second instrument to assess maternal risk of traumatic death is likely not required.

Because the Affordable Care Act has created a set of prevention and screening measures that will be available to all women in the future and will be covered by insurance plans, more women will undergo intimate partner violence screening at their health care visits. This screening could include other social risk factors as covered by the Healthy Start Screen

Table 6
Estimated Relative Risks (RR) and 95% Confidence Intervals for Comparing Subjects in Specific Risk Categories

Risk Score	1	2	3	4	5	6	7	8	9
RR (s:s-1)	2.24	1.99	1.46	1.79	0.63	1.62	1.46	1.76	1.79
Lower confidence limit	0.77	0.93	0.83	1.11	0.35	0.76	0.58	0.51	0.31
Upper confidence limit	6.57	4.26	2.59	2.89	1.15	3.45	3.72	5.99	9.28

without adding unduly to the length of the screening encounter, redoubling the value of the screening and allowing for appropriate referral and intervention.

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