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# Healthy Start Prenatal Screening: Preterm Birth and Low Birth Weight Percentages by Screening Score

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8/24/11 – Dan Thompson

## Introduction and Background

Florida implemented the statewide Healthy Start initiative in April 1992, as a result of legislation passed in 1991. Section 383.14, Florida Statutes required the Department of Health to develop a multilevel screening process that includes a risk assessment instrument to identify women at risk for a preterm birth or other high-risk conditions. The prenatal risk assessment is a major component of Healthy Start initiative.

The department developed the original Healthy Start Prenatal Risk Screen instrument in 1991 in collaboration with the Healthy Start Advisory committee, which included representatives from county health departments, universities, the legislature, and the private healthcare sector. The prenatal risk screening criteria were revised in 1994. The prenatal risk screening criteria were not revised again until July 2008, in conjunction with a newly designed Healthy Start prenatal risk screening form.

Department of Health staff and the Florida Association of Healthy Start Coalitions, in collaboration with other perinatal health professionals, spent two years developing the revised screening criteria implemented in 2008.

Extensive reviews of research literature were done and available data were analyzed. The goal was to improve the effectiveness, ease of use, and acceptability of prenatal risk screening.

Department staff continues to assess the performance and effectiveness of the prenatal screen. The purpose of this analysis is to assess the relationship between the screening risk scores and two birth outcomes: preterm birth and low birth weight.

## Methods

For this analysis, screenings conducted in 2009 were linked to singleton birth records. Multiple births were excluded from the analysis since they tend to have risk factors for low birth weight and preterm birth that are different from the risk factors for singleton births. There were 168,556 prenatal screening records for 2009 that were done with the new screening. These records were linked to birth records in two ways. The first linking process used the social security number (SSN) and the mother's birth date to link the records. An unduplicating process was conducted since there were instances where women were screened more than once within a pregnancy event or may have been pregnant more than once during 2009. The screening records were unduplicated so that each unique combination of SSN and mother's date of birth was represented by one record in the data file. After unduplicating and excluding records with

invalid SSNs and birth dates, there were 146,109 (87%) screening records. The second linking process was the same as the first except the linking key used was the first five letters of the mother's first name and the birth date. After both linking processes were done there were 111,513 prenatal screening records linked to birth records. Most of these (101,081 or 91%) were linked using the SSN and date of birth, and the rest (10,432 or 9%) were linked using the second method. In summary, there were 168,556 prenatal screening records for 2009 and after unduplicating, linking and excluding multiple births, there were 111,513 (66%) linked records available for the analysis. Some of the prenatal screening records did not link to birth records because the pregnancies did not end with live births. In some cases, live births may have occurred in another state if the pregnant woman relocated after the screening but before the birth. Also, some prenatal screening records did not link to birth records due to a failure of the linking process. With the data available for this analysis, it is not possible to determine what proportions of the non-linked records are attributable to each of these factors.

The linked records were used to categorize the screened women by Healthy Start risk screening score. In practice, a score of 6 or higher is classified as a positive screening. The percentages of low birth weight births and preterm births were then calculated for each score category. The birth weight from the birth record was used to determine if infants were below 2500 grams at birth. Birth weights below 500 grams and above 8000 grams were excluded since they are very likely to be data entry errors. There were 157 of these on the linked file. The clinical estimate of gestational age was used to determine if infants were born before 37 weeks of gestation. Gestational ages over 41 weeks were excluded as implausible. There were 347 of these on the linked file.

## Results

As shown in the graphs and tables below, the percentages of low birth weight and preterm birth increase steadily with increasing screening scores. For example, the low birth weight percentage for women with a risk score of zero is 2.9%. This percentage increases with each increase in risk score and for women with a score of 6 the percentage is 9.0% or more than 3 times the percentage for women with a score of zero. It is worth noting that even for risk scores in the negative range of zero to 5, the percentages increase. For example, the percentage for women with a score of 5 is 7.4% which is more than double the percentage of 2.9% for women with a score of 0. The same pattern is evident for preterm birth.

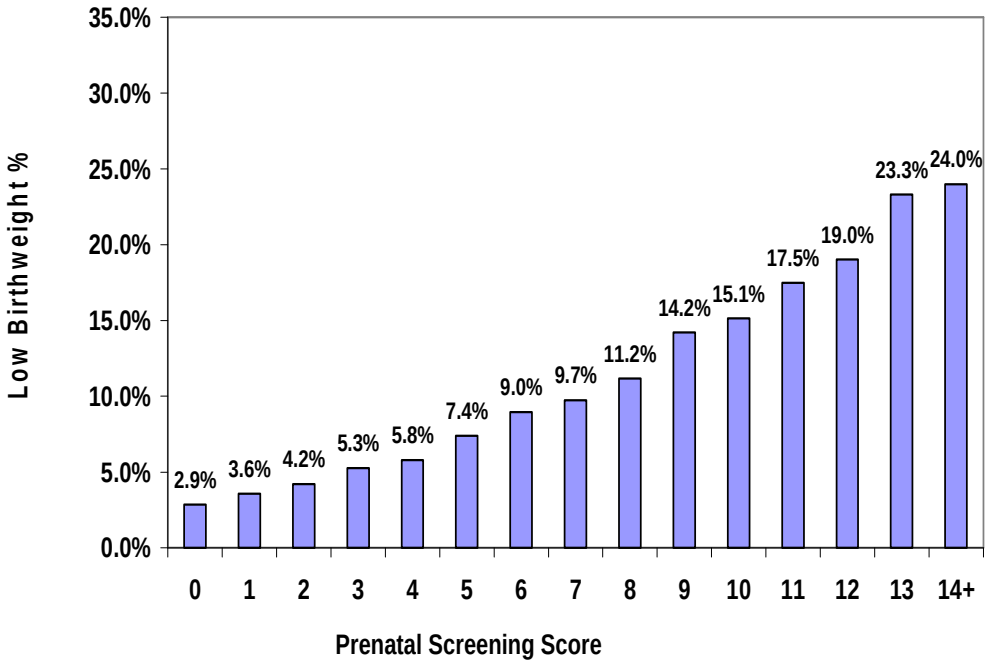
## Limitations

One potential limitation is the accuracy of the linking between the prenatal screening and birth records. Another limitation is the accuracy of the birth record data. If the data on the birth record used to classify the births as preterm or low birth weight is incorrect, then infants could be incorrectly classified regarding low weight or preterm births.

## Conclusion

The Healthy Start prenatal screening risk scores are closely correlated with risk of low birth weight and preterm birth. Women with higher scores on the screening have higher risks for both of these outcomes.

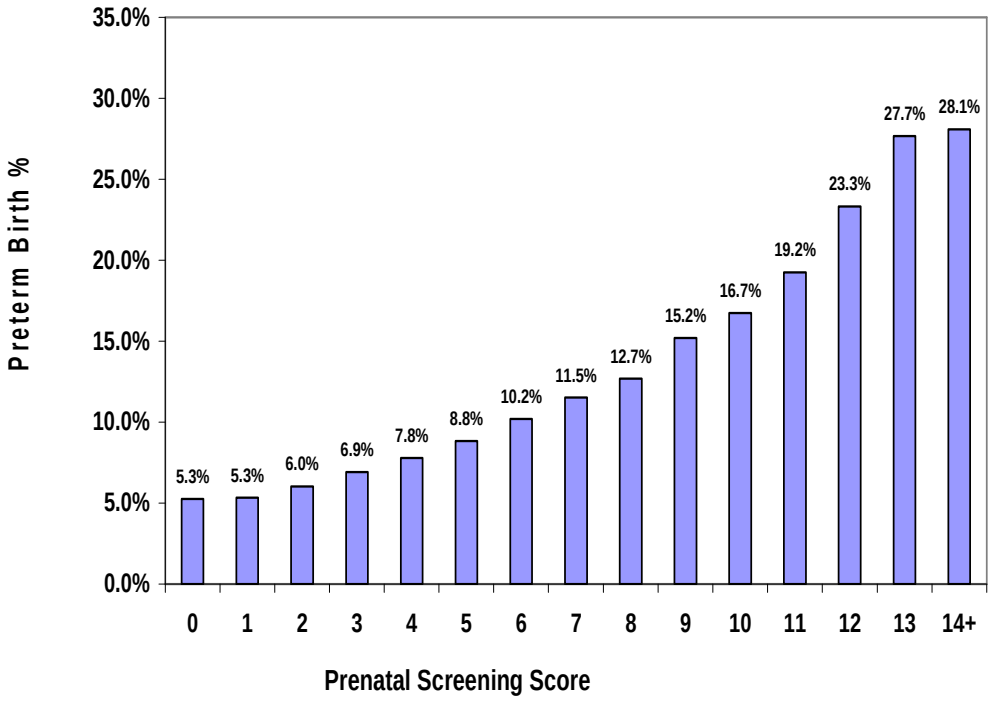
## Low Birth Weight* Percentages for Singleton Births by Healthy Start Prenatal Screening Score For 111,356 Women Screened in 2009




Source: Florida Department of Health, Division of Family Health Services

* Birthweight < 2500 grams

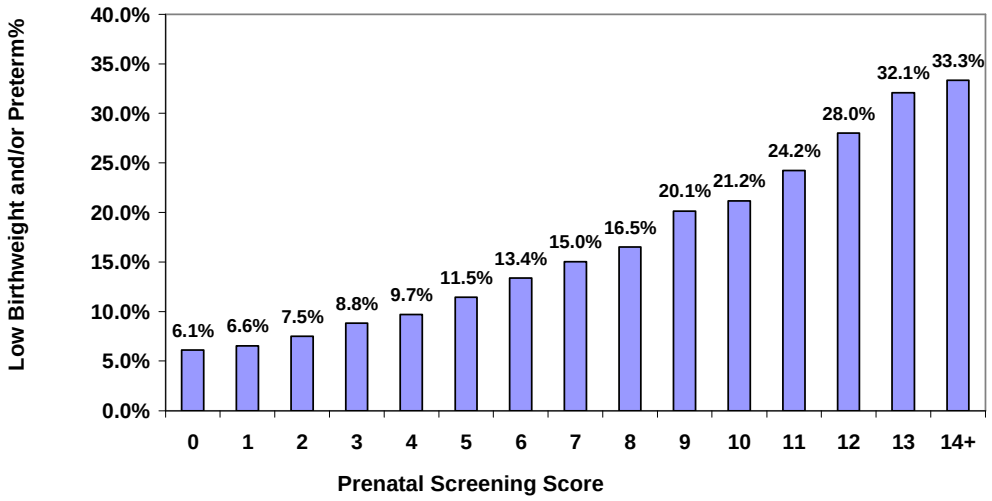
## Preterm Birth* Percentages for Singleton Births by Healthy Start Prenatal Screening Score For 111,166 Women Screened in 2009




Source: Florida Department of Health, Division of Family Health Services

* Gestational age < 37 weeks

**Percentages of Low Birth Weight* and/or Preterm* Birth**
**for Florida Singleton Births**
**by Healthy Start Prenatal Screening Score**
**For 111,513 Women Screened in 2009**




Source: Florida Department of Health, Division of Family Health Services

* Birthweight < 2500 grams and/or gestational age < 37 weeks

## Low birth Weight Percentages for Singleton Births by Healthy Start Prenatal Screening Score For 111,356 Women Screened in 2009

| Healthy Start Prenatal Screening Score | Number of Women | Low Birth Weight ( < 2500 grams ) Births | Low Birth Weight Percent | Margin of Error (Alpha = 0.05) | Cumulative* Low Birth Weight ( < 2500 grams ) Percent |
|---|---|---|---|---|---|
| **0** | 7919 | 227 | 2.9% | 0.4% | 7.0% |
| **1** | 10434 | 374 | 3.6% | 0.4% | 7.3% |
| **2** | 15814 | 667 | 4.2% | 0.3% | 7.8% |
| **3** | 16529 | 871 | 5.3% | 0.3% | 8.5% |
| **4** | 14725 | 853 | 5.8% | 0.4% | 9.4% |
| **5** | 12114 | 895 | 7.4% | 0.5% | 10.5% |
| **6** | 10824 | 969 | 9.0% | 0.5% | 11.6% |
| **7** | 7957 | 775 | 9.7% | 0.7% | 12.8% |
| **8** | 5565 | 622 | 11.2% | 0.8% | 14.5% |
| **9** | 3773 | 536 | 14.2% | 1.1% | 16.4% |
| **10** | 2405 | 364 | 15.1% | 1.4% | 17.9% |
| **11** | 1395 | 244 | 17.5% | 2.0% | 20.0% |
| **12** | 783 | 149 | 19.0% | 2.7% | 21.8% |
| **13** | 498 | 116 | 23.3% | 3.7% | 23.7% |
| **14+** | 621 | 149 | 24.0% | 3.4% | 24.0% |
| **Total** | 111356 | 7811 | 7.0% | 0.2% | |

*Percent low birth weight for births with this screening score or higher

## Preterm Birth Percentages for Singleton Births by Healthy Start Prenatal Screening Score For 111,166 Women Screened in 2009

| Healthy Start Prenatal Screening Score | Number of Women | Preterm Births ( < 37 weeks ) | Preterm Birth Percent | Margin of Error (Alpha = 0.05) | Cumulative* Preterm Birth ( < 37 weeks ) Percent |
|---|---|---|---|---|---|
| **0** | 7902 | 415 | 5.3% | 0.5% | 8.8% |
| **1** | 10412 | 554 | 5.3% | 0.4% | 9.0% |
| **2** | 15768 | 950 | 6.0% | 0.4% | 9.4% |
| **3** | 16490 | 1137 | 6.9% | 0.4% | 10.1% |
| **4** | 14691 | 1143 | 7.8% | 0.4% | 11.0% |
| **5** | 12091 | 1067 | 8.8% | 0.5% | 12.0% |
| **6** | 10814 | 1102 | 10.2% | 0.6% | 13.2% |
| **7** | 7958 | 915 | 11.5% | 0.7% | 14.6% |
| **8** | 5561 | 705 | 12.7% | 0.9% | 16.3% |
| **9** | 3771 | 573 | 15.2% | 1.1% | 18.4% |
| **10** | 2408 | 403 | 16.7% | 1.5% | 20.4% |
| **11** | 1393 | 268 | 19.2% | 2.1% | 23.2% |
| **12** | 785 | 183 | 23.3% | 3.0% | 26.0% |
| **13** | 499 | 138 | 27.7% | 3.9% | 27.9% |
| **14+** | 623 | 175 | 28.1% | 3.5% | 28.1% |
| **Total** | 111166 | 9728 | 8.8% | 0.2% | |

* Percent preterm for births with this screening score or higher

## Percentages of Singleton Births That Were Low Birth Weight and/or Preterm by Healthy Start Prenatal Screening Score For 111,513 Women Screened in 2009

| Healthy Start Prenatal Screening Score | Number of Women | Low Birth Weight ( < 2500 grams ) and/or Preterm ( < 37 weeks ) Births | Low Birth Weight ( < 2500 grams ) and/or Preterm ( < 37 weeks ) Percent | Margin of Error (Alpha = 0.05) | Cumulative* Low Birth Weight ( < 2500 grams ) and/or Preterm ( < 37 weeks ) Percent |
|---|---|---|---|---|---|
| **0** | 7923 | 485 | 6.1% | 0.5% | 11.1% |
| **1** | 10442 | 685 | 6.6% | 0.5% | 11.5% |
| **2** | 15823 | 1192 | 7.5% | 0.4% | 12.1% |
| **3** | 16545 | 1460 | 8.8% | 0.4% | 13.0% |
| **4** | 14740 | 1431 | 9.7% | 0.5% | 14.1% |
| **5** | 12135 | 1390 | 11.5% | 0.6% | 15.6% |
| **6** | 10846 | 1449 | 13.4% | 0.6% | 17.0% |
| **7** | 7979 | 1198 | 15.0% | 0.8% | 18.7% |
| **8** | 5576 | 922 | 16.5% | 1.0% | 20.7% |
| **9** | 3782 | 762 | 20.1% | 1.3% | 23.2% |
| **10** | 2413 | 511 | 21.2% | 1.6% | 25.1% |
| **11** | 1398 | 339 | 24.2% | 2.2% | 28.0% |
| **12** | 785 | 220 | 28.0% | 3.1% | 30.8% |
| **13** | 502 | 161 | 32.1% | 4.1% | 32.8% |
| **14+** | 624 | 208 | 33.3% | 3.7% | 33.3% |
| **Total** | 111513 | 12413 | 11.1% | 0.2% | |

*Percent for births with this screening score or higher