



APGAR SCORE AND INFANT MORTALITY IN PUERTO RICO

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The Apgar Score was introduced in 1952 with the purpose of assessing the physical condition of the newborn infant at his first minute of life (1). Later on, Drage, et.al. recommended to be also taken at the five minutes of life, a practice that have been accepted (2).

The Apgar Score varies between a minimum value of zero (0) to a maximum of ten (10) obtained through the observation of five signs of life: heart rate, respiratory effort, muscle tone, reflex irritability and color (1). Newborn infants are usually grouped into three categories according to their ratings: severely depressed (0-3), moderately depressed (4-6) and good to excellent physical conditions (7-10). Sometimes the group with 7-10 scores are subdivided into good (7-8) and excellent (9-10) conditions.

It has been claimed that the 1-minute assessment is an indication of the newborn's condition at birth while the 5-minutes value is a combination of the infant's condition at birth and the care received during his first five-minutes of life (3). One of the major objectives of the system was to utilize the score as a predictor of the outcome (4). Thus, as Crawford, et.al. suggested one of the most important contributions of the system have been "the intensive interest exhibited internationally in the newborn infant" (4).

In spite of the fact that Apgar's data have been considered accurate enough for its purposes, some health scientists are not of the same opinion and have questioned its usefulness (5).

Although this evaluation system began to be used in Puerto Rico in some hospitals few years after Apgar's recommendation, and in spite of the extensive and intensive attention which has received (6-21), the authors have been unable to find at least a single study dealing with this matter in the Island. Items about the 1-minute and 5-minutes scores were introduced into Puerto Rico's live birth certificate in 1978, but such data began to be published in 1979 (22). Although the results obtained for that year were similar to those recorded in the United States in 1978 (3), the high proportion of "non-response" in the birth certificates of Puerto Rico (11 percent for the 1-minute and 12 percent for the 5-minutes) makes the comparison somewhat uncertain. Since then, the "non-response error" has been reduced considerable (0.3 percent in 1990). Although at present the data seem to be relatively accurate at first glance, the authors will try to assess its usefulness through an analysis of consistency.

The main objectives of this study are:

1. To uncover the relationships between Apgar Score and some demographic and socioeconomic characteristics of the mother, the adequacy of the prenatal care received, her pregnancy and delivery complications, and her infant's birthweight and gestational age. If the expected relationships are confirmed, this analysis will show in an indirect way the degree of usefulness of this score as indicator of the physical condition of the newborn infant.

2. To determine if the Apgar Score is in Puerto Rico a good predictor of the newborn probability of surviving his first year of life.

METHODS

The data utilized in this study was derived from a file of the 1990's birth certificates (computer tape) obtained from the Department of Health of Puerto Rico. In the analysis of the relationship between Apgar Score and infant mortality, the file of the 1990 live birth cohort in which data about the corresponding infant deaths were included, will be used.

Simple analytic techniques such as percent distributions, proportions and death ratios will be utilized in this study. Infant death ratios differ slightly from the conventional infant death rates as they are based on a cohort experience. For this reason, infants dying in Puerto Rico but born elsewhere were not considered whereas they are included in the conventional infant death rates. Ratios are expressed in per 1,000 live births in the case of neonatal and total infant mortality and in per 1,000 neonatal survivors in the case of late infant mortality.

RESULTS

According to the 1990 data, one percent of the newborn infants was in an extremely depressed condition at the first minute of life. Almost four percent was considered moderately depressed and 15 percent was evaluated in excellent conditions (9 and 10) (Table 1). These figures changed considerably between the 1-minute and the 5-minutes assessment. The most striking change was the

increment in the proportion of newborns considered in excellent physical conditions; an increase from 12 percent to 91 percent. The same trend is observed among infants born in private hospitals as well as among those born in public institutions, although newborns delivered in private settings have higher scores than those born in public hospitals.

(TABLE 1)

The radical change in the percentage of newborn considered in excellent conditions from the 1-minute to the 5-minutes evaluation was due to an enormous score's increase from 8 to 9. According to the 1990 data, 97 percent of the newborns with an eight score in the 1-minute evaluation experienced such a change. This striking increase, has also been observed in the United States (3).

Correlates of Apgar Score

In this section, the authors will considered only the 5-minutes score as it has been claimed that it is a better predictor of the newborn's chances of survival than the 1-minute (3, 1). However, much similar relationships were found with respect to the 1-minute score. Mother's age showed a weak association with her newborns 5-minutes score although the proportion of infants classified in excellent physical conditions (9-10 scores) presented a curvilinear relationship; those of mother's 25-34 years of age having the highest percentage. The highest figures of depressed newborns (0 to 6 scores) were recorded among infants of adolescent mothers and among those of 35 years of age and older.

A similar association was observed between the 5-minutes Apgar

Score and mother's parity. Primiparae and high parity mothers had the highest percentages of depressed newborns and the lowest percentages of infants considered in excellent conditions.

Mother's marital arrangement was closely associated with their newborns' conditions. Infants of legally married mothers had the highest Apgar Scores whereas those of unwed ones had the lowest.

Mother's schooling was directly associated with their newborns physical state; as mother's number of years of school completed increased, the proportion of depressed infants (0-6) declined whereas the percentage evaluated in excellent conditions increased.

(Table 2)

One of the most clear-cut associations was observed between the newborn's Apgar Score and the number of prenatal visits made by his mother (Table 3). The percent of depressed newborns, both severely and moderate, decreased as the number of prenatal visits made by the mother increased whereas the proportion assessed in excellent conditions showed a direct association. Contrary to what should be expected, the trimester of pregnancy in which mother's prenatal care began showed no association with her newborn's Apgar Score. In fact, the lowest proportion of depressed infants corresponded to those whose mothers began the care in the second trimester of pregnancy.

The Kessner Index (23) which combines the number of prenatal visits and month of pregnancy in which the care began with the weeks of pregnancy at the outcome to assess the adequacy of the care, showed a clear relationship with the Apgar Score; as the

level of adequacy increased the score increased (Table 3).

Pregnancy and labor complications were found to be closely related to the newborn physical condition. Those infants whose mothers had no complications at all had the lowest proportion of depressed newborns and the highest percentage in excellent conditions. On the other hand, the poorest performance corresponded to those whose mothers had both types of complications. The figures on Table 3 tend to demonstrate that delivery complications had a more depressing effect than pregnancy problems.

(Table 3)

As expected, birthweight and gestational age were closely associated with Apgar Score. The 5-minutes rating increased as birthweight increased but among heavyweight newborns there was a slight decline (Table 4). A similar relationship was observed with gestational age.

When birthweight and gestational age were combined a clear-cut association emerged. Newborns who were both low birthweight and preterm had a very high proportion of depressed infants and a very low percentage in excellent physical conditions (Table 4). To be low birthweight seems to have more influence in the condition of the newborn than to be preterm.

(Table 4)

To determine if Apgar Score was a function of other variables such as the newborn birthweight and gestational age a simple linear regression analysis was undertaken in which the 5-minutes score, the dependent variable, was arbitrarily considered as a

quantitative variable (interval). The simple correlation coefficients obtained demonstrate that out of 12 independent variables considered, only weeks of gestation, type of hospital in which the delivery took place, number of prenatal visits made by the mother and birthweight showed relatively strong relationships with Apgar Score (Table 5). However, when a multiple regression analysis was undertaken, only weeks of gestation and type of hospital in which the delivery took place had partial correlation coefficients of relative importance. Thus, this analysis demonstrated that Apgar Score is an independent indicator which has little to do with birthweight.

Apgar Score and Infant Mortality

The 1990 data showed that infant mortality was closely associated with the newborn 5-minutes Apgar Score. This was true both for neonatal as well as for late infant mortality. As shown on Table 6, infant mortality ratios declined rapidly and consistently as the Apgar Score increased. Although not included in this study, similar trends were observed between the 1-minute Apgar Score and infant mortality.

(Table 6)

To determine whether the relationship between Apgar Score and infant mortality was due to the close relationship between this score and newborn's birthweight and gestational age, cross-tabulations were utilized (contingency analysis). The results presented on Table 7 indicate that the five-minutes Apgar Score had an independent strong relationship with infant mortality.

It is clearly demonstrated that in all the birthweight and gestational age categories neonatal mortality declined consistently as Apgar Score increased.

(Table 7)

DISCUSSION

In this study the association between Apgar Score and a set of independent variables included in the Puerto Rico's live birth certificate was examined. The five-minutes score behaved as expected with almost all the demographic and socio-economic variables considered.

With respect to prenatal care, Apgar Score was clearly and directly associated with the number of prenatal visits but did not behave as expected in relation to the trimester of pregnancy in which the care began. In this case, newborns of mothers who began the care in the first trimester did not have higher scores than those whose mothers began the care in the second trimester. This peculiar relationship has been observed since 1984, the first year for which the authors have been able to analyze these data. It seems that if prenatal care do not begin too late (e.g. third trimester of pregnancy) the month of pregnancy in which is initiated has at present little to do with the outcome. In Sweden, for example, 98 percent of the mothers began this care in the first trimester whereas in Japan the corresponding figure was 50 percent (24). But in spite of this difference Japan has the lowest infant mortality rate of the World and Sweden a slightly higher.

The 1990 data showed, as expected, that low birthweight and heavy birthweight newborns had the lowest Apgar Scores. A similar relationship was observed with respect to gestational age. On the other hand, infants born in private hospitals were in better physical health conditions at birth than those delivered in public

facilities. As the 1990 data demonstrate, this difference was due mainly to socio-demographic differences between the two clientele. The majority of adolescent and unwed mothers as well as those of the lowest socioeconomic level had their deliveries in public hospitals whereas the opposite is true for private institutions (25). In addition, the quality of this care seems to be better in private settings than in public ones.

One of the most important findings of this study was the strong negative association between infant mortality and Apgar Score, even when the effect of other important independent variables such as birthweight and gestational age were held constant. In an unpublished study Vázquez-Calzada found that Apgar Score is the best predictor of neonatal mortality in Puerto Rico (26).

The results of this study tend to demonstrate that Apgar Score is an adequate indicator of the newborn condition at birth and a very good predictor of infant mortality. Thus, if this assessment is not carried out by some physicians as indicated, a criticism that the authors have heard many times, its improvement would undoubtedly increase its power of predictability of the newborn's probability of dying during his first year of life. It would also be a much better indicator of the newborn physical condition at birth. It must be recognized that Apgar Score is not a perfect index but it cannot be accepted that it is such a poor measure as some health scientists have concluded (5). If such assertion would be true we will be facing a perplexing scientific enigma; how

is, that such an unreliable measurement can be such a good predictor of an outcome as evidenced by almost all studies and almost everywhere?

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SUMMARY

This study has as its objectives: 1) to examine the association between Apgar Score and a set of demographic and socioeconomic variables so as to assess its usefulness as an indicator of the physical conditions of the newborn; 2) to determine if Apgar Score in Puerto Rico is a good predictor of the newborn probability of surviving during his first year of life. For this purpose the 1990 live births and infant deaths data was utilized. The results indicate a direct relation between Apgar Score with mother's schooling, father's occupation, and number of prenatal visits. Apgar Score shows, also, an U curve type relationship with birthweight and gestational age, while it was found to be higher in private than in public hospitals. One of the most important findings was the strong association between infant mortality and Apgar Score, even when the effect of other important independent variables such as birthweight and gestational age were held constant. These results demonstrate that, in spite of its criticisms Apgar Score seems to be an excellent indicator of the newborn conditions at birth and a very good predictor of infant mortality in Puerto Rico.

Key Words: Apgar Score, Prenatal Care, Infant birthweight, Infant gestational age, Infant Mortality.

RESUMEN

Este estudio tiene como objetivos: 1) examinar la asociación entre el valor Apgar y un grupo de variables demográficas y socioeconómicas para evaluar su utilidad como indicador de la condición física del recién nacido, 2) determinar si el valor Apgar es un buen pronosticador de la probabilidad de sobrevivencia del recién nacido durante su primer año de vida. Para estos propósitos se utilizaron los datos de Puerto Rico correspondientes a los nacidos vivos en 1990 así como las muertes infantiles correspondientes a este cohorte de nacimientos. Los resultados indican una relación directa entre el valor Apgar y el nivel de instrucción de la madre, la ocupación del padre y el número de visitas prenatales. El valor Apgar muestra, además, una relación de tipo U con la edad y resulta ser más alta entre los nacidos vivos en hospitales privados que entre los nacidos en hospitales públicos. Un hallazgo importante de este estudio fue la fuerte relación negativa entre la mortalidad infantil y el valor Apgar, aún controlado el efecto de otras variables independientes como peso y edad gestación. Este estudio demuestra que a pesar de las críticas, el valor Apgar parece ser un excelente indicador de las condiciones físicas del recién nacido y un buen pronosticador de la mortalidad infantil en Puerto Rico.

REFERENCES

- (1) Apgar V. A proposal for a new method of evaluation of the newborn infant. *Current Researches in Anesthesia and Analgesic*; 32:260-67, 1953.
- (2) Drage JS. The Apgar Score as an index of infant mortality. *Develop. Med. Child Neurol*; 8:141, 1966.
- (3) Querec LJ. Apgar Score in the United States: 1978, *Monthly Vital Statistics Report*; 30:1, 1981.
- (4) Crawford JS, Davis P, Pearson JF. Significance of the individual components of the Apgar Score; *Bret. J. Anaesth*; 45:148-158, 1973.
- (5) Sykes GS, et.al., Do Apgar scores indicate asphyxia?, *The Lancet*: 494-496, 1982.
- (6) Colburn DH, Salzman H. Apgar Score in the evaluation of the newborn infant. *N.Y. St. J. Med*; 60:240, 1960.
- (7) Barrie H. The Apgar evaluation of the newborn infant. *DEV. Med. Child. Neurol*; 4:128-132, 1962.
- (8) Chamberlain G, Banks J. Assessment of the Apgar Score. *The Lancet*, 1225-1228, 1974.
- (9) Dureck HS, et.al. Developmental sequelae in infants having suffered severe perinatal asphyxia. *Am. J. Obstet. Gynecol*; 119:811-815, 1974.
- (10) Hebre H. The Apgar evaluation of the newborn infant. *Dev. Med. Child. Neurol*; 4:128-132, 1974.
- (11) Thompson AJ, Searle M, Russell G. Quality survival after severe birth asphyxia. *Arch. Dis. Child.*; 52:620-626, 1977.
- (12) Mulligan JC, et.al. Neonatal mortality and long term sequelae. *J. Pediatr.*; 96:903-907, 1980.
- (13) Jenvett RJ, et.al. Apgar index: A statistical tool, *Am. J. Obstet. Gynecol*, 140:206-211, 1981.
- (14) Nelson KB, Ellen JH, Apgar scores as predictors of Chronic neurologic Disability, *Pediatrics*; 68:36-44, 1981.
- (15) Miller JM, Levien DH, Michel Y., Low Apgar Scores and neonatal mortality; *Obstet. Gynecol.*, 63:602-603 (letter), 1984.
- (16) *The Lancet*, The value of the Apgar Score; June, 1982.

- (17) Levine DH, Michel Y, Miller JM, Another look at the Apgars, Clin. Res; 30:885A, 1982.
- (18) Atkinson D. An Evaluation of Apgar scores as predictors of infant mortality, N. Car. Med. J.; 44:46-54, 1983.
- (19) Committee on Fetus and Newborn. Use and abuse of the Apgar Score. Am. Acad. Ped.; 1148-1149, 1986.
- (20) Deckercq ER., Out of Hospitals births, U.S.; 1978, Birthweight and Apgar scores as measures of outcome. Pub. H. Rep.; 64-74, 1984.
- (21) Catlin EA, et.al., The Apgar score revisited; influence of gestational age, J. Pediatr; 109:865-868, 1986.
- (22) Departamento de Salud de Puerto Rico, Informe Anual de Estadísticas Vitales, 1979.
- (23) Hughes D. et.al., The health of America's Children, Children's Defense Fund, Washington, D. C., Technical Note, 1988.
- (24) Borgsjo, P., Baketeing LS. Overview of Maternal and Infant Care in ICE Countries and States. In: Centers for Disease Control, National Center for Health Statistics 1992, Proceedings of the International Collaborative Effort on Perinatal and Infant Mortality, Volume III.
- (25) Departamento de Salud de Puerto Rico, Informe Anual de Estadísticas Vitales: 1990.
- (26) Vázquez-Calzada, JL, Correlates of infant mortality in Puerto Rico (unpublished), School of Public Health, Medical Sciences Campus, University of Puerto Rico.

TABLE 1

PERCENT DISTRIBUTIONS OF NEWBORN ACCORDING TO THE ONE
AND FIVE MINUTES APGAR SCORES AND TYPE OF HOSPITAL
IN WHICH THE DELIVERY TOOK PLACE
PUERTO RICO, 1990

APGAR SCORE	ALL HOSPITALS*		PRIVATE HOSPITALS		PUBLIC HOSPITALS	
	ONE MINUTE	FIVE MINUTES	ONE MINUTE	FIVE MINUTES	ONE MINUTE	FIVE MINUTES
0 - 3	1.1	0.4	0.5	0.2	1.6	0.6
4 - 6	3.3	1.0	1.5	0.3	4.4	1.4
7 - 8	83.3	7.2	77.9	4.5	86.7	8.9
9 - 10	12.3	91.4	20.1	95.0	7.3	89.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of Live Births	66,326	66,326	25,496	25,496	40,830	40,830

*Exclude infants born outside hospitals.

TABLE 2

PERCENT DISTRIBUTIONS OF NEWBORNS BY BROAD GROUPS OF FIVE MINUTES
APGAR SCORE AND SELECTED DEMOGRAPHIC AND SOCIOECONOMIC
VARIABLES, PUERTO RICO, 1990

FIVE MINUTES APGAR SCORE					
VARIABLE	0-3	4-6	7-8	9-10	NUMBER OF LIVE BIRTHS*
Mother's Age					
17 or less	0.4	1.5	9.9	88.2	5,338
18-19	0.4	0.9	8.5	90.2	7,128
20-24	0.4	0.9	7.1	91.6	21,272
25-29	0.4	0.8	6.4	92.3	18,407
30-34	0.5	1.0	6.8	91.7	9,725
35 and over	0.5	1.2	6.9	91.4	4,467
Mother's Parity					
One	0.4	1.1	8.1	90.4	26,113
Two	0.4	0.8	6.3	92.5	20,043
Three	0.4	0.9	6.3	92.4	11,797
Four	0.7	1.1	7.7	90.5	4,621
Five or more	0.6	1.4	8.0	90.0	3,777
Mother's Marital Arrangement					
Legally married	0.3	0.8	6.7	92.2	41,975
Consensually married	0.6	1.1	8.2	90.1	18,640
Unwed	0.7	1.4	8.3	89.6	5,717
Mother's Years of School Completed					
0-6	0.7	1.7	9.1	88.5	3,309
7-11	0.6	1.2	8.7	89.5	18,851
12	0.4	0.9	7.4	91.3	18,898
13-15	0.4	0.8	6.1	92.7	14,530
16 and over	0.3	0.6	5.2	93.8	10,666

*The number of live births in each row represents 100 percent and excludes "not reported".

TABLE 3

PERCENT DISTRIBUTIONS OF NEWBORNS BY BROAD GROUPS OF FIVE
MINUTES APGAR SCORE BY PRENATAL CARE VARIABLES, AND
PREGANANCY AND DELIVERY COMPLICATIONS
PUERTO RICO, 1990

VARIABLE	FIVE MINUTES APGAR SCORE				NUMBER OF LIVE BIRTHS*
	0-3	4-6	7-8	9-10	
Number of Prenatal Visits					
0	3.4	2.8	11.9	81.9	783
1-3	2.2	2.7	10.4	84.7	2,256
4-6	0.9	2.1	3.8	88.2	9,957
7-9	0.4	0.9	8.2	90.5	16,862
10 or more	0.2	0.5	6.0	93.3	36,433
Trimester Prenatal Care Began					
First	0.4	1.0	7.0	91.6	47,041
Second	0.3	0.9	7.6	91.2	15,933
Third	1.2	1.2	8.5	89.2	3,129
Adequacy of Prenatal Care (Kessner Index)					
Inadequate	1.1	1.4	8.8	88.8	6,048
Intermediate	0.4	1.0	7.9	90.7	24,367
Adequate	0.4	0.9	6.5	92.3	35,682
Pregnancy and Delivery Complications					
No Complications	0.2	0.4	5.6	93.9	43,104
Only Pregnancy	0.5	1.0	7.7	90.9	6,405
Only Delivery	0.8	1.9	10.2	87.2	11,834
Both Complications	2.0	3.9	14.4	79.7	4,639

*The number of live births in each row represents 100 percent and excludes "not reported".

TABLE 4

PERCENT DISTRIBUTIONS OF NEWBORNS BY BROAD GROUPS OF FIVE
MINUTES APGAR SCORE BY BIRTHWEIGHT AND GESTATIONAL AGE
PUERTO RICO, 1990

VARIABLE	FIVE MINUTES APGAR SCORE				NUMBER OF LIVE BIRTHS*
	0-3	4-6	7-8	9-10	
Birthweight (in grams)					
1500 or less	20.1	29.4	32.6	18.0	763
1501 - 2000	2.7	7.1	35.9	59.3	1,054
2001 - 2500	0.7	2.1	15.4	81.8	4,205
2501 - 3000	0.2	0.6	7.0	92.2	15,678
3001 - 3500	0.1	0.4	5.2	94.3	27,266
3501 - 4000	0.1	0.4	5.4	94.1	14,075
4001 and over	0.0	0.4	7.5	92.1	3,178
Weeks of Gestation					
36 or less	2.7	4.9	16.3	76.1	7,501
37	0.1	0.5	7.3	92.1	5,892
38	0.1	0.4	5.2	94.3	11,396
39	0.1	0.3	5.3	94.3	15,561
40	0.1	0.5	5.9	93.5	14,436
41	0.2	0.7	7.5	91.6	7,097
42 and over	0.3	0.8	7.6	91.2	4,286
Low Birthweight or Preterm†					
Nor Low Birthweight nor Preterm	0.1	0.4	5.7	93.8	55,902
Only Preterm	0.3	0.7	8.1	90.8	4,238
Only Low Birthweight	0.9	1.8	14.2	83.1	2,752
Low Birthweight and Preterm	5.6	10.4	27.0	57.0	3,257

*The total number of live births in each column equal 100 percent.

†Low birthweight, 2500 grams or less; preterm, 36 weeks of gestation or less.

TABLE 5

SIMPLE AND PARTIAL CORRELATION COEFFICIENTS BETWEEN FIVE
MINUTES APGAR SCORE (DEPENDENT VARIABLE) AND THE
FOUR MOST IMPORTANT INDEPENDENT VARIABLES
PUERTO RICO, 1990

CORRELATION COEFFICIENTS

INDEPENDENT VARIABLES	SIMPLE*	PARTIAL+
Weeks of Gestation	0.264	0.258
Type of Hospital (private = 1, public = 0)	0.129	0.129
Prenatal Visits	0.121	0.035
Birthweight in Grams	0.110	0.024

*The simple correlation coefficient between the dependent variable (Apgar Score) and the indicated independent variable.

+The correlation coefficient between the dependent variable (Apgar Score) and the indicated independent variable controlling the effects of the other three independent variables.

TABLE 6

INFANT MORTALITY RATIOS BY FIVE MINUTES APGAR SCORE
PUERTO RICO, 1990

APGAR SCORE	NEONATAL*	LATE INFANT†	TOTAL*
0-3	612.2	105.3	653.1
4-6	259.3	83.9	321.4
7	71.4	28.5	97.9
8	19.6	6.8	26.2
9	2.5	1.8	4.3
10	1.8	1.2	3.0

*Number of infant deaths per 1,000 live births.

†Number of infant deaths 28 days of life and more per 1,000 neonatal survivors.

TABLE 7

NEONATAL MORTALITY RATIOS BY FIVE-MINUTES APGAR
SCORE BY BIRTHWEIGHT AND BY GESTATIONAL AGE
PUERTO RICO, 1990

BIRTHWEIGHT IN GRAMS	FIVE MINUTES APGAR SCORE			
	0 - 3	4 - 6	7 - 8	9 - 10
1500 or less	830.1	497.8	276.0	131.4
1501 - 2500	370.4	226.7	68.8	17.5
2501 - 3000	400.0	113.6	23.2	8.4
3001 - 4000	346.7	103.7	8.2	1.6
4001 or more	*	166.7	8.4	1.7
WEEKS OF GESTATION				
36 or less	712.9	369.3	85.0	9.1
37 - 38	250.0	129.0	16.3	2.6
39	200.0	71.4	14.4	1.5
40	421.1	120.0	2.4	1.4
41 or more	580.6	122.0	11.5	1.3

*Few live births in this category.