

Cutting Public Funding for Undocumented Immigrants' Prenatal Care Would Raise the Cost of Neonatal Care

Undocumented immigrants who do not receive prenatal care are nearly four times as likely to have low-birth-weight infants and seven times as likely to have preterm infants as those who obtain care during pregnancy, according to a two-year retrospective study conducted at a California hospital.¹ Furthermore, their infants incur higher expenses for neonatal care. Public funding of prenatal care for undocumented women has become a subject of intense public debate in recent years, particularly in California. Policymakers and voters there have supported proposals, which have been stalled by legal challenges, to eliminate public benefits, including prenatal care, for undocumented immigrants. According to the study's cost-benefit analysis, each dollar cut from prenatal care could cost taxpayers up to \$3.33 more in neonatal care.

The study's sample was drawn from 3,351 women who delivered at a large university hospital between January 1, 1996, and December 31, 1997. Among these women, 34% had no legal residency status in the United States. The investigators reviewed medical records to obtain information about the women, their pregnancies and the birth outcomes. They excluded women with past conditions that could lead to low birth weight (less than 2,500 g), preterm birth (delivery before the 37th week of gestation) or perinatal costs unrelated to prenatal care. This reduced the sample to 970 women.

The researchers calculated the cost of care for these women and their infants on the basis of Medi-Cal (California's Medicaid program) reimbursement schedules. Maternity costs included the costs of hospital services and obstetrician fees for intrapartum and postpartum care. The cost of neonatal care included fees for intensive care and for pediatricians and neonatologists. The long-term cost of caring for children who were low-birth-weight was estimated on the basis of costs published in a previous study for health care, child care, special education and grade repetition from birth to age 15.

Ten percent of the women had had no prenatal care; 35% had started prenatal care in the first trimester, 42% in the second trimester and 13% in the third trimester. Women who had received prenatal care and those who had not shared many background characteristics: In both groups, the average age was 25, roughly nine in 10 women were from Mexico, one-third had not given birth before and fewer than one in five had a cesarean delivery. Women who delivered preterm and who had not received prenatal care were similar to their counterparts who had received prenatal care with respect to cigarette smoking, use of alcohol or illicit substances and insurance and employment status.

However, birth outcomes and length of infant hospital stay differed significantly between women who had had prenatal care and those who had not. A higher proportion of women who had not received prenatal care than of women who had received prenatal care had low-birth-weight infants (19% compared with 6%). The same was true for preterm births: Thirty-five percent of women who had not had prenatal care delivered preterm infants, compared with 8% of women who had had prenatal care. Newborns whose mothers had received prenatal care had a mean gestational age at birth of 39 weeks and a mean hospital stay of almost three days, compared with a gestational age of 37 weeks and a mean hospital stay of almost five days for newborns whose mothers had not received prenatal care.

To calculate the relative risk of low birth weight and preterm births between the two groups of women, the researchers used logistic regression techniques, controlling for age, parity, marital status and obstetric risk factors. They found that infants whose mothers had not received prenatal care were nearly four times as likely as others to be low-birth-weight (risk ratio, 3.8) and were seven times as likely to be premature (7.4).

The cost of prenatal care for women in the sample was \$702 per woman. Total maternity care costs were similar regard-

less of whether women had had prenatal care, but the cost of neonatal care differed significantly between the two groups. The average cost of the initial hospitalization for an infant whose mother had not received prenatal care was \$2,341 more than that for an infant whose mother had received prenatal care (\$3,930 vs. \$1,589). The difference was largely attributable to the prevalence of low birth weight among infants born to women who had not received care during pregnancy. On average, neonatal care cost \$1,003 for a normal-birth-weight baby and \$18,627 for a low-birth-weight infant whose mother had not received prenatal care.

On the basis of the \$702 cost for prenatal care and the \$2,341 excess hospitalization costs for infants whose mothers had not received prenatal care, the investigators calculated that every dollar spent on prenatal care would save \$3.33 in neonatal care costs. To estimate what this ratio would mean for public spending statewide, the researchers extrapolated their figures to the 83,000 pregnancies potentially affected annually among undocumented women. According to their results, while eliminating public funding for neonatal care would save the state \$58 million in direct prenatal care costs, neonatal care would cost taxpayers up to \$194 million; the state and federal government would share the additional cost of \$136 million.

Furthermore, as the investigators note, the impact of prenatal care does not cease after the infant's discharge from the initial hospitalization. The long-term costs of caring for a child who was low-birth-weight averaged \$3,247 more if the mother had not received prenatal care (\$4,839) than if she had (\$1,592). For every dollar cut from public funding of prenatal care for undocumented women, the researchers estimated an increase of \$4.63 in the costs of long-term care. This would mean a cost to taxpayers of \$211 million annually if public funding of prenatal care for undocumented immigrants were eliminated.

The investigators acknowledge several limitations of their study. Because the

sample consisted of undocumented immigrants at one university hospital in California, more than 90% of whom claimed Mexican origin, the findings may not be generalizable to the statewide population of undocumented immigrants. Also, the researchers point out the possibility that undocumented women who received no prenatal care had different risks for adverse birth outcomes from women who received care and that these differences, rather than prenatal care alone, explain the differences in birth outcome. Though they controlled for several variables that may have affected birth outcomes, the investigators acknowledge that they may not have accounted for all the differences in underlying risks.

Despite the study's drawbacks, the researchers conclude that denial of prenatal benefits for undocumented immigrants could significantly worsen birth outcomes and substantially increase the cost of neonatal care. For these reasons, they recommend that public funding of prenatal care for undocumented immigrants not be eliminated.—*B. Brown*

Reference

1. Lu MC et al., Elimination of public funding of prenatal care for undocumented immigrants in California: a cost/benefit analysis, *American Journal of Obstetrics and Gynecology*, 2000, 182(1, pt. 1):233-239.

Deficits from Small Size At Birth Do Not Extend To Adults' Emotional Lives

People who were born small for their gestational age are slightly less likely to perform well in school, are less likely to hold professional or managerial jobs and report lower weekly incomes than people who were normal-birth-weight, according to a study that followed participants from birth to age 26. However, at age 26, the two groups are equally likely to be married and working, and equally satisfied with how their lives have turned out.¹

To assess the functional effects of being small for gestational age (defined as having a birth weight less than the fifth percentile for age at term), the investigator analyzed data on infants born in the United Kingdom during the period April 5-11, 1970, who were followed up at ages five, 10, 16 and 26. Infants were excluded if they had congenital abnormalities, which can influence developmental outcomes, or if they were born preterm. The resulting sample consisted of 1,064 infants who were small for gestational age and 13,125

normal-birth-weight infants, who served as the comparison group.

There were some significant differences in the demographic characteristics of the two birth-weight groups. For example, 24% of normal-birth-weight infants had at least one parent who was a professional, compared with 15% of infants who were small for gestational age. Ten percent of infants who were underweight at birth were born to single mothers, compared with 6% of normal-birth-weight infants; 8% and 6%, respectively, were born to women aged 18 or younger.

Follow-up data included participants' standardized test scores, teacher evaluations and, for adolescents and adults, responses to questionnaires on emotional and social development. At ages 16 and 26, participants responded to questions about their self-perception. At age 26, they also reported on their marital and employment status and income. The data were adjusted for sex, parental social class and region of birth. The proportion of the entire sample who responded was 93% at age 5, 80% at age 10, 72% at age 16 and 53% at age 26.

At ages five, 10 and 16, participants who had been small for gestational age had lower scores than normal-birth-weight participants on standardized tests measuring a range of academic and developmental outcomes. However, the differences between the two groups were very small (0.1-0.4 standard deviations), and scores on some measures were not significantly different: Reading scores at age 10 and spelling and word recognition scores at age 16 were similar in both groups.

Teachers' ratings of the general knowledge and academic achievement of 10-year-olds who had been small for gestational age were significantly lower than their ratings for those who had been normal-birth-weight. Twenty-one percent of 10-year-olds who had been underweight at birth were rated by their teachers to be "above average or well informed," compared with 31% of those who had been normal-weight.

When they were 16, youths who had been small for gestational age were less likely than others to be rated by their teachers as being in the top 15th percentile of their class (13% vs. 20%) and in the highest grade levels in math (16% vs. 28%). In addition, adolescents who had been small for gestational age were more likely than their normal-birth-weight peers to have been placed in special education (5% vs. 2%). Although adolescents

who had been small for gestational age were more likely than other adolescents to report difficulties at school (49% vs. 40%), the two groups were similar on measures of social and emotional development, such as their number of friends, levels of family stability and happiness, and interest in recreational and social activities. Virtually all of the teenagers in both groups described themselves as friendly, popular and loving; about three-fifths in each group considered themselves angry or shy.

At age 26, participants who had been underweight at birth were less likely than those who had had a normal birth weight to hold professional or managerial jobs (9% vs. 16%) and were more likely than others to work as unskilled, semiskilled or manual laborers (34% vs. 28%). Those who had been small for gestational age reported a lower weekly income than did people who had had a normal birth weight. However, there was no difference between the two groups in several areas. Participants in both groups had attended school until they were 18 and worked approximately 40 hours per week; more than nine in 10 were employed, and about one-third were married. Furthermore, the two groups were equally satisfied with their lives, and on average, 52% of participants in both groups perceived their standard of living to be better than others'.

The investigator acknowledges that the findings may be biased as a result of the low follow-up rate at age 26. However, he contends that this study presents the most comprehensive picture to date of the long-term outcomes of infants who were small for gestational age since previous research focused on testing cognitive development and did not measure social and emotional outcomes. In discussing the policy implications of his findings, the investigator observes that early intervention programs such as Head Start can enhance cognitive development among disadvantaged preterm and full-term infants. These programs, he suggests, could also benefit children who had been small for gestational age, who may have functional impairment. In conclusion, he recommends that children who were underweight at birth be provided with "an enriched environment to minimize the long-term negative effects."—*B. Brown*

Reference

1. Strauss RS, Adult functional outcome of those born small for gestational age: twenty-six-year follow-up of the 1970 British birth cohort, *Journal of the American Medical Association*, 2000, 283(5):625-632.

Large Immigration Flows Could Help Offset Declines In Developed Populations

Because of low fertility and increased longevity, the populations of most developed countries are likely to become smaller and older by the year 2050. As the size of the working-age population shrinks relative to the size of the population aged 65 and older, these societies could suffer profound economic, social and political consequences. International migration could help stem both overall declines and declines in the size of working-age populations, but the volume of immigration needed to maintain current population sizes varies widely and in many cases would entail substantial increases over recent or expected levels. In Italy, for example, the number of immigrants would have to grow to roughly 20 times the expected levels to maintain the total population size and to about 30 times the projected level to maintain the size of the working-age population. These are among the key findings of a United Nations study on replacement migration.¹

The study focused on eight countries and two regions whose fertility levels are below replacement level: France, Germany, Italy, Japan, the Republic of Korea, the Russian Federation, the United Kingdom, the United States, Europe and the European Union. In the late 1990s, the total fertility rate in these countries and regions ranged from 1.2 to 2.0 births per woman. Five countries (France, Germany, Italy, Korea and the United Kingdom) had populations of less than 100 million in 1995, two (Japan and Russia) had populations of about 125–150 million, and the United States had a population of about 270 million. Overall, Europe's population was around 725 million, and that of the European Union was about 375 million.

Annual flows of international migration have varied widely among these countries. While France, Germany, Japan and the United Kingdom received fewer than 100,000 immigrants in 1998, the United States received nearly 700,000. In 1990, immigrants accounted for 1–10% of these populations.

Using the medium variant of the biennial United Nations population projections, the analysts examined the levels of international migration needed to achieve three population objectives in the study areas: maintaining the overall population size, maintaining the size of the population of working age (15–64) and maintaining the ratio of the working-age population to the population aged 65 and

older. This last measure, known as the potential support ratio, is a key area of concern because of its effect on pension and other social service systems. In 1950, the ratio ranged from 5.8 to 18.2 in the study areas, but it has fallen steadily ever since; in 1995, the range was 4.1–12.6.

Medium Variant Projections

According to the medium variant projections, total fertility rates in all 10 populations will rise slightly but will remain below replacement level through 2050. Most of these populations will begin to drop before then, and the declines within the next 50 years may be dramatic—28% in Italy, 17% in Japan and 14% in Europe overall. The exception is the United States, whose population will keep growing, because fertility is near replacement level and the number of arriving immigrants is expected to remain high (about 760,000 a year). If these conditions continue, the U.S. population in 2050 will exceed the 2000 total by about 70 million.

Under the medium variant scenario, potential support ratios will change substantially (Table 1). In many countries, the ratio will fall by roughly half, but in Korea, it will tumble by about 80%, from 12.6 to 2.4. Italy, Japan and the European Union are projected to have ratios below 2.0; Italy's may approach 1.5.

France, Italy and the United Kingdom will receive an average of about 10,000–20,000 immigrants a year, or between

about 500,000 and one million in all, under this scenario. Japan will register no net migration, and Korea will experience a net loss. The remaining countries and regions (other than the United States) will gain roughly 135,000–428,000 immigrants annually, for totals of 7–24 million.

Effect of No Migration

In an alternative scenario, under which no international migration occurred after 1995, population declines would be generally similar to those in the medium variant projections. However, the U.S. population, without the expected high levels of immigration, would begin to decline after 2025. As a result, although the U.S. population would experience net growth for the period, the gain would be considerably smaller than the increase expected under the medium variant projection—only 16 million. France and Korea would register small population increases, because immigration under the medium variant was not substantial and its absence would therefore have little effect.

Without migration, the working-age population in every country and region in the study would fall faster than the total population. For example, in the European Union, the population aged 15–64 would decline by 30% between 2000 and 2050, while the total population would decline by 17%. Men and women aged 65 and older would represent between one-quarter and one-third of these 10 populations

Table 1. Projected potential support ratio and projected total number of immigrants under various scenarios, selected countries and regions, 1995–2050

Country or region	1995	Medium variant	Medium variant with no migration	Maintain total population	Maintain working-age population	Maintain ratio
Ratio						
France	4.36	2.26	2.26	2.33	2.49	4.36
Germany	4.41	2.05	1.75	2.26	2.44	4.41
Italy	4.08	1.52	1.52	2.03	2.25	4.08
Japan	4.77	1.71	1.71	2.07	2.19	4.77
Republic of Korea	12.62	2.40	2.40	2.49	2.76	12.62
Russian Federation	5.62	2.43	2.44	2.86	3.12	5.62
United Kingdom	4.09	2.37	2.36	2.49	2.64	4.09
United States	5.21	2.82	2.57	2.63	2.74	5.21
Europe	4.81	2.11	2.04	2.38	2.62	4.81
European Union	4.31	1.97	1.89	2.21	2.42	4.31
No. of Migrants (in 000s)						
France	na	525	0	1,473	5,459	93,794
Germany	na	11,400	0	17,838	25,209	188,497
Italy	na	660	0	12,944	19,610	119,684
Japan	na	0	0	17,141	33,487	553,495
Republic of Korea	na	–450	0	1,509	6,426	5,148,928
Russian Federation	na	7,417	0	27,952	37,756	257,110
United Kingdom	na	1,200	0	2,634	6,247	59,775
United States	na	41,800	0	6,384	17,967	592,757
Europe	na	23,530	0	100,137	161,346	1,386,151
European Union	na	16,361	0	47,456	79,605	700,506

Notes: The potential support ratio is the ratio of the population aged 15–64 to the population aged 65 and older. The second and third columns refer to the medium variant of the biennial United Nations population projections; the last three columns indicate the estimated numbers of international migrants required to achieve the given objective. na=not applicable.

by 2050, and the potential support ratio would range from 1.5 (in Italy) to 2.6 (in the United States).

Maintaining Current Levels

If no international migration occurred after 1995, these populations would reach their highest levels sometime between 1995 (Germany, Italy, Russia and Europe) and 2035 (Korea), but immigration could help maintain those levels. The number of immigrants that countries would have to receive through the year 2050 to avert population decline ranges from about 1.5 million in France and Korea to 17–28 million in Germany, Japan and Russia, and 100 million in Europe as a whole (Table 1). In the United States, the number of immigrants required to maintain the population size (6.4 million) is considerably smaller than the number projected in the medium variant (41.8 million), but in all of the other countries and regions studied, the volume of international migration would have to increase substantially. In Germany, it would have to grow by about half, and elsewhere it would need to roughly triple (France) or quadruple (Europe). Italy would have to receive about 20 times the number of immigrants expected to maintain its population size.

Under this scenario, the proportion of the population made up of people who had immigrated after 1995 or their descendants would range from 3% (in the United States) to 29% (in Italy) in 2050. Potential support ratios in 2050 would be slightly higher under this scenario than they would in the absence of international migration, but the range would remain narrow (2.0–2.9).

Similarly, if migration ceased after 1995, the working-age populations of these countries and regions would peak between 1995 (Germany, Italy, Japan and the European Union) and 2020 (Korea). The levels of immigration that would be required to maintain the size of this subgroup are far higher than those needed to hold the overall population constant: 5–6 million in France, Korea and the United Kingdom; nearly 20 million (or about 30 times the projected total) in Italy; roughly 35 million in Japan and Russia; and 161 million in Europe. By 2050, immigrants and their descendants would represent a sizable share of the total population of these countries; the proportion would range from 8% in the United States to 39% in Italy. Again, potential support ratios would increase very slightly.

Finally, the analysts projected the volume of immigration needed to keep potential support ratios at their 1995 levels. In all 10 countries and regions, the numbers are

enormous: roughly 60 million in the United Kingdom; more than one-half billion in Japan, the United States and the European Union; and five billion in Korea. Under this scenario, the proportion of the population in 2050 who had immigrated after 1995 or were descendants of immigrants would range from 59% in the United Kingdom to 99% in Korea. The analysts observe that “maintaining potential support ratios at current levels through replacement migration alone seems out of reach, because of the extraordinarily large number of migrants that would be required.”

Implications

The analysts point out that “the prospects of population decline and population ageing during the coming decades, and particularly the rapid and extensive reduction of the potential support ratio in many countries, raise a number of crucial issues in the areas of employment, economic growth, health care services, pensions and social support services.” In view of the projected trends, they urge governments to undertake “objective, thorough and comprehensive reassessments” of labor-force participation; appropriate retirement ages; the nature and types of retirement and health care benefits available for aging citizens; policies and programs pertaining to international migration; and the integration of immigrants and their descendants into society.—*D. Hollander*

Reference

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Odds of Spousal Infidelity Are Influenced by Social And Demographic Factors

Some 11% of adults who have ever been married or cohabited have been unfaithful to their partner, according to the results of a national survey. In the first analysis of its kind to examine a constellation of factors that have not previously been studied simultaneously, the investigators assessed the influence of adults’ opportunities for meeting additional sex partners, sexual values and tastes, current relationship and demographic characteristics on the odds of being unfaithful.¹ When these factors were analyzed together, thinking about sex several times a day, having had a high number of prior sex partners, living in a central city, being male or black, and having been part of a couple for a long time

were all associated with an increased risk of infidelity. Disapproving of sexual infidelity and sharing social networks with one’s partner were associated with reduced odds of having been unfaithful.

The analysis included 2,598 men and women aged 18–59 who had participated in the 1992 National Health and Social Life Survey and who had ever been married or lived with a sexual partner. In face-to-face interviews, respondents answered questions about their social background; health; fertility; and sexual activities, attitudes and fantasies. They then filled out self-administered questionnaires indicating whether they had ever had extramarital sex. Following the survey, interviewers gathered more information about the timing of respondents’ marital and cohabiting unions and their sexual histories, including whether they had had sex with someone other than their primary partner in the past 12 months.

Overall, 11% of respondents reported infidelity. Among the 1,717 adults who had been married only once, 16% reported having engaged in extramarital sex; of the 2,010 respondents who had been in a cohabiting or marital relationship in the 12 months prior to the survey, 5% reported unfaithful behavior during that period.

Most respondents expected their partners to be sexually exclusive and believed that their partners expected the same of them. Cohabiting respondents were only slightly less likely to expect their partners to be exclusive or to believe their partners expected exclusivity (94–95%) than were married respondents (98–99%, depending on whether they had lived with their spouse before marrying). Cohabiting individuals and those who married without cohabiting were about equally likely to actually be exclusive (88% vs. 92%).

Aware that concerns about social acceptability may influence respondents’ reporting of sensitive issues such as extramarital sex, the researchers conducted a preliminary set of analyses on a subgroup of participants in which they compared results from the self-administered questionnaire with results from the face-to-face interviews. The data proved to be generally comparable, so the investigators used information from the interviews to perform a series of logistic regression analyses testing the effects of several types of factors on the likelihood of unfaithful behavior among respondents who had ever been married or in a cohabiting relationship.

When demographic and control variables alone were examined, being male or black were highly associated with the risk of infidelity (odds ratios, 2.2 and 1.8, re-

spectively). In addition, for each year couples lived together, respondents became 1% more likely to be unfaithful (odds ratio, 1.1), and respondents whom the interviewers judged to be frank in their replies had an elevated risk of reporting infidelity (1.4). When the variables related to sexual tastes and attitudes were added to the analysis, respondents who thought about sex often had increased odds of being unfaithful (1.3), while those who did not approve of extramarital sex had reduced odds of experiencing infidelity (0.5). Men's likelihood of being unfaithful declined but remained statistically significant (1.6); results for the other background variables remained essentially unchanged.

In the next step of the analysis, the researchers added factors measuring characteristics of respondents' relationships. In these calculations, men and women who had cohabited were 40% more likely than others to have been unfaithful (1.4). Partners' religious, educational and age differences had no significant impact on the odds of infidelity. The background and

attitudinal factors that were significant previously maintained their effects.

The last set of estimates included factors measuring respondents' opportunities for meeting additional sex partners. The more sex partners a respondent had had between age 18 and the time of first marriage or cohabitation, the more likely he or she was to be unfaithful (1.01). Men and women who lived in a central city had elevated odds of infidelity (1.5), while those who shared social networks with their partner had decreased odds of being unfaithful (0.7). The likelihood of infidelity was not significantly influenced by sexual opportunities in the workplace or by attendance at religious services. In this analysis, which encompassed all variables, black respondents, males and individuals with a high level of interest in sex remained at increased risk of being unfaithful, while those with strict attitudes about extramarital sex continued to have reduced odds of infidelity.

In a separate set of analyses, the researchers examined the behavior of married and cohabiting adults over the 12

months prior to the study. When they tested the same array of variables used in the calculations for all adults, the results were generally similar. In an additional analysis including two new variables, respondents in a cohabiting relationship and those who demonstrated a high dissatisfaction with their current relationship were more likely than others to be unfaithful (odds ratios, 2.1 and 1.3, respectively).

Commenting on the study's findings, one of the researchers observes that sexual behavior is social behavior, and suggests that interventions aimed at reducing risky sexual behavior should take into account the social contexts in which individuals make decisions related to sexual partnerships, as well as demographic risk factors.²—*I. Olenick*

Reference

1. Treas J and Giesen D, Sexual infidelity among married and cohabiting Americans, *Journal of Marriage and the Family*, 2000, 62(1):48–60.
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Maternal Factors and Multiple Births Are Main Cause Of Poor Birth Outcomes After In Vitro Fertilization

Twenty-seven percent of Swedish women who become pregnant after undergoing in vitro fertilization have a multiple birth, compared with 1% of women overall. Babies conceived via in vitro fertilization are more likely than others to be born preterm, to have a low birth weight and to have congenital malformations. However, the results of a retrospective registry study suggest that these outcomes are mostly attributable to maternal characteristics and the occurrence of multiple births, rather than to in vitro fertilization.¹

To calculate the risks of adverse pregnancy and infant health outcomes after in vitro fertilization, the researchers compared data on all 4,517 births following in vitro fertilization in Sweden from 1982 to 1995 with data on all 1.5 million births in the general population during that time period. The data came from national registries of births, malformations, cancers and deaths. For women in the in vitro fertilization group, the researchers also gathered information on their fertility treatment from the clinic that provided it.

Women who underwent in vitro fertilization differed from the overall population of women who gave birth in several ways that may influence pregnancy outcomes: They were only 23% as likely to be younger than 30, were 50% more likely to

be having their first child and were only 82% as likely to smoke 10 cigarettes or more per day. Information on the length of time that women who conceived via in vitro fertilization experienced infertility was available for 65% of the women in that group; the median duration of infertility was six years.

Among all births to women who underwent in vitro fertilization, 27% were multiple births—24% twins, 3% triplets and a negligible proportion quadruplets. By contrast, the proportion of multiple births nationwide was only 1%. The investigators observe that the generally increasing frequency of multiple births following in vitro fertilization appears to be contributing to an upward trend in multiple births in all of the Swedish population. Pregnancies resulting from in vitro fertilization accounted for 2% of twin births in 1986–1990; that proportion increased to 13% in 1991–1995.

The duration of gestation was known for all but seven of the 3,305 singleton births resulting from in vitro fertilization. Three percent of these babies were born at less than 32 weeks of gestation (very preterm), and 11% were born at less than 37 weeks (preterm). In the general population, only 1% of babies were born at less than 32 weeks, and 5% were born at less than 37

weeks. Infants who were conceived using in vitro methods were 3.5 times as likely as Swedish infants in general to be very preterm; the increase in risk was reduced when the data were stratified for maternal age, parity and infertility (risk ratio, 1.5).

Birth weight was known for all but 10 singleton infants born after in vitro fertilization. Three percent of these infants weighed less than 1,500 g at birth (very low birth weight), and 9% weighed less than 2,500 g (low birth weight). The corresponding proportions for the general population were 1% and 4%, respectively. Infants born after in vitro fertilization had a substantially increased risk of being very low birth weight (risk ratio, 4.4). Again, the increased risk was lowered when maternal age, parity and infertility were taken into account (risk ratio, 1.5).

Among infants conceived via in vitro fertilization, the rate of perinatal mortality (defined as stillbirths and infant deaths within one week of birth) was eight per 1,000 births; in the general population, this rate was seven per 1,000. The risk ratio for perinatal death among infants conceived using in vitro fertilization (1.6) reached borderline significance before the data were stratified, but it was not significant after stratification for year of birth, maternal age, parity, years of infertility and birth weight.

Of the 5,856 infants who were born after in vitro fertilization, 5% had a congenital malformation. On the basis of this proportion, the analysts calculate that babies born after in vitro fertilization were 1.4 times as likely as Swedish infants in general to have a malformation. The overall likelihood of congenital malformation was significantly increased for singletons (risk ratio, 1.3), but not for multiple births. However, when the investigators examined specific malformations, they found that only three conditions were significantly more common among children born after in vitro fertilization than among others: anencephaly (absence of a major part of the brain), hydrocephalus (increase in the amount of cerebrospinal fluid in the cranial cavity) and atresia (closure) of the esophagus, which had risk ratios of 12.9, 5.7 and 3.9, respectively. Moreover, all of the babies with anencephaly and the majority with hydrocephalus were from sets of twins, suggesting that these conditions were due to the multiple pregnancy rather than to in vitro fertilization.

The number of children born after in vitro fertilization who later developed cancer (four) was similar to the number expected in the general population. The researchers caution that this finding is problematic because their data had limited power to study cancer incidence.

The investigators conclude that children born after in vitro fertilization have elevated odds of experiencing some poor medical outcomes, but that the increase is due largely to maternal risk factors and to the risks inherent in multiple births, rather than to the technique of assisted conception. They believe that "a carefully thought-out strategy is needed to try to lower the rate of multiple births," and that the "selection of one viable embryo" should be the goal of in vitro fertilization practice.

Two researchers commenting on the study agree that the benefits of inserting multiple embryos are outweighed by the risk associated with multiple pregnancies.² Although the reasoning behind transferring more embryos is that there will be a greater chance of conception, these researchers feel that "data to support this view are scant." They also note that clinicians as well as parents tend to underestimate the risks involved with triplet pregnancies. While advocating that clinical practice should be to transfer only two embryos, they conclude that "the ultimate goal remains single-embryo transfer."

However, a group of clinicians in the field argue the opposite point.³ When the embryo quality is good and the recipient

is younger than 38 or will not consider fetal reduction, they also recommend transferring only two embryos. But they have found that older women with poorer embryo quality benefit from a larger number of transfers. If clinical practice were restricted to two embryo transfers, they contend that "in a group of 1,000 women over the age of 40 years, two triplet pregnancies would be avoided at the expense of 44 women who did not achieve a live birth."—*L. Gerstein*

References

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Poor Psychosocial Support Raises the Odds of Having An Underweight Infant

Women whose psychosocial resources are inadequate to help them cope with the stresses of a first birth may have an elevated risk of bearing an infant who is small for gestational age, according to results of a Swedish prospective cohort study.¹ Among a sample of women who had a first birth in the early 1990s, those who participated little in social activities and those who had limited access to advice and information were 2–3 times as likely as women with greater psychosocial resources to have an underweight infant.

The sample consisted of women obtaining prenatal care at four clinics in Malmö in 1991–1992. Participants answered a questionnaire that covered their background and lifestyle characteristics, as well as seven psychosocial factors: social stability (the degree of a woman's involvement in formal and informal groups), social participation (the extent to which she participates in social groups), emotional support (the support she receives from others), instrumental support (her access to advice, information and services), support from the child's father and from her mother, and conditions at her workplace. Information pertaining to the pregnancy and its outcome was obtained from women's medical records and a perinatal database.

A total of 826 women who had a singleton live birth were included in the analyses. Most were in their 20s (70%), had

been born in Sweden (78%), were living with a partner or spouse (88%), and had had 12 or fewer years of schooling (61%). Thirty percent smoked; 18% smoked at least 10 cigarettes daily.

On average, the infants weighed 3,394 g at birth and were delivered at 39 weeks' gestation. Seven percent of infants were small for gestational age—that is, their birth weight was at least two standard deviations below the mean for their gender and gestation. The majority of these infants (80%) were born at term, and nearly half (47%) weighed less than 2,500 g.

In univariate analyses, the odds of giving birth to a baby who was small for gestational age were approximately doubled among women who were short (157 cm or less), those who were not Swedish-born and those who smoked 10–19 cigarettes a day. Low levels of social stability, social participation and emotional support also were associated with a roughly doubling of the odds of this outcome; the effect of a low level of instrumental support was similar but reached only a borderline level of statistical significance.

To assess the independent contributions of the psychosocial factors that had significant (or nearly significant) effects at the univariate level, the investigators conducted a series of multiple logistic regression analyses, controlling for factors that are associated with both the psychosocial variables and the risk of bearing an underweight infant. They first controlled for the mother's age, height and weight, then added her native country (Sweden vs. other) and educational level; next, they controlled for all of these factors plus the mother's alcohol consumption, smoking and level of physical exercise.

According to these analyses, social stability and emotional support do not have significant independent effects on the risk of bearing an underweight infant. However, women with a low level of social participation had an elevated risk in each set of calculations (odds ratios, 1.9–2.2). And the effect of low instrumental support grew as the researchers included more controls: The odds ratio was 1.9 and marginally significant in the initial analysis, but increased to 2.6 and achieved statistical significance when all factors were taken into account.

Fourteen percent of the study participants experienced some type of medical complication during pregnancy (e.g., urinary tract infection, bleeding or preterm contractions), and these women were marginally more likely than others to have an infant who was small for gestational age.

However, a set of multivariate analyses that controlled for the effects of those medical risk factors revealed that their inclusion did not alter the results involving the psychosocial variables.

The analysis further showed the additive effects of inadequate psychosocial resources. Women who had low levels of both social stability and social participation were about three times as likely as those with neither of these factors to have an underweight infant (odds ratio, 3.3). Similarly, those who simultaneously registered low instrumental and emotional support had nearly triple

the risk of this outcome (2.7).

While the researchers conclude that psychosocial factors appear to influence fetal growth, they note that the mechanism underlying the association is unclear. The effects may be indirect, operating through unhealthy behavior, such as smoking or drinking. Or they may be direct: Stress hormones may decrease the blood flow to the uterus or alter the immune system, causing adverse effects. Another possibility is that an increased secretion of certain hormones in response to stress may affect the mother's weight gain and thus the infant's

birth weight. Whatever the reason for the relationship, the investigators contend that "pregnant women with insufficient psychosocial resources are a high risk group that should be identified early in pregnancy and offered specific intervention programmes with individualised support."—*D. Hollander*

Reference

1. Dejin-Karlsson E et al., Association of a lack of psychosocial resources and the risk of giving birth to small for gestational age infants: a stress hypothesis, *British Journal of Obstetrics and Gynaecology*, 2000, 107(1):89–100.