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Psychosocial Factors and the Timing of Prenatal Care Among Women in New Jersey's HealthStart Program

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Context: Helping high-risk pregnant women obtain prenatal care early is the main policy goal of most U.S. publicly funded programs aimed at reducing the incidence of low birth weight and infant mortality. It is therefore crucial to understand the factors that influence when women initiate prenatal care.

Methods: The effects of psychosocial and demographic risk factors on the timing of entry into prenatal care were estimated using data on roughly 90,000 Medicaid recipients who participated in New Jersey's HealthStart prenatal care program.

Results: Overall, 37% of women began prenatal care in the first trimester. Multivariate logistic regression indicated that women who lived in poor housing conditions and those who smoked, drank or used hard drugs had a reduced likelihood of entering care early (odds ratios, 0.8-0.9), while those who had clinical depression or who experienced domestic violence or abuse had elevated odds of early entry (1.1-1.2). The risk factor with the greatest impact on the timing of prenatal care was the wantedness of the pregnancy; women whose pregnancy was unwanted had dramatically reduced odds of entering care early (0.4). Separate analyses of women of varying racial and ethnic backgrounds demonstrated the differential effects of risk factors, the importance of including ethnicity with race and the universal impact of wantedness across racial and ethnic groups.

Conclusions: Entry into prenatal care for at-risk women is affected by factors from multiple domains. It is important for prenatal programs to recognize the complexity of the issue as well as the barriers that different subgroups of women face. =paragraph

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Getting women who are at high risk of having a poor birth outcome into prenatal care early is the main policy goal of most publicly funded programs designed to reduce the incidence of low birth weight and infant mortality in the United States. However, the proportion of pregnant women receiving care in the first trimester—83% overall, and 72-74% among black and Hispanic women in 1997—still falls short of the Healthy People 2000 goal of 90%.¹ Although results of empirical research on the relationship between prenatal care use and infant health outcomes remain ambiguous, we know that in general, women who fall into the highest risk categories for poor birth outcomes also are the most likely to get late or no prenatal care.² Consequently, connecting at-risk women with a program combining health care and easier access to social services may

reduce the high rates of poor birth outcomes in the United States.

In this article, we examine variables associated with differential timing of entry into prenatal care among a group of high-risk women (as defined by socioeconomic status), focusing on the effects of a set of psychosocial risk factors. While many studies examining the timing of prenatal care use among high-risk women employ data from one clinic or city, we use data on approximately 90,000 Medicaid recipients who participated in New Jersey's comprehensive prenatal care program, HealthStart, between 1988 and 1996.

BACKGROUND

The timing of poor women's entry into prenatal care depends both on the public health system and on women's individual characteristics. The system determines who is eligible for publicly funded care, where that care is located and the kinds of services provided. Structural barriers, such as distance to a provider and access to transportation, are significant in affecting when, where and how often women obtain prenatal care.³ Provider-related factors also affect prenatal care use. Discontinuity of providers, poor communication with or distrust of health care providers, long waits for appointments and inconvenient schedules all have been linked with late entry into prenatal care.⁴

However, even if prenatal care were universally and easily available, we would still expect to see individual variation in the time at which women enter care. Some women may attach more importance to early care than others, some may not recognize that they are pregnant early on, some may be ambivalent about the pregnancy and delay getting care, and some may have other responsibilities that preclude their early entry into the system. For example, women with many day-to-day survival concerns may have difficulty making the time and effort to get prenatal care, especially if it is not easily accessible or they do not recognize its importance.

Numerous economic, demographic, medical, psychosocial and behavioral factors affect the timing of prenatal care initiation. Women are at significant risk for initiating prenatal care late or not at all if they are young, poor, unemployed, members of minority groups or unmarried; have less than a high school education; lack health insurance; or have other children.⁵ For example, Mexican American women who work full-time during their pregnancies are more likely than those who do not work to get early care,⁶ perhaps because they have greater access to health insurance or a more stable lifestyle.

A woman's general level of health, her knowledge of potential problems in the pregnancy and her timing of initiation of care in past pregnancies also may influence when she seeks care.⁷ Support from a partner or others⁸ and a woman's knowledge and beliefs about pregnancy⁹ likewise affect the timing of prenatal care. Factors related to late initiation of care include having an unplanned or unintended pregnancy and not accepting or feeling ambivalent about the pregnancy,¹⁰ as well as perceiving a lack of interest from others, experiencing depression or disrupted family situations, and not living with or having a poor relationship with the baby's father.¹¹ Behavioral correlates of late prenatal care initiation include smoking and substance abuse¹² and, possibly, alcohol consumption.¹³

Given that factors from many realms influence women's decisions about when to begin prenatal care, it is important to control statistically for as many of these as possible; otherwise, apparently significant effects may simply be masking unobserved risk factors. In our analyses, we control for a set of behavioral, socioeconomic and demographic risk factors while simultaneously assessing the effects of an extensive set of psychosocial risk factors, using a rich, highly accurate data set. The analyses are based on data from structured interviews with a large sample of poor women throughout New Jersey. (Another study has shown that reporting of risk factors for late care and poor birth outcomes was substantially higher in the interview data than in birth certificate data for the same women.¹⁴) Since New Jersey is the state that is the most diverse in terms of its racial and ethnic composition,¹⁵ we can use these data to examine how effects differ across racial and ethnic groups.

THE HEALTHSTART PROGRAM

In 1988, the New Jersey Department of Health and Department of Human Services jointly launched HealthStart, a program combining comprehensive medical and health support services for pregnant Medicaid-eligible women with preventive pediatric care for their babies. The program operated until 1996, when it was phased out as managed care was phased in. Program services were administered at the offices of individual providers who agreed to participate; a case coordinator at each office oversaw all aspects of a woman's case. The medical care protocol called for 15 prenatal visits and one postnatal visit (following the recommended regimen of the American College of Obstetricians and Gynecologists and the American College of Nurse-Midwives). The health support component encompassed a wide range of risk assessments, coordination with other agencies, counseling and other services. By contrast, outside the program, Medicaid covered eight prenatal visits (and more only if they were deemed medically necessary) and no ancillary services.

HealthStart operated on a basis of presumptive eligibility for Medicaid, thus removing the financial barrier to early entry into prenatal care.* In addition, the income eligibility requirements for Medicaid broadened several times during the life of the program as New Jersey responded to legislative changes at the federal level. Prior to April 1, 1991, pregnant women with family incomes up to 100% of the federal poverty line were eligible for Medicaid in New Jersey. From April through June 1991, those up to 133% of poverty were eligible; as of July 1, eligibility was expanded to 185% of the poverty line.

Whether a woman participated in HealthStart depended on where she went for care. If she went to a certified program provider, she was automatically enrolled; if she switched to a provider outside the program, she received only standard Medicaid prenatal services. All HealthStart providers were required to engage in outreach activities, so the program may have affected where women went for care.

At a woman's first HealthStart visit, the provider assessed her overall level of risk for poor birth outcomes, considering medical, nutritional and psychosocial factors, as well as her need for health education. Using a standard form, the provider wrote a plan of care, which was placed in the woman's file and was adjusted as necessary throughout the pregnancy in response to changes in her circumstances.

METHODS

Data

One requirement of the program was that the case coordinator fill out a HealthStart Maternity Services Summary Data (MSSD) form for each woman who received care. The form includes information on the woman's basic socioeconomic and demographic characteristics, her medical and psychosocial risk factors, services provided, and the delivery and the infant's health if the woman gave birth. The medical and psychosocial risk factors were assessed retrospectively for the period immediately before the pregnancy, then throughout the pregnancy and delivery.

Every case coordinator received training from the Department of Health in the use of the four-page form and was provided with a detailed manual for filling it out. By law, once a woman stopped receiving services, the case coordinator had 90 days to file the form with the state, which made the form machine-readable and entered the information into a database.[†] Given the coordinators' training and the standardization of the form, we expect the data to be of high quality.

Our data set consists of the approximately 90,000 women who participated in HealthStart between 1988 and 1996.[‡] The state estimates that the program served nearly 18% of pregnant Medicaid recipients in 1988. This proportion increased to 52% in 1989, to 65% in 1990 and to 90% in 1993.¹⁶

Analytic Techniques

We begin by examining, for the total sample, the bivariate relationships between various risk factors and the likelihood of getting early care, then move to multivariate analyses with controls for race and ethnicity. We then conduct separate analyses for different racial and ethnic subgroups, because past research reveals ethnic variation in the effects of risk factors on birth outcomes within a given race. For example, in an analysis that controlled for immigrant status, Hispanic black women were significantly less likely than non-Hispanic black women to have low-birth-weight infants; additionally, being on Medicaid was associated with lower rates of low birth weight for Hispanic blacks but not for blacks overall.¹⁷ The effects of psychosocial risk factors also may vary by ethnicity within broad racial groups.

One benefit of the size and the racial and ethnic diversity of our sample is that we are able to create more detailed racial and ethnic categories than is normally possible. While most research classifies women as white, black or Hispanic, we created five categories: non-Hispanic white, non-Hispanic black, non-Hispanic women of other races, Hispanic white and Hispanic women who specify another race or no race at all.

Variables and Sample Characteristics

We classified a woman as having initiated prenatal care in the first trimester (early) if she obtained care from any provider—not just a HealthStart provider—within the first 12 weeks of pregnancy. We divided our predictor variables into two main categories (along with some control variables): socioeconomic and demographic risk factors, and psychosocial risk factors. The MSSD coding manual instructed case coordinators to check off any risk factor that "was present or existed for the client *just prior to*" or during the current pregnancy.

• *Socioeconomic and demographic factors.* By definition, all program participants were Medicaid-eligible. While such economically vulnerable women are usually grouped together as a single unit, there are social and economic variations even among them. The socioeconomic and demographic variables in our analyses are designed to capture as completely as possible a woman's socioeconomic status, her possible access to social and emotional resources, and her immigration and language status, all of which may be related to prenatal care initiation.

Previous research has revealed large racial and ethnic differences in the timing of prenatal care: Non-Hispanic white women are the most likely and non-Hispanic black women are the least likely to obtain early care.¹⁸ Hispanic women's patterns of prenatal care use tend to most closely resemble those of blacks, but their birth outcomes tend to be most similar to white women's, a situation labeled the "Hispanic paradox."¹⁹ These differences may reflect variations in the distributions of socioeconomic risk factors and, possibly, psychosocial risk factors and cultural practices. Table 1 shows that the sample was predominantly non-Hispanic (36% black, 27% white and 4% women of other races). Hispanic white women made up 21% of the sample; Hispanic women of other races, 12%.

Table 1. Percentage of women with selected socioeconomic/demographic and psychosocial characteristics, New Jersey HealthStart program, 1988-1996 (N=91,585)	
Characteristic	%
Socioeconomic/demographic	
Race/ethnicity	
Non-Hispanic white	27.2
Non-Hispanic black	36.3
Non-Hispanic other	3.5
Hispanic white	21.1
Hispanic other	11.8
U.S.-born	70.1
Dominant language not English	23.1
Worked during first trimester	19.6
Married at any time during pregnancy	24.2
Age	
<15	0.4
15-17	7.3
18-19	13.1
20-24	36.8
25-29	23.8
30-34	12.9
35-39	4.7
>=40	1.0
City size	
<50,000	39.3
50,000-74,999	8.7
>=75,000	52.0
Year	

1988	1.6
1989	11.0
1990	15.5
1991	20.6
1992	24.6
1993	18.1
1994	6.0
1995	2.2
1996	0.5
Psychosocial	
Housing situation	
Threatened with eviction/homelessness	2.7
Poor housing conditions	1.8
Inadequate financial resources	34.2
Caregiver	1.0
Involvement with criminal justice system	1.9
Emotional strain	
Violence/abuse in the household	2.9
Depression/other mental health problems	4.9
Pregnancy unwanted	3.9
Behavioral	
Smoked cigarettes	24.9
Drank alcohol	7.7
Used marijuana only	2.4
Used marijuana and hard drugs	1.4
Used hard drugs only	4.4
Used no drugs	91.7
Other†	6.1
†"Other" psychosocial characteristics were not specified, but presumably these include such factors as having a poor relationship with the baby's father, not understanding the importance of prenatal care and living in a disruptive family situation.	

We also include immigration status and English-language use. Some groups of immigrant women (particularly Mexicans) use prenatal care and other health services less than their U.S.-born counterparts, because of a complex web of legal, language, socioeconomic and cultural barriers.²⁰ At the same time, however, immigrant women do not have worse birth outcomes than their U.S.-born counterparts.²¹ Thus, it is noteworthy that while immigrant status presents numerous barriers to prenatal care, it is also associated with offsetting nutritional, social and lifestyle advantages that result in favorable birth outcomes. Program participants were predominantly U.S.-born women, and most spoke English as their dominant language.

Working during the first trimester may have several positive or negative effects on the early initiation of care. Women who work may have a higher income and more stable lifestyle than those who do not; they also may have insurance, better prepregnancy health and greater access to information on the importance of prenatal care. On the other hand, women who work may be doing so because of financial hardship and may experience more stress than others. One-fifth of the sample reported some

employment during the first trimester of pregnancy.

Similarly, marital status has important effects on prenatal care use and infant health outcomes: Married women tend to initiate prenatal care earlier than those who are unmarried, and their infants have lower rates of low birth weight and mortality than babies born to single women.²² Only one-quarter of women in HealthStart were married during their pregnancy.

Contrary to popular beliefs about the age distribution of poor women who become pregnant, the majority of program participants were not teenagers, but women in their 20s. As shown by previous research, the relationship between maternal age and birth outcomes is complicated and differs by race,²³ but generally younger women are less likely to get early care than their older counterparts.

The size of the city in which a woman resides is likely to be an indicator of service availability and accessibility to care. Although large cities tend to have high rates of poor birth outcomes, access may be easiest there, because programs generally are targeted to these areas and public transportation generally is readily available. A slight majority of participants (52%) resided in cities with populations of at least 75,000; most of the rest lived in cities with fewer than 50,000 people.

We expect participants' likelihood of getting early care to have increased throughout the years of the program, as publicity about HealthStart widened.

- *Psychosocial factors.* Much theorizing on why women do not get early prenatal care centers on psychosocial risk factors, such as women's overall stress level and coping strategies, risk-taking behavior and feelings about the pregnancy.²⁴ HealthStart case coordinators assessed the presence of 11 psychosocial risk factors, encompassing "problems or conditions in the client's home and larger social environment, ranging from mild to emergency or near emergency," that were likely to negatively affect a woman's well-being and pregnancy outcomes. Information on these risk factors was obtained from medical records and direct questions asked during each prenatal visit.

We have information on two aspects of the woman's housing situation: whether she had been "told that she may have to move out of her home or [had] been without a home with an address at some point" and whether she was living in a home that lacked the "basic necessities for promoting good health, well being, and positive pregnancy outcomes—inadequate heat, electricity, running water, or generally poor living conditions." Only 2-3% of women were at risk because of these factors.

A woman's financial resources were defined as inadequate if she was unable to pay for food, housing, medical care or "other essentials needed for the promotion of good health, well being, and positive pregnancy outcomes." With 34% of the sample reporting financial difficulties, this was by far the most prevalent psychosocial risk factor.

Another risk factor is whether the woman was the primary caregiver for a household member who required extensive care because of chronic or serious acute illness, trauma or handicap. We also examine whether "the client or another member of the client's household was involved in some type of crime or action against the law, as either perpetrator or victim, that brought either or both of them in contact with the

criminal justice system," thus generating stressful home situations. However, involvement with the criminal justice system could have a positive impact, in that it provides a connection to the social services system, which may encourage care. These factors were present in only 1-2% of women.

Two variables reflecting emotional strain are included. The first indicates whether the client "has witnessed, experienced, or been the initiator of" verbal or physical (including sexual) violence or abuse in her household. The second indicates whether she "has had a diagnosis of clinical depression or other mental health problem, made and documented by a physician or other trained mental health professional." Some 3-5% of women were at risk because of these factors; the expected directions of these effects are uncertain.

We categorized a woman as having an unwanted pregnancy if she has ignored the pregnancy, delayed care or missed prenatal care appointments; is considering having an abortion or placing her infant for adoption; or totally denies or refuses to accept any aspects of the pregnancy and her future responsibilities related to the care of the infant. Unwantedness was measured as soon as care began, an improvement upon work that relied on retrospective measures at or after delivery.²⁵ The proportion of women not wanting their pregnancies was 4%, which is considerably lower than the overall proportion of U.S. pregnancies that are unintended (40%).²⁶

Three behavioral risk factors are included: smoking cigarettes, drinking alcohol and using drugs. We have divided drug use into four categories: used no drugs, smoked marijuana but used no other drugs, used both marijuana and hard drugs (e.g., heroin, cocaine or crack), and used only hard drugs. One-quarter of the sample reported smoking during the pregnancy, while 8% reported drinking alcohol. Fewer than one in 10 women reported drug use; the majority of these women used hard drugs.

Finally, the "other" category covers potential risk factors that the case coordinator was aware of but that did not fit into the above categories. While these factors were not specified, they probably include having a poor relationship with the infant's father, not understanding the importance of prenatal care and living in a disruptive family situation. Six percent of women reported such factors.

RESULTS

Bivariate Analysis

Overall, only 37% of women in the program began prenatal care in the first trimester (Table 2). (By comparison, according to 1989-1992 birth certificate data, 78% of all women in New Jersey started care early.) The initial analysis reveals a clear relationship between race and ethnicity and the likelihood of early prenatal care: Non-Hispanic white women were the most likely to get early care (45%), and non-Hispanic black women were the least likely (32%). Age shows the expected pattern: Younger women were less likely than older women to get care in the first trimester. City size appears to have little relationship to timing of prenatal care. Early care became more common over time: More than half of program participants in 1996 got care in the first trimester, compared with about one-third from 1988 to 1991.

Table 2. Percentage of women who obtained prenatal care during the first trimester, by selected characteristics

Characteristic	%	Characteristic	%
All women	36.8	All women	36.8
Race/ethnicity		Threatened with eviction/homelessness?	
Non-Hispanic white	44.9	Yes	33.3
Non-Hispanic black	31.7	No	36.9
Non-Hispanic other	32.7	Living in poor housing conditions?	
Hispanic white	36.5	Yes	30.6
Hispanic other	35.4	No	36.9
U.S.-born?		Inadequate financial resources?	
Yes	37.2	Yes	36.9
No	35.8	No	36.7
Dominant language other than English?		Caregiver?	
Yes	34.7	Yes	37.4
No	37.4	>No	36.8
Worked during first trimester?		Ever involved with criminal justice system?	
Yes	46.7	Yes	33.8
No	34.3	No	36.8
Married at any time during pregnancy?		Violence/abuse in household?	
Yes	42.6	Yes	39.3
No	34.9	No	36.7
Age		Depression/other mental health problems?	
<15	20.5	Yes	37.9
>15-17	28.4	No	36.7
18-19	33.1	Pregnancy unwanted?	
20-24	36.3	Yes	17.5
25-29	39.7	No	37.6
30-34	39.8	Smoked?	
35-39	41.3	Yes	37.7
>=40	39.5	No	36.5
City size		Drank?	
<50,000	37.3	Yes	34.8
50,000-74,999	34.2	No	36.9
>=75,000	36.6	Drug use	
Year		Marijuana only	39.5
1988	30.3	Marijuana plus hard drugs	33.8
1989	33.4	Hard drugs only	32.0
1990	34.2	None	37.0
1991	33.2	Other psychosocial risk factors?	
1992	36.7	Yes	33.1
1993	41.2	No	37.0
1994	45.2		
1995	48.2		
1996	54.2		

Employment status during the first trimester of pregnancy appears to have a strong impact on the timing of prenatal care: Nearly half (47%) of women who worked began

care early, compared with one-third (34%) of those who were not employed. Women who were born in the United States and those whose primary language is English do not seem to be at an advantage. Marital status shows the expected relationship.

Turning to the psychosocial risk factors, we see that having stable and better housing is associated with early care. This analysis does not suggest an effect of having financial difficulties or of caring for a sick household member. Having a connection with the criminal justice system leads to a slightly lower likelihood of early care. Women who have witnessed, experienced or initiated domestic violence or abuse are more likely than those who have not to get first-trimester care, while there is little difference between women with depression and those without. By far the largest difference in the timing of entry into prenatal care has to do with whether the pregnancy was wanted: Some 18% of women who did not want their pregnancies initiated care in the first trimester, compared with 38% of those whose pregnancies were wanted. Women who smoked marijuana were slightly more likely to get early care than were women who reported no drug use.

Because the number of women in the program was so large, significance testing of the bivariate relationships would not yield meaningful results. None of these factors, however, operates in isolation from the others. Thus, to see whether these relationships hold up when we look at all the variables simultaneously, we turn now to the multivariate analysis.

Multivariate Analysis

If racial and ethnic differences were due completely to differential representation in the other risk categories, then we would expect the race and ethnicity variables to be nonsignificant in the multivariate analysis. Instead, we see that the relationships shown in the bivariate relationships hold (Table 3). Non-Hispanic women who are black or of "other races" were roughly 30-40% less likely than non-Hispanic white women to initiate care early (odds ratios, 0.7 and 0.6, respectively). Interestingly, results are the same for Hispanic white women and Hispanic women of "other races": Both groups were 16% less likely than non-Hispanic white women to get early care.

Table 3. Odds ratios from logistic regression indicating the likelihood that a woman will obtain prenatal care in the first trimester, by socioeconomic/demographic and psychosocial characteristics

Characteristic	Odds ratio
Socioeconomic/demographic	
Race	
Non-Hispanic white (ref)	1.00
Non-Hispanic black	0.65***
Non-Hispanic other	0.63***
Hispanic white	0.84***
vHispanic other	0.84***
U.S.-born	1.07**
Dominant language not English	0.81***
Worked during first trimester	1.57***
Married at any time during pregnancy	1.23***
Age	

<15	0.50***
15-17	0.70***
18-19	0.79***
20-24	0.87***
25-29 (ref)	1.00
30-34	0.99
35-39	1.03
>=40	1.00
City size	
<50,000 (ref)	1.00
50,000-74,999	0.93*
>=75,000	1.14***
Year	
1988 (ref)	1.00
1989	1.05
1990	1.08
1991	1.05
1992	1.20**
1993	1.46***
1994	1.93***
1995	2.20***
1996	2.87***
Psychosocial	
Threatened with eviction/homelessness	0.86
Poor housing conditions	0.88*
Caregiver	1.01
Inadequate financial resources	1.00
Involvement with criminal justice system	0.97
Violence/abuse in the household	1.12**
Depression/other mental health problems	1.16***
Pregnancy unwanted	0.37***
Behavioral	
Smoked cigarettes	0.93***
Drank alcohol	0.90***
Used marijuana only	1.11*
Used hard drugs only	0.82***
Used marijuana and hard drugs	0.94
Used no drugs (ref)	1.00
Other	0.94*
χ^2	4,598.9***
<i>df</i>	59
*p<.05. **p<.01. ***p<.001. <i>Notes:</i> Analysis includes controls for county of residence. For categorical variables, ref=reference group. For dichotomous variables, reference group is women without the characteristic listed in the table.	

Working during the first trimester exerts a positive impact on early entry into care, as does being married. In contrast to the bivariate results, having been born in the United States significantly increases the likelihood of early care after other variables are

controlled for (odds ratio, 1.1), and women whose dominant language is not English were significantly less likely to get early care than were English speakers. Age has a significant impact only for young women: Those younger than 25 were 15-50% less likely than women aged 25-29 to get care early.

Living in a large city proves advantageous, raising the likelihood of early prenatal care by 14%. By contrast, living in a medium-sized city appears to be a handicap, reducing the odds by 7%.

The effect of year is positive and significant for each year after 1991. The impact increases over time, which suggests that as the program became more widely implemented and advertised, it may have had an independent effect on getting women into care earlier. There may be another explanation, however: The inclusion of higher income women in Medicaid after eligibility was expanded in 1991 likely increased the proportion obtaining care early.

Turning to the psychosocial risk factors, we find that only one of the housing variables has a significant effect: Living in poor housing conditions reduced the likelihood of early care by 12%. Being threatened with eviction or homelessness, having the burden of caring for a seriously ill person in the household and involvement with the criminal justice system have no impact on the timing of initiation of care. Inadequate financial resources also have no effect, perhaps reflecting that financial stresses may not be as much of an obstacle for a Medicaid-eligible population overall as for women just above the eligibility levels. In fact, previous research has shown that women without any insurance are the least likely to get early care, not those on Medicaid.²⁷

Both measures of emotional strain are statistically significant and have positive effects (odds ratios, 1.1-1.2). These results suggest that a connection with "the system" may encourage women to get early care or at least to make sure they are provided with information.

Again, the psychosocial risk factor with the largest impact is the wantedness of the pregnancy. Women with an unwanted pregnancy were 63% less likely than those whose pregnancy was wanted to get early prenatal care. These results underscore the importance of making family planning services available prior to conception and suggest that preventing unwanted pregnancies may be an effective means by which to improve birth outcomes.

Women who smoked or consumed alcohol just prior to or during pregnancy had lower likelihoods of getting early care than their abstaining counterparts (odds ratio, 0.9 for each). Of course, there may be an endogeneity problem here: Women who do not get care early may not be as fully informed as others about the risks of smoking and drinking. In terms of drug use, women who reported smoking marijuana were slightly more likely to get early care than women who used no drugs (1.1), while women who used hard drugs had reduced odds of getting early care (0.8).

Other regressions (not shown) indicate that the impacts of traditional risk factors were insensitive to the inclusion of the psychosocial risk factors; in all cases, the inclusion of the psychosocial factors added significantly to the explanatory power of the models.

Do the risk factors have the same impacts for all women, or are they more important

for certain racial and ethnic groups than for others? To answer this question, we conducted detailed analyses of racial and ethnic patterns.

Racial and Ethnic Variations

Table 4 shows the compositional differences between the racial and ethnic groups. (We excluded non-Hispanic women of "other races," because they are a small, heterogeneous group.) Non-Hispanic white women, who were the most likely to initiate care early, appear to be advantaged in terms of employment status, marriage and financial resources. However, they also are the most likely to report involvement with domestic violence and to smoke and drink, and they have a high incidence of drug-taking behavior.

Table 4. Percentage of women who obtained prenatal care in the first trimester, and percentage with selected socioeconomic/demographic and psychosocial characteristics, by race/ethnicity

Characteristic	Non-Hispanic		Hispanic	
	White (N=24,915)	Black (N=33,213)	White (N=19,369)	Other (N=10,847)
Started care in first trimester	44.9	31.7	36.5	35.4
Socioeconomic/demographic				
U.S.-born	91.6	92.8	30.3	37.0
Dominant language not English	5.9	2.7	59.4	52.9
Worked during first trimester	25.7	16.1	19.3	18.9
Married at any time during pregnancy	33.6	9.5	31.5	24.7
Age				
<15	0.2	0.6	0.3	0.3
15-17	4.1	10.4	7.0	7.4
18-19	11.8	15.7	11.1	13.7
20-24	39.1	38.1	32.8	37.1
25-29	25.3	20.8	25.9	23.4
30-34	13.9	10.2	15.1	12.5
35-39	4.8	3.5	6.4	4.6
>=40	0.9	0.6	1.6	1.0
City size				
<50,000	76.6	43.2	48.7	42.9
50,000-74,999	8.0	6.5	10.2	13.9
>=75,000	15.4	50.2	41.1	43.2
Year				
1988	1.2	2.1	1.4	1.3
1989	10.8	12.9	9.2	10.0
1990	16.0	16.9	12.9	16.0
1991	20.7	21.1	19.4	21.2
1992	26.0	23.9	24.3	23.9
1993	19.4	16.6	19.0	17.8
1994	4.3	5.1	8.8	6.0
1995	1.3	1.1	4.3	3.0

	1996	0.3	0.3	0.8	0.8
Psychosocial					
Threatened with eviction/homelessness	3.2	3.4	1.2	2.3	
Poor housing conditions	1.4	2.1	1.3	2.5	
Caregiver	1.3	1.1	0.8	0.8	
Inadequate financial resources	30.7	32.5	34.4	45.8	
Involvement with criminal justice system	2.2	2.6	1.0	1.1	
Violence/abuse in the household	4.7	2.4	2.1	2.6	
Depression/other mental health problems	5.3	4.9	4.6	5.4	
Pregnancy unwanted	3.5	5.5	2.4	2.9	
Behavioral					
Smoked cigarettes	44.8	23.7	11.8	11.2	
Drank alcohol	10.6	10.1	3.0	3.3	
Used marijuana only	3.7	2.9	0.9	1.0	
Used marijuana and hard drugs	2.1	1.9	0.5	0.7	
Used hard drugs only	5.0	6.3	2.1	3.0	
Used no drugs	89.3	88.9	96.6	95.3	
Other	5.8	6.1	5.6	7.5	

By contrast, the data suggest some possible reasons why non-Hispanic black women have the lowest likelihood of early prenatal care use. They are the least likely to be working or to be married, they tend to become pregnant at younger ages than other groups and they have high rates of unwanted pregnancies. Black women are also the most likely to have been born in the United States, speak English as their primary language and live in large cities.

The multivariate results for the entire sample showed that Hispanic white women and Hispanic women of "other races" had equal likelihoods of obtaining early care. Is this because they have similar risk profiles? Should we group Hispanic women together regardless of their race? The results in Table 4 suggest that the answer is no, but complicated. Comparing the first two columns with the last two, we see that for many factors, Hispanic women are more similar to each other than to non-Hispanic black or white women.

However, when we compare the last two columns, we see that among Hispanic women, whites have a different risk profile than those of other races. White Hispanic women are less likely than other Hispanic women to have been born in the United States and to speak English. They are more likely to be married, and they have a slightly older age distribution. Among Hispanics, white women have better housing conditions and are less likely to report serious financial difficulties than those of other races; they are also less likely to have unwanted pregnancies. The two groups of Hispanic women have similar behavioral patterns, and they report many fewer risks than their non-Hispanic counterparts.

The bivariate relationships between the risk factors and the likelihood of getting first-trimester care show a consistent pattern among racial and ethnic groups (Table 5): Non-Hispanic black women are almost always the least likely to get early care, no matter what the risk factor, and non-Hispanic white women are almost always the most likely to get early care. However, the likelihood of early care varies by risk factor, and in each racial and ethnic group, pregnancy wantedness seems to have the largest effect.

Characteristic	Non-Hispanic		Hispanic		Characteristic	Non-Hispanic		Hispanic	
	White	Black	White	Other		White	Black	White	Other
U.S.-born					Living in poor housing conditions?				
Yes	45.6	31.5	35.9	36.6	Yes	36.7	27.3	30.8	32.1
No	36.4	34.9	36.7	35.3	No	45.0	30.8	36.6	35.5
Dominant language other than English?					Inadequate financial resources?				
Yes	34.2	28.0	35.6	35.0	Yes	43.2	32.9	37.5	36.7
No	45.5	31.9	37.8	35.9	No	45.6	31.2	35.9	34.3
Worked during first trimester?					Caregiver				
Yes	54.0	42.6	43.4	41.5	Yes	42.9	35.4	38.3	26.4
No	41.7	29.7	34.8	34.0	No	44.9	31.7	36.5	35.5
Married at any time during pregnancy?					Ever involved with criminal justice system?				
Yes	49.2	38.4	40.0	38.6	Yes	42.6	28.7	33.2	33.3
No	42.7	31.0	34.9	34.4	No	44.9	31.8	36.5	35.4
Age					Violence/abuse in household?				
<15	35.0	14.1	30.6	32.3	Yes	43.7	33.5	42.6	32.5
15-17	34.7	24.1	32.0	32.8	No	44.9	31.7	36.3	35.5
18-19	40.5	29.4	33.6	31.3	Depression/other mental health problems?				
20-24	44.1	32.7	33.9	34.3	Yes	45.2	32.9	40.3	32.1
25-29	47.7	34.9	38.5	37.2	No	44.8	31.7	36.3	35.6
30-34	47.4	33.6	39.7	39.0	Pregnancy unwanted?				
35-39	48.5	33.6	44.0	40.5	Yes	20.6	14.4	24.0	19.0
>=40	44.1	37.3	37.8	42.5	No	45.7	32.8	36.8	35.9
City size					Smoked?				
<50,000	45.5	29.9	34.4	33.1	Yes	44.7	29.1	36.4	32.7
50,000-74,999	42.9	29.4	36.1	27.8	No	45.0	32.6	36.5	35.7
>=75,000	42.6	33.6	38.3	40.2	Drank?				
Year					Yes	43.6	27.2	41.3	30.9
1988	34.5	25.3	34.2	35.0	No	45.0	32.3	36.3	35.6
1989	37.9	28.8	36.1	36.2	Drug use				
1990	41.2	30.3	33.3	33.5	Marijuana only	46.2	33.6	37.0	40.6
1991	40.9	29.0	32.8	30.5	Marijuana plus hard drugs	48.1	22.5	34.4	27.4
1992	47.5	31.9	34.0	32.1	None	44.9	32.3	36.5	35.4
1993	51.2	35.5	38.6	39.3	Hard drugs only	41.3	25.6	33.7	37.4
1994	50.0	40.3	47.2	46.1	Other psychosocial risk factors?				
1995	56.0	46.3	42.9	55.8	Yes	36.9	28.6	36.5	35.2
1996	47.7	55.0	58.9	53.0	No	45.0	32.0	36.5	35.4
Threatened with eviction/homelessness?									

Yes	37.6	30.3	36.6	32.4
No	45.1	31.8	36.5	35.5

To test whether the risk factors have the same impact on women of all races and ethnicities, we regressed these variables on the likelihood of getting first-trimester care for each racial and ethnic group separately. Results of these analyses show that several variables have positive impacts that transcend racial and ethnic categories (Table 6). Working, being married and being in the program in its later years consistently increase the likelihood of getting early prenatal care. Living in a big city and being depressed are significantly positive for three of the four groups. There are also variables with consistently negative impacts: If English is not a woman's main language or if she does not want her pregnancy, she has reduced odds of getting early care. Smoking has a negative impact for non-Hispanic whites, non-Hispanic blacks and "other" Hispanics.

Table 6. Odds ratios from logistic regression indicating the likelihood that a woman will obtain prenatal care in the first trimester, by socioeconomic/demographic and psychosocial characteristics, according to race/ethnicity

Characteristic	Non-Hispanic		Hispanic	
	White	Black	White	Other
Socioeconomic/demographic				
U.S.-born	1.28***	1.04	0.95	1.06
Dominant language not English	0.77***	0.75***	0.90***	0.86**
Worked during first trimester	1.57***	1.68***	1.43***	1.43***
Married at any time during pregnancy	1.29***	1.23***	1.23***	1.26***
Age				
<15	0.80	0.35***	0.77	0.80
15-17	0.72***	0.63***	0.77***	0.85
18-19	0.82***	0.78***	0.81***	0.81**
20-24	0.87***	0.89***	0.80***	0.88*
25-29 (ref)	1.00	1.00	1.00	1.00
30-34	0.97	0.94	1.04	1.10
35-39	0.99	0.90	1.23***	1.13
>=40	0.88	1.08	0.97	1.30
City size				
<50,000 (ref)	1.00	1.00	1.00	1.00
50,000-74,999	1.01	0.92	0.96	0.85
>=75,000	1.00	1.13*	1.18***	1.42***
Year				
1988 (ref)	1.00	1.00	1.00	1.00
1989	1.08	1.12	1.02	1.01
1990	1.24	1.21*	0.88	0.97
1991	1.26	1.16	0.87	0.85
1992	1.63***	1.32**	0.91	0.91
1993	1.90***	1.54***	1.13	1.32
1994	2.10***	1.90***	1.71***	1.89**
1995	2.85***	2.33***	1.48**	2.87***
1996	2.25**	3.35***	2.85***	3.08***

Psychosocial				
Threatened with eviction/homelessness	0.89	1.05	1.02	1.01
Poor housing conditions	0.87	0.88	0.85	1.04
Caregiver	0.94	1.20	1.10	0.70
Inadequate financial resources	0.91**	1.00	1.11**	0.96
Involvement with criminal justice system	1.02	0.99	0.86	1.03
Violence/abuse in the household	1.04	1.16	1.33**	1.00
Depression/other mental health problems	1.18**	1.21***	1.17*	0.94
Pregnancy unwanted	0.33***	0.36***	0.50***	0.43***
Behavioral				
Smoked cigarettes	0.94*	0.89***	0.96	0.83*
Drank alcohol	0.95	0.82***	1.24*	0.84
Used marijuana only	1.11	1.14	0.92	1.33
Used hard drugs only	0.91	0.74***	0.86	0.99
Used marijuana and hard drugs	1.34**	0.70***	0.93	0.72
Used no drugs (ref)	1.00	1.00	1.00	1.00
Other	0.83	0.96	0.95	1.11
χ^2	1,383.1***	1,352.7***	701.3***	649.1***
df	55	55	55	54
*p<.05. **p<.01. ***p<.001. Notes: Analysis includes controls for county of residence. For categorical variables, ref=reference group. For dichotomous variables, reference group is women without the characteristic listed in the table.				

Some variables affect only one group of women, but others have opposing impacts, depending upon the group. While having inadequate financial resources is positively linked to early prenatal care for Hispanic white women, it has the opposite effect for their non-Hispanic counterparts. Similarly, drinking has a positive impact for Hispanic white women and a negative effect for non-Hispanic black women. Using marijuana and hard drugs is associated with early care for non-Hispanic white women, but with later care for non-Hispanic black women. Further investigation into why these factors have different impacts is needed. For example, are they measuring different concepts for different groups, or do they really have varying effects on each group?

CONCLUSION

Our study has identified factors that appear to lead high-risk women to enter prenatal care early and factors that seem to preclude the early initiation of care. While Hispanic women have a similar overall risk for late entry into prenatal care no matter what their race, the risk factors appear to have slightly different impacts for Hispanic women who are white and those who are of "other races."

For women participating in the HealthStart program, living in poor housing conditions and engaging in risky behaviors were associated with delayed entry into prenatal care. Paradoxically, having clinical depression or another mental illness and experiencing violence or abuse were linked to earlier entry. Association with the mental health community may facilitate early initiation of care, and violence may propel women into

contact with the medical and social services systems.

The wantedness of a woman's pregnancy had by far the largest and most consistent effects on the timing of prenatal care. Unlike research that has had to rely upon retrospective reports of pregnancy wantedness,²⁸ our study identified women who did not want their pregnancies while they were pregnant. It may be necessary, however, to interpret the estimated effects of wantedness with caution: Since unwanted pregnancies can encompass situations that do not meet any of the criteria of our definition, the estimated effect of this measure may be overstated. Furthermore, our definition partially includes the outcome we are analyzing, timing of entry into prenatal care. However, the low proportion of women classified as having unwanted pregnancies and the fact that 18% of these women got care in the first trimester suggest that our measure of unwantedness encompasses more than late entry into care.

Two additional points lead us to conclude that the estimates of the effects of pregnancy wantedness found in our study are probably not confounded by the definition of this variable. We reanalyzed the data without the wantedness variable (not shown), and the resulting odds ratios and significance levels for the remaining variables were virtually identical to those in the analyses including wantedness. Moreover, the results for wantedness are in line with those of studies using data from other states and different control measures. For example, mothers in Texas who reported after delivery that they had not tried or had not wanted to get pregnant were 57% more likely to have delayed prenatal care than were those who had tried to get pregnant.²⁹

A limitation of our study is the absence of education and parity as predictors of prenatal care timing. Neither of these variables was contained in the data set. Past research indicates that education usually has a positive effect (increasing the probability of obtaining first-trimester care), while parity generally has a negative effect.³⁰ Multiparous women may be more likely than women with few or no children to recognize the importance of getting early care but may also feel they know what will be said in prenatal care visits; additionally, they may face greater barriers to getting the care (such as making child care arrangements). Some or all of the education and parity effects found in other studies may operate through the psychosocial risk factors included in our analysis, and education and parity themselves may play no direct roles. However, until an analysis can be conducted that includes education, parity and psychosocial risk factors, along with the other conventional risk factors for late prenatal care, these effects cannot be disentangled.

Another potential limitation involves the composition of the sample. Specifically, if women who participated in the HealthStart program were systematically different in unobserved ways from Medicaid recipients who did not participate, the results presented here would not be generalizable to all women on Medicaid in New Jersey. The generalizability of our results is also limited by the absence of data on Medicaid recipients who received no prenatal care.

A study of the effects of the HealthStart program on birth outcomes in 1989-1990 that linked birth certificate files and Medicaid records addressed the potential selection of Medicaid recipients into the program.³¹ Using a two-stage estimation to test for selection bias, the analysts found that observed characteristics accounted for any

differences between program participants and nonparticipants; thus, HealthStart women were representative of all women on Medicaid in New Jersey in 1989-1990. To further investigate this issue, we analyzed our data for all women for 1993, by which time 90% of Medicaid-covered women participated. In general, the coefficients tended to be a bit smaller than those in the model for all years combined, but otherwise the results and patterns of significance were strikingly similar.

We also explored whether the absence of information on women who received no prenatal care may have biased the results. Using a data set containing birth records that had been linked with Medicaid records for New Jersey births in 1989-1990, we assessed the characteristics of the 1,419 Medicaid recipients not in the HealthStart program (only 4% of all women covered by Medicaid) who received no prenatal care. We compared these women with HealthStart participants in 1988-1993 who initiated care in the eighth or ninth month. We found that the two groups were similar in terms of nativity and age, but that those who received no care were more likely than those who began care late to be black (79% vs. 49%) and to live in a big city (63% vs. 38%), and were less likely to be married (10% vs. 23%). Given that the women receiving no care represented such a small proportion of the Medicaid population, however, the results of our analyses probably would not have changed substantially if they had been included. Moreover, if their inclusion had an effect, it probably would have produced a slight bias toward the null hypothesis of no impact for the different psychosocial risk factors.

We conclude, therefore, that the HealthStart data are highly representative of the overall population of Medicaid recipients giving birth in New Jersey—a high-risk group consisting of poor and near-poor women. Although the sample is from just one state, the results can complement findings from other geographic areas and the United States as a whole.

A surprising aspect of our findings is the psychosocial factors that did not appear to be significant: Homelessness or the threat of eviction, caring for sick household members and involvement with the criminal justice system had no effect in our analyses. These results have several possible explanations. First, there may be measurement error: Although the case coordinators should have known about all risk factors, they may not have; as a result, we may have underestimated the prevalence of these factors. In particular, crime and drug use may be underreported. However, the proportion of women in the sample who used drugs during pregnancy (5.4%) is virtually identical to the national rate in 1992-1993 (5.5%).³² Second, what may be important is not the simple absence or presence of a specific risk factor, but whether or how the presence of that risk factor translates into prenatal care. Third, these psychosocial risk factors may not affect the timing of entry into prenatal care, but may affect consistency of use. In addition, they may influence infant health directly, not through prenatal care use.

Our results indicate that it is important for programs to consider ethnicity along with race when they target specific prenatal care interventions. At the same time, programs need to respond to the dynamics of the health care delivery system, particularly the transition to Medicaid managed care and the effects that this process has on the timing of prenatal care initiation. For example, the advantages of being involved with the health care system in the context of having a mental illness or being exposed to

domestic violence may be less present in a managed care environment. More generally, it is important for programs designed to attract women into prenatal care to recognize the complexity of the issue as well as the opportunities and barriers that different groups of women face.

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*Under presumptive eligibility, a pregnant woman who is not already enrolled in Medicaid is covered by the program if it appears that she will be financially eligible once her income is verified.

†State personnel indicate that not all of the original forms were entered into the database because of a lack of funding. We compared the county distribution of women in the MSSD with that of all Medicaid births in New Jersey and found that except for Essex County, the distributions were fairly similar. All of our analyses control for county.

‡New Jersey began shifting its Medicaid patients into managed care settings in 1994. All Medicaid-reimbursed health maintenance organizations were supposed to provide services consistent with HealthStart guidelines, D forms. As fee-for-service Medicaid providers began to phase out, so too did the HealthStart program: There were 52 HealthStart providers in 1988, 72 in 1989, 80 in 1990, 81 in 1991, 79 in 1992, 84 in 1993, 39 in 1994, 12 in 1995 and seven in 1996. Although the numbers of participants declined after 1993, we have kept all of the years in the analyses. We reran all of the analyses including only data for 1989-1993, and the results did not change.

