Trends in Maternal and Infant Health in Poor Urban Neighborhoods: Good News from the 1990s, but Challenges Remain

Embry M. Howell, PhD[a]
Kathryn L. S. Pettit, MPP[a]
G. Thomas Kingsley, MCP[a]

SYNOPSIS

Objectives. During the 1990s, numerous public policy changes occurred that may have affected the health of mothers and infants in low-income neighborhoods. This article examines trends in key maternal and child health indicators to determine whether disparities between high-poverty neighborhoods and other neighborhoods have declined.

Methods. Using neighborhood-level vital statistics and U.S. Census data, we categorized "neighborhoods" (Census tracts) as being high poverty (greater than 30% of population below the federal poverty level in 1990) or not. We compared trends in four key indicators—births to teenagers, late prenatal care, low birthweight; and infant mortality—over the l990s among high-poverty and other neighborhoods in Cuyahoga County, Ohio; Denver, Colorado; Marion County, Indiana; and Oakland, California.

Results. In all four metropolitan areas, trends in high-poverty neighborhoods were more favorable than in other neighborhoods. The most consistently positive trend was the reduction in the rate of teen births. The metropolitan areas with the most intensive programs to improve maternal and child health—Cuyahoga County and Oakland—saw the most consistent improvement across all indicators. Still, great disparities between high-poverty and other neighborhoods remain, and only Oakland shows promise of achieving some of the Healthy People 2010 maternal and child health goals in its high-poverty neighborhoods.

Conclusions. While there has been a reduction in maternal and infant health disparities between high-poverty and other neighborhoods, much work remains to eliminate disparities and achieve the 2010 goals. Small area data are useful in isolating the neighborhoods that should be targeted. Experience from the l990s suggests that a combination of several intensive interventions can be effective at reducing disparities.

[a]The Urban Institute, Washington, DC

Address correspondence to: Embry M. Howell, PhD, Health Policy Center, The Urban Institute, 2100 M St. NW, Washington, DC 20037; tel. 202-261-5714; fax 202-261-5887; e-mail <ehowell@ui.urban.org>.

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During the 1980s, public health policy makers became increasingly concerned about disparities in health services and health outcomes in the United States between low-income and higher-income people. Partially due to the declining ranking of the U.S. infant mortality rate compared to other countries in the world, policy concern was focused particularly on maternal and infant health disparities.[1,2] Experts and public officials called for concerted efforts to address the underlying causes of poor maternal and infant health among certain income and ethnic groups.[3,4] As a result, many initiatives were developed around the country to target selected geographic areas with the worst outcomes.[5,6] These efforts, coordinated by public health agencies as well as private, non-profit, community-based organizations, received added impetus from the Healthy People 2000 goals[7] adopted by the U.S. Public Health Service, which highlighted several key maternal and child health indicators (teen pregnancy, prenatal care initiation, low birthweight, and infant mortality) and set concrete goals for improvement.

One example of such an initiative was the Healthy Start program, which began in 1991 as a demonstration program in 15 local areas with very high infant mortality rates. The program eventually expanded to more than 90 areas nationwide.[8] The 15 early programs had diverse interventions, most using case management to encourage early and continuous prenatal care, family planning, and other positive lifestyle changes. An evaluation of these early programs found mixed results,[9,10] with a majority of programs improving prenatal care use, but only a few improving birth outcomes.

In addition to interventions targeted toward selected poor neighborhoods, other changes happening at the national and state levels may have affected maternal and infant health in poor neighborhoods during the 1990s. The Medicaid expansions of the 1980s and early 1990s made more women and infants eligible for Medicaid.[11] The Welfare reform law of 1996 encouraged delayed childbearing for teenagers, encouraged work and school attendance for Welfare beneficiaries, and restricted the receipt of Welfare for some women.[12] The advent of Medicaid managed care restructured the way in which health services were organized and financed for many poor women.[13–15] Other initiatives that were more variable from state-to-state and locality-to-locality were efforts to increase the number of health care providers in low-income areas,[16] expansions in the availability of neonatal intensive care,[17] and efforts to promote regular perinatal risk assessment and referral.[18]

Generally, studies of disparities in maternal and infant health have focused on individual characteristics, such as a mother's race/ethnicity, income, or education.[19] However, several recent studies have shown a relationship between neighborhood characteristics and maternal/infant health outcomes or other health outcomes, independent of individual characteristics.[20–28] For example, Perloff and Jaffee found that residence in a distressed urban neighborhood significantly increased the risk of late prenatal care, even after controlling for maternal risk.[25] O'Campo and others found that women living in high-risk neighborhoods benefited less from prenatal care than other women.[26] Pearl and others found that residents of less favorable neighborhoods had lower-birthweight infants.[27] There are numerous ways that neighborhoods could directly affect health, including factors such as crime or environmental pollution.

Most of the previous neighborhood-level studies are based on data from the 1980s and early 1990s. This article provides new data from 1990 to 2000 on key maternal/infant outcomes for low-income neighborhoods in four urban areas: Cuyahoga County, Ohio (contains Cleveland); Denver, Colorado; Marion County, Indiana (contains Indianapolis); and Oakland, California. Key indicators—teen pregnancy rates, prenatal care timing, low birthweight, and infant mortality—were examined for each of these areas.

Nationally, there have been improvements in three of these indicators: teen pregnancy rates, prenatal care timing, and infant mortality.[29,30] In contrast, the rate of low birthweight did not decline during the decade. This contradictory pattern has been attributed to both a lack of successful interventions to prevent prematurity and to an increase in the rate of multiple births.[31,32]

One question that has not been addressed due to a lack of national data is whether these changes in maternal and child health outcomes have been more pronounced in low-income neighborhoods, where many of the interventions to reduce health disparities have been concentrated during this period. If this is true, then disparities among geographic areas defined according to income will have declined. Such changes could be due to various types of neighborhood changes, such as reduced crime, increased employment, or interventions that specifically target those communities. Also, it is possible that peer interactions within a neighborhood lead to differential change over time. (For example, the behavior of older sisters may affect the behavior of their younger siblings for whom they serve as role models.) This peer interaction could affect, for example, both teen births and prenatal care utilization.

To determine whether the poorest neighborhoods have benefited from positive trends to the same, lower, or greater extent as other neighborhoods, we provide new data contrasting trends in indicators across the 1990s for poor neighborhoods with trends for other neighborhoods in the same urban areas.

METHODS

Data in this study originated from organizations in the National Neighborhood Indicators Partnership (NNIP), a collaborative effort by the Urban Institute and 21 local partners to further the development and use of neighborhood-level information systems in local policymaking and community building. The NNIP partners are committed to creating cross-topic, recurrently updated data warehouses drawing from a variety of sources, including U.S. Census data, health data (for example, birth and death certificates), crime data, and housing data, among others. The Urban Institute provides technical assistance to the NNIP partners on research techniques, organizational strategy, and other common problems (http://www.urban.org/nnip/).

The NNIP was established in 1995 with funding primarily from the Rockefeller Foundation and several other foundations. Currently, its main sponsor is the Annie E. Casey Foundation. Each city's inventory differs somewhat, but all

have a core set of Census data and most have vital statistics. Data from all sources are aggregated for small areas (usually Census tracts). Census tracts are small geographic areas with a population size of about 4,000, with substantial socioeconomic similarity in the population. This article refers to them as "neighborhoods."

In 2001, the U.S. Department of Health and Human Services awarded a contract to the Urban Institute to, among other tasks, assemble neighborhood-level Census and vital statistics data from selected cities and perform an analysis of trends in maternal and child health indicators over the 1990s.[33] The cities were chosen based on the interest of the NNIP partners and the availability in their databases of high-quality vital statistics data at the Census-tract level.

For this analysis, "high poverty" neighborhoods are those where 30% of the residents were below the federal poverty level in 1990. This cut-off has been used by other researchers to identify concentrated poverty.[34,35] The same designation was used throughout the study period, although some neighborhoods no longer had 30% of people below the poverty level by 2000.

The analysis contrasts trends in key maternal and child health indicators in high-poverty and other neighborhoods between 1990 and 2000:

- Teen birth rate: number of births per 100 females aged 15–19 giving birth during the year;
- Late prenatal care rate: percent of births with prenatal care starting after the first trimester of pregnancy;
- Low birthweight rate: percent of births with birthweight below 2,500 grams; and
- Infant mortality rate: infant deaths per 1,000 live births.

To smooth trend lines, we created three-year rolling averages. For example, the first data point is an average of data for 1990 through 1992, and the last data point is an average of data for 1998 through 2000. This results in nine data points for the time series.

The trends in the four key indicators are plotted over time and shown in Figures 1 through 4. Beside each trend line, we also present the slope for a simple linear regression with the indicator as the dependent variable, and time as the

Figure 1. Trends in teen birth rates in high-poverty neighborhoods and other neighborhoods, 1990–2000

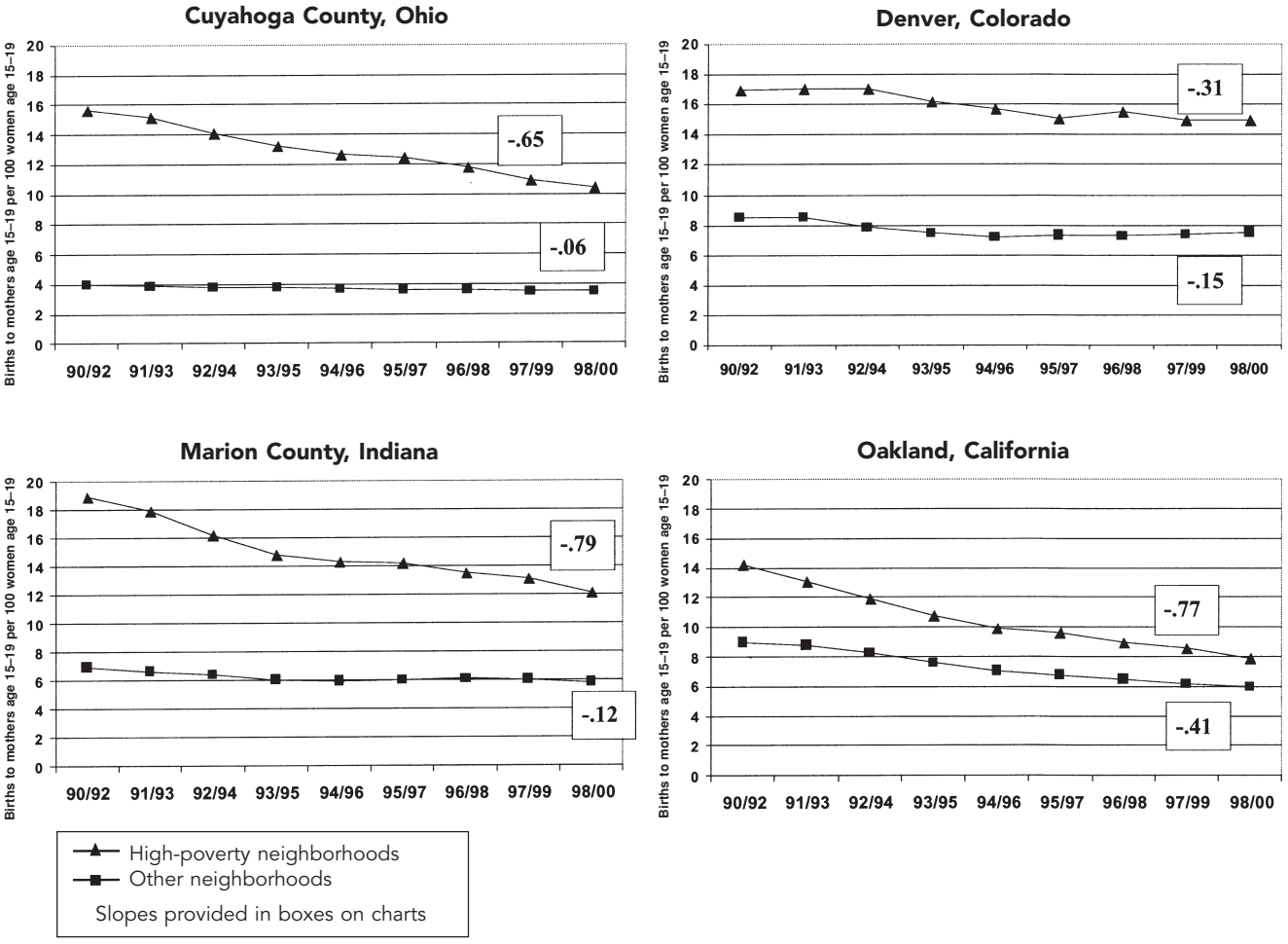
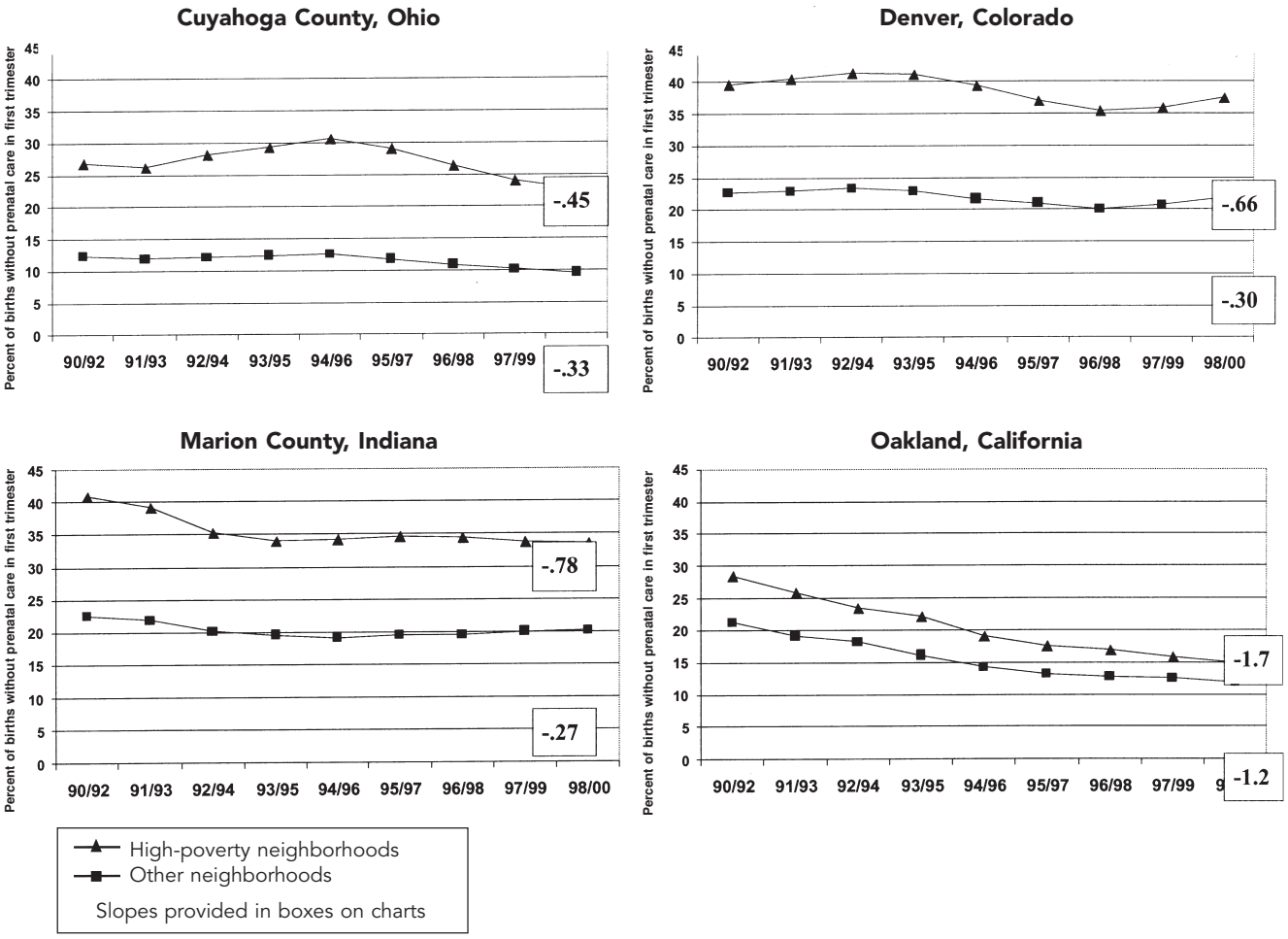


Figure 2. Trends in late prenatal care rates in high-poverty neighborhoods and other neighborhoods, 1990–2000



independent variable. The slope indicates whether and to what degree the indicator was rising or falling during the decade, and allows for a quick comparison of trends between the high-poverty neighborhoods and other neighborhoods in each urban area.

Limitations

The major limitation of this analysis is that it relies on neighborhood-level indicators and does not control for individual characteristics of the women. Also, the analysis is confined to four urban areas chosen because they participate in the NNIP and were able to provide data for the analysis. Finally, the classification of neighborhoods according to their poverty levels in 1990 means that some neighborhoods classified as "high poverty" in 1990 (about 30%) changed status during the decade. (We reanalyzed the data by excluding those tracts from the "high-poverty" group and including them in the "other" group, and the results were essentially unchanged, with only small changes in the slopes of the trend lines.) Finally, we did not have longitudinal data to show definitively whether improvements in the socioeconomic status of residents of high-poverty neighborhoods are due to a movement of higher-income people into the neighborhoods, an exodus of poor people from the neighborhoods, or improvement in the socioeconomic status of those who lived there at the beginning of the decade and remained there.

We performed tests for the statistical significance of differences in the slopes of trend lines for "high-poverty" and "other" neighborhoods. The differences presented are all statistically significant at the .05 level for all the indicators presented in this analysis.

RESULTS AND DISCUSSION

Table 1 shows some key characteristics of the neighborhoods identified as "high poverty" in contrast to other neighborhoods in 1990 and 2000. Most indicators were stable over the decade, with the following exceptions:

- The Hispanic population was growing in all four cities, most prominently in Oakland. This pattern was occurring in both high-poverty and other neighborhoods.

Table 1. Key socioeconomic characteristics, selected high-poverty neighborhoods and other neighborhoods, 1990 and 2000

	Cuyahoga County, Ohio (Cleveland)		*Denver, Colorado*		*Marion County, Indiana (Indianapolis)*		*Oakland, California*	
Demographic characteristics	*High poverty*	*Other*	*High poverty*	*Other*	*High poverty*	*Other*	*High poverty*	*Other*
Number of neighborhoods	125	374	28	153	25	179	14	93
Population (000)								
1990	237	1,175	83	384	69	728	52	320
2000	215	1,179	100	456	62	798	58	342
Percent African American								
1990	67	16	21	11	61	17	55	41
2000	70	20	15	11	60	22	42	36
Percent Hispanic								
1990	6	1	46	18	1	1	19	12
2000	8	2	52	27	4	4	30	20
Percent below 100% poverty								
1990	44	8	40	12	38	10	38	16
2000	37	9	29	11	31	10	34	17
Percent of families with children with female head								
1990	63	23	52	28	59	27	56	39
2000	62	27	40	27	58	30	43	36
Percent of housing units owner occupied								
1990	35	67	29	53	36	59	23	44
2000	36	68	32	56	36	61	23	44

SOURCE: CensusCD Neighborhood Change Database, produced by GeoLytics, Inc., and the Urban Institute.

- Poverty rates declined in high-poverty neighborhoods, along with some decline in the percent of female-headed families, most prominently in Denver.

In addition, crime rates declined in both high-poverty and other neighborhoods in all four metropolitan areas. (Data are not shown in the table because uniform data were not available across neighborhoods.)

Clear distinctions between high-poverty and other neighborhoods persisted throughout the decade, with the high-poverty neighborhoods being much more heavily minority, poorer, with lower rates of home ownership, and with higher rates of crime.

Figure 1 shows trends in teen birth rates from 1990 to 2000. As shown, teen birth rates went down in both high-poverty and other neighborhoods, but the decline was much more pronounced in high-poverty neighborhoods. For example, in Marion County (Indianapolis), the teen birth rate declined from almost 19 to about 12 per 100 women in high-poverty neighborhoods, whereas it changed very little in other neighborhoods. The pattern was very similar in Cuyahoga County (Cleveland). Oakland's high-poverty and lower-poverty neighborhoods both experienced a pronounced decline in teen birth rates, although the difference in trends between high-poverty and other neighborhoods was lower. (Oakland's high-poverty and other neighborhood characteristics are not as different as in the other urban areas studied.)

Teen birth rates did not fall as rapidly in the Denver high-poverty neighborhoods as in the other cities. One likely explanation for the difference in patterns is the different ethnic mix in the four urban areas. In Marion County, Cuyahoga County, and Oakland (to a lesser extent), a high percentage of the population is African American, while the percentage of African Americans is lower in Denver's high-poverty neighborhoods. Nationally, teen birth rates have fallen most rapidly among African American teenagers during this period.[36]

While the differential trends between high-poverty and other neighborhoods led to a reduction in disparities of rates for the two types of neighborhoods, substantial differences still exist. In addition, by the end of the decade, teen birth rates in these four urban areas for both types of neighborhoods, as well as nationwide, remained substantially higher than other developed countries,[37] showing that further progress is possible.

It is not possible to discern, from these limited data, the reasons for the differential decline in teen birth rates in high-poverty neighborhoods. Possible explanations include more targeted family planning interventions in these neighborhoods (such as from the Healthy Start program, which

was largest in Cuyahoga County and Oakland), as well as Welfare reform, which included several interventions targeted at reducing teen births.[38]

Figure 2 shows trends in the rate of late prenatal care in the four urban areas, separately for high-poverty and other neighborhoods. As with teen births, there was greater improvement in the timing of prenatal care in high-poverty neighborhoods than in other neighborhoods. However, in two of the areas (Cuyahoga County and Denver), there was not as much improvement in this indicator as in the teen birth rate, and progress was not as steady throughout the decade. Substantial disparities remained between high-poverty and other neighborhoods, with little change over time. The exception was Oakland, where the rate of late prenatal care was cut approximately in half in both high-poverty and other neighborhoods.

Changes in the timing of prenatal care could be due to interventions such as Healthy Start, managed care, or changes in provider supply or reimbursement. It is very difficult to disentangle these interrelated factors. The positive trends in Oakland suggest that public health outreach and education programs may be partially responsible for the steady progress there.

Figure 3 shows trends in the rate of low birthweight for all four urban areas. In spite of the national trend of an increased rate of low birthweight during the 1990s,[31] we found that in three of the urban areas studied, rates of low birthweight declined in high-poverty neighborhoods. (The exception was Marion County, where it increased in both types of neighborhoods.) One possible explanation for the decline is a shift in the demographic mix, from African American (who have high rates of low birthweight) to Hispanic (who have low rates), but this shift only occurred substantially in Oakland during the decade. For example, in Cuyahoga County, the rate of low birthweight declined in high-poverty neighborhoods (and increased in other neighborhoods), even though there was no such demographic shift.

Finally, Figure 4 shows infant mortality rates for three of the study areas. (The number of infant deaths in Oakland's high-poverty tracts was too small to calculate stable rates.) As shown, as with the other indicators, while infant mortality

Figure 3. Trends in low birthweight rates in high-poverty neighborhoods and other neighborhoods, 1990–2000

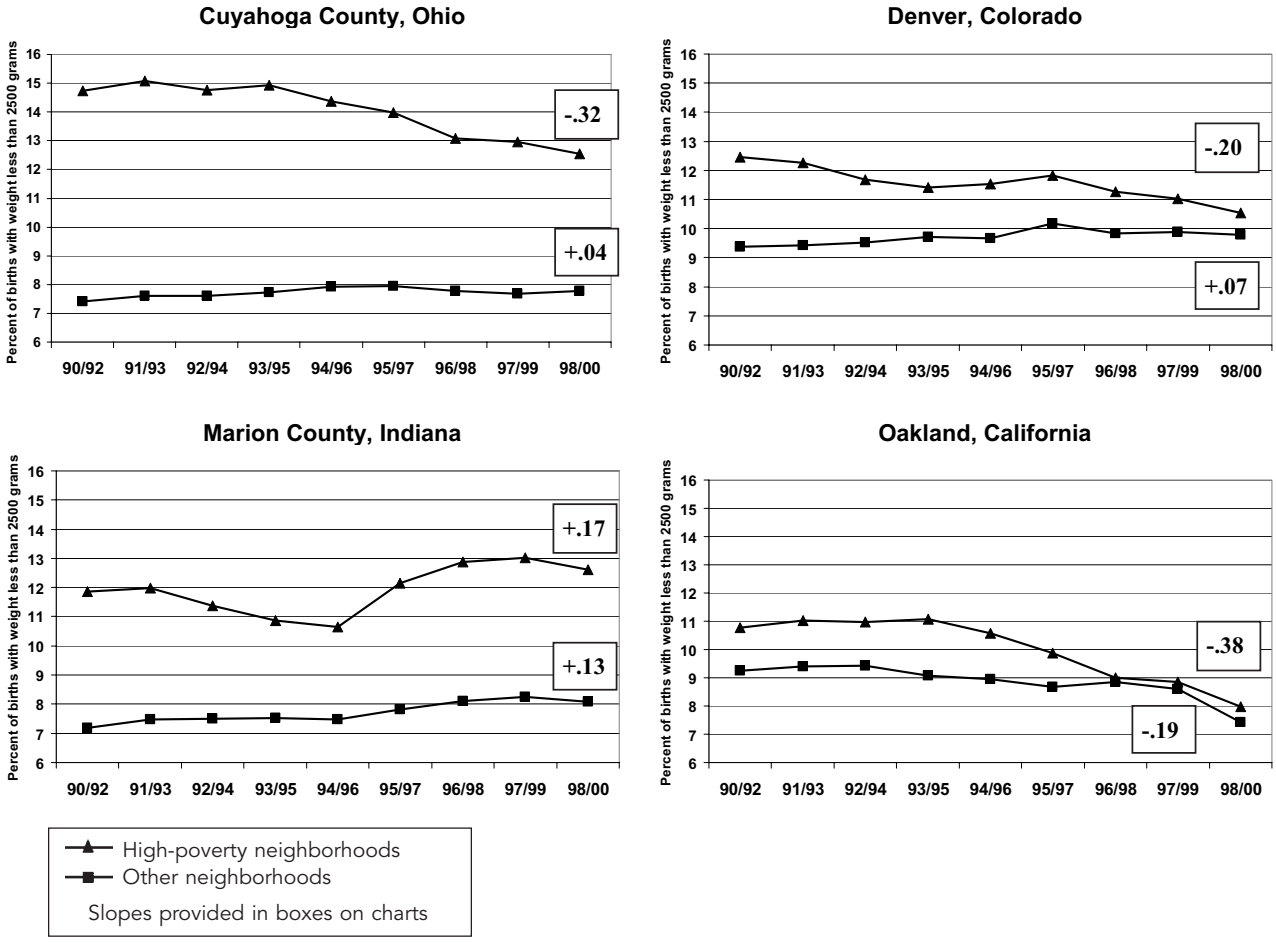
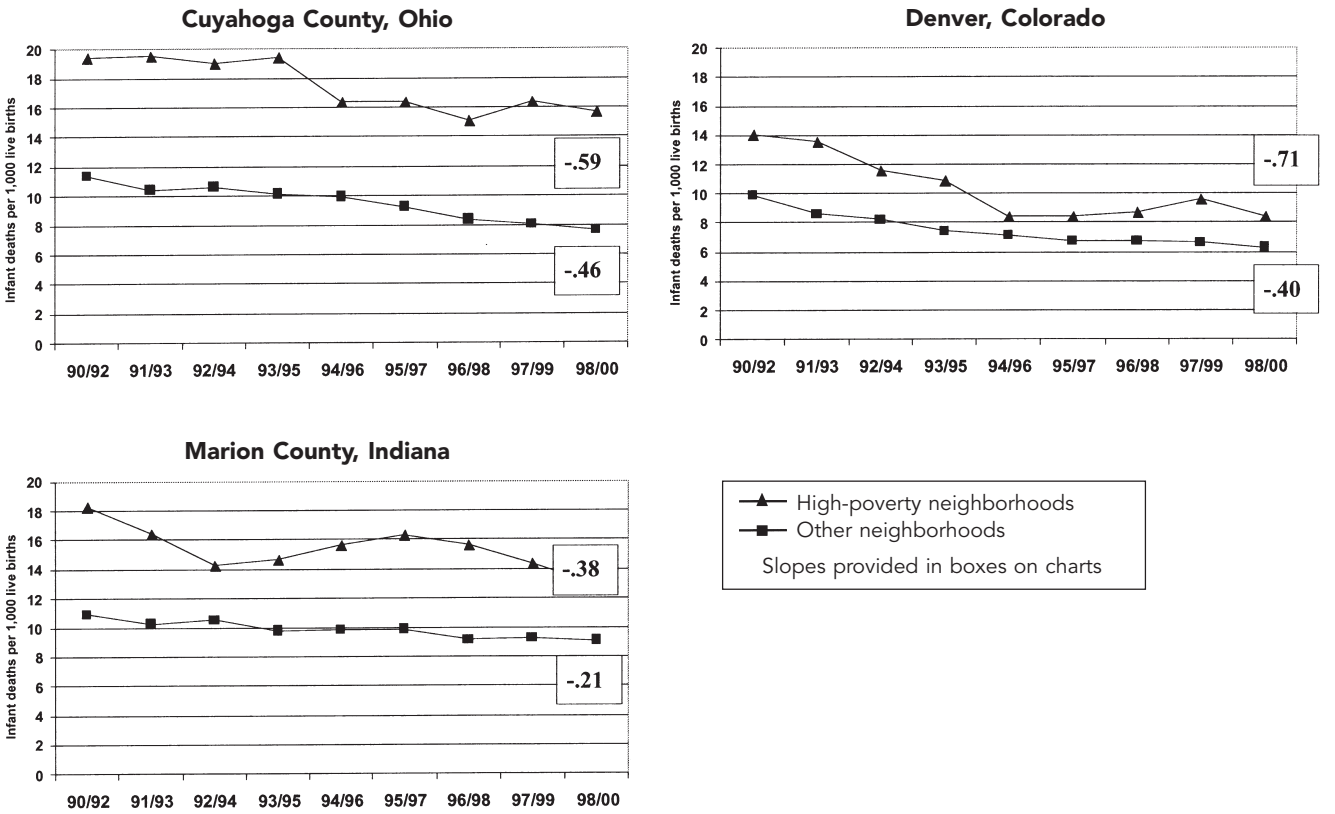


Figure 4. Trends in infant mortality rates in high-poverty neighborhoods and other neighborhoods, 1990–2000



rates declined in both poor and other neighborhoods in all three urban areas, the declines were greater in high-poverty neighborhoods. This was especially true in Denver and Cuyahoga County. We do not believe this is due to an increase in the Hispanic population—whose infant mortality rates are relatively low—in either city, since the proportion of the population who were Hispanic did not grow substantially in either place during the decade (Table 1). Since the infant mortality rate is often considered to be an indicator of overall social conditions, the greater decline in the poor neighborhoods of these urban areas can be considered an indication of improving social conditions there.

CONCLUSIONS

This analysis has shown more rapid improvement in four key indicators of maternal and child health in high-poverty neighborhoods, compared to other neighborhoods, in four American cities. While this is good news, there is still substantial need for continued improvements. For example, we found that in all cases, rates for all four indicators were substantially higher (in most cases twice as high or higher) in these high-poverty neighborhoods in 2000 than the Healthy People goals for 2010 (see Table 2). In almost all cases, rates were also higher in the other neighborhoods of these cities as well. Of all four cities, Oakland has come closest to already meeting the 2010 goals, and consequently holds promise of achieving most of the goals by 2010. (The exception is the teen pregnancy goal.) Both Oakland and Cuyahoga County (which had Healthy Start programs, as well as other maternal and child health interventions targeted toward low-income neighborhoods) showed sustained improvements throughout the decade and a reduction in disparities between high-poverty and other neighborhoods. The lessons learned from these interventions should be disseminated more widely, so that other cities can benefit from their experience.

As we enter a new decade, it remains to be seen whether a trend toward reducing disparities between high-poverty and other neighborhoods in these cities can be sustained. The data for tracking such indicators in different types of neighborhoods, available from the NNIP and other similar data sources, will help policy makers target interventions in the areas of greatest need within their local jurisdictions.

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Table 2. Healthy People 2010 goals for maternal and child health compared to results for selected high-poverty and other neighborhoods, 1998–2000

		1998–2000 Average							
	Healthy People 2010 goal[a]	Cuyahoga County		Denver		Marion County		Oakland	
Indicator		High poverty	Other	High poverty	Other	High poverty	Other	High poverty	Other
Teen births per 100 females ages 15–19	4[b]	10	3	15	7	12	6	8	6
Percent of births with late prenatal care	10	23	10	37	22	34	20	15	12
Percent of births with low birthweight	5	13	8	11	10	13	8	8	7
Infant deaths per 1,000 live births	4.5	16	8	8	6	13	9	NA	7

[a]Source: Department of Health and Human Services (US). Healthy people 2010. Volume II [cited 2004 Apr 6]. Available from: URL: www.healthypeople.gov/Document/HTML/Volume2.

[b]The Healthy People 2010 goal is for pregnancies, not births. Findings presented here are for 2000 births. Thus, the difference between the goal and actual experience is more pronounced than portrayed in the table.

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