The Journal of Sociology & Social Welfare

Volume 26
Issue 3 *September*

Article 8

September 1999

# A Path Analysis of the Effect of Welfare on Infant Mortality

Michael A. Lewis
*SUNY at Stony Brook*

# A Path Analysis of the Effect of Welfare on Infant Mortality

MICHAEL LEWIS

SUNY at Stony Brook
School of Social Welfare

*Social epidemiologists have found a relationship between poverty and infant mortality. Welfare policy experts have found that welfare benefits affect work effort, family structure, migration, and the rate of intergenerational transmission of welfare receipt. Social epidemiologists have paid little attention to the effects of poverty policies on infant mortality. Welfare policy experts have paid little attention to the effect of welfare on infant mortality. This paper merges the concerns of social epidemiologists and welfare policy experts by examining the relationship between welfare and infant mortality. The key finding is that welfare directly and indirectly affects infant mortality rates. States with higher welfare benefit levels also have lower infant mortality rates. The policy implications of this finding are discussed.*

One of the perennial concerns of social epidemiologists is the question of the etiology of infant mortality in the United States. The main cause of this problem has been found to be low birth weight. A report by the U.S. Department of Health and Human Services (1991) estimated that low birth weight was the primary cause of approximately 60 percent of all infant deaths. A great deal of recent research has attempted to determine what variables are linked to low birth weight.

Although variables such as age of mother (Orme, 1993), use of cigarettes and other drugs (Frank, et al., 1992 and Weiss and Lonnquist, 1997), inadequate prenatal care (Frank, et al., 1992 and Sharma 1998), and race and ethnicity of mother (Hummer, 1993; LaVeist, 1992; Druschel, et al., 1996; and Schoendorf, et al., 1992) have been found to be related to low birth weight, one of

Journal of Sociology and Social Welfare, September, 1999, Volume XXVI, Number 3

the most important variables related to this condition appears to be poverty. Singh, et al. (1995); Weiss and Lonnquist (1997); and Frank, et al., (1992) all report that poverty, via its generation of low birth weight, causes infant mortality.

Just as a great deal of attention has been paid to the causes of infant mortality, another set of researchers has assessed the effects of welfare benefits. For example, Moffit (1992) found that welfare creates work disincentives, is related to the formation of so called female-headed families, appears to cause some impoverished residents of low benefit states to migrate to higher benefit ones, and results in intergenerational transmission of welfare receipt. The intergenerational point simply means that children of welfare recipients are more likely to end up on welfare than children of non-recipients are. Lichter, et al. (1997) and Hoffman and Duncan (1995) also found that welfare is related to the formation of female-headed families. Fairlie and London (1997) assessed whether receiving higher benefits as a result of having children while on welfare causes women to have babies to obtain more benefits. They found no statistically significant relationship between these two variables.

What I do in this paper is attempt to "merge" the concerns of these two disparate literatures. Although social epidemiologists have been interested in the effect of poverty on infant mortality they have not addressed whether higher welfare benefits might curtail poverty rates and, thereby, curtail infant mortality rates. Although welfare researchers have been interested in the effects of welfare benefits they have also allocated little attention to this question. Presumably higher welfare benefits generate lower poverty rates, and, assuming social epidemiologists' findings hold at the aggregate level, lower poverty rates should generate lower infant mortality rates. The effect of welfare on infant mortality rates, via its effect on poverty rates, is called an indirect effect. This paper is, in part, an attempt to assess the extent of such an effect.

In addition to assessing the indirect effect of welfare on infant mortality rates, I exploit one of the advantages of the methodology I use (discussed below) and assess the total effect of welfare on such rates. This total effect is the sum of the direct and indirect effect of welfare on infant mortality rates. An assessment of the

indirect and total effects of welfare on infant mortality can provide guidance regarding the extent to which welfare can be used to curtail the proportion of infant deaths. Thus, after discussing the various types of effects of welfare on infant mortality I conclude with a discussion of the policy implications of my findings.

## MODEL

Given that I am interested in the indirect and total effects of welfare on infant mortality rates, an extension of regression analysis called *path analysis* is the appropriate methodology to use to assess such effects. The units of analysis for my examination were the fifty states in the U.S. Washington, D.C. was not included in the analysis because its proportion of female-headed families with children under eighteen (about 39%) was more than seven standard deviations (each standard deviation was 1.24 units) above the mean proportion (about 9%), and its infant mortality rate (20.7%) was more than eight standard deviations (each standard deviation was 1.42 units) above the mean infant mortality rate (about 9%). According to Gujarati (1988), if a value on a particular observation is at least four standard deviations above or below the mean value of all the other observations, this particular observation is an outlier. Thus, Washington, D.C. was an outlier and outliers can appropriately be excluded from analyses because inclusion of them tends to overstate or understate the extent to which key variables are related to one another (Agresti and Finlay, 1997).

### *Exogenous and Endogenous Variables*

The exogenous variables in the model I estimated were the following:

EDUC = the proportion of those twenty-five years old or older in states with B.A. degrees or higher

UNEMPLOY = states' unemployment rates

DISABLED = the proportion of those in states too disabled to work

SINGLE = the proportion of single mothers in states with children under eighteen years old

WELFARE = states' average monthly AFDC payments per family

I included EDUC in the model because economic analysis informs us that, at the individual level of analysis, there is a negative relationship between educational level and poverty (Schiller, 199). I hypothesized that this relationship might hold for my aggregate level data as well. I modeled a direct inverse relationship between EDUC and INFANT because recent epidemiological researchers have found evidence for such a relationship at the individual level of analysis (Singh, et. al., 1995 and Sharma, 1998). I conjectured that this association might hold at my higher level of analysis as well.

UNEMPLOY, DISABLED, and SINGLE were included in the model because all are positively related to poverty at the individual level of analysis (DiNitto, 1995; McLanahan and Garfinkel, 1995; and Mishel and Bernstein, 1994). I thought the same might hold at the aggregate level of analysis. I modeled a direct positive effect of UNEMPLOY on INFANT because there is research that suggest that unemployed persons are more likely to mistreat their children than employed persons are. One reason for this may be the increased contact that takes place between parents and children when parents are unemployed (Belsky, 1980).

I included a direct positive relationship between DISABLED and INFANT in the model because of a conjecture on the relationship between disability status and low self-esteem. I take it for granted that members of our society discriminate more often against disabled persons than against non-disabled ones. Such discrimination may lead to relatively higher rates of low self-esteem among the disabled, and low self-esteem has been found to be associated with child maltreatment (Bhatti, et. al., 1989; Oates and Forrest, 1985; and Shorkey, 1979).

The direct positive relationship between SINGLE and INFANT was included in the model because of a conjecture that single mothers of young children suffer higher rates of stress than the rest of us. There is evidence that suggest a positive relationship between stress and child maltreatment (Oates and Forrest, 1985 and Steele and Pollock, 1974).

The inclusion of all the above variables in my model allowed me to compare their total effects on infant mortality with that of welfare. Such a comparison is important for policy purposes.

The endogenous variables in the model were the following:

POVERTY = states' poverty rates

INFANT = states' infant mortality rates

The first equation in the model is:

$$\text{POVERTY} = a - p(\text{EDUC}) + p(\text{UNEMPLOY}) + p(\text{DISABLED}) + p(\text{SINGLE}) - p(\text{WELFARE}) + e$$

The second equation in the model is:

$$\text{INFANT} = a - p(\text{EDUC}) + p(\text{UNEMPLOY}) + p(\text{DISABLED}) + p(\text{SINGLE}) - p(\text{WELFARE}) + p(\text{POVERTY}) + e$$

Where each "p" stands for respective path coefficients.

## DATA

The source for my data was the 1990 census. Census data are based on answers to questionnaires that were sent to all housing units in the country. Each unit received one or two versions of the census questionnaire.

The short form version asked about basic population and housing issues. For example, questions about family structure, income, employment status, etc. were asked of all respondents. All housing units received this version of the questionnaire.

The long form version contained the same questions as the short form one plus some additional questions. A probability sampling procedure was used to determine which housing units were to receive the long form questionnaire.

Census officials also made attempts to obtain data from those who did not reside in housing units. This was done in the following way. Census takers visited public and private shelters to obtain counts of shelter residents. Shelters for runaway youths and abused women and children were also visited. Census takers also made counts in open locations in the streets and other places not intended for habitation.

## RESULTS

Table 1 contains the path coefficients for the direct causal effects of the five exogenous variables in the model on states' poverty rates.

These path coefficients measure the relative magnitudes of the direct impacts of each exogenous variable on states' poverty rates, controlling for the other exogenous variables in the model. For example, controlling for the other exogenous variables in the model, for each standard deviation increase in states' proportions of those twenty-five years old or older with B.A. degrees or higher (EDUC), states' poverty rates decrease by 1/10 of a standard deviation on average. The adjusted R squared value for this model is .67, indicating that almost 70% of the variation in poverty is explained by the five exogenous variables in the model. This is a pretty high amount of explained variation by social science standards.

Table 2 contains path coefficients for the direct causal effects of the five exogenous variables in the model and states' poverty rates on states' infant mortality rates.

We see that states' proportions of families headed by women with children under eighteen years old has a stronger direct effect on states' infant mortality rates than any of the other independent variables in the model. For each standard deviation increase in

Table 1

*Path Coefficients for the Direct Causal Effects of Exogenous Variables on States' Poverty Rates*

| *Exogenous Variables* | *POVERTY* |
|---|---|
| EDUC | −.10 (.143) |
| UNEMPLOY | .25 (.373) |
| DISABLED | .29 (.468) |
| SINGLE | .22 (.342) |
| WELFARE | −.28 (.004) |

R Squared = .70
Adjusted R Squared = .67
Standard Errors in Parentheses

Table 2

*Path Coefficients for the Direct Causal Effects of the Five Exogenous Variables in the Model and States' Poverty Rates (POVERTY) on States' Infant Mortality Rates (INFANT)*

| *Independent Variables* | *INFANT* | |
|---|---|---|
| EDUC | −.21 | (.059) |
| UNEMPLOY | −.17 | (.160) |
| DISABLED | .02 | (.199) |
| SINGLE | .61 | (.146) |
| WELFARE | −.29 | (.062) |
| POVERTY | .003 | (.002) |

R Squared = .58
Adjusted R Squared = .53
Standard Errors in Parentheses

states' proportions of families headed by women with children under eighteen years old, states' infant mortality rates increase by about 3/5 of a standard deviation on average.

The direct effect of state's average monthly AFDC payments per family on states' infant mortality rates is second in magnitude. For each standard deviation increase in states' monthly AFDC payments per family, states' infant mortality rates decrease by a little more than ¼ of a standard deviation on average.

The adjusted R squared value for this model is .53, indicating that this is a weaker model than that in Table 1. A model that explains more than half the variation in a response variable is still a pretty good one by social science standards.

In Table 3 we have path coefficients for the indirect causal effects in the model, that is the effects of each of the exogenous variables on states' infant mortality rates by way of their effects on states' poverty rates. These were obtained by multiplying the appropriate path coefficient for the direct effect of each exogenous variable on poverty by the direct effect of poverty on infant mortality rate.

The table indicates that the indirect impact of states' proportions of residents too disabled to work is higher than that

Table 3

*Indirect Causal Effects of Exogenous Variables on States' Infant Mortality Rates*

| *Exogenous Variables* | *INFANT* |
|---|---|
| EDUC | −.0003 |
| UNEMPLOY | .0008 |
| DISABLED | .0009 |
| SINGLE | .0007 |
| WELFARE | −.0008 |

of any of the other exogenous variables in the model. The indirect influences of states unemployment rates and states' average monthly AFDC payments on states' infant mortality rates are equal.

In Table 4 we find the measures of the total causal effects of the exogenous variables in the model on states' infant mortality rates. These were obtained by adding the direct impacts of each exogenous variable on states' infant mortality rates to the indirect impacts of each of these variables on infant mortality rates. For example, the total impact of states' proportions of those too disabled to work on states' infant mortality rates is equal to .02 (see Table 2) plus .0009 (see Table 3).

We see from the table that the total causal effect of states' proportions of families headed by women with children under

Table 4

*Total Causal Effects of Exogenous Variables in the Model on States' Infant Mortality Rates*

| *Exogenous Variables* | *INFANT* |
|---|---|
| EDUC | −.2103 |
| UNEMPLOY | .1708 |
| DISABLED | .0209 |
| SINGLE | .6107 |
| WELFARE | −.2908 |

eighteen years old on states' infant mortality rates is greater than that of any of the other endogenous variables in the model. The total causal effect of states' average monthly AFDC benefits per family is second in magnitude.

## POLICY IMPLICATIONS

This paper has been concerned with the impact of welfare on infant mortality. One of the reasons for this concern is that analysts of the causes of infant mortality have not investigated the extent to which a policy, such as welfare, that presumably curtails poverty might also curtail infant mortality. The other is that analysts of the effects of welfare benefits have neglected to consider the impact of such benefits on infant mortality, that is children's literal life chances.

In the first section of this paper, I stated that researchers have found that welfare creates a work disincentive, generates intergenerational transmission of welfare receipt, causes poor persons in low benefit states to migrate to higher benefit ones, and causes the formation of female-headed families. On the basis of such findings some have argued that welfare benefits ought to be abolished.

For example, pointing out what he views as the "social ills" associated with welfare generated reductions in work effort and increases in female headed families (e.g., crime, poverty, etc.), Tanner (1996) has argued that government should get out of the business of providing welfare and leave such provision to private charities. Although he does not appear that interested in infant mortality, Tanner could cite findings from this paper to bolster his case. Recall that the total effect of female-headed parenthood on infant mortality was the highest among the exogenous variables included in the model. Thus, Tanner could argue, that if welfare causes female-headed parenthood and female headed parenthood causes infant mortality, we could curtail infant mortality by curtailing welfare benefits. There are two problems, however, with this line of reasoning.

First, recent research has shown that the effect of welfare on family structure is small; thus decreasing welfare benefits might not do much to curtail the formation of single-parent families

(Lichter, 1997). Secondly this paper has shown that welfare benefits are negatively related to infant mortality. That is, a decrease in welfare would cause an increase in infant mortality. This is because welfare is both indirectly, through its effect on poverty, and directly related to infant mortality. Thus, if lowering infant mortality is one's policy target, whether or not it would be advisable to decrease welfare spending depends on whether or not a decrease in spending, through its effect on the formation of female-headed families, would decrease infant mortality enough to offset the increase in infant mortality that would follow from the welfare spending decrease. If the increase in welfare spending ended up not having much of an effect on the formation of female-headed families but a large negative effect on infant mortality, the welfare spending reduction would have "backfired." Since no one has developed a path analysis in which female-headed parenthood, poverty, and infant mortality serve as endogenous variables while welfare serves as an exogenous one, we are not, at this point, in a position to make a good prediction about the effect of a welfare spending reduction on infant mortality. The major contribution of this paper is its suggestion that we may be able to make a substantial dent in the infant mortality problem by providing destitute families with more income assistance.

In addition to having some impact on the formation of female-headed families, recent research findings discussed above suggest such an increase would create more intergenerational transmission of welfare receipt, less work effort and more migration from low benefit to high benefit states. Again, how increases in these occurrences would compare to the decrease in infant mortality could only be predicted with a more complicated model. Currently, public officials and the electorate seem very interested in curtailing work disincentives, intergenerational transmission of welfare receipt, and migration from low to high benefit states. Thus, they might not be likely to support an increase in welfare benefits. The findings presented in this paper suggest that by refusing to increase welfare benefits we might be forgoing the opportunity to curtail the untimely deaths of a substantial number of children. As a society we have to decide if this is a cost we want to bear.

## REFERENCES

Agresti, Alan and Finlay, Barbara. *Statistical Methods for the Social Sciences.* New Jersey: Prentice Hall, 1997.

Bhatti, Bonnie; Derezotes, David; Kim, Seung-Ock; and Specht, Harry. "The Association Between Child Maltreatment and Self-Esteem." Mecca, Andrew M.; Smelser, Neil J.; and Vasconcellos, John (editors). *The Social Importance of Self-Esteem.* California: University of California Press, 1989.

Belsky, J. " Child Maltreatment: An Ecological Integration." *American Psychologist,* no. 35 (1980), pp. 320–355.

DiNitto, Diana M. *Social Welfare: Politics and Public Policy.* Massachusetts: Allyn and Bacon, 1995,

Druschel, Charlotte; Hughes, Jeffrey P.; and Olsen, Carolyn. "Mortality Among Infants with Congenital Malformations, New York State, 1983 to 1988." *Public Health Reports,* vol. 3, no. 4, (July/August 1996), pp. 359–365.

Fairlie, Robert W. and London, Rebecca A. "The Effect of Incremental benefit Levels on Births to AFDC Recipients." *Journal of Policy Analysis and Management,* vol. 16, no. 4, (Fall 1997), pp. 575–597.

Frank, Richard G.; Strobino, Donna M.; Salkever, David S.; and Jackson, Catherine A. "Updated Estimates of the Impact of Prenatal Care on Birth Weight Outcomes by Race." *Journal of Human Resources,* vol. 27, no. 4, (Fall 1992), 629–642.

Gujarati, Damodar N. *Basic Econometrics.* New York: McGraw-Hill, Inc., 1988.

Hummer, Robert A. "Racial Differentials in Infant Mortality in the U.S.: An Examination of Social and Health Determinants." *Social Forces,* vol. 72, pp. 529–554.

LaVeist, Thomas A. "Segregation, Poverty, and Empowerment: Health Consequences for African-Americans." *The Milibank Quarterly,* vol. 71, pp. 41–64.

Litchter, Daniel T;. McLaughlin, Diane K.; and Ribar, David C. "Welfare and the Rise in Female-Headed Families." *American Journal of Sociology,* vol. 103, no. 1, (July 1997), pp. 112–143.

McLanahan, Sara and Garfinkel, Irwin. *Single Mother Families and Social Policy: Lessons for the United States from Canada, France, and Sweden.* McFate, Katherine; Lawson, Roger; and Wilson, William Julius (editors). *Poverty, Inequality, and the Future of Social Policy.* New York: Russell Sage Foundation, 1995.

Mishel, Lawrence and Bernstein, Jarod. *The State of Working America.* New York: M.E. Sharpe, 1994.

Moffit, Robert. "Incentive Effects of the U.S. Welfare System: A Review." *Journal of Economic Literature,* vol. 30, no. 1 (March 1992), pp. 1–61.

Oates, R.K. and Forrest, D. "Self-Esteem and Early Background of Abusive Mothers." *Child Abuse and Neglect,* no. 9, (1985), pp. 38–92.

Orme, Terri Combs. "Health Effects of Adolescent Pregnancy: Implications for Social Workers." *Families in Society,* vol. 74, no. 6, (June 1993), pp. 344–354.

Schoendorf, Kenneth C.; Hogue, Carol J.R.; Kleinman, Joel C.; and Rowley, Diane. "Mortality Among Infants of Blacks as Compared with White College

Educated Parents." *New England Journal of Medicine*, vol. 326, (March 1992) pp. 1522–1526.

Sharma, Ravik. "Causal Pathways to Infant Mortality: Linking Social Variables to Infant Mortality Rates Through Intermediate Variables." *Journal of Health and Social Policy*, vol. 9, no. 3, (1998), pp. 15–28.

Schiller, Bradley R. *The Economics of Poverty and Discrimination.* New Jersey: Prentice Hall, Inc., 1998.

Shorkey, C.T. "A Review of Methods Used in the Treatment of Abusing Parents." *Social Casework*, no. 60, (1979), pp. 360–367.

Singh, Gopol K and Yu, Stella M. "Infant Mortality in the United States: Trends, Differentials, and Projections, 1950–2010." *American Journal of Public Health*, vol. 85, no. 17, (July 1995), pp. 957–964.

Steele, B.F. and Pollock, C.B. "A Psychiatric Study of Parents Who Abuse Infants and Small Children." Kempe, C.H. and Helfer, R.E. (editors). *The Battered Child.* Illinois: University of Chicago Press, 1974.

Tanner, Michael. *The End of Welfare: Fighting Poverty in the Civil Society.* Washington, D.C.: Cato Institute, 1996.

U.S. Department of Health and Human Services. *Healthy People 2000.* Washington, D.C.: DHHS Publication No. (PHS) 91-50213, 1991.

Weiss, Gregory L. and Lonnquist, Lynne E. *The Sociology of Health, Healing, and Illness.* New Jersey: Prentice Hall, Inc. 1997.