Development and Use of Neighborhood Health Analysis: Residential Mobility in Context

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EXECUTIVE SUMMARY

In November 2001, the Urban Institute selected The Providence Plan as one of five National Neighborhood Indicators Partnership (NNIP) sites to participate in a national project to assess the development and use of health indicators at the neighborhood level. With the support of the U.S. Department of Health and Human Services, the Urban Institute and project partners seek to 1) increase knowledge of the relationships between characteristics of neighborhoods and health outcomes, and 2) help expand the range of health indicators available at the neighborhood level in America's localities.

Over the past year and with support from the Rhode Island Department of Health, The Providence Plan analyzed the impact of residential mobility on health and educational outcomes among Providence children. We also explored the relationship between neighborhoods with high levels of childhood residential mobility and other indicators of neighborhood distress. We chose to divide our work into two discreet phases, both of which incorporated large amounts of administrative data from local partners as well as Census 2000 data.

The first phase relied on descriptive statistics of administrative datasets to reveal correlations between childhood residential mobility, health and educational outcomes, and children most at risk for mobility based on particular socioeconomic characteristics. The second phase of the work involved an analysis of fifteen indicators of mobility and resident well-being at the tract level. Our analyses revealed the following:

Residential Mobility and Childhood Health

- Residentially mobile children have fewer office visits and therefore less contact with a physician than other children. Very young children in mobile households are much less likely to have frequent office visits than less mobile children.
- Children in residentially mobile households are only slightly more likely to see more than one provider within the first five years of life than residentially stable children.
- Residential mobility does not appear to affect whether a child received timely blood lead screenings (i.e. two screenings by age 3).

Predictors of Residential Mobility

- Children born to disadvantaged women, either economically or educationally, are more likely to experience residential mobility.
- Mobile children are more likely to be born to women that receive late or insufficient prenatal care.
- Mobile children are more often born to single women.
- Children in mobile households are more likely to have been born to a teen mother.
- Mobile children are more likely to have been identified as developmental risk positive at birth by the RI Department of Health.

Residential Mobility and Educational Outcomes

• There appears to be a direct correlation between residential mobility and poor educational performance. Students that move often are more likely to repeat a grade, perform poorly on standardized tests, and have high rates of absenteeism than less mobile students.

Residential Mobility and Indicators of Neighborhood Distress

- Based on our criteria, thirteen Providence census tracts exhibited high levels of distress in areas of residential mobility, maternal and child health, crime, poverty, and property characteristics. These tracts are clustered in the central and south sides of Providence and include the neighborhoods of Olneyville, Smith Hill, Federal Hill, Downtown, Upper and Lower South Providence, Elmwood and the West End.
- Every neighborhood with high levels of residential mobility show signs of neighborhood distress as defined by high crime rates, poor maternal and child health, poverty, and below-average property values.

Based on these findings, there are several avenues for local action.

The Rhode Island Department of Health (HEALTH) is now in a strong position to qualitatively assess residential mobility, specifically through targeted discussions with recipients of health services to learn *why* they move. Parent Consultants employed by HEALTH can help with outreach to mobile families. These peer discussions will enable HEALTH to better understand family circumstances that result in mobility.

Results from these discussions, coupled with the quantitative findings in this report, will provide HEALTH with the opportunity to assess whether existing services meet the needs of mobile families. For example, are the home visiting services offered to at-risk families being accessed, or is residential mobility interfering with services?

The tract-level analysis performed as part of this study confirms that mobility risk differs for families according to a variety of circumstances, including neighborhood choice. This provides a necessary first step to help HEALTH target resources to those most in need. Coupled with qualitative knowledge and partnering outreach through the Providence Community Health Centers will help to reach populations in at-risk neighborhoods.

Finally, as HEALTH and The Providence Plan evaluate these next steps, it is essential that we connect to existing efforts focused on children and families. Two unique and exciting neighborhood initiatives are just underway in Providence. *Ready to Learn Providence* aims to ensure that children enter school healthy and ready to learn. *Making Connections* is an initiative of the Annie E. Casey Foundation that seeks success for children and families through helping to build strong, supportive environments.

Connections to neighborhood resources and social networks are central to both efforts, and a real challenge given the documented mobility that occurs in our distressed neighborhoods. As participants in both initiatives, HEATH and The Providence Plan will be in a position to help inform strategies that respond to mobile families. While residential stability might be an ideal goal, interim efforts need to respond to the needs of mobile families.

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SECTION 1: BACKGROUND AND CONTEXT

Through funding made available by the U.S. Department of Health and Human Services and the Urban Institute, The Providence Plan explored locally available administrative data to assess the impact of residential mobility on childhood health and educational outcomes. We also explored the relationship between residential mobility and other indicators of neighborhood distress. Our analysis focuses primarily on the scope and impact of mobility on health outcomes for the preschool population in Rhode Island, with additional supporting information on educational outcomes for the school-aged population in Providence.

For several years, and at the request of local partners such as the Providence School Department, The Providence Plan has tracked residential mobility among public school students. Our analysis has revealed that approximately 25% of public school students in Providence move at least one time in any given year. Our work has provided insight on the scope of the problem, but has always been limited to Providence public school children.

The findings included in this report expand our analyses thanks in large part to the interest and assistance of the Rhode Island Department of Health (HEALTH). Because there are not local health departments in Rhode Island, HEALTH has multiple responsibilities in promoting the health and safety of Rhode Island residents. The Division of Family Health, our primary partner in this study, develops and supports community-based programs that address the health and development needs for all children and their families with specific focus on policy, planning, community partnerships and prevention strategies. Through this study they sought to a) learn how to better connect mobile families to continuous health services, and b) partner with local agencies to more holistically address the impact of mobility on child well being.

Review of Existing Research

While research on the topic of residential mobility is not exhaustive, available studies proved to be thorough and from them similar findings emerged. Generally, they indicate serious educational disadvantages among highly mobile children. Studies on the impact of residential mobility on health outcomes are virtually non-existent

Effects of Mobility on Learning

Residentially mobile children are much more likely to suffer academically than their more residentially stable peers. Much of this mobility exacerbates, and is the result of, other challenges such as low-income and migrant status (GAO, 1994). Existing research examines the problem of mobility from the very youngest learners to high school students. Among preschool aged children, residential mobility has been linked to poor verbal abilities (Koehn, 1998). Common difficulties among school-aged children include poor attendance, lower test scores, and repeated grades (Buerkle, 1999, GAO, 1994, Koehn, 1998). Among teenagers, mobile students were more likely to have skipped school, been suspended, or been expelled than other students (Moore, 2000). There is also an increased risk of dropping out of high school for highly mobile children. One study found that highly mobile children have a drop out rate of almost double that of their stable counterparts (Scanlon, 2001). Research reveals that these academic difficulties intensify as residential mobility increases (Koehn, 1998, Buerkle, 1999).

Residential mobility also disrupts learning because of the emotional and behavioral difficulties that accompany it. Children who move often are placed under more stress because of the loss of friendships and other social support systems that they build in their neighborhoods and schools (Koehn, 1998, Buerkle, 1999, Moore, 2000). Qualitative survey findings from a study among Minneapolis public school students revealed low self-esteem and difficulties with friendships among mobile children (Buerkle, 1999).

Finally, children who move often are less able to benefit from education programs such as limited English proficiency, special education, and migrant education (GAO, 1994,Scanlon, 2001).

Characteristics of Mobile Families and Children

The Rhode Island Department of Health is interested in better understanding which children are most at risk of mobility, particularly given their developmental risk screening and early intervention services. Existing research indicates that families that experience numerous house changes are more likely to be low income, to have lower levels of education, and to be headed by single parents, usually single mothers (Koehn, 1998, DHHS, 1998, Buerkle, 1999, Moore, 2000, GAO, 1994,). Families earning less than \$25,000 annually are more at risk for mobility (Scanlon, 2001). Residentially mobile children are usually non-white living in urban, high-risk neighborhoods (Buerkle, 1999, GAO, 1994). Families receiving public assistance are also more likely to suffer from residential instability, and frequent residential changes may increase the risk of welfare dependence (DHHS, 1998, Buerkle, 1999, Moore, 2000). Low income, single parent households face many difficulties and residential mobility is most likely simply a response to situations they face such as inadequate housing, economic displacement, divorce, chemical dependency, and legal problems or other negative circumstances. (Buerkle, 1999, Scanlon, 2001)

Mobility and Childhood Health

As noted above, the effects of residential mobility on childhood health outcomes and access to health services has been far less documented. Only two sources discussed child health outcomes in these terms. In 1994 the U. S. General Accounting Office reported that children who have changed schools frequently are more than twice as likely to have nutrition and health or hygiene problems than children who have never changed schools (GAO, 1994). At the American Public Health Association annual meeting in 1995, presenters reported that highly mobile populations lack continuity of health services. In their survey, change of residence since birth was associated with insufficient immunization by one year of age and risk of delayed immunizations increased with numerous moves (Morrow, 1995).

It is important to note that residential mobility does not always reveal nor results from negative circumstances. For example, research supports the conclusion that low-income, female-headed families that move from impoverished, urban neighborhoods to more affluent suburban communities improve their socioeconomic position and social integration (South, 1998).

Mobility in Rhode Island

How many children are moving and how often are they moving?

As noted, The Providence Plan has tracked residential mobility among Providence public school students for several years. An average of 25% of students changed addresses at least once in any given year. For example, one in four Providence public school students enrolling in October

2001 reported a different address than they had in October 2000. This represents nearly 5,000 children. Moreover, we know that an additional 3,600 students in kindergarten through 11th grade failed to return in 2001. Some may have remained at their same Providence address but enrolled in a private school and many others probably left Providence. To date, and prior to the work undertaken as part of this study, we have only been able to track the students who remain in the Providence public school system. The data do not reveal any mid-year mobility, as address information is only updated at fall enrollment.

With the addition of HEALTH data, we are in a far greater position to start describing mobility patterns over time for the youngest children in Rhode Island. A cursory analysis of the data revealed the characteristics below.

- Out of 65,795 children born in Rhode Island between January 1997 and December 2001, 22,168 (or 34%) changed residences at least once.
 - 14,746 (22.4%) moved only once.
 - 4,707 (7.2%) moved twice.
 - 1,769 (2.7%) moved three times.
 - 662 (1%) moved four times.
 - 208 (.3%) moved five times.
 - 72 (.1%) moved six times.
 - 4 (.01%) moved seven times
- Nearly one-third of these 65,795 children had moved at least once by their first birthday.
- The older the child, the more likely that child would have moved. For example, 43% of all children born in 1997 moved at least once by December 2001, compared with 31% of children born in 2000.
- Children born in one of Rhode Island's core cities were far more likely to experience mobility than children living in other areas of the state. Compare the following statistics:

Place of Birth	All Births	No Moves	1 Move	2 Moves	3+ Moves
Central Falls	1,692	48%	28%	14%	11%
Newport	1,655	57%	27%	10%	5%
Pawtucket	4,778	59%	25%	10%	6%
Providence	13,182	51%	27%	13%	9%
Woonsocket	2,683	52%	28%	12%	9%
Core Cities	23,990	53%	27%	12%	8%
Rest of Rhode Island	35,552	73%	20%	5%	2%

Residential mobility among children 0-5 years based on place of birth

Rhode Island Department of Health

SECTION 2: APPROACH

We divided our analysis into two distinct phases and employed two different analytical approaches to examine correlations between residential mobility and other indicators of child well being. As our findings reveal, the methods complemented each other and serve to better validate our conclusions.

Part A

The first phase of analysis incorporated many thousands of records of data provided to us by the Rhode Island Department of Health, the Rhode Island Department of Education, and the Providence School Department. A description of data fields and manipulation techniques can be found in Appendix A.

The datasets included the following:

- Rhode Island Department of Health KidsNet Databases. KidsNet is a centralized database in which the Rhode Island Department of Health tracks children who are born or receive services in Rhode Island. Local health care providers are linked to this database and can update services received and other pertinent information, such as address of record. Specific datasets drawn from KidsNet included -
 - Newborn Level 1 Screening Database, all births in Rhode Island, 1997-2001
 - KidsNet Lead Screening Database records of all children screened that were born between 1997-2001
 - Immunization Database Records of all children born 1997-2001 that received immunizations at Rhode Island health clinics or select pediatrician's offices
 - Address Databases Addresses of record for all children born 1997-2001 in Rhode Island and for whom any change of address was reported during this period
- 2. Rhode Island Department of Education Providence public schools Standardized Test Scores, 1996-2000
- 3. Providence School Department Students Enrollment Databases, 1987-2001

We established a record of mobility for all children in the Health Department Address database and Providence School Department database to determine the frequency of address changes. For each child in our datasets we were thus able to develop a longitudinal perspective on residential mobility. A new field was added to the datasets that was a simple count of how times each child had moved over the course of our specified number of years. For the Health Data this was a five-year period (1997-2001) and for Providence school data it was a fifteen-year period (1987-2001).

The analyses we performed were primarily summary statistics and cross-tabulations between number of residential moves and other indicators of maternal and child health and educational performance. Our findings for this analysis are outlined in section 3A.

Part B

The second type of analysis we performed was consistent with the request by the US Department of Health and Human Services to examine indicators at the tract level. The indicators we used were derived from the following datasets:

- 1. Providence School Department Enrollment Data, 1995-2001
- 2. KidsNet Address Database Addresses of record for all children born 1997-2001 in Rhode Island and for whom any change of address was reported during this period
- 3. Newborn Level 1 Screening Database, all births in Rhode Island, 1995-2000
- 4. Providence Police Department Crime Database, 2000
- 5. US Census Bureau, Census 2000

All of the datasets except for Census Data were obtained at the address level. The Providence Plan geocoded these datasets and aggregated the data to the census tract level using 1990 tract boundaries. The fifteen indicators that provided the core of our tract-level analysis are listed below.

Residential Mobility		
Student Residential Mobility	Providence School Dept.	1995-2001
Early Childhood Residential Mobility	HEALTH	1997-2001
Maternal and Child Health		
Births to Women with Fewer than 12 Years of		1005-2000
Education	HEALIN	1999-2000
Births to Women Receiving Delayed Prenatal Care	HEALTH	1995-2000
Births to Women Receiving Insufficient Prenatal Care	HEALTH	1995-2000
Births to Teens (ages 15-19)	HEALTH	1995-2000
Births to Single Women ¹	HEALTH	1995-2000
Low Birth weight Infants	HEALTH	1995-2000
Births identified as Developmental Risk Positive ¹	HEALTH	1995-2000
Childhood Lead Exposure	HEALTH	1995-2000
Crime		
Part I Violent Crime per 1000 Population	Providence Police Dept.	2000
Part I Property Crime per 1000 Population	Providence Police Dept.	2000
Property Indicators		
Vacant dwelling units	US Census Bureau	2000
Renter-occupied dwelling units	US Census Bureau	2000
Family Income		
Family Income (calculated as less than 75% of the Providence median income, or \$24,044)	US Census Bureau	2000

¹ No census tract exceeded one standard deviation of the mean for these areas

As the note listed above references, we compared all tract-level indicators to each other and to the city mean to calculate the standard deviation. Any tracts that exceeded one standard deviation from the mean for the above indicators was flagged as distressed in that area. Section 3B includes a few of the maps that illustrate our findings related to general neighborhood distress and areas of significant residential mobility. Appendix 3 includes maps for the remainder of the indicators. All of the maps were prepared with three gradations of shading to illustrate distress in a particular area.

- The lightest shading represents tracts that are *below the city average* in the particular area. For the most part these represent areas of the city that are doing comparatively "better" than other areas of the city as measured by a particular indicator.
- The medium shading represents tracts that are *less than one standard deviation above the city average*.

• The darkest shading represents census tracts that are *more than one standard deviation above the city average*. Generally tracts exceeding one standard deviation of the mean in a particular area represent distress in that area. No single census tract exceeded the city mean by one standard deviation in the following three areas: median family income, births identified as risk positive, or births to single women.

We employed additional information aggregated to the tract level to provide general context, such as predominant race and ethnicity, average property values, and populations receiving public assistance. These additional contextual variables are described in Appendix A.

SECTION 3: IMPACTS OF MOBILITY ON HEALTH AND EDUCATIONAL OUTCOMES

Mobility Defined

In its broadest definition in our study, residential mobility is **any documented address change** for our two subject populations -1) children born in Rhode Island between 1997 and 2001 and 2) children enrolled in Providence public schools between 1987 and 2001. Data limitations require us to calculate residential mobility slightly different for both populations in our analyses.

3A: What is the Impact of Mobility on Health Outcomes?

HYPOTHESIS:Children ages 0 to 5 that move more often will have more
disruptions to health care access, specifically they will have
fewer contacts with the same primary care physician.FINDINGS:Children in residentially mobile households are only slightly
more likely to see more than one provider than their more
stable counterparts.

A relatively small number of children in our sample saw more than one provider during their first five years of life. Of 44,735 children, approximately one in five (18% or 8,066 children) saw more than one provider between 1997 and 2001. Young children living in residentially mobile households are only slightly more likely to see more than one provider than their more stable counterparts. On average, 21% of children that moved at least once also saw more than one provider. However, as the number of moves increase thus also increases the chance that a child will see more than one provider. The following chart displays this information.

The first line represents the children that saw only one provider within our five-year period. The percentage of children that never moved and saw one provider is 84%. This percentage decreases according to the number of residential moves. So if a child moved once they were slightly less likely to see the same provider (80%), two moves saw a decrease to 77%, and 74% of children moving four or more times saw one provider. The second line represents children that saw two or more providers during this period. While not overly dramatic, the slopes of both lines do indicate a relationship between the number of moves and provider continuity.



HYPOTHESIS: Children ages 0 to 5 that move more often will have more disruptions to health care access, specifically they will have fewer contacts with *any* primary care physician.

FINDINGS: Residentially mobile children have fewer office visits and therefore less contact with a physician than children in more stable households. Moreover, the younger the mobile child, the more obvious is the effect of mobility on frequency of office visits.

To further investigate the relationship between residential mobility and primary care, we analyzed data for 44,735 children to determine if residential mobility impacted the frequency of care. Frequency of care from primary care physician was determined by analyzing visits associated with immunizations for all children in our birth cohorts. A cursory analysis of the complete dataset - all children born between 1997 and 2001 - failed to produce any correlation, which proved logical given that immunizations vary by age. Thus, we assessed number of visits for each birth cohort and present our findings for the 1997, 1999, and 2001 cohorts below.

The Department of Health database included 10,120 records for children born in 1997. Children in this cohort had up to 10 visits with their primary care physician tracked in the immunization database. We grouped the office visit data into three categories -0.3 visits, 4-6 visits, and 7-10 visits. Our assumption in presenting our findings is that office visits associated with immunizations is desirable, i.e. the more visits, the better.

Regardless of the number of residential moves, a small number of children had three or fewer office visits - on average only 11%. There was very little variation regardless of whether a child moved often or not.

The difference in residential mobility is most noticeable in the categories of 4-6 visits and 7-10 visits.

As displayed below, 74% of children who never moved had between 7-10 office visits. This percentage decreases when a child moved more often, 70% with one residential move, 69% with two, and so on to 62% with four residential moves. Children who moved more often were thus receiving fewer office visits, which explains the higher percentages in the category denoting 4-6 office visits.



The chart below displays findings from a similar analysis performed for children born in 1999, which included a total of 8,624 records. As with the children born in 1997, a relatively small proportion of children had 0-3 office visits, and regardless of number of moves, they averaged about 18% of this population. Children who never moved were more likely to have more 7-10 office visits for immunizations (50%) than those who moved 4 or more times (37%). As one would expect, children that moved often were more likely to have 4-6 office visits (29% versus 15% for children than never moved).

Analysis of 8,209 children born in 2001 revealed similar findings. 57% of those children that never moved had 4-6 office visits, compared with 38% of those that moved four more times. In contrast, only 38% of those children who never moved received 1-3 office visits compared with almost 60% of those children that moved four or more times. Thus, the younger the child, the more obvious is the effect of residential mobility on primary care and immunizations.



HYPOTHESIS:

Children ages 0 to 5 who move more often will have more disruptions to health care access, specifically they will be less likely to obtain two lead screenings by age 3.

FINDINGS:

Residential mobility does not appear to affect whether a child received timely blood lead screenings.

Generally speaking, if a child had a second lead screening, it was by age 3: fully 96% of all children had their second lead screening by age 3. Only 860 children, or 4% of the sample, reported a second screening above age 3 (at 4 or 5 years of age). The following table displays the frequency of residential moves for children ages 0-3 compared with those ages 4 or 5 at the time of their second lead screening. The percentages are virtually the same for both groups, meaning that residential mobility does not appear to be a factor in whether a child received timely blood lead screenings.

	Age at Second Lead Screening	
	0 to 3 years old	4 or 5 years old
No residential moves	60%	59%
1 move	24%	25%
2 moves	10%	9%
3 or more moves	6%	6%
Rhode Island Department of F	lealth	

3B: Are there Particular Health-Related Predictors of Residential Mobility?

HYPOTHESIS: Maternal health and socioeconomic characteristics can serve as predictors of future mobility. In particular, women who received late or no prenatal care or who have been evaluated as development risk positive will be more likely to move more often than other women. Mothers who are teenaged, non-white, unmarried or less educated will move more often than other women.

FINDINGS: Children born to disadvantaged women (economically or educationally), women of color, and single women are more likely to experience residential mobile than other children.

To study the effects of mobility on child outcomes, we specified which children would be termed "mobile" based on the number of moves in their first few years of life. Using this method, 10,086 children are "mobile" in our study, as follows:

		Number of
Birth Cohort	Mobility Criteria	Records
1997	Any child that moved 2 or more times by December 2001	2,058
1998	Any child that moved 2 or more times by December 2001	1,487
1999	Any child that moved 2 or more times by December 2001	1,457
2000	Any child that moved 2 or more times by December 2001	1,281
2001	Any child that moved at all by December 2001	3,803

Mobile children are more likely to be born to women of color.

The light gray bars in the following chart represent the overall averages for all children incorporated in this study regardless of mobility status. "Other" combines a number of racial categories provided by the Department of Health including Asian, Pacific Islander, American Indian, and mixed race. White children represent more than 75% of all children in the study, 57% of those identified as mobile and 80% of those that are non-mobile. Black and Hispanic children however represent a much smaller percentage of the total at 7% and 13%, but double those percentages as mobile children. The mobility status of children in the other racial category is proportionally consistent with the overall averages. These numbers are consistent with prior research on this topic.



Mobile children are more likely to be the children of women that received late and insufficient prenatal care. Late prenatal care is care that began after the first trimester, and insufficient prenatal care is defined as fewer than six obstetric visits by the 36th week of pregnancy.



Mobile children are more likely to be the children of single women. Marital status was determined at the time of birth and single was expanded to include women that classified themselves as single (92%), divorced (5%), separated (3%), or widowed (<1%).

All of the existing research indicates that children in single parent households are much more likely to be at risk for high residential mobility, and our findings are overwhelmingly consistent with this finding. Of the 10,086 mobile children, 6,700 of them or 66%, were born to a single mother.



Mobile children are more likely than non-mobile children to have been born to a teen mother. Of all births in Rhode Island between 1996 and 2000, 10% were to teenagers between the ages of 15 and 19. Of all mobile children, 21% were to teen mothers. The chart below compares the share of births to teens based on mobility status. At 8%, far fewer non-mobile children were born to teen mothers.



Children that experience residential mobility are more likely to have been born to a woman with less than a high school education. The chart below displays a difference of 3 times between mobile and non-mobile children and mother's education level. More than one-third of all mobile children were born to women with less than a 12th grade education, compared to 12% of the non-mobile population. On average, 16% of births between 1997 and 2001 were to women with fewer than 12 years of education.



Children who experience residential mobility early in life are more likely to be identified as developmentally risk positive by the Department of Health at birth.

The Rhode Island Department of Health establishes risk for developmental delay for all newborns based on a variety of maternal health and socioeconomic criteria and vital statistics gathered at birth. A list of all factors included in determining risk disposition is included as Appendix B.

When we compared Risk Positive disposition to mobility status, we found that 63% of mobile children were identified as Risk Positive at birth, compared with 36% of non-mobile children. This should not infer that all children who were categorized as Risk Positive were also in residentially mobile families – of 65,795 births between 1997 and 2001, nearly 27,000 were identified as risk positive, and of these 25% were residentially mobile children. The risk disposition criteria seek to identify far more than residential mobility and related risk factors, however theses criteria do appear to at least provide a beginning assessment to determine risk for residential mobility in families.



3C: What is the impact of residential mobility on educational outcomes?

HYPOTHESIS:

Children in highly mobile families are more likely to miss schools, repeat a grade, and perform poorly on standardized tests than children that do not move as often.

FINDINGS:

Students that moved often were more likely to repeat a grade, perform poorly on standardized tests, and have high rates of absenteeism than less mobile students.

For purposes of assessing impacts of residential mobility on academic performance, we incorporated all children born since 1980 and enrolled in the Providence public schools between 1987 and 2001. Working with data from 1987 and onwards allowed us to track children's progress through the system on an annual basis. While we did not incorporate health data into this portion of the analysis, healthy beginnings for children are tantamount to educational success.

Residential mobility was determined by annual enrollment data. In October of each year, the Providence schools submit official enrollment data to the Rhode Island Department of Education. This same data is provided to The Providence Plan, and in it each child's address is included. Our perception of residential mobility is based solely on the address as of October of each year. Any address changes that occur at other points in the year are not captured by data to which we have access. Thus it is safe to assume that our discussion of residential mobility is actually less than the mobility that actually occurs.

A total of 57,642 children were included in this longitudinal analysis. Of these children, nearly half (47%) moved at least once during their tenure in Providence public schools, as displayed below. The chart captures all residential moves, from no moves (53%) up to 11 moves – only 1% of the public school population moved as many as seven to 11 times. The majority of children that moved did so once or twice.



Grade Advancement

Consistent with existing research on the topic, our findings reveal that **the more often a child moves**, **the more likely that child will repeat a grade at least once**.

The following chart displays data related to residential mobility and repeating grades. The slope of the top line most clearly indicates the relationship between the two factors. At the top left of the chart we see that 87% of children that experienced no residential moves also never repeated a grade. Twelve percent (12%) of children that never moved repeated once, 1% repeated twice and less than 1% repeated three or more times. As the number of residential moves increases, the percentage of children that have never repeated a grade decreases sharply. Just half (53%) of all children that experienced three moves advanced continuously during their enrollment in Providence schools, and only one quarter (27%) of those who experienced excessive residential moves, six or more times, never stayed back.

The slope of the second line, which represents children repeating a grade once during their tenure, rises fairly dramatically as the number of residential moves increases. The remaining lines, indicating children that repeated twice and three or more times, slope similarly upwards as residential moves increase.



Performance on Standardized Tests

Students in the Providence public schools are periodically tested in the areas of reading and writing, math problem solving and health. For purposes of this analysis we will review performance in tests of reading and math at the fourth, eighth, and tenth grades taken between

1996 and 2000. As with our analysis of grade repetition, we include children born since 1980 and enrolled in the Providence public schools between 1987 and 2001.

One caveat in working with school performance data is that children in Providence perform extremely poorly compared with state averages and other school systems in Rhode Island. Thus the poor performance of mobile students is only relatively worse compared with the overall averages. Regardless of the average performance, our analysis reveals **that children that move often perform worse on standardized tests than children that have not experienced residential mobility. Moreover, the more frequent the number of moves, the worse the performance.** This is true of standardized tests taken in fourth, eighth, and tenth grades. The following series of charts displays our results.



Sixty-six percent (66%) of 4th graders that never moved met the standard in reading compared with 59% of those that moved once, 56% of those that moved twice, and 48% of those that moved 3 times or more.

In general, 4th graders in Providence performed very poorly on tests of math problem solving, as the above chart illustrates. However children that moved once or more often performed more poorly in math than children that never moved.

The following chart displays data for students in 8th grade that completed tests of reading and math problem solving between 1996 and 2000. Findings reveal a similar trend as previously described. Among students that never moved, 42% met the eighth grade reading standard, compared to 25% of those that moved 3 times or more. Similarly, 18% of non-moving students met the math standard compared with 5% of those that moved often. Comparable findings for performance on standardized tests among students in the tenth grade follow.





Attendance

Our final analysis using data at the individual level concerns attendance. The only data available to us for this section was end-of-year attendance data for students enrolled during the 2001-2002 academic year. Mobility for each student was obtained by comparing address in October 2000 to October 2001. While the dataset is not as extensive as that used in the prior analyses, it contained records for more than 16,000 public school students enrolled in 2000. Consistent with background literature on the topic, we found that **students that moved were absent more often than those students that did not move**. The following chart displays our findings.

A higher percentage of students that *did not move* missed fewer than 15 days of school (67%) versus those students that did move during this same period (55%). The next sets of bars in the chart displays those students that had between 16 and 30 absences. In this case we see that the proportions are reversed and that 27% of children that moved were absent between 16 and 30 times compared with 22% of those students that did not move. Proportions remain similar for 31 to 45 absences and 46 to 60 absences, with the proportion of mobile students exceeding proportions of non-mobile students.



SECTION 4: RESIDENTIAL MOBILITY AND OTHER INDICATORS OF NEIGHBORHOOD WELL-BEING

There are 37 census tracts in Providence (based on 1990 boundaries). Except in a few cases, tract boundaries do not follow other delineated geographies such as neighborhoods or wards. We will primarily refer to the areas by tract number, but at times may also reference the neighborhoods they describe. The map on the following page shows census tracts in relation to Providence's 25 neighborhoods.

The tract level analysis that forms the second part of our report was prepared to discern correlations between indicators of child health and other factors such as crime, income levels, and mobility. Fifteen indicators were incorporated into the final analysis. They are listed in our approach outlined in Section 1 and a more specific discussion about the data sources and manipulation techniques is included as Appendix A. Maps that illustrate our findings are included in the following pages and in Appendix C. Two of the indicators, births to single women and risk positive births, are excluded from this portion because no tract exceeded one standard deviation of the mean.

Distressed Tracts in Providence

HYPOTHESIS:	Neighborhoods with higher risk factors (such as single parent households, high levels of public assistance, and poor housing conditions) will also have a higher mobility index and poorer health outcomes.
FINDINGS:	Thirteen census tracts exhibited high levels of distress in areas of maternal and child health, residential mobility, crime, poverty, and property characteristics. These tracts are clustered in the central and south sides of Providence and include the neighborhoods of Olneyville, Smith Hill, Federal Hill, Downtown, Upper and Lower South Providence, Elmwood and the West End.

Our analysis reveals thirteen census tracts exhibiting significant distress in particular areas of resident and child well being. We identified them using the approach described in Section 2 (selecting tracts that exceed the mean by more than one standard deviation in thirteen areas). Census tracts that exceed the city average by one standard deviation in **two or more of the thirteen areas** will be labeled as "distressed". These findings are not intended to imply that census tracts not described as distressed are therefore "not distressed". They simply do not appear to be struggling as much as other neighborhoods in these particular areas – childhood residential mobility, maternal and child health, part I crimes, and property characteristics.

A tract excluded from our summary analysis is Tract 30, which is identified with "N/A" on all maps. Tract 30 is located in the Mount Hope neighborhood. In 2000 the population was only



Providence Neighborhood and 1990 Census Tract Boundaries

712 people, and 706 of them lived in a high rise for senior citizens. There were only 11 births between 1995 and 2000, a denominator too small for statistical validity. For the residents that live in tract 30, challenges are real and many; however, for the purposes of this analysis tract 30 will not be considered.

The map on the following page shows the thirteen distressed tracts. The shading gradations indicate in how many different areas the particular tract exceeded one standard deviation of the mean. See Appendix C for a list of distressed tracts and the particular areas in which they exceed the city average by more than one standard deviation.

According to Census 2000, these distressed tracts account for more 46,813 residents. Residents are generally young, non-white, and low income. They live in neighborhoods with low property values and low owner occupancy rates. Vacancies in the neighborhoods are high, as are crime rates, for both violent and property crime. Women living in these neighborhoods are under-educated, single, and appear to have difficulty accessing prenatal care. Their children are more likely to be lead poisoned than other children in the city. Consider the following:

- Almost all of the tracts (12 of 13) had percentages of **student residential mobility** above the city average between 1996 and 2001.
- Almost all of the tracts (12 of 13) had percentages of **residential mobility for young children ages 5 and under** that were above the city average.
- The majority of the tracts (10 of 13) had **birthrates** above the city average.
- The majority (11 of 13) had percentages of **births to Hispanics** above the city average.
- Approximately half of the tracts (7 of 13) had percentages of **births to Blacks** above the city average.
- Almost all (12 of 13) had percentages of births to women with **fewer than 12 years of education** above the city average.
- Almost all (12 of 13) had percentages of births to women with **delayed prenatal care** above the city average.
- Almost all of the tracts (12 of 13) had percentages of births to women with **insufficient prenatal care** above the city average.
- Almost all of the tracts (11 of 13) had percentages of births to **teen mothers** above the city average.
- Almost all (12 of 13) had percentages of births to single mothers above the city average.
- All 13 tracts had percentages of births **risk positive for developmental delay** above the city average.
- All 13 tracts had percentages of children with **elevated blood lead levels** above the city average.
- The majority (8 of 13) have **black populations** above the city average.
- The majority of the tracts (11 of 13) have **Hispanic populations** above the city average.
- Half (7 of 13) have Asian populations above the city average.
- The majority (10 of 13) have populations of **people under age 18** above the city average.
- The majority (10 of 13) have **violent crime rates** above the city average.
- The majority (10 of 13) have **property crime rates** above the city average.
- Tracts 6, 7, and 8 demonstrate the highest rates of both violet and property crimes.
- The majority of the tracts (11 of 13) have percentages of **renter-occupied dwelling units** above the city average.
- The majority (12 of 13) have percentages of **vacant dwelling units** above the city average.



- All tracts (except downtown) have **lower property values** for one- and two-five family residences than the city average.
- The majority (10 of 13) have shares of residents receiving public assistance cash assistance (Family Independence Program), Food Stamps, and Medicaid above the city average.
- The median income in all 13 tracts (except downtown) is less than the city average. Moreover, the majority of tracts (8 of 13) have a median family income below 75% of the city (\$24,044).

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As the map shows, tract 19 stands out among the other tracts because it has the most indicators (seven) that are more than one standard deviation above the city average in the following areas:

- Student residential mobility
- Childhood residential mobility
- Undereducated new mothers
- Insufficient prenatal care
- Violent crimes
- Renter occupancy
- Vacant dwelling units
- Family income in tract 19 was \$21,928 in 2000

Most of tract 19 is the Olneyville neighborhood. Olneyville exceeded the city average, but by less than one standard deviation, in all additional indicators of well-being, except in the area of low birth weight infants.

This same map confirms what most residents, practitioners, and policy makers already know – that the city's most distressed neighborhoods are concentrated in the central and south sides of the city.

Residential Mobility and Neighborhood Indicators of Distress

In the first part of our report we discussed the effects of residential mobility on health and educational outcomes and young populations most at risk for residential mobility given particular socioeconomic and demographic characteristics. These findings beg the following question - Can similar generalizations be drawn when assessing residential mobility among young populations at a particular geographic level?

	Neighborhoods with higher rates of childhood mobility will exhibit poor health outcomes and show higher rates of risk.
FINDINGS:	Every neighborhood with high levels of childhood residential mobility show signs of neighborhood distress as defined by high crime rates, poor maternal and child health, and low property values.

As the maps on the following two pages illustrate, tracts 4, 5, 8, 9, 10, 11, and 19 have high levels of residential mobility among child populations. These were measured using Providence School Department data and Rhode Island Department of Health data. These seven tracts also share the following characteristics, with Downtown the exception in some instances as noted:

- Births to Hispanics above the city average (except Downtown)*
- Births to women with fewer than 12 years of education above the city average (except Downtown)*
- Births to women with **delayed prenatal care** above the city average (except Downtown)*
- Births to women with insufficient prenatal care above the city average
- Births to **teens** above the city average (except Downtown)*
- Births to single women above the city average (except Downtown)*
- Births **positive for risk** above the city average
- Children with elevated blood lead levels above the city average (except Downtown)*
- Violent crime rates above the city average
- High levels of vacant dwelling units
- Below-average property values for single and multi-family dwellings
- Family income below the city average (except Downtown)*

* Downtown, located entirely within tract 8, is an exception in several of these areas. While Downtown's population is comparable in size to that of other census tracts, the housing characteristics are very different. There are a small number of large apartment complexes, a few high-end loft apartment buildings, but no small (1-5 unit) residential structures. Unlike tract 30, which was eliminated from the analysis because the small resident population living there, it is appropriate that we include downtown in our analyses but with caveats when presenting our findings.

Our findings reveal that residentially mobile children and families in Providence face many challenges, both personal and external. The majority of children live in impoverished, single parent households. Family incomes of their neighbors are equally low and opportunities for increasing economic assets are few given low education levels. Their neighborhoods have high levels of crime, which most likely contribute to residential mobility as parents seek safe environments for their children.





SECTION 5: NEXT STEPS and COMMUNITY PROCESS

In this report we have presented evidence that residential mobility negatively impacts health outcomes and educational performance among children in Providence. These findings are supported by prior research around the country. While convincing, it is important to recognize that our statistical analyses cannot account for the residential mobility, learning difficulties, or poor health care that may be in response to other very significant challenges facing families in Providence. As previously discussed, children in residentially mobile families face numerous difficulties including poverty, single parenting, neighborhood crime, and limited housing choices. In deciding appropriate next steps and outreach based on these findings, it will be important for HEALTH staff and caregivers in the community to be able to consider the myriad factors impacting urban families.

Health Interventions

We envision three aspects to health interventions in response to needs of mobile families. The first entails a qualitative assessment of mobile families that are receiving health services. Now that we have more specifically identified children most at risk for mobility, HEALTH is in a better position to have targeted discussions with families to know *why* they move. Parent Consultants employed by HEALTH can help with outreach to mobile families. These peer discussions will enable HEALTH to better understand family circumstances that result in mobility.

Results from these discussions, coupled with the quantitative findings in this report, will provide HEALTH with the opportunity to assess whether existing services meet the needs of mobile families. For example, families of risk positive children are offered home visiting and early intervention services. Given our findings, that nearly two of three highly mobile children were identified as risk positive at birth, HEALTH might examine whether different interventions are necessary for these children at risk. Are the home visiting services offered to these families being accessed, or is residential mobility interfering with services?

The tract-level analysis performed as part of this study confirms that mobility risk differs for families according to a variety of circumstances, including neighborhood choice. With limited resources available, HEALTH needs specific neighborhood indicators to help target resources to those most in need. Our findings provide a necessary first step. Coupled with qualitative knowledge gained through parent consultant discussions, this work will help HEALTH refine criteria for targeting at a geographic level. Coordinated outreach through Providence Community Health Centers will also help to reach populations in at-risk neighborhoods. Four of the health centers are located in distressed Providence neighborhoods.

Connecting to Existing Initiatives

As HEALTH and The Providence Plan evaluate these next steps, it is essential that we connect to existing efforts focused on children in family. Over the next several years Providence residents will benefit from two unique and exciting neighborhood initiatives that are designed to strengthen children and families.

Ready to Learn Providence, recently awarded funding through the U.S. Department of Health and Human Services, aims to ensure that children enter school healthy and ready to learn. The funded activities of *Ready to Learn Providence* originated from a yearlong task force convened by the Mayor of Providence in 1999 and 2000, in which HEALTH and The Providence Plan actively participated. The goals outlined by the Task Force in the areas of child health, education, and family support rely on outreach and service to all households in Providence, including highly mobile ones.

Making Connections, an initiative of the Annie E. Casey Foundation, seeks success for children and families through helping to build strong, supportive environments. Focused in four distressed neighborhoods with residentially mobile populations, Upper and Lower South Providence, Elmwood, and the West End, *Making Connections* will bring together residents, service providers, and policy makers around central goals. Although the initiative is just underway, Providence participants have already prioritized the need for household stability among local residents.

Connections to neighborhood resources and social networks are central to both initiatives, and a real challenge given the documented mobility that occurs in our distressed neighborhoods. As participants in both initiatives, HEATH and The Providence Plan will be in a position to help inform strategies that respond to mobile families. While residential stability might be an ideal goal, interim efforts need to respond to the needs of mobile families.

APPENDIX A

Data Development and Manipulation

Very large amounts of data were used in this analysis, the majority of which originated from local administrative sources. On the following pages are descriptions of the datasets and details regarding their manipulation. The fields reported are only those relevant for this analysis. In several instances, many additional fields were provided from the data provider but were irrelevant for this scope of work.

DATA USED FOR ANALYSIS PART A

Source: Rhode Island Department of Health

Dataset: KidsNet 1997-2001

Geography: Rhode Island

TABLE NAME and FIELDS	DESCRIPTION OF MANIPULATION TECHNIQUES	
Child Table		
Number of Records	65,987	
Kids Net ID	Child table was linked to several of the following tables by Kids	
Child DOB	NET ID to assign date of birth.	
Sex		
Child Race		
Newborn Level 1		
Number of Records	65,975	
Kids Net ID	Data included only one record per child. Additional fields were	
Mother DOB	created to create indicators of maternal and child health. For	
Mother Race	example:	
Education	Mother's age at time of birth was calculated;	
Marital Status	<i>birth weight</i> became " <2500 grams" or ">2500 grams";	
Birth Weight (grams)	Number of visits by 36 weeks became "<6 visits" or "6 visits+";	
Gestational Age	month prenatal care began became "1" trimester", "2"	
# Visits by 36 Weeks	trimester", or "3 trimester".	
Month Prenatal Care began		
Insurance		
Risk Disposition		
Address Table	1	
Number of Records	182,747	
Kids Net ID	In excel, multiple addresses for the parent of a child were	
Parent Address	collapsed into a single record with all addresses maintained as	
Parent Apt	additional fields. A formula was used to count the number of	
Parent City	different reported addresses for a given child. This total number	
Parent State	was added as a field and became our key indication of mobility.	
Parent ZIP	Providence births were selected from this set and address matched to determine tract. This information was used to develop an indicator of childhood mobility.	

Lead Table		
Number of Records	88,456	
Kids Net ID	In excel, multiple records for a child were collapsed into a single	
Lead Test Date	record with lead screening date and results as additional fields	
Lead Results	in chronological order.	
Lead Sample Type		
Lead Physician Name		
Immunization		
Number of Records	268,831	
Kids Net ID	Multiple immunizations for a child were collapsed into a single	
Immunization Info	record. Additional fields recorded provider ID's . A formula was used to count the number of different providers that a child saw.	
Provider ID		
Date of Immunization	A different formula allowed us to count the total number of immunizations a child received.	
Women, Infant and Child Food Su	pplement Program	
Number of Records	28,758	
Kids Net ID	Data were received but not included in analysis because of	
WIC Status	insufficient useful information.	
Early Intervention		
Number of Records	3,956	
Kids Net ID	Data were received but not included in analysis because of	
Referral Date	insufficient useful information.	
Review Date		

Source: Providence School Department Dataset: October Enrollment Data, 1987-2001 Geography: Providence

Number of Records	351,323
Student ID	We queried enrollment datasets by birth cohorts 1980-1995 to
Address	create a new table with a single record for each child enrolled
Grade	in Providence anytime between 1987 and 2001. This new
School	table includes demographic information and a chronological record of all schools, grades, and addresses for each child. Formulae were used to count the number of different addresses and the number of times a child repeated a grade. This information is included as additional fields.

Source: Rhode Island Department of Education

Datasets: Metropolitan Achievement Test, 1996, 1997, 1998; Rhode Island Math, 1996, 1997; New Standards Math, 1997, 1998, 1999, 2000; New Standards English Language Arts, 1997, 1998, 1999, 2000

Geography: Providence

Number of Records	N/A – records for children in 4 th , 8 th , and 10 th grade only
Student ID	Scores from various test sets were standardized to uniformly
Grade	report students that met or did not meet state standards.
School	Using student ID, these data sets were linked to Providence

	School Department enrollment data above so that each child
Relevant Test Scores	in the school system has an individual record documenting
	standardized test scores chronologically.

DATA USED FOR TRACT LEVEL INDICATOR DEVELOPMENT PART B

Source: Providence School Department Dataset: October Enrollment Data, 1995-2001

Geography: Providence

Indicator:			
- Student Residential Mobility			
Student ID	All datasets were address matched (approximately 96%		
Address	matched) and 1990 census tract assigned to each record.		
Grade	Residential mobility was determined by linking sets by student		
School	ID and comparing reported address as of October of each year. Number of students living in each tract and moving was calculated annually. Our indicator was calculated as follows: Numerator = Number of students living in tract that reported a change of address between 1995 and 2001; Denominator = Total number of living in tract between 1995 and 2000.		

Source: Rhode Island Department of Health Dataset: KidsNet, 1997-2001

Geography: Providence

Indicator:				
 Early Childhood Residential Mobility 				
Kids Net ID	In excel, multiple addresses for the parent of a child were			
Parent Address	collapsed into a single record with all addresses maintained as			
Parent Apt	additional fields. Providence births were selected from this set			
Parent City	and address matched to determine tract at time of birth. Our			
Parent State	indicator was calculated as follows: Numerator = Number of			
	children born in the tract between 1997 and 2001 that moved 2			
	or more times; Denominator = Total number of children born in			
	the tract between 1995 and 2000.			

Source: Rhode Island Department of Health Dataset: Level 1 Birth Data 1995-2000

Geography: Providence

Indicators: - Births to Women with Fe 12 Years of Education - Births to Women Receiving Prenatal Care - Births to Women Receiving Insufficient Prenatal Care	ewer than ng Delayed ng	 Births to Teens Births to Single Women Low Birth Weight Infants Births identified as Developmental Risk Positive
Child ID	All data were address matched and aggregated to 1990 census tracts. Match rate was approximately 95%. Maternal and child health indicators were derived from available fields. Mother's age at time of birth was calculated to identify births to teens. Number of prenatal care visits was collapsed to "<6 visits" or "6 visits+" and Birth weight became " ≤2500 grams" or ">2500 grams" to determine low birth weight infants.	
Mother DOB		
Mother Race		
Child DOB		
Address		
City		
State		
Education		
Marital Status		

Birth Weight (grams)
Gestational Age
Visits by 36 Weeks
Trimester Prenatal Care began
Insurance
Risk Disposition

Source: Rhode Island Department of Health Dataset: Lead Screening Database 1995-2000

Geography: Providence

Indicator:			
- Childhood Lead Exposure			
Child ID	Multiple records for a child were collapsed into a single		
DOB	record for each child that tracked multiple screening dates		
Lead Screening Date	and results. Data were address matched to the address at		
Lead Screening Result	the time of first lead screening to determine child's census		
Lead Screening Type (venous or finger stick)	tract. Match rate was approximately 95%. We calculated the age at the time of first screening and selected all children under the age of 6. Our indicator was calculated as follows: Numerator = Number of children living in tract exposed to lead between 1995 and 2000 (10 ug/dl or higher); Denominator = Total number of children in tract screened for lead between 1995 and 2000.		

Source: Providence Police Department Dataset: Crime Data, 2000 Geography: Providence

Indicators:

- Part 1 Violent Crimes per 1000 Population Part 1 Property Crimes per 1000 Population _

- Turi TTroperty Crimes per 1000 Topulation		
Report Number	After address matching, with a match rate of 97%, we	
Report Date	selected out part 1 crimes based on Uniform Crime	
Address or Intersection	Reporting codes. Number of Part 1 violent crimes -	
UCR Code	homicide, rape, robbery, aggravated assault - were	
Crime Description	calculated for each census tract and included in a rate per	
	1000 residents in the tract as of Census 2000. Rate of part	
	1 property crimes - burglary, larceny, motor vehicle theft,	
	arson - were calculated similarly.	

Source: Census 2000 Dataset: SF1 and SF3

Geography: Providence

Indicators:

- Vacant Dwelling Units
- *Renter Occupied Dwelling Units*
- Family Income

Data on dwelling units were aggregated from the block level to 1990 tract boundaries. Median family income for 1990 tracts was approximated by calculating the mean of reported family incomes for block groups whose boundaries coincided with the 1990 tract boundaries. Because no tract exceeded the city mean by more than one standard deviation, we reduced the income criteria to 75% of the median family income, or \$24,044, to better identify areas of economic distress.

ADDITIONAL CONTEXTUAL DATA

The following additional data were gathered and aggregated to the 1990 census tract level. Although these datasets were not formally incorporated as indicators, they provide important contextual information about Providence neighborhoods.

Data Field or Indicator	Source
Household receiving cash assistance through	Rhode Island Department of Human Services
Family Independence Program (TANF), 2000	
Households receiving Food Stamps, 2000	Rhode Island Department of Human Services
Households receiving Medical Assistance,	Rhode Island Department of Human Services
2000	
Births by race, 1995-2000	Rhode Island Department of Health
Population under age 18, 2000	Census 2000
Hispanic population, 2000	Census 2000
Black population, 2000	Census 2000
Asian population, 2000	Census 2000
White, non-Hispanic population, 2000	Census 2000
Property values, 2001	City of Providence Tax Assessor

APPENDIX B

RHODE ISLAND UNIVERSAL NEWBORN DEVELOPMENTAL RISK SCREENING CRITERIA FOR RISK CATEGORIZATION

Single Risk Criteria

- Birthweight less than 1500 grams
- Intensive care unit hospitalization greater than 48 hours
- Any known established condition
- HBSG if positive

Multiple Risk Criteria

- Mother and/or father education less than 11th grade <u>and</u> child lives with that parent
- Mother's age less than 19 or greater than 37
- Mother is not married
- Number of live births greater than 5 (not including this child)
- Number of live births equal zero
- Presence of at least one family history risk factor and child lives with that parent
- Number of prenatal care visits before 36 weeks (OB record) less than 6 or total number of prenatal care visits (birth certificate) less than 10
- No prenatal care visits before 5 months
- Gestational age greater than 37 weeks and birthweight BETWEEN 1500 and 2500 grams
- Apgar Score at 1 and 5 minutes less than 7 (Apgar Score is an objective scoring system based on five clinical signs)
 - 1.Heart rate
 - 2.Respiratory effort
 - 3.Reflex irritability
 - 4.Muscle tone
 - 5.Color

FINAL DISPOSITION

Risk (+)

Any <u>one</u> of the <u>Single Risk Criteria</u> Any <u>two</u> or more of the <u>Multiple Risk Criteria</u>

Risk (+/-)

Any one of the Multiple Risk Criteria except "Number of live births = zero"

Risk (-)

All children who are neither Risk (+) or Risk (+/-)

APPENDIX C

Descriptions of Distress by Tract and Related Maps

All tracts exceeding the city average by more than one standard deviation in a particular area are listed below. Maps that illustrate our findings are included in the following pages.

Tract 2 Low birth weight infants

Tract 3 Lead exposure among children under 6 years Low-income families

Tract 4 Early childhood mobility Births to teens Lead exposure among children under 6 years

Tract 5 Early childhood mobility Delayed prenatal care Low-income families

Tract 6 Lead exposure among children under 6 years Property crime rate Vacant units Low-income families

Tract 7 Insufficient prenatal care Births to teens Violent crime rate Property crime rate Renter occupied units

Tract 8 Student mobility Low birth weight infants Violent crime rate Property crime rate Renter occupied units *Tract 9* Student mobility Insufficient prenatal care Vacant units

Tract 10 Student mobility

Tract 11 Student mobility Vacant units

Tract 12 Low birth weight infants

Tract 13 Delayed prenatal care Insufficient prenatal care Lead exposure among children under 6 years

Tract 14 Women with fewer than 12 years of education Delayed prenatal care Insufficient prenatal care Lead exposure among children under 6 years Low-income families

Tract 19 Student mobility Early childhood mobility Women with fewer than 12 years of education Insufficient prenatal care Violent crime rate Vacant units Low-income families *Tract 22* Vacant units

Tract 25 Low birth weight infants Low-income families

Tract 26 Insufficient prenatal care Vacant units Low-income families

Tract 36 Low birth weight infants

Tract 37 Low birth weight infants



























APPENDIX D

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