SUPPLEMENT ARTICLE

The Health and Well-being of Adopted Children

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ABSTRACT

OBJECTIVE. We compared the health and well-being of adopted and biological children and examined whether observed differences may be a result of differences between these 2 groups in demographic characteristics and special health care needs.

METHODS. The 2003 National Survey of Children's Health was funded by the Maternal and Child Health Bureau, Health Resources and Services Administration, and was conducted as a module of the State and Local Area Integrated Telephone Survey by the National Center for Health Statistics, Centers for Disease Control and Prevention. The nationally representative sample consisted of 102 353 children, including 2903 adopted children. We compared estimates for 31 indicators of health and well-being for adopted and biological children and present adjusted estimates that control for differences in demographic characteristics and special health care needs prevalence.

RESULTS. Adopted children are more likely than biological children to have special health care needs, current moderate or severe health problems, learning disability, developmental delay or physical impairment, and other mental health difficulties. However, adopted children are more likely than biological children to have had a preventive medical visit or a combination of preventive medical and dental visits during the previous year, to receive needed mental health care, and to receive care in a medical home; they are more likely to have consistent health insurance coverage, to be read to daily, or to live in neighborhoods that are supportive, and they are less likely to live in households in which someone smokes. These differences between adopted and biological children remain statistically significant even after adjustments for differences in demographic characteristics and the prevalence of special health care needs.

CONCLUSION. The results suggest that, although adopted children may have poorer health than biological children, their parents may be doing more to ensure that they have needed health care and supportive environments.

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Key Words
adopted children, children's health, special health care needs

Abbreviations
AAP—American Academy of Pediatrics
NSCH—National Survey of Children's Health

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The American Academy of Pediatrics (AAP) has recognized that adopted children may have particular vulnerabilities and health conditions for which pediatricians should be alert and has made recommendations regarding the content of initial medical examinations of children at the time of adoption.[1] The AAP has also recognized a role for pediatricians in facilitating communication about adoption-related health issues with adoptive families.[2] Pediatricians may need to evaluate preexisting health conditions in children whom families are considering adopting or who have been adopted, and specialty health clinics on adoption now exist in most large cities.[3]

The literature on the health of adopted children is primarily limited to clinical or volunteer samples or studies of small populations. Of 101 studies included in a recent meta-analysis, only 7 involved sample sizes of >500 children.[4] There are clear advantages to using large, nationally representative samples to examine issues specific to adopted children,[5] yet few national surveys have sufficient sample sizes to permit reliable analyses of adopted children. The National Survey of Children's Health (NSCH), with a sample of nearly 3000 adopted children, is an exception. In this article, we take advantage of this resource to examine the health and well-being of adopted children relative to biological children.

THE HEALTH OF ADOPTED CHILDREN

Adoption is a legal action in which parental rights and responsibilities are transferred from one person to another, creating a parent-child relationship where one did not exist at birth. Approximately 2.5% of US children (1.6 million) joined their families through adoption. Analyses of census data have shown that adopted children differ demographically from children living with biological parents: adopted children are less likely to be <6 years of age and are more likely to be girls and to live in families with higher incomes.[6]

Review articles have described the literature regarding the health and development of adopted children.[7,8] Although most adopted children are healthy, adopted children have been shown to be at elevated risk for adjustment problems, externalizing behaviors, conduct disorders, and attachment disorders. A recent meta-analysis of studies regarding behavioral problems and mental health referrals suggested that adopted children had somewhat more behavior problems but were substantially overrepresented beyond their higher levels of need in their use of mental health services.[4] This phenomenon may reveal both higher problem prevalence and higher levels of service seeking by adoptive families.[9–11] In addition to mental health concerns, adopted children are also more likely to have at least 1 disability.

Representative survey data have provided some information about the prevalence of health problems and health care issues for adopted children. Miller and colleagues[5] found that although the vast majority of adopted adolescents were well within the normal range of functioning, adopted children were at higher risk across a broad array of domains, including school achievement, physical health, and psychological well-being. Sharma et al[12] examined data on nearly 5000 adoptees and matched controls selected from a large survey of youth in schools and found that adopted children experienced consistently higher levels of drug use, negative emotionality, and antisocial behavior. These surveys, however, focused on issues of adolescents and, although large, were not representative of the national population of adopted children.

We present and compare estimates of the health and well-being of adopted children and biological children. Recognizing that there are differences in demographic characteristics between these 2 populations, characteristics that may be related to health and well-being outcomes, we adjust estimates to control for differences in demographics. Because we expect that adopted and biological children will differ on health status, we also adjust estimates of health care access and use and child well-being to control for special health care needs status to examine whether these indicators show differences above and beyond differences in need. Our analyses allow us to make inferences about the health and well-being of adopted children relative to biological children, independent of preexisting differences in demographic characteristics and the prevalence of special health care needs.

METHODS

The data are from the 2003 NSCH, which is described in the article by Kogan and Newacheck[13,14] in this issue; more in-depth information can be found elsewhere.[15] Human subjects review was not required for this study.

In the NSCH, there were a total of 2903 adopted children, 2.8% of the total sample. Respondents were asked their relationship to the child, and if the respondent was the mother (or father), the respondent was asked whether she (he) was a biological, adoptive, step, or foster mother (or father). If the respondent was not the mother (or father), then the respondent was asked whether the mother (and/or father) in the household was a biological, adoptive, step, or foster mother (or father). This enabled us to identify, for any household with a mother (and/or father) present, whether that mother (father) was the adoptive mother (father) to the child. We identified any child with an adoptive mother or father as an adopted child.

We focus our analyses on the cleanest differentiation between adopted and biological children: adopted children are those with at least 1 adoptive parent and no biological parents in the household, and biological children are those with at least 1 biological parent and no

adoptive parents in the household. The resulting analysis groups consist of 2303 adopted children and 95 827 biological children.

Measures

The demographic characteristics estimated for adopted and biological children are listed in Table 1 and described elsewhere.[15] The measures of health and well-being are listed in Tables 2 and 3. Most of these indicators are drawn from *The Health and Well-being of Children: A Portrait of States and the Nation, 2005*, and are coded as in that chartbook.[16] Six additional indicators are used in the present analysis: whether the responding parent had ever been told that the child had a learning disability; whether that parent had ever been told the child had a developmental delay or physical impairment; whether the parent's relationship to the child is described as very close; whether the parent ever feels that the child is harder to care for than most children; whether the parent ever feels that he or she is giving up more than expected to meet the child's needs; and whether the child has special health care needs (indicated by ≥1 of the following consequences of a medical condition that has lasted or is expected to last at least 12 months: prescription medication; more medical care, mental health services, or educational services than usual for children of the same age; limitation in the ability to do things most children the same age can do; physical, occupational, or speech therapy; or treatment or counseling for an emotional, developmental, or behavioral problem).[15]

TABLE 1 Demographic Characteristics of Adopted and Biological Children in the United States

Demographic Characteristic	% (SE)		
	All Children	Adopted Children[a]	Biological Children[b]
Household			
Income level, % FPL[c]			
<50	6.2 (0.18)	3.1 (0.72)[d]	6.0 (0.18)[d]
50 to <100	11.6 (0.22)	6.0 (0.96)[d]	11.5 (0.22)[d]
100 to <200	22.8 (0.26)	16.8 (1.50)[d]	22.7 (0.26)[d]
200 to <400	32.6 (0.26)	30.0 (1.71)	32.9 (0.27)
>400	26.7 (0.24)	44.1 (1.89)[d]	26.9 (0.25)[d]
Highest education in household			
Less than high school	7.9 (0.19)	2.8 (0.59)[d]	7.7 (0.19)[d]
High School	26.5 (0.26)	17.2 (1.45)[d]	26.1 (0.26)[d]
More than high school	65.7 (0.28)	80.0 (1.52)[d]	66.2 (0.29)[d]
MSA status			
In MSA, central city	31.7 (0.26)	28.7 (1.63)	31.6 (0.27)
In MSA, not central city	48.5 (0.27)	48.9 (1.83)	48.8 (0.28)
Not in MSA	19.9 (0.18)	22.4 (1.43)	19.6 (0.18)
Primary language spoken in household			
English	87.3 (0.22)	98.1 (0.68)[d]	87.0 (0.24)[d]
Not English	12.7 (0.22)	1.9 (0.68)[d]	13.0 (0.24)[d]
Mean No. of adults in household	2.1 (0.00)	2.1 (0.03)	2.1 (0.01)
Mean No. of children in household	2.4 (0.01)	2.3 (0.07)[d]	2.4 (0.01)[d]
Mean No. of parents in household	1.7 (0.00)	1.66 (0.02)[d]	1.73 (0.00)[d]
Child			
Mean age, y	8.6 (0.03)	9.3 (0.17)[d]	8.5 (0.03)[d]
Gender			
Male	51.1 (0.28)	48.8 (1.83)	51.3 (0.29)
Female	48.9 (0.28)	51.3 (1.83)	48.7 (0.29)
Race/ethnicity			
Hispanic	17.6 (0.23)	11.1 (1.15)[d]	17.8 (0.24)[d]
Non-Hispanic white	60.7 (0.28)	52.1 (1.85)[d]	61.6 (0.29)[d]
Non-Hispanic black	14.4 (0.21)	16.4 (1.42)[d]	13.5 (0.21)[d]
Non-Hispanic other	7.3 (0.18)	20.4 (1.66)[d]	7.1 (0.19)[d]
Birth location			
In United States	95.2 (0.15)	77.3 (1.64)[d]	95.4 (0.15)[d]
Out of United States	4.8 (0.15)	22.7 (1.64)[d]	4.6 (0.15)[d]

FPL indicates federal poverty level; MSA, metropolitan statistical area.

[a] Adopted children have at least 1 adoptive and 0 biological parents in the household

[b] Biological children have at least 1 biological and 0 adoptive parents in the household

[c] FPL was derived from income-to-household size ratio and DHHS federal poverty guidelines.[16]

[d] Estimates for adopted and biological children significantly differ at the .05 level.

Source: NSCH, 2003.

TABLE 2 **Unadjusted and Adjusted Health and Health Care Indicators, Adopted and Biological Children in the United States**

Child Health Status or Health Care Indicator	Unadjusted Estimate, % (SE)			Estimate Adjusted for Demographics[a]		Estimate Adjusted for Demographics, Special Health Care Needs	
	All	Adopted[b]	Biological[c]	Adopted	Biological	Adopted	Biological
Child's overall health is excellent/very good	84.1 (0.22)	85.3 (1.34)	84.5 (0.23)	80.3[d]	85.4[d]	—[e]	—[e]
Child has current health problems that are moderate/severe	7.9 (0.15)	19.9 (1.52)[d]	7.4 (0.15)[d]	21.2[d]	7.6[d]	—[e]	—[e]
Child is affected by asthma	8.1 (0.15)	12.5 (1.22)[d]	7.8 (0.15)[d]	12.3[d]	8.0[d]	—[e]	—[e]
Impact of asthma on family is great/medium	16.3 (0.74)	10.1 (2.52)[d]	16.4 (0.76)[d]	11.2	16.2	—[e]	—[e]
Child had injury requiring medical attention last year (ages 0–5)	9.4 (0.27)	10.2 (1.94)	9.5 (0.28)	7.4	9.8	—[e]	—[e]
Child missed ≥11 school days last year (ages 6–17)	5.2 (0.14)	6.4 (1.20)	5.1 (0.15)	6.8	5.2	—[e]	—[e]
Parents concerned with learning/development/behavior (ages 0–5)	36.7 (0.47)	45.5 (3.63)[d]	36.1 (0.48)[d]	43.6	36.3	—[e]	—[e]
Child has moderate/severe difficulty with emotions/concentration/behavior/getting along (ages 3–17)	9.2 (0.18)	24.3 (1.67)[d]	8.5 (0.18)[d]	26.4[d]	8.6[d]	—[e]	—[e]
Parents ever told child has learning disability	9.7 (0.18)	20.3 (1.52)[d]	9.2 (0.18)[d]	22.5[d]	9.3[d]	—[e]	—[e]
Parents ever told child has developmental delay/physical impairment	3.4 (0.10)	16.1 (1.46)[d]	3.1 (0.09)[d]	17.1[d]	3.2[d]	—[e]	—[e]
Child has special health care needs	17.6 (0.21)	36.9 (1.83)[d]	16.9 (0.21)[d]	36.8[d]	17.5[d]	—[e]	—[e]
Child is currently insured	91.2 (0.17)	95.4 (0.90)[d]	91.3 (0.18)[d]	94.3[d]	91.9[d]	93.9	91.9
Child lacks consistent insurance coverage	15.0 (0.21)	9.1 (1.14)[d]	14.9 (0.22)[d]	10.5[d]	14.2[d]	10.6[d]	14.2[d]
Child had preventive medical visit last year	77.8 (0.24)	83.9 (1.21)[d]	77.7 (0.25)[d]	84.2[d]	78.0[d]	82.4[d]	78.0[d]
Child had preventive medical and dental visits last year	58.8 (0.28)	69.2 (1.64)[d]	58.5 (0.29)[d]	68.4[d]	59.1[d]	66.5[d]	59.2[d]
Child (with current emotional/developmental/behavioral problems) received mental health care last year (ages 1–17)	58.7 (1.14)	70.4 (3.65)[d]	56.7 (1.26)[d]	70.7[d]	56.6[d]	70.2[d]	56.7[d]
Child's care meets medical home definition	46.1 (0.28)	52.6 (1.83)[d]	46.3 (0.28)[d]	52.4[d]	46.8[d]	52.8[d]	46.8[d]

[a] Estimates were adjusted for demographics, controlling for all significant differences between adopted and biological children found in Table 1.
[b] Adopted children have at least 1 adoptive and 0 biological parents in the household.
[c] Biological children have at least 1 biological and 0 adoptive parents in the household.
[d] Estimates for adopted and biological children significantly differ at 0.05 level.
[e] Estimates of health status were not adjusted for special health care needs status.
Source: NSCH, 2003.

Data Analysis

We compared demographic characteristics between adopted and biological children. We then presented unadjusted and adjusted estimates of the health and well-being outcomes for adopted and biological children. Weighted estimates are calculated in SUDAAN,[17] which accounts for the complex sample design of the NSCH. The significance of differences in the unadjusted estimates was evaluated with *t* tests at the .05 level.

The adjusted estimates were calculated twice. First, estimates for all indicators were adjusted for the demographic characteristics that showed a significant difference between adopted and biological children. Second, estimates for measures of health care access and use and child well-being were adjusted for both demographics and special health care needs status. The adjusted estimates are mean predicted marginals calculated by the predmarg option in the SUDAAN logistic regression procedure, and the significance of differences between groups is evaluated at the 0.05 level by using the pred_eff option.[17] The adjusted estimates allowed us to compare the health and well-being of adopted and biological children as if the 2 groups had the same demographics and, for measures of health care access and use and child well-being, the same levels of special health care needs.

RESULTS

Table 1 shows that adopted children are more likely to live in higher-income households, in households where someone has attended college, or where the primary language is English. The average numbers of children and parents in the household are slightly but significantly smaller for adopted children, who are slightly older than biological children, less likely to be born in the United States, and less likely to be Hispanic, non-Hispanic white, or non-Hispanic black but more likely to be non-Hispanic and other than white or black (Table 1).

Tables 2 and 3 show the unadjusted and adjusted estimates of the health and well-being indicators for

TABLE 3 **Unadjusted and Adjusted Family, School, and Neighborhood Indicators, Adopted and Biological Children in the United States**

Family, School, or Neighborhood Indicator	Unadjusted Estimate, % (SE)			Estimate Adjusted for Demographics[a]		Estimate Adjusted for Demographics, Special Health Care Needs	
	All	Adopted[b]	Biological[c]	Adopted	Biological	Adopted	Biological
Parent's relationship with child is very close (ages 6–17)	85.7 (0.24)	81.0 (1.73)[d]	86.0 (0.25)[d]	81.1[d]	86.0[d]	81.9[d]	86.0[d]
Parent never feels child is much harder to care for than most children	69.7 (0.26)	58.9 (1.83)[d]	70.2 (0.27)[d]	58.0[d]	70.4[d]	62.2[d]	70.3[d]
Parent never feels he/she is giving up more than expected to meet the child's needs	59.3 (0.28)	57.1 (1.79)	59.8 (0.29)	54.9[d]	60.1[d]	56.6	60.1
Parent had to make different child care arrangements in past month and/or job change in past year (ages 0–5)	33.2 (0.45)	34.9 (3.44)	33.1 (0.47)	37.0	34.2	35.7	34.2
Child is read to daily (ages 0–5)	47.8 (0.48)	63.6 (3.40)[d]	47.7 (0.50)[d]	60.1[d]	48.0[d]	59.2[d]	48.0[d]
Child lives in household where someone smokes	29.5 (0.26)	21.2 (1.57)[d]	29.5 (0.27)[d]	23.7[d]	29.7[d]	23.0[d]	29.7[d]
Child attends religious service weekly	55.7 (0.28)	63.7 (1.76)[d]	55.4 (0.29)[d]	64.8[d]	55.3[d]	65.1[d]	55.3[d]
Mother's physical and emotional health both excellent/very good	58.9 (0.29)	64.2 (1.82)[d]	58.9 (0.29)[d]	59.3	59.6	61.4	59.5
Child has been home alone during last week (ages 6–11)	16.0 (0.35)	16.6 (2.67)	16.1 (0.36)	14.1	16.5	13.8	16.5
Child attends nursery/preschool/kindergarten (ages 3–5)	60.7 (0.68)	76.4 (3.54)[d]	60.4 (0.70)[d]	68.7	61.1	67.9	61.1
Child participates in activities out of school (ages 6–17)	81.0 (0.29)	85.3 (1.60)[d]	81.4 (0.30)[d]	81.9	82.1	82.6	82.1
Child has repeated ≥1 grade (ages 6–17)	11.3 (0.23)	17.3 (1.90)[d]	10.7 (0.23)[d]	19.3[d]	10.6[d]	17.2[d]	10.6[d]
Neighborhood is supportive	81.4 (0.23)	85.4 (1.42)[d]	81.4 (0.24)[d]	84.7[d]	81.6[d]	85.4[d]	81.6[d]
Neighborhood usually/always is safe	83.8 (0.23)	88.2 (1.51)[d]	83.8 (0.24)[d]	85.9	84.4	86.4	84.4

[a] Estimates were adjusted for demographics, controlling for all significant differences between adopted and biological children found in Table 1.
[b] Adopted children have at least 1 adoptive and 0 biological parents in the household.
[c] Biological children have at least 1 biological and 0 adoptive parents in the household.
[d] Estimates for adopted and biological children significantly differ at the .05 level.
Source: NSCH, 2003.

adopted and biological children. Some indicators showed no significant differences between adopted and biological children for the unadjusted estimates or for either set of adjusted estimates: whether the child had an injury requiring medical attention or >10 school absences (Table 2); whether the parent had to make different child care arrangements in the previous month or change jobs in the previous year; and whether the child spent time alone in the home (Table 3). Adopted and biological children do not differ on these outcomes.

Some indicators show significant differences between adopted and biological children that do not change substantially when demographics or demographics and special needs status are controlled for. Adopted children are more likely than biological children to be affected by asthma, to have moderate or severe health problems, and to have difficulties with emotions, concentration, behavior, or getting along with others. Their parents are more likely to have been told that the child had a learning disability, developmental delay, or physical impairment; and they are more than twice as likely as biological children to have special health care needs (Table 2). These differences in health status are not related to differences in demographics. Adopted children are more likely to have repeated a school grade and are less likely to have a very close relationship with the parent (Table 3), but are also more likely than biological children to have had a preventive medical or dental visit the previous year, receive needed mental health care, receive care in a medical home (Table 2), attend religious services weekly, and live in a supportive neighborhood (Table 3). Demographics and special health care needs are not related to these differences between adopted and biological children.

For some indicators, adjusting for demographics and special needs reduces but does not eliminate significant differences between adopted and biological children. Parents of adopted children are more likely than parents of biological children to have felt that the child is harder to care for than most children (Table 3). However, adopted children are less likely than biological children to lack consistent health insurance coverage (Table 2) or live in a household where someone smokes, and they are more likely to be read to daily (Table 3). These differences are partially but not entirely explained by the higher affluence and prevalence of special needs among adopted children.

Adjusting for demographics and/or special needs ren-

dered observed differences for the following indicators as nonsignificant: whether the family is affected by the child's asthma; whether the parents are concerned with the child's learning, development, or behavior; whether the child is currently insured (Table 2); whether the child's mother is in good health; whether the child attends nursery, preschool, or kindergarten or participates in activities out of school; and whether the neighborhood is safe (Table 3). For these indicators, differences between adopted and biological children are fully explained by the higher affluence and/or prevalence of special health care needs among adopted children.

There seems to be no difference in overall health between adopted and biological children (~85% of both groups are in excellent or very good health), but when demographic characteristics are controlled for, the predicted marginals suggest that adopted children would be less likely to be in excellent or very good health if the 2 groups had the same demographic characteristics (Table 2). This pattern is also evident for the indicator of whether the parent feels that he or she is giving up more than expected to meet the child's needs (Table 3). However, when special needs status is also controlled for, the estimates for this indicator once again show no significant difference.

DISCUSSION

Adopted children tend to live in more affluent households, households in which the primary language is English, or where someone has attended college. These factors can affect the health and well-being of the children independent of their adoptive status. Most of the health status differences we examined are not reduced when the higher affluence of adopted children's families is controlled. Adopted children are more than twice as likely as biological children to have special health care needs. Our results suggest that even if adopted and biological children had the same demographic characteristics and prevalence of special needs, adopted children would be more likely to have consistent insurance coverage, receive preventive and dental visits, receive care in a medical home, and receive needed mental health care.

Many of the outcomes that seem worse for adopted children constitute health problems for the child, whereas most outcomes that seem better for adopted children relate to their access to and use of health care, their family, and neighborhood environments, and family practices that promote health and well-being. Many indicators of health care use and child well-being show better outcomes for adopted children, even when special health care needs status is controlled. This suggests that, although adopted children may have poorer health than biological children, their parents are doing more to ensure that they have needed health care and supportive environments above and beyond the level indicated by the higher need of adopted children. Adoption assistance agreements for most children adopted from foster care provide Medicaid coverage through age 18,[18,19] which may help explain why adopted children have more consistent insurance coverage and more preventive care visits.

We investigated the possibility of ascertainment bias; that is, adopted children could be more likely to have their health problems identified because they are more likely to receive preventive visits and get care in a medical home. However, adjusted estimates of health outcomes that also controlled for the indicators of medical home and preventive visits showed no evidence of attenuated differences between adopted and biological children, suggesting that ascertainment bias is not operating. (Results are available on request from the authors.)

LIMITATIONS

In recent years, the number of new adoptions occurring each year was relatively stable. However, this overall stability masks rapid change in the types of adoptions. Domestic adoptions through private agencies or of kin declined from 77% of all adoptions in 1992 to 44% in 2001, balanced by increases in adoptions from foster care (39% in 2001, up from 18% in 1992) and international adoptions (5% in 1992, increasing to 15% in 2001).[20]

The demographics of children and parents involved in these adoption types are different, as are the typical experiences of children before the adoption. A recent study found that the vast majority of parents adopting internationally were white (98%), with high incomes (73%), and college degrees (84%). In contrast, 46% of those adopting children from foster care were white, 14% had high income, and 28% had completed college.[21] In addition, although domestic private adoptions almost always involve infants, fewer than half of international adoptions,[22] and only 2% of foster care adoptions involve infants.[23]

The 2003 NSCH did not collect information on how the child was adopted, but home environments and health and well-being outcomes may vary dramatically among these subgroups of adopted children. The 2003 NSCH also did not collect information on age at adoption and did not verify whether adopted children were legally adopted. The next NSCH, to be conducted in 2007, will provide more detail about adopted children.

As a sample survey, the NSCH is subject to nonrandom error, including coverage bias and nonresponse bias. These findings are based on parents' experiences and perceptions. Information provided about health status and health care use was not verified with health care professionals.

CONCLUSIONS

Although adopted children do suffer poorer outcomes on some measures of health and well-being, their families are more likely to make sure that they get preventive medical and dental visits, are consistently insured, and get needed mental health care. Pediatricians should expect to encounter more health problems among adopted children but should also expect adoptive parents to be motivated to ensure the good health and well-being of their children.

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