

SPECIAL ARTICLE

The Quality of Ambulatory Care Delivered to Children in the United States

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ABSTRACT

BACKGROUND

Little is known about the magnitude of deficits in the quality of care delivered to children, since comprehensive studies have been lacking.

METHODS

We assessed the extent to which care processes recommended for pediatric outpatients are delivered. Quality indicators were developed with the use of the RAND–UCLA modified Delphi method. Parents of 1536 children who were randomly selected from 12 metropolitan areas provided written informed consent to obtain medical records from all providers who had seen the children during the 2-year period before the date of study recruitment. Trained nurses abstracted these medical records. Composite quality scores were calculated by dividing the number of times indicated care was documented as having been ordered or delivered by the number of times a care process was indicated.

RESULTS

On average, according to data in the medical records, children in the study received 46.5% (95% confidence interval [CI], 44.5 to 48.4) of the indicated care. They received 67.6% (95% CI, 63.9 to 71.3) of the indicated care for acute medical problems, 53.4% (95% CI, 50.0 to 56.8) of the indicated care for chronic medical conditions, and 40.7% (95% CI, 38.1 to 43.4) of the indicated preventive care. Quality varied according to the clinical area, with the rate of adherence to indicated care ranging from 92.0% (95% CI, 89.9 to 94.1) for upper respiratory tract infections to 34.5% (95% CI, 31.0 to 37.9) for preventive services for adolescents.

CONCLUSIONS

Deficits in the quality of care provided to children appear to be similar in magnitude to those previously reported for adults. Strategies to reduce these apparent deficits are needed.

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SERIOUS PROBLEMS WITH THE QUALITY and safety of health care in the United States have been widely documented.¹⁻³ However, this evidence comes mainly from studies of care delivered to adults¹ and the elderly.^{4,5} Comprehensive, national studies of the quality of care delivered to children and adolescents are needed. Previous studies of children have examined few quality measures⁶⁻⁸; have involved self-reported data from parents, patients, or providers^{6,8-10}; or have been limited to Medicaid enrollees⁷ or to one geographic area.^{6,7,11}

Research and policy related to children have focused on expanding eligibility for public insurance programs, but expanding access to a system that does not deliver necessary services will not result in optimal outcomes. Deficits in the delivery of care must be identified if appropriate strategies to close the gaps are to be developed and implemented.

In an attempt to address the limitations of previously published studies of the quality of care provided to children, we developed a comprehensive method for evaluating quality on the basis of information in medical records. We recruited a nationally representative sample of children by means of collaboration with the Community Tracking Study (CTS), conducted by the Center for Studying Health System Change.¹² We sought to answer five questions. First, how good is the quality of care for children overall? Second, does quality vary according to the type of care (care for acute or chronic medical problems or preventive care)? Third, does quality vary across the continuum of care functions (screening, diagnosis, treatment, and follow-up)? Fourth, does quality vary according to the mode of care (history taking, physical examination, laboratory testing or radiography, medication, immunization, encounter, education, or counseling)? Fifth, does quality vary according to the type of clinical area?

METHODS

DEVELOPMENT OF QUALITY INDICATORS

Members of the RAND staff reviewed established national guidelines and the medical literature and developed indicators of quality for the continuum of care functions — including screening, diagnosis, treatment, and follow-up — for the most common childhood health care needs.¹³ A nine-member expert panel assessed the validity of the proposed indicators, using the RAND-

UCLA modified Delphi method.¹⁴ We solicited nominations for panelists from the American Academy of Pediatrics, the American Academy of Family Physicians, the Ambulatory Pediatric Association, and the Society for Adolescent Medicine. The panel consisted of four general pediatricians, two family practitioners, two specialists in adolescent medicine, and one specialist in pediatric infectious diseases (see Appendix 1 of the Supplementary Appendix, available with the full text of this article at www.nejm.org).

Panelists rated indicators on a 9-point scale, with a score of 1 denoting not valid and a score of 9, very valid. Indicators with a median validity score of 7 or higher were included in the study. Previous work has shown this method of selecting indicators to be reliable and to have content, construct, and predictive validity in other applications.¹⁵⁻¹⁷ The criteria for selecting the clinical areas, literature reviews, procedures followed by the panel, and final indicators have been reported elsewhere.¹⁸ (For more details, see the Technical Appendix in the Supplementary Appendix.) Table 1 provides brief descriptions and classifications for a sample of the 175 indicators that we selected for use from the original 242 (Appendix 2 in the Supplementary Appendix). The indicators were categorized according to type of care (preventive care, care for acute conditions, or care for chronic conditions), function of care (care serving as screening, diagnosis, treatment, or follow-up), mode of care (encounter, medication, immunization, physical examination, or laboratory testing or radiography), and type of clinical area (e.g., acne). We excluded indicators associated with modes of care for which the adequacy of documentation may be a concern (i.e., history taking, counseling, and education).

RECRUITMENT OF PARTICIPANTS

The CTS recruited households in 12 metropolitan areas (Boston; Cleveland; Greenville, SC; Indianapolis; Lansing, MI; Little Rock, AR; Miami; Newark, NJ; Orange County, CA; Phoenix, AZ; Seattle; and Syracuse, NY), using a random-digit-dial telephone survey. The communities were randomly selected to represent metropolitan areas with a population of more than 200,000. Between October 1998 and August 2000, we telephoned participating households that had a child enrolled in the CTS. We interviewed the adult in the household who was most familiar with the child's medical history to obtain demographic information and

Table 1. Selected Quality-of-Care Indicators and Classifications Used in the Study.*

Clinical Area	Example of Indicator from Clinical Area	Classification for Composite Scores				Problem with Quality†
		Type of Care	Function	Mode		
Acne (8 indicators)	Indicator 6: If isotretinoin is prescribed to postpubescent girls, a pregnancy test performed within 2 wk before the start of therapy should be negative.	For chronic condition	Treatment	Laboratory testing or radiography		Misuse
ADHD (5 indicators)	Indicator 4: Before a child is started on stimulant medication, the health care provider should measure the blood pressure.	For chronic condition	Treatment	Physical examination		Underuse
Adolescent preventive services (8 indicators)	Indicator 8: If abnormal height or weight velocity is found, a follow-up visit should occur.	Preventive	Follow-up	Encounter		Underuse
Allergic rhinitis (2 indicators)	Indicator 1: Treatment for allergic rhinitis should include at least one of the following: recommendation for allergen avoidance, antihistamine therapy, nasal corticosteroid therapy, or nasal cromolyn therapy.	For chronic condition	Treatment	Medication		Underuse
Asthma (17 indicators)	Indicator 14: Patients whose asthma medication is changed (new medication added or current dose decreased or increased) during one visit should have a follow-up visit within 3 wk.	For chronic condition	Follow-up	Encounter		Underuse
Depression (6 indicators)	Indicator 1: Once major depression has been diagnosed, treatment with antidepressants, psychotherapy, or both should begin within 2 wk.	For chronic condition	Treatment	Medication		Underuse
Diarrhea, acute (12 indicators)	Indicator 8: If the child was breast-fed while healthy, the health care provider should advise the parent to continue breast-feeding if the child is able to feed orally.	For acute condition	Treatment	Encounter		Underuse
Fever (15 indicators)	Indicator 4: If the infant appears to be severely ill or is found to be at high risk for sepsis between 28 and 90 days of age, the infant should be hospitalized.	For acute condition	Treatment	Encounter		Underuse
Immunizations (15 indicators)	Indicator 8: All children should have had one MMR vaccination between 1 and 2 yr of age.	Preventive	Treatment	Immunization		Underuse
UTI (6 indicators)	Indicator 2: To diagnose a UTI, positive culture of a urine specimen (collected by means of suprapubic bladder aspiration, catheterization, or "clean catch") is necessary.	For acute condition	Diagnosis	Laboratory testing or radiography		Underuse
Vaginitis and STDs (15 indicators)	Indicator 5: If a patient presents with any STD, HIV testing should be offered.	Preventive	Screening	Laboratory testing or radiography		Underuse
Well-child care (33 indicators)	Indicator 2: The child's weight should be measured at least 4 times between 1 wk and 1 yr of age and must be plotted on a growth curve or recorded along with the percentile for age or sex.	Preventive	Screening	Physical examination		Underuse

* ADHD denotes attention deficit-hyperactivity disorder; MMR measles, mumps, and rubella; UTI urinary tract infection; HIV human immunodeficiency virus; and STD sexually transmitted disease.

† Misuse was defined as the provision of care that has a high probability of resulting in harm. Underuse was defined as the failure to provide the indicated care. Overuse (which was found for indicators that are not listed here) was defined as the provision of care that is not needed.

both oral and written informed consent to request copies of the child's medical records from all providers seen during the 2-year period before the date of the interview. The results are based on care delivered between October 1996 and August 2000.

RESPONSE RATES

The study was approved by the RAND Human Subjects Protection Committee. We began with

an initial sample of 4096 children who had participated in the CTS, for which the response rate was 62.5%. Of these children, 398 (9.7%) were deemed ineligible, primarily because their families had moved. We interviewed the parents of 2851 of the 3698 eligible children (77.1%) and excluded 77 (2.7%) because they had not seen a health care provider during the prior 2 years. Among the 2774 children who had at least one

visit to a provider, parents provided oral informed consent to obtain records for 2415 children (87.1%) and written informed consent to do so for 1813 children (65.4%). We received 2264 of the 3597 medical records (62.9%) for which we had written informed consent. We obtained at least one medical record for 1536 of the 1813 children for whom we had written informed consent (84.7%). Children for whom we obtained at least one medical record (1553 of the 3698 eligible children [42.0%]) were included in the analyses.

ABSTRACTING OF CHARTS

All charts were sent to RAND for abstraction. We developed computer-assisted abstraction software on a Visual Basic platform (version 6.0, Microsoft). The software allowed the abstraction to be tailored to the record being reviewed and permitted checks of the range and consistency of the data, calculations (e.g., determination of the presence of fever), and classifications (e.g., determination of the drug class) during abstraction. Seven trained registered nurses abstracted the medical records. Charts were abstracted separately for each health care provider of each child.

To assess interrater reliability, we re-abstracted charts from a randomly selected 10.4% of participants (160 participants). Average reliability, indicated by the kappa statistic, ranged from substantial to almost perfect¹⁹ at three levels: the presence or absence of a given clinical area ($\kappa=0.89$; 95% confidence interval [CI], 0.86 to 0.91), the child's eligibility for the care represented by a given indicator ($\kappa=0.95$; 95% CI, 0.94 to 0.96), and the participant's score for that indicator ($\kappa=0.83$; 95% CI, 0.80 to 0.85).

INDIVIDUAL AND COMPOSITE SCORING OF INDICATORS

We determined whether each child was eligible for the care represented by each indicator (whether indicator eligibility was met) using data collected from the abstracted charts, such as age, diagnosis, and presenting symptoms. For children who were eligible, we determined whether the required care had been received on the basis of documentation in the chart that included orders, prescriptions, patterns of visits, visit notes, discharge abstracts, and correspondence.

Each indicator was scored at one of three levels — that of the child, the child–provider dyad, or the episode of care — depending on the care process being evaluated. The scoring level deter-

mined the number of times indicator eligibility was met (which was the denominator in the calculation of the composite score). Child-level indicators were given a score of “pass” if any of the child's health care providers delivered the indicated care (e.g., immunizations). Indicators scored at the level of the child–provider dyad (e.g., limiting of the use of nasal decongestants to 4 days) were scored separately for each provider who saw the child. Episode-level indicators generally required coordination of care provided by multiple providers (e.g., hearing evaluation in patients with persistent bilateral otitis media).

Composite scores were constructed with the use of an opportunity-score approach.²⁰ Specifically, they were calculated by dividing the total number of times the indicated care was noted in the record as having been ordered or delivered by the total number of times indicator eligibility was met.

STATISTICAL ANALYSIS

Because all children who were eligible for the study had participated in the CTS, we had a rich set of variables with which to assess nonresponse. We estimated the relationship between individual characteristics of the children (age, race, income, parent-reported level of use of physicians and hospitals, insurance status, and health status) and participation in the current study, using logistic-regression analysis. Although we adjusted the regression model for all individual characteristics, only race and health status were predictive of participation. Blacks and other nonwhites were less likely to participate than whites ($P<0.001$), and children in excellent or very good health were less likely to participate than those in good, fair, or poor health ($P=0.001$) (Appendix 3 in the Supplementary Appendix). We used the results of the logistic-regression analysis to create weights to adjust for nonresponse and to make the respondents representative of the study population.

All means and standard errors incorporate adjustments for sampled population and nonresponse, as well as for the clustering of eligibility events for each patient (with the use of generalized estimating equations). The survey procedures in SAS software, version 9.2, were used to perform these analyses. P values of less than 0.05 were considered to indicate statistical significance. We also conducted a number of sensitivity analyses to assess threats to the validity of our findings by recalculating composite scores

for different subgroups of indicators and using t-tests to determine whether the differences between the original and recalculated results were significant.

ANALYSIS OF CARE DELIVERED

Tables 3, 4, and 5 show the number of indicators included in each composite score, the number of children eligible for the care represented by one or more indicators within each category, the total number of times indicator eligibility was met, and the weighted mean percentage of indicated care received (adherence rate and 95% confidence interval). On average, according to the data documented in the charts, children received 46.5% (95% CI, 44.5 to 48.4) of the indicated care (Table 3). They received 67.6% (95% CI, 63.9 to 71.3) of the indicated care for acute medical problems, 53.4% (95% CI, 50.0 to 56.8) of the indicated care for chronic medical conditions, and 40.7% (95% CI, 38.1 to 43.4) of the indicated preventive care. Adherence rates for the continuum of care functions ranged from 37.8% (95% CI, 34.6 to 41.0) of the indicated screening processes to 65.9% (95% CI, 62.4 to 69.4) of indicated treatment processes (Table 3).

RESULTS

CHARACTERISTICS OF PARTICIPANTS

Detailed results of the analysis comparing the 3698 children who had participated in the CTS and who were eligible for this study with various nonrespondent subgroups are given in Appendix 3 in the Supplementary Appendix. Study participants were more likely than the average child in the United States to be white and to have private insurance (Table 2) but were less likely to live in households with annual incomes of \$50,000 or more.²¹ We received medical records from an average of 2 providers per child (range, 1 to 10). On average, children were eligible 8 times (range, 1 to 44) for care represented by quality indicators.

Table 2. Characteristics of the 1536 Children and Their Households, as Compared with Children Living in MSAs and Those Living in the United States, in 2000.*

Characteristic	Study Participants	Children in MSAs†	Children in U.S. percent
Age — no. (%)			
<1 yr	194 (12.6)	4.7	5.0
1 to 2 yr	178 (11.6)	10.7	12.0
3 to 4 yr	153 (10.0)	12.2	11.0
5 to 11 yr	554 (36.1)	41.3	40.0
12 to <18 yr	457 (29.8)	31.1	33.0
Nonwhite race — no. (%)‡	354 (23.0)	39.1	36.0
Male sex — no. (%)	770 (50.1)	51.9	51.0
Private insurance — no. (%)	1258 (81.9)	69.1	70.0
Very good or excellent health — no. (%)	1296 (84.3)	83.7	82.0
Parental respondent graduate of high school — no. (%)	1292 (84.1)	84.2	85.0
Annual household income ≥\$50,000 — no. (%)	726 (47.3)	36.5	52.0
≥1 Chronic conditions — no. (%)	394 (25.7)	NA	NA
≥1 Acute conditions — no. (%)	859 (55.9)	NA	NA
No. of clinical areas for which children were eligible			
Mean	3	NA	NA
Range	1–7	NA	NA
No. of times children were eligible for indicators			
Mean	8	NA	NA
Range	1–44	NA	NA

* NA denotes not applicable.

† Metropolitan statistical areas (MSAs) were defined as areas in the United States with populations of 200,000 or more. The original Community Tracking Study participants were sampled from this population.

‡ Race of children was reported by their parents.

As shown in Table 4, indicators requiring that the provider prescribe a specific medication had the highest rates of documented adherence (81.0% [95% CI, 78.7 to 83.3]), and indicators requiring laboratory or imaging services had the lowest rates of documented adherence (36.3% [95% CI, 29.8 to 42.7]).

PROBLEMS WITH QUALITY OF CARE

The rates of documented adherence were lower for indicators characterized by underuse of services (42.4% [95% CI, 40.2 to 44.6]) than for those characterized by overuse (73.1% [95% CI, 64.6 to 81.6]) or misuse (90.2% [95% CI, 87.8 to 92.5]).

VARIATION IN CLINICAL AREAS

In the group of 11 clinical areas for which data for at least 50 children were included in the composite-score calculation, the rates of documented adherence ranged from 92.0% (95% CI, 89.9 to 94.1), for indicated care for upper respiratory tract infection, to 34.5% (95% CI, 31.0 to 37.9),

for indicated preventive care for adolescents (Table 5).

SENSITIVITY ANALYSES

In analyses involving all 242 original indicators (including those requiring documentation of medical histories and of counseling or education), the overall adherence rate was 42.2% (95% CI, 40.4 to 43.9). The adherence rate for the 110 indicators with a median validity score of 8 or 9 (the maximum possible score) was 42.1% (95% CI, 39.9 to 44.4), and the rate for the 61 indicators with a median validity score of 9 was 41.5% (95% CI, 39.2 to 43.8). The inclusion of only the 99 indicators based on expert consensus pediatric guidelines reduced the overall adherence rate to 39.5% (95% CI, 37.0 to 42.1). Among the 895 children for whom we had all medical records, the overall adherence rate was 46.8% (95% CI, 44.2 to 49.4), and it was 46.3% (95% CI, 42.6 to 49.9) among the 457 children for whom just one record was missing.

Table 3. Adherence to Quality Indicators, Overall and According to Type and Function of Care.

Variable	No. of Indicators	No. of Eligible Children	Total No. of Times Indicator Eligibility Was Met	Weighted Adherence Rate (95% CI) <i>percent</i>
Overall care	175	1536	11,886	46.5 (44.5–48.4)
Type of care				
Preventive	57	1528	8,809	40.7 (38.1–43.4)
For acute condition	77	862	2,077	67.6 (63.9–71.3)
For chronic condition	41	394	1,000	53.4 (50.0–56.8)
Function				
Screening	55	1514	6,419	37.8 (34.6–41.0)
Diagnosis	32	378	1,018	47.2 (43.3–51.1)
Treatment	64	1056	2,981	65.9 (62.4–69.4)
Follow-up	24	754	1,468	44.7 (40.9–48.5)

Table 4. Adherence to Quality Indicators, According to Mode.

Mode	No. of Indicators	No. of Eligible Children	Total No. of Times Indicator Eligibility Was Met	Weighted Adherence Rate (95% CI) <i>percent</i>
Encounter	27	1062	1914	44.8 (41.5–48.1)
Medication	34	880	1560	81.0 (78.7–83.3)
Immunization	13	333	1257	52.6 (45.8–59.4)
Physical examination	46	1519	6118	38.7 (35.6–41.7)
Laboratory testing or radiography	52	403	1022	36.3 (29.8–42.7)

Table 5. Adherence to Quality Indicators, According to Clinical Area.*

Indication	No. of Indicators	No. of Eligible Children	Total No. of Times Indicator Eligibility Was Met	Weighted Adherence Rate (95% CI) percent
Upper respiratory tract infection	5	654	914	92.0 (89.9–94.1)
Allergic rhinitis	2	156	159	85.3 (79.6–90.9)
Acne	8	72	85	56.8 (45.4–68.2)
Fever	15	148	328	51.4 (43.2–59.6)
Childhood immunizations	15	769	2498	49.8 (45.6–54.0)
Urinary tract infection	6	84	144	47.8 (36.7–59.0)
Vaginitis and sexually transmitted diseases	15	59	169	44.4 (33.5–55.3)
Asthma	17	165	676	45.5 (42.3–48.7)
Well-child care	33	1022	4406	38.3 (34.2–42.5)
Acute diarrhea	12	76	419	37.8 (33.3–42.3)
Adolescent preventive services	8	532	1852	34.5 (31.0–37.9)

* Data are not reported for the management of prenatal care, otitis media with effusion, depression, or attention deficit-hyperactivity disorder, because fewer than 50 children were eligible for care processes related to these clinical areas.

DISCUSSION

On the basis of medical record documentation, deficits in the delivery of indicated care to children (for which the overall adherence rate was 46.5%) are similar in magnitude to those previously reported for adults (for which the overall adherence rate was 54.9%).¹ These deficits may result in avoidable adverse health outcomes. For example, only 44.0% of children with asthma who were noted to be using β_2 -agonists at least three times per day had a prescription for an anti-inflammatory medication recorded in the chart. Similarly, studies of children with persistent asthma have shown that only 39 to 51% were treated with antiinflammatory medications.²²⁻²⁴ Children with persistent asthma who are treated with inhaled antiinflammatory drugs, as compared with those who are not, have fewer asthma-related symptoms and improved pulmonary function,²⁵ are hospitalized less frequently,²⁶ and have lower asthma-related mortality.²⁷

Immunizations are effective in protecting children against a variety of serious childhood diseases. Only 49.8% of children in our study who reached 2 years of age during the study period were fully immunized, according to their records. The rate of immunization during this period ranged from 47 to 54%, according to the Health Plan Employer Data and Information Set (HEDIS),

which is based on a combination of data from chart review and medical claims.²⁸

According to chart data, urine cultures were obtained for 16.2% of children 3 to 36 months of age who presented with fever of unknown origin and who were thought to be at high risk for sepsis. The reported prevalence of urinary tract infection is high (4 to 5%) among children 2 months to 2 years of age who have fever without an identified source of infection on the basis of the history and physical examination.^{29,30} Early diagnosis of urinary tract infection might lead to earlier identification of high-grade vesicoureteral reflux, allowing for the prevention of recurrent infections, worsening renal damage, and chronic renal failure.^{31,32}

Only 41.5% of eligible adolescent girls in the current study had charts showing evidence of laboratory orders for tests for *Chlamydia trachomatis* or of the results of such testing, as compared with 37.0% of adolescent girls enrolled in Medicaid and 24.0% of those with commercial health insurance, according to data for 2000 from HEDIS.²⁸ Screening for chlamydia is important, because 75% of such infections are asymptomatic,³³ and it is reported that 40% of untreated women and adolescents will have pelvic inflammatory disease. Of that 40% of women, 20% will have infertility due to tubal factors and 9% will have life-threatening complications during pregnancy.³⁴

Broad-based screening, early detection, and treatment have decreased the incidence of pelvic inflammatory disease associated with chlamydia in adolescent girls by 60%, lowering rates of hospitalization and complications.^{11,35}

Our present study has a number of limitations. Nonresponse bias is a concern because the sample we analyzed included only 42.0% of the children who were eligible, though the direction of that bias is unclear. Our study participants included children who had seen a provider at least once in 2 years and who were more likely than the average child in the United States to have private insurance. We would expect these children to have a higher quality of care than the average child. We did not study children living in rural areas and those without telephones; we would expect their quality of care to be lower. Children in excellent health were less likely to participate; we would expect their quality of care to be higher. The adjustments for nonresponse and sampled population were used to account for as much of this type of bias as possible.

We did not have all medical records for all the children, which raises the question of bias due to missing data. We examined whether the rates of performance varied on the basis of whether we had all the charts, were missing one chart, or were missing two or more charts; there were no significant differences among these groups. We abstracted all the information available in each chart, which gave us some information on the care delivered by providers for whom we were missing charts. In many cases, the chart that has the information necessary to determine whether a child is eligible for a care process is also the chart that contains information on whether the care was delivered or ordered, so a missing chart is likely to have caused us to miss information on both the indicator eligibility and the scoring.

We relied on medical records to determine both indicator eligibility and score. Concordance between the content of medical records and direct observations, audiotapes, or videotapes of the encounters described in the records varies according to the type of care.³⁶⁻³⁹ We restricted the results reported here to the subgroup of indicators (175 of the original 242) for which the documen-

tation was generally good. However, some care that was delivered may not have been documented, and some care that was documented may not have been delivered.

The data on which our results are based are 7 to 11 years old, which raises the question of whether patterns of practice are different today. Most quality measurements, reporting of quality assessments, improvement efforts, and incentive payments have been focused on care for adults. In the National Healthcare Quality Report by the Agency for Healthcare Research and Quality, the median level of improvement has been about 3.1% per year — mostly in hospital-based care of adults for heart attack, heart failure, and pneumonia.⁴⁰ Thus, it appears that the quality of health care for adults is improving only slowly, despite considerable attention. There has been no equivalent commitment to improve health care for children, and it therefore seems unlikely that quality has changed markedly over time.

Apparent deficits in the quality of care for children are similar in magnitude to those previously reported for adults.¹ Although the data in this study are based on recorded care delivered from 1996 to 2000, it seems unlikely that quality has improved substantially since that period.⁴⁰ Expansion of access to care through insurance coverage, which is the focus of national health care policy related to children, will not, by itself, eliminate the deficits in the quality of care.

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