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Assessing Health System Provision of Well-Child Care: The Promoting Healthy Development Survey

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ABSTRACT. *Background.* **Preventive care guidelines for children include parent education and counseling, developmental assessment, and screening for psychosocial and safety risks. Health care providers are in a unique position to identify and follow up on potential problems and to influence parenting knowledge, attitudes, and behavior to ensure the healthy development of young children. Few quality measures are available to assess health care system performance in this important area.**

Objective. **To develop a feasible, valid, and reliable methodology for evaluating health care system performance in providing family-centered anticipatory guidance and child and family assessment services on behalf of children from birth through 48 months old.**

Methods. **The Promoting Healthy Development Survey (PHDS) was developed and tested with a diverse group of families in 3 managed care organizations (n = 1478). A standard mail administration protocol was used, including an informed consent with a waiver of documentation, 2 mailings, a postcard reminder, and telephone reminders. The 36-item parent survey assesses whether health care providers[1] talk with parents about topics recommended in Bright Futures and the American Academy of Pediatrics Guidelines for Health Supervision,[2] provide follow-up for children who may be at risk for developmental problems,[3] and address psychosocial well-being and safety within the family. The PHDS also assesses the degree to which parent's interactions with providers are family-centered, helpful, and facilitate parental confidence. Psychometric, bivariate, and multivariate analyses were conducted to assess the reliability, validity, and patterns of variation in the seven quality measures derived from the PHDS.**

Results. **Psychometric analyses demonstrated that the PHDS quality measure scales have strong construct validity (mean factor loading: 0.69) and internal consistency (mean Cronbach's α: 0.80). Parents reporting positive parenting behaviors had significantly higher scores on the anticipatory guidance quality measure compared with parents not reporting positive behaviors. Parents who reported that their questions on specific anticipatory guidance topics were answered were more likely to report higher confidence in related parenting activities (odds ratio [OR]: 5.9, 95% confidence interval [CI]: 3.4–10.2; OR: 8.3, 95% CI: 5–13.8)and were less likely to report concerns about their child's development in related areas compared with parents who reported they wished they had talked more with their child's doctor about these topics (OR: 0.46, 95% CI: 0.29–0.72; OR: 0.58, 95% CI: 0.37–0.89).**

The 7 PHDS quality measure scores for health plans ranged from 17 to 67 (on a 0–100 scale; where 100 is the best score possible) and varied significantly across health plans. Performance was highest for provision of anticipatory guidance information from health plans and lowest for family psychosocial assessment. Scores for families with Medicaid coverage were significantly higher on 2 of the PHDS measures and significantly lower for 3 measures compared with scores for families with commercial insurance. Age of child, whether child is firstborn, parental marital status, education, income, and race were significant predictors for 1 or more of the PHDS quality measures (average R_2 = 0.05).

Conclusions. **The PHDS provides a comprehensive, psychometrically valid and reliable assessment of how well health plans and the health care providers working within these plans promote the healthy development of young children. The PHDS seems to differentiate among health care plans and among the different aspects of preventive care provided within a health plan. For the population studied here, there is significant room for improvement in ensuring families and children receive appropriate and family-centered care to promote the healthy development of children between 3 and 48 months old. Because the PHDS is conceptually based on national recommendations for child health supervision, improved performance on the PHDS would indicate greater adherence to these national recommendations and progress toward the achievement of Healthy People 2010 goals. The generalizability of the findings presented in this report are being examined using data collected in 5 statewide Medicaid samples (N = 11 696) and data from the National Survey of Early Childhood Health, which has incorporated most of the PHDS items.** *Pediatrics* **2001;107:1084–1094;** ***health care system performance, family-centered anticipatory guidance, Promoting Health Development Survey.***

ABBREVIATIONS. PHDS, Promoting Healthy Development Survey; FACCT, the Foundation for Accountability; OR; odds ratio; CI, confidence interval.

As the public mandate for health care accountability continues to grow, the availability of scientifically sound quality measures that are relevant to consumers becomes increasingly important. Measurement is required to produce information for consumers and purchasers to use in identifying high-quality health care providers and to allow health care systems to demonstrate and improve quality. Ideally, a national portfolio of quality mea-

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sures would exist to address a range of health care needs for each major life stage—young children, teenagers, young adults, midlife, seniors, and the frail elderly. Included would be measures showing how well the health care system is doing to help people become and stay healthy, get better when they are sick, and live as well as possible with ongoing chronic conditions.

Many measures are available to evaluate the performance of managed care health plans through the National Committee for Quality Assurance's Health Plan Employer Data and Information Set.[1] To date, however, none of these measures allow consumers, purchasers, policymakers, health plans, or providers to assess whether services to promote the healthy development of young children are routinely provided as recommended in guidelines set forth by the American Academy of Pediatrics[2] and the Maternal and Child Health Bureau's Bright Futures initiative.[3] The few quality measures that do exist rely on medical record or administrative data and focus on the number of children that have received a well-visit or level of adherence to physical examination guidelines for children. Medical record and administrative data do not provide reliable information about the quality of the full range of anticipatory guidance and developmental services provided during the well-visit. These data are more appropriately obtained from parents directly.

Lack of measures in this area is attributable, in part, to a lack of tested and/or feasible measurement methodologies and a paucity of evidence-based studies demonstrating the impact of anticipatory guidance and developmental services. A growing body of knowledge, however, makes performance measures in this area increasingly appropriate to consider for quality measurement and performance comparison systems such as the Health Plan Employer Data and Information Set.

A number of studies support the effectiveness of provider-delivered anticipatory guidance on issues such as reading to children and language development,[4–6] injury prevention,[7–9] safety,[9–11] feeding and nutrition,[12–14] discipline and parent-child interactions,[15–17] sleeping,[18–20] and toilet training.[21] Evidence also exists to support provider assessment of parental concerns about the development of their children[22,23] and the assessment of family smoking, alcohol and drug use, depression, family violence, and other psychosocial issues.[24–26]

In addition, many strategies have been developed and tested for improving performance in the provision and effectiveness of developmental services. These interventions include group parent education and counseling,[27,28] home visits,[29,30] use of developmental specialists,[31] use of parent surveys, encounter forms and/or checklists[32,33] and parent handouts, waiting room boards, and advice lines.[16,18,20,34–36] Other studies have produced evidence that the comprehensive provision of anticipatory guidance, developmental assessments, and family assessments can reduce health care costs.[10,37,38]

Guidelines recommend that children see a health care provider ~12 times in the first 3 years of life for routine, well-care services. As such, health care plans and providers are in a unique position to contribute to the healthy development of young children. Recommended developmental services include the following[2,3,39]:

1. Anticipatory guidance, defined as routine parent and child education and counseling regarding feeding and nutrition, sleeping, nurturing, injury prevention, growth, learning, behavior, discipline, communication, language development, and toileting.
2. Developmental assessment and follow-up (eg, assessment of age-appropriate developmental capability in areas of physical mobility, hearing, seeing, communication, language, learning, cognition, social-emotional development, and behavior).
3. Family psychosocial assessment and follow-up (eg, maternal depression; mental health of parents; smoking, alcohol and drug use; presence of adequate economic, social, and emotional supports; guns; family violence; and other safety issues).

Past studies have demonstrated that parents want to talk with health care providers about the topics that comprise anticipatory guidance and developmental assessment recommendations, such as feeding and nutrition, sleep, injury prevention, child learning, communication and behavior, discipline, and toilet training.[14,40–42] Parents are also willing to discuss sensitive issues regarding the psychosocial well-being and risks in their family, such as smoking, alcohol and drug use, depression and mental health, family violence, and gun safety.[43–45]

Despite this, there is a known gap between recommended and actual provision of anticipatory guidance to parents.[7,14,44,46–49] In addition, many opportunities to identify and respond to parental concerns and questions, to assess children's developmental status, and to assess the psychosocial risks to their health are missed by health care providers. Studies show that providers tend to underestimate parental concerns about parenting and the developmental status of their children, as well as the presence of psychosocial risks to the health of the child.[8,14,43,44,50–53]

The Promoting Healthy Development Survey (PHDS) has been developed to help fill the measurement gap in the assessment of health care quality to promote the healthy development of young children. The PHDS is intended to help providers, consumers, purchasers, and policymakers assess the degree to which health plans and practitioners provide recommended developmental services. The PHDS is a 36-item (11 pages) parent survey capturing information about the provision of age-appropriate anticipatory guidance, developmental assessment and follow-up, and family psychosocial assessment. In addition, the PHDS assesses the degree to which services provided are family-centered, are helpful, and facilitate parental confidence; all primary goals for well-child care visits.[2] The PHDS items assess care received "in the last 12 months". To capture care that may be delivered by multiple health care providers, items

asking about provider-based care use the wording "a doctor or other health provider". Examples of the PHDS items are included in Appendix A.

METHODS

Development and Testing of the PHDS

The PHDS was developed under the rubric of the Child and Adolescent Health Measurement Initiative, coordinated by The Foundation for Accountability (FACCT). A standard, multistage process was used that began with focus groups with families to identify the aspects of health care quality that are important to parents in the area of preventive care for their children. A review of literature identified through Medline or during key informant interviews was conducted. Over a dozen parent surveys on early childhood development and family-centered care and other topics, encounter forms, and checklists used by clinicians to help with the provision of anticipatory guidance and the assessment of young children and their families were identified and reviewed. Three advisory groups within the Child and Adolescent Health Measurement Initiative, comprised of pediatricians, family practitioners, consumer representatives, public health experts, and researchers, regularly reviewed and provided input on the identification of quality measurement topics and the development of the PHDS.

A range of relevant quality measures were identified regarding well- child care, and several were eliminated from additional consideration because of a lack of a reliable data source, lack of evidence, or redundancy with other measures. The 7 quality measurement concepts retained for additional development included:

1. Provision of anticipatory guidance by providers;
2. Provision of anticipatory guidance information by health plans;
3. Follow-up for children at risk for developmental problems;
4. Family assessment on psychosocial and safety issues;
5. Assessment of smoking, alcohol, and drug use in the family;
6. Family-centered care (eg, respect for family and community culture, special concerns addressed);
7. Helpfulness and effect of information on confidence of parents.

The first 5 measures include several specific education, counseling and assessment topics outlined in the American Academy of Pediatrics and Bright Futures guidelines. Although the majority of these services are recommended to be delivered in person by health care providers, quality measure number 2 was identified to assess efforts by the provider and/or health plan to give parents information through alternative avenues such as pamphlets in the

TABLE 1. PHDS Quality Measures: Content, Scoring, and Internal Consistency

PHDS Quality Measure	What Is Measured?	Scoring	Internal Consistency (Cronbach's α)
1. Anticipatory guidance from providers	4 multipart items assess whether general and age-specific anticipatory guidance topics are addressed. Includes feeding and nutrition, sleeping and physically caring for child, safety and injury prevention, child growth, development, communication, and behavior.	Mean score on multiitem scale.	0.88
2. Anticipatory guidance information from health plan	1 multipart item assesses whether families receive anticipatory guidance information from their health plan. Includes health care tips, safety tips, child care tips, and developmental information.	Average proportion answering "yes" across topics.	0.81
3. Follow-up for children at risk for developmental problems	2 multipart items assess risk for developmental problems. One multipart item assesses whether follow-up is provided. Risk assessment items drawn from the Parent's Evaluation of Development Status (Glascoe, 1998). Measure scored conservatively such that providers receive a positive score for even minimal follow-up (eg noted a concern to be watched, gave advice).	Proportion identified as high/moderate risk that received some form of appropriate follow up.	NA
4. Assessment of psychosocial well-being and safety in the family	2 multipart items assess whether providers talk with parents about their own well-being and safety within the family. Topics include depression, history of abuse, stressors and emotional support, firearms, feeling safe in home.	Average proportion answering "yes" to each assessment topic.	0.73
5. Assessment of smoking, drug and alcohol use in the family	2 items within the family assessment scale assess whether providers talk with parents about smoking, alcohol, and drug use in the family.	Average proportion answering "yes" to each survey item.	0.63
6. Family-centered care	2 multipart items assess the degree to which care is provided in a family centered manner. Includes respect, understanding specific needs of child and concerns of parent, asking how feeling as a parent, understand family "culture" and talking about resources and issues in the community.	Mean score on a multi-item scale.	0.85
7. Helpfulness and effect of information from providers and plan on confidence	2 multipart items ask about how helpful all information from providers and plans was in specific areas of parenting and effect of all information on confidence as a parent in specific areas of parenting.	Mean score on a multi-item scale.	0.88

NA indicates not applicable.

waiting room, postcard reminders, and telephone hotlines. Table 1 summarizes the survey topics included in each of the 7 PHDS quality measures and the scoring used to construct the measures. Respondents are required to answer at least half of the items in each scale in order for the quality measure to be scored.

Although many of the PHDS survey concepts reflect those represented in the surveys and tools reviewed, nearly all of the PHDS items were newly developed resulting from a lack of available, tested candidate items appropriate for performance assessment in a self-administered survey. For example, to be useful for performance measurement and accountability, anticipatory guidance survey items need to be constructed in a way that ensures providers and health plans receive credit for anticipatory guidance provided in settings other than the child's primary doctor's office. To accomplish this, the PHDS survey items comprising this measure ask whether a child's doctor or other health care providers talked with parents about key anticipatory guidance topics. In recognition of the different starting point needs of parents, a 4-part response set is also used to capture related outcomes of provider-parent interactions: 1) "Yes, and all my questions were answered"; 2) "Yes, but my questions were not answered completely"; 3) "No, but I wish we had discussed that"; and 4) "No, but I already had information about this topic and did not need to discuss it any more". Conservative scoring of this measure would give nearly equal weight for response option 4 as for response 1.

In-depth cognitive testing of the draft survey was conducted with 15 families representing a range of racial, income, and education groups, as well as different types of health insurance coverage, age of child, age and sex of parent, and number of children in family. Parents were uniformly able to complete the self-administered survey in 10 to 15 minutes. Readability assessments indicated the PHDS to be written at the 8th- to 9th- grade reading level. Cognitive testing confirmed the readability of the PHDS for people across a range of educational levels. Survey design and formatting was finalized with input from a group of experts and family representatives.

The PHDS was administered by mail in 3 managed care health plans to a random sample of 1048 parents whose children were commercially insured and 430 parents whose children were covered through Medicaid. Two of the health plans serve families in California and the third serves families in Ohio. Families were eligible to be sampled if they had at least 1 child between 3 and 48 months old continuously enrolled in the health plan for 12 months or since birth. One child meeting the age and enrollment requirements was randomly chosen from each eligible family as the target child for the survey. Fifty percent of the target children selected were female; 23.4% were 3 to 18 months old and 76.6% were 19 to 48 months old at the time of sampling. Of the 1478 families who received the PHDS survey, 580 (39%) responded. The response rate ranged from 32% to 45% across the 3 health plans. No age or gender differences were observed between target children sampled and those whose parents responded to the survey. Table 2 summarizes the characteristics of parents responding to the PHDS. Respondents represented a range of educational, income, and racial/ethnic groups.

TABLE 2. Characteristics of PHDS Survey Respondents

Characteristic	Proportion of Respondents (N = 580)
Male target child	53.5%
Child age 3–18 mo	23%
Child age 19–48 mo	77%
Child first-born	42%
Mother answered survey	92.7%
Parent education high school or less	20%
Parent income	
<$10 000	14.4%
$10 000–$30 000	20.6%
>$30 000	65%
Race	
White	48%
Black	16%
Hispanic	24%
Asian	8%
Medicaid insurance	33.5%
Commercially insured	66.5%

Factor analysis was conducted to assess the construct validity of the PHDS. A Scree test was used to determine the number of factors to extract. Both oblique and orthogonal rotations were evaluated with promax and varimax methods used, respectively. The reliability of the scale-based quality measures was evaluated using Cronbach's α to measure internal consistency. Multivariate and logistic regression was used to examine the explanatory power of child and family characteristics on variations in performance scores for individual families. Analysis of variance and χ^2 tests were conducted to assess the significance of observed differences in performance on the PHDS quality measures across the 3 health plans and across various subgroups within and across health plans. Odds ratios (ORs) were calculated to determine if subgroups were more or less likely to respond differentially to specific survey items.

RESULTS

Psychometric Analysis

Factor analysis demonstrated a strong factor structure within the PHDS. Each of the survey items used to construct the 6 PHDS scale-based quality measures were used in the factor analysis. Items used to construct the "follow-up for children at risk for developmental problems" PHDS quality measure were not included in the factor analysis, as these items are not intended to be treated as a survey scale. The 8 factors extracted support the construction of the 6 PHDS scales outlined in Table 3. Based on expert input regarding the conceptual components of the quality domains, scoring of the PHDS combines factors 7 and 8 to create the "helpfulness and effect of information" scale. Factors 3 and 6 are combined to create the "family-centered care" scale. Both oblique and orthogonal models yielded the same 8 factors. Average factor loading ranged from 0.49 to 0.83 across factors (mean: 0.69). The lowest average factor loading of 0.49 is attributable to uniformly low scores with little variation observed across individuals or health plans for the survey items comprising the family assessment quality measure.

Internal consistency results further support the reliability of the PHDS quality measurement scales construction (Table 1). Cronbach's α for the 6 PHDS quality measurement scales ranged from 0.63 to 0.88 (mean: 0.80). Removing survey items did not increase the Cronbach's α for any of the PHDS scales.

Concurrent Validity

To assess the concurrent validity of the PHDS quality measures, hypothesized associations among PHDS items and scales were examined. Three hypotheses were evaluated:

1. Respondents who indicate that providers talked with them about recommended anticipatory guidance topics are more likely to report increased confidence as a parent because of interactions with health care providers compared with respondents who indicate that providers did not talk with them although they wished they had done so.
2. Respondents who indicate that providers talked with them about specific anticipatory guidance topics are more likely to report positive parenting behaviors in related areas compared with respon-

TABLE 3. Factor Analytic Solution: Oblique Rotation

PHDS Quality Measure	Proportion of Variation Explained by Factor	Survey Items	Average Factor Loading of Items
1. Anticipatory guidance from providers	19.52	3a–3g	0.72
2. Anticipatory guidance information from health plan	13.65	11a–11d	0.70
3. Family-centered care	14.88	8a–8d 9a–9b	0.70
4. Assessment of smoking, drug and alcohol use in the family	5.47	17c–17d	0.66
5. Assessment of psychosocial well-being, and safety in the family	10.39	17a–17b, 17e 18a–18e	0.49
6. Information about community resources and health issues	7.00	9c–9d	0.62
7. Effect of information on confidence	15.47	12a–12d	0.83
8. Helpfulness of care provided	13.82	10a–10c	0.71

dents who indicate that providers did not talk with them although they wished they had done so.

3. Respondents who indicate that providers talked with them about specific anticipatory guidance topics are less likely to report being concerned about their child's development in related areas compared with respondents who indicate that providers did not talk with them although they wished they had done so.

Overall, 16% of parents selected the "no, but I wish we had discussed that" response to the anticipatory guidance items applicable for all children between 0 and 48 months old (range: 8.4%–26% across these 7 items). On the age-specific anticipatory guidance items, parents selected this response option an average of 18.5% to 31% of the time.

As shown in Table 4, parents responding "yes, and my questions were answered" were significantly more likely to report that their confidence as a parent increased because of information and counseling received from their child's doctor, other health care providers, or health plan compared with parents answering "no, but I wish we had discussed that", (OR: 5.9, 95% confidence interval [CI]: 3.4–10.2 to OR: 8.3 95% CI: 5–13.8).

Similarly, parents who reported positive parenting behaviors in the areas of injury prevention (70.9 vs 92.1, $P < .000$) and reading to their child (69.1 vs 13, $P < .000$) also had significantly higher scores on the "anticipatory guidance from providers" PHDS quality measure.

Finally, significantly fewer parents reported concerns about their child's behavior if they also reported that their child's doctor or other health care providers talked with them about the kinds of behaviors they might expect to see in their child (46.7% "yes, talked" vs 65.5% "no, wish", $P < .000$; OR: 0.46 95% CI: 0.29–0.72). Similarly, parents of children 10 to 48 months old were less likely to report being concerned about how their child talks and makes speech sounds if they indicated that their child's doctor or other health care providers had talked with them about words and phrases used by their child (35.2% "yes, talked" vs 48.5% "no, wish", $P < .005$; OR: 0.58, 95% CI: 0.37–0.89).

TABLE 4. Expected Associations Among PHDS Items and Scales

Association Questions	OR (95% CI)
Parent more likely to report "a lot or a little" more confident in protecting child from injury if provider talked with parent about ways to prevent injury.	6.9 (4.0–12.0)
Parent more likely to report "a lot or a little" more confident in protecting child from injury if provider talked with parent about keeping house and car safe.	5.9 (3.4–10.2)
Parent more likely to report "a lot or a little" more confident in helping child grow and learn if provider talked with parent about ways to help child grow and learn.	8.3 (5.0–13.8)
Parent less likely to report concerns about how child behaves if provider talked with parent about kinds of behaviors to expect to see in child.	0.46 (0.29–0.72)
Parent less likely to report concerns about how child talks and/or makes sounds if provider talked with parent about the sounds child makes or words and phrases their child uses.	0.58 (0.37–0.89)

Pearson correlation coefficients were calculated across all measures and between age-specific and all-ages anticipatory guidance survey scales to further test hypotheses about expected relationships among the PHDS quality measures and to assess the degree to which each of the PHDS quality measures provide unique information. Although 19 of the 21 correlation coefficients among the 7 PHDS quality measures were statistically significant, the strength of the observed correlations were not so high as to suggest redundancy across measures (average correlation: 0.34). The highest correlation observed was between the "anticipatory guidance from providers" and the "family-centered care" measures (0.64).

Observed Variation and Opportunities for Improvement

Significant variations in scores on the PHDS quality measures were observed across health plans, age groups, and children in different categories of risk for developmental problems. Table 5 displays the observed scores (mean-based measures scores are calculated on a 0–100 basis; where 100 is the best score possible; rate-based measure scores are reported as percentages) across all health plans and age groups. Significant differences in scores across the 3 health plans were observed for 5 of the 7 PHDS quality measures ($P < .05$). Significant differences between health plans were not found for the "family-centered care" nor for the "family psychosocial assessment" measure, which had uniformly low scores across plans. Scores for children having Medicaid insurance coverage were significantly lower on the "anticipatory guidance by providers" and "follow-up for at-risk children" measures, and significantly higher on the "family psychosocial assessment", "smoking, alcohol, and drug assessment" and "effect of information" measures.

Overall, scores across the 7 PHDS quality measures ranged from 20 to 75 out of 100 possible for the 3- to 18-month-old group, and from 16 to 65 out of 100 possible for 19- to 48-month-old group. Scores reported by parents of children 19 to 48 months old were significantly lower for 4 of the 7 measures—"anticipatory guidance from providers", "anticipatory guidance information from health plans", "smoking, alcohol, and drug assessment" and "effect of information". Scores for the "family psychosocial assessment" measure were similarly low for both age groups (20.1% ages 0–18 months; 15.9% ages 19–48 months).

The PHDS assesses children's risk for developmental problems using the Parent's Evaluation of Development Status tool.[54] Parents whose children are determined to be at high or moderate risk for developmental and/or behavioral delays using the Parent's Evaluation of Development Status tool reported significantly lower performance on 3 of the PHDS quality measures ("anticipatory guidance from providers," "family-centered care," and "effect of information") compared with parents with children not at risk ($P < .05$; Table 6).

Multivariate and logistic regression was used to evaluate the unique effect of parent and child characteristics on variations in scores for the PHDS quality measures. Six independent variables were used in the regression for each of the 7 PHDS quality measures: age of child, gender of child, whether child is first-born, race of parent, marital status of parent, education of parent, and income of parent. Results of the regression analysis are presented in Table 7. After controlling for other factors, age of child was a significant predictor for 5 of the 7 PHDS quality measures (measures 1, 2, 4, 5, 7), suggesting that parents of younger children (3–18 months old) may be systematically more likely to receive comprehensive anticipatory guidance and developmental services than parents of older children (19–48 months old).

Child's gender did not have a unique effect on any of the PHDS quality measures, but birth order and race had some effect on the "anticipatory guidance from provider" and "effect of information" measures. Marital status was negatively associated with level of "anticipatory guidance from providers" such that lower scores for this measure were observed for unmarried parents. Education was negatively associated with "smoking, alcohol, and drug assessment," indicating that more highly educated parents may be less likely to be screened for these issues.

Taken together, the 7 variables included in the multivariate analysis accounted for only a small pro-

TABLE 5. Mean Observed Scores and Variation in PHDS Quality Measures Across Health Plans and Age Groups

PHDS Quality Measure	Children Age 3 to 48 Months		Children Age 3 to 18 Months	Children Age 19 to 48 Months	
	Mean Observed Score Across 3 Plans (Range of Individual Health Plan Scores)	Significance Across 3 Health Plans	Mean Observed Score (Range of Individual Health Plan Scores)	Mean Observed Score (Range of Individual Health Plan Scores)	Significance Between Age Groups
1. Anticipatory guidance from providers	66.1 SD = 27.15 (60.5–73.1)	$F = 10.36$ ($P = .000$)	72.3 SD = 23.8 (68.3–76.0)	64.4 SD = 28.4 (59.2–71.9)	$F = 18.6$ ($P = .000$)
2. Anticipatory guidance information from health plan*	67.5% (60.9–75.8)	$F = 8.33$ ($P = .000$)	75.4% (70.5–85.6)	65.1% (60.7–72.2)	$X^2 = 4.23$ ($P = .04$)
3. Follow-up for children at risk for developmental problems**	52.7% (35.5–65.7)	$F = 16.8$ ($P = .000$)	60.5% (30.0–65.6)	50% (47.7–50.4)	$X^2 = 2.14$ ($P = .15$)
4. Assessment of psychosocial well-being and safety in the family*	16.8% (15.2–19.2)	$F = 1.83$ ($P = .16$)	20.1% (18.5–21.0)	15.9% (16.8–25.0)	$X^2 = .98$ ($P = .33$)
5. Assessment of smoking, drug, and alcohol use in the family*	51.2% (53.8–59.3)	$X^2 = 34.1$ ($P = .000$)	56.7%** (55.2–70.6)	49.4% (23.3–28.7)	$X^2 = 9.5$ ($P = .01$)
6. Family-centered care	56.4 SD = 25.15 (53.8–59.3)	$F = 2.19$ ($P = .12$)	60.3 SD = 23.2 (55.2–70.6)	55.3 SD = 25.7 (52.3–58.0)	$F = 33.6$ ($P = .06$)
7. Helpfulness and effect of information from providers and plan on confidence	64.8 SD = 23.4 (62.0–68.0)	$F = 3.06$ ($P = .048$)	68.1 SD = 20.9 (65.5–77.8)	63.8 SD = 24 (60.6–63.1)	$F = 5.2$ ($P = .02$)

* Scored as average percentage of "yes" responses across items comprising measure.
** Rate-based score.

TABLE 6. PHDS Quality Measures Scores by Category of Risk for Developmental Problems

	Group 1 High Risk† $N = 185$	Group 2 Moderate Risk $N = 125$	Group 3 Low Risk $N = 121$	Group 4 No Risk $N = 131$	Significance of Differences Across Groups
Measure 1: Anticipatory guidance from providers	58.0 SD = 31.2	63.2 SD = 25.6	69.4 SD = 24.1	77.7 SD = 19.8	$F = 15.1$ ($P = .00$)
Measure 2: Anticipatory guidance from health plan*	64.5%	65.4%	67.3%	73.7%	$F = 1.76$ ($P = .15$)
Measure 4: Assessment of psychosocial well-being and safety in the family*	18.6%	15.8%	16.9%	15.2%	$F = .77$ ($P = .51$)
Measure 5: Assessment of smoking, drug, and alcohol use in the family*	51.9%	52.8%	52.1%	48.1%	$X^2 = .36$ ($P = .78$)
Measure 6: Family-centered care	51.3 SD = 25.5	54.0 SD = 25.5	57.3 SD = 23.7	65.2 SD = 23.4	$F = 8.3$ ($P = .00$)
Measure 7: Helpfulness and effect of information from providers and plan on confidence	64.5 SD = 24.7	59.4 SD = 21.0	63.1 SD = 22.4	71.6 SD = 23.2	$F = 6.2$ ($P = .00$)

SD indicates standard deviation.
†Differences in scores between the high- and no-risk group for measure 1, 6, and 7 are significant ($P < .05$).
* Scored as average percentage of "yes" responses across items comprising measure.

TABLE 7. Results of Regression Analysis Assessing Explanatory Power of Socioeconomic and Other Variables on PHDS Quality Measures

	Dependent Variables: Individual Level Values on the PHDS Quality Measures						
	Measure 1: AG Providers	Measure 2: AG Plan	Measure 3: FU at Risk	Measure 4: Family Assessment	Measure 5: Assess Smoking/Drug	Measure 6: FCC	Measure 7: Effect
Independent Variable	($R^2 = 0.07$)	($R^2 = 0.04$)	($R^2 = 0.07$)	($R^2 = 0.03$)	($R^2 = 0.09$)	($R^2 = 0.03$)	($R^2 = 0.05$)
Intercept	$\alpha = 75.1$	$\alpha = 74.85$	$\alpha = 60.2$	$\alpha = 25.67$	$\alpha = 77.62$	$\alpha = 52.40$	$\alpha = 59.6$
Age of child	$\beta = -7.32$ $P = .01$	$\beta = -12.0$ $P = .003$	$\beta = -0.310$ $P = .33$	$\beta = -5.94$ $P = .01$	$\beta = -13.6$ $P = .00$	$\beta = -3.59$ $P = .21$	$\beta = -5.75$ $P = .03$
Child's gender	$\beta = 1.26$ $P = .62$	$\beta = 5.01$ $P = .15$	$\beta = 0.094$ $P = .71$	$\beta = -2.08$ $P = .30$	$\beta = -5.51$ $P = .14$	$\beta = -0.243$ $P = .92$	$\beta = 3.93$ $P = .08$
First child	$\beta = -5.11$ $P = .04$	$\beta = 1.05$ $P = .77$	$\beta = -0.196$ $P = .48$	$\beta = -1.39$ $P = .49$	$\beta = -2.06$ $P = .58$	$\beta = -1.76$ $P = .47$	$\beta = 0.770$ $P = .73$
Black	$\beta = -3.81$ $P = .38$	$\beta = -5.40$ $P = .36$	$\beta = -0.223$ $P = .62$	$\beta = 5.93$ $P = .08$	$\beta = 0.00$ $P = .99$	$\beta = -3.87$ $P = .35$	$\beta = 6.97$ $P = .07$
Hispanic	$\beta = -6.69$ $P = .10$	$\beta = -0.742$ $P = .89$	$\beta = -0.218$ $P = .61$	$\beta = 2.34$ $P = .48$	$\beta = 2.83$ $P = .63$	$\beta = -0.677$ $P = .86$	$\beta = 11.9$ $P = .001$
Asian	$\beta = -8.67$ $P = .05$	$\beta = 6.68$ $P = .28$	$\beta = -0.42$ $P = .34$	$\beta = 0.03$ $P = .99$	$\beta = -9.0$ $P = .18$	$\beta = -3.29$ $P = .44$	$\beta = 8.34$ $P = .04$
Married	$\beta = -7.62$ $P = .05$	$\beta = -5.34$ $P = .33$	$\beta = -0.38$ $P = .34$	$\beta = -4.35$ $P = .17$	$\beta = 12.0$ $P = .04$	$\beta = -0.305$ $P = .94$	$\beta = -1.01$ $P = .77$
Education	$\beta = 1.77$ $P = .25$	$\beta = 1.18$ $P = .57$	$\beta = -0.212$ $P = .22$	$\beta = -0.417$ $P = .73$	$\beta = -5.36$ $P = .02$	$\beta = 2.61$ $P = .08$	$\beta = -0.902$ $P = .50$
Income	$\beta = -2.33$ $P = .82$	$\beta = -0.277$ $P = .85$	$\beta = 0.242$ $P = .08$	$\beta = -0.70$ $P = .40$	$\beta = -0.88$ $P = .57$	$\beta = 0.691$ $P = .49$	$\beta = 1.29$ $P = .16$

AG indicates anticipatory guidance; FU, follow-up; FCC, family-centered care.
Definition of variables: Age: 1 = 19–48 months, 0 = 3–18 months; Gender: 1 = female, 0 = male; First born child: 1 = yes, 0 = no; Black/parent: 1 = yes, 0 = no; Hispanic/parent: 1 = yes, 0 = no; Asian/parent: 1 = yes, 0 = no; Parent married: 1 = not married, 0 = married/living as married; Parent education: 1 = less than high school, 2 = some college, 3 = college, 4 = more than college; Parent income: 1 = <10 000, 2 = 10–20K, 3 = 20–30K, 4 = 30–40K, 5 = 50–60K, 6 = >60K.

portion of the observed variation in PHDS quality measure scores across individual survey respondents. The average R^2 across measures was 0.05, a finding that strongly suggests that most of the variation observed across scores can be attributed to actual quality differences among provider and health plan practices and other nondemographic or nonsocioeconomic differences among respondents. Although the results of regression analyses indicate a relationship between socioeconomic and demographic factors and scores on PHDS quality measures, these findings point to the need for improvement in care for particular subgroups rather than for a need to adjust PHDS quality measures for socioeconomic factors.

Although the results of the regression analyses highlight population groups for which improvement may be most needed, an analysis of parents' responses to individual survey items provides insight into specific areas for improvement in the delivery of preventive services for young children. Half of the parents surveyed reported having 1 or more concerns about their child's behavior or development, yet these concerns were likely to not be sufficiently addressed by their child's health provider. Parents reporting concerns rated the anticipatory guidance received from their child's providers significantly lower than parents expressing no concerns regarding their children's behavior or development ($P < .05$).

The largest gaps between what parents say they

need and what they get in terms of anticipatory guidance are in the areas of their child's communication and behavior, discipline, injury prevention, and toilet training. Parents are more satisfied with information they receive about caring for their child's physical needs, including dressing, bathing, feeding, and sleeping. This finding corresponded well with self-reports of parental confidence. In this study, parents reported that their confidence increased the most in areas of physically caring for their child and increased least regarding ways to help their child grow and learn as a result of information and guidance received from their doctors, other providers, and their health plan. (Table 8).

The PHDS inquired whether families had been asked about several psychosocial topics. As summarized in Table 8, respondents were least likely to report being asked whether they felt depressed (9.6%), how their own childhood may impact their relationship with their child (4.2%), and about stressors within their family and home (14%). They are most likely to be asked about smoking (68.0%), drug and alcohol use in the home (34.7%), and whether they feel safe in their home (eg, domestic violence) (25.6%). In addition, parents report that they are rarely asked about other psychosocial issues, including gun safety (15.3%) or how parenting works into their daily activities (16.6%). These findings are similar to those of other studies.[14,44,50]

Most parents reported that doctors and other providers respect them as the expert on their child (94.0%) and take the time to understand the specific needs of their child (93.5%). However, many parents indicated that doctors never ask them how they are feeling as a parent (46.0%), talk about resources that are available to them in their community (59.0%), or discuss safety and health issues in the community that may impact their child's well-being (46.0%). (Table 8). Although 73.4% of parents reported receiving health care tips from their health plan, only 63% say they have received information about injury prevention.

Limitations

The unique characteristics of the sampled population and health plans represented in this study may limit the generalizability of this study for specific groups, such as publicly insured children. Analyses presented here are currently being replicated in 2 statewide studies with publicly insured children. Findings regarding the reliability, validity, and variation in performance for the PHDS quality measures is being further evaluated for this population. These follow-up studies will also examine 1) the relationship between parental report of development services provided and services noted as provided in the medical chart; and 2) methods for enhancing response rate. The generalizability of the findings pre-

TABLE 8. Parental Report of Developmental Services

Topics Reported by Parents as More Likely to Have Been Addressed by Providers	Topics Reported by Parents as Less Likely to Have Been Addressed by Providers
Measure 1: Anticipatory Guidance from Providers—All Ages (Percentage Reporting "No, but I wish we had discussed that")	
1. Talk about how to dress, bathe, and feed child (8.4%)	1. Talk about things to do to help child grow and learn (26%)
2. Talk generally about child's growth and development (9.6%)	2. Talk about kinds of behaviors to expect to see in child (23%)
Measure 1: Anticipatory Guidance from Providers—3–9 months (Percentage Saying "No, but I wish we had discussed that")	
1. Talk about child's sleeping position (8.3%)	1. Talk about what child is able to understand (37.5%)
2. Talk about where child sleeps (16.7%)	2. Talk about how child communicates needs (29.2%)
Measure 1: Anticipatory Guidance from Providers—10–18 months (Percentage Saying "No, but I wish we had discussed that")	
1. Talk about sleeping with a bottle (8.7%)	1. Talk about toilet training (33%)
2. Talk about vitamins and foods child needs (15.2%)	2. Talk about guidance and limit setting techniques (32.4%)
Measure 1: Anticipatory Guidance from Provider—19–48 months (Percentage Reporting "No, but I wish we had discussed that")	
1. Talk about things child may start to do for him/herself (23.9%)	1. Talk about ways to help child respect dangerous situations (37.3%)
2. Talk about toilet training (24.3%)	2. Talk about guidance and limit setting techniques (37.3%)
Measures 4 and 5: Family Psychosocial Assessment (Percentage Reporting "No, doctor/other provider did not ask")	
1. Whether anyone in your family smokes (32.1%)	1. Whether you felt depressed, sad, or had crying spells (90.4%)
2. Whether anyone in your family uses drugs or drinks alcohol excessively (65.3%)	2. How your own childhood experiences may impact your relationship with your child (95.8%)
3. Whether you feel safe in your home (74.4%)	3. Stressors in the family or home (86%)
Measure 6: Family-Centered Care (Percentage Reporting Doctors/Other Providers "Never" Do This)	
1. Respect you as the expert on your child (6.1%)	1. Talk about resources available to you in your community (59%)
2. Take time to understand the specific needs of your child (6.5%)	2. Ask how you are feeling as a parent (46%)/Talk about safety and health issues in your community (45.9%)

sented in this report are being examined using data collected in 5 statewide Medicaid samples (N = 11 696) and data from the National Survey of Early Childhood Health, which has incorporated most of the PHDS items (Centers for Disease Control and Prevention, http://www.cdc.gov.nchs/about/major/slaits/nsech.htm. Last accessed March 21, 2001).

CONCLUSION

Study findings confirm that there is a need for ongoing effort to bridge the gap between guidelines and practice in the area of early childhood preventive and developmental services. Barriers to routinely incorporating developmental services into practice may include a lack of provider knowledge, time, economic incentives, or training.[53,55–58] Uncertainty on the part of practitioners regarding effective interventions or available resources for responding to the health care issues and needs that may emerge from the routine education, counseling, and assessment of children and families is likely to account for some of the gap between guidelines and practice.[46]

In addition, some parents may be reluctant or unaccustomed to initiating conversations with health care providers about their concerns as parents.[14,40,48] Unless providers actively elicit parents' input, they may conclude that many parents do not have concerns or questions and, consequently, may not provide education, counseling, and assessment as frequently as parents might desire.

The PHDS is a conceptually and psychometrically valid and reliable instrument that serves as an important complement to existing quality measures. It provides a comprehensive assessment of developmental services in the areas of anticipatory guidance and developmental and family assessment. When administered to a representative sample of parents affiliated with specific providers and/or health plans, the PHDS is a useful tool for evaluating health care system performance, holding the system accountable for delivering high quality developmental services, and for supporting health care quality improvement. The demographic and socioeconomic survey items included in the PHDS make it possible for providers, health plans, and policymakers to identify populations and subgroups for which health service improvement is most needed.

The PHDS also complements the efforts of States to evaluate their Early Periodic Screening and Diagnostic Testing programs. These evaluations typically involve an extensive review of medical charts to determine the provision of developmental and preventive services. They rarely include, however, an evaluation of the provision of parent and child education, counseling or assessment services as this information is not routinely or reliably captured in the medical record. The PHDS may also be useful as a parent education and empowerment tool, helping parents to identify unmet needs and to act on their own behalf to obtain education, counseling, and assessment services.

Families can be an excellent source of information for evaluating the quality of the health care system's performance in promoting the healthy development of young children. It is expected that studies of preventive and developmental services for young children will continue to confirm early findings regarding the important role of the health care system in providing parents of young children with recommended anticipatory guidance and developmental and family assessment services. The PHDS can be used in conjunction with other efforts to continue to assess and improve health care quality in this critical area of child and family health.

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Appendix A: Examples of the PHDS Survey Items scored in Performance Values

PV1: Anticipatory Guidance and Education from Health Care Providers
In the last 12 months did your child's doctors or other health providers talk with you about the following: (*Response Choice A*)

3a: Your child's growth and development
3b: The kinds of behaviors you can expect to see in your child
3c:How to dress, bathe, and feed you child
3d:The importance of talking to, reading to, and playing with your child
3e:Things you can do to help your child grow and learn
3f: How to make your house and car safe for your child
3g: Ways to prevent your child from injury
5.1a: Breast feeding and other issues related to food
5.1b: Your child's sleeping positions
5.1c: Where your child sleeps
5.1d: Night waking and fussing
5.2a: How your child responds to you, other adults, and caregivers
5.2b: How your child communicates his or her needs
5.2c: What your child is able to understand
6.1a: Vitamins and foods your child should eat
6.1b: Your child's bed and nap time routine
6.1c: Night waking and fussing
6.1d: Sleeping with a bottle
6.1e: The words and phrases your child uses and understands
6.2a: How your child may start to explore away from you
6.2b: Weaning your child from a bottle
6.2c: How your child "gets into things"
6.2d: Guidance and limit setting techniques to use with your child
6.2e: Toilet training
7.1a: Changes you may see in your child's appetite and food pref.
7.1b: Bed time routing and how many hours of sleep your child needs
7.1c: Ways to help your child respect dangerous situations
7.1d: Things your child may start to do for himself or herself
7.1e: The words or phrases your child uses and understands
7.2a: How your child may interact with other children and adults
7.2b: How well your child follows directions
7.2c: Guidance and limit setting techniques to use with your child
7.2d: Toilet training

PV2:Information from the Health Plan
In the last 12 months did your receive information from your health plan about: (*Response Choice B*)

11a: Safety Tips: How to make your house and car safe for your child (For example: information about lead poisoning or car seats)
11b: Health Care Tips: When and how often your child should see the doctor, immunization reminders, information on other health care services available for your child
11c: Child Care Tips: Information about caring for your child
11d: Developmental Information: Information about your child's development and how you can help your child grow and learn

PV3: Follow Up for Children at Risk for Developmental Delays
Did your child's doctors or other health providers ever: (*Response Choice B*)

16a: Make a referral to another doctor or other health provider
16b: Test your child's learning and behavior
16c: Note a concern that should be watched carefully
16d: Make a referral for speech-language or hearing testing
16e: Give you advice about how to help your child

Note- Children are identified as being at risk by how the parents answers questions #13 and #14. Using an age-specific algorithm to score certain items, specific parental concerns noted for children of specific ages are scored in order to classify the child as either at high, moderate, low, or no risk for developmental delays. Children at high and moderate risk are then included in the denominator for this performance value and questions 16 a-e are scored differently depending on the level of risk.*

PV4:Assessment of Family Well Being and Safety
In the last 12 months, have your child's doctors or other health providers asked you: (*Response Choice B*)

17a: If you ever felt depressed, sad, or had crying spells
17b: To discuss your own childhood experiences with him or her and how they relate to you interaction with your child
17e: If you felt safe at home
18a: To discuss support you have received from your family, friends, and community
17e: If you felt safe at home
18a: To discuss support you have received from your family, friends, and community
18b: To discuss any changes or new stressors in your family or home
18c :If you had firearms in your home
18d: How parenting works into your daily activities and future plans
18e: To discuss how your and your family are enjoying raising your child

Pv5: Assessment of Smoking and Substance Abuse in the Family
In the last 12 months, have your child's doctors or other health providers asked you: (*Response Choice B*)

17c: If a family member of the child smokes
17d: If a family member uses alcohol or other drugs or substances excessively

PV6: Family Centered Care: Communication and Experience of Care
In the last 12 months how often did your child's doctors or other health providers: (*Response Choice C*)

8a:Take time to understand the specific needs of your child
8b: Respect that you are the expert on your child
8c: Build your confidence as a parent
8d: Ask you about how you are feeling as a parent
9a: Address your concerns or questions about your child and give you specific information to address these concerns
9b: Understand you and your family and how your prefer to raise your child
9c: Talk to you about resources that are available to support you (parent support groups, childcare, alternative health care)
9d:Talk to you about issues in your community that may affect your child's health and development (such as lead poisoning, pool safety, community violence, gun safety, or window guards)

PV7: Helpfulness and Effect of Care Provided
In the last 12 months, how helpful were your discussions with your child's doctors or other health providers in: (*Response Choice D*)

10a: Helping your understand your child's behavior
10b: Helping you learn to meet your own needs while caring for your child
10c: Giving you information you needed when you needed it

Overall, how much more or less confident do you feel in doing the following things because of the information or guidance you received from your child's doctors or other health providers: (Response Choice E)

12a: Physically caring for your child
12b: Protecting your child from injuries and accidents
12c: Doing things for your child to help him or her grow and learn
12d: Addressing any special concerns you have about your child such as sleeping, feeding or toilet training.

Response Choice Options:

A) Yes, and all my questions were answered; Yes but my questions were not answered completely; No, but I wish we had discussed; No, but I already had information about this topic and did not need to discuss it any more
B) Yes; No
C) Never; Sometimes; Usually; Always
D) Very Helpful; Helpful; Somewhat Helpful; Not at all Helpful; We did not discuss
E) I feel a lot more confident; I feel a little more confident; I do not feel more or less confident; I feel less confident