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## An evaluation of physicians' engagement of children with asthma in treatment-related discussions

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### Abstract

Our objectives were to examine whether providers engage children with asthma in treatment-related discussions at the level children prefer (engagement concordance) and to determine whether engagement concordance is related to child, caregiver, and provider characteristics. Children with asthma ( $n = 296$ ) aged 8–16 years were recruited at five pediatric practices in North Carolina. Using audiotaped medical visit transcripts, we documented the number of treatment-

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related questions the providers asked the children. Children reported their preferred level of provider engagement. A logistic generalized estimating equation was used to determine which variables predicted engagement concordance. Most children (96.6%) wanted to be involved in treatment-related discussions. One-third of the providers did not ask children any treatment-related questions. Only 36.1% of provider–child dyads were concordant. Most discordant dyads were under-engaged (83.1%). Better engagement concordance was observed among older children (odds ratio (OR) = 1.19, 95% confidence interval (CI) (1.07, 1.33)), male children (OR = 1.67, 95% CI (1.03, 2.70)), and among providers with fewer years in practice (OR = .97, 95% CI (.94, .99)). Providers engaged in treatment-related discussions with younger children and females less frequently than these children preferred. Providers should ask children how much they want to be involved in treatment-related discussions and then attempt to engage children at the level they prefer.

## Keywords

Adolescent; chronic illness; communication; family-centered care; medication

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## Introduction

Asthma is one of the most common chronic conditions among youth worldwide, with approximately 7% of adolescents and 5% of children reporting symptoms of severe asthma (Lai et al., 2009). For school-aged children, asthma is responsible for millions of school absences and emergency department visits each year (Akinbami et al., 2009). Expensive negative asthma-related sequelae can be reduced when children adhere to their medication regimens (Bartlett et al., 2002; Bauman et al., 2002).

The United States Pharmacopeia asserts that providers should communicate directly with children about medications (Bush et al., 1999). Additionally, the U.S. Institute of Medicine (2001), the United Kingdom Department of Health (2004), and Ireland's Department of Health and Children (2000) have called upon health-care professionals to more actively involve children in medical visits. Despite these calls, studies have shown that directly communicating with children can improve medication adherence and other outcomes (Butz et al., 2007; Gavin et al., 1999; Tieffenberg et al., 2000; Zolnieriek and Dimatteo, 2009). Less research has documented children's preferences for treatment-related communication. Because previous studies have shown that shared decision-making rarely occurs among children with asthma, their caregivers, and their providers, the need to document children's communication preferences may be particularly important for children with chronic disease (Coyne and Harder, 2011; Sleath et al., 2011). This is especially true given that children with asthma are unlikely to ask their provider about medication-related problems during medical visits (Sleath et al., 2010).

In general, children are rarely engaged in discussions of substance during medical visits (Cahill and Papageorgiou, 2007; Coyne, 2008; Stivers, 2012; Tates and Meeuwesen, 2001; Wassmer et al., 2004; Wissow et al., 1998) with their involvement typically accounting for only 3–15% of the total medical visit interactions (Cahill and Papageorgiou, 2007).

Moreover, most child involvement is limited to social talk (Cahill and Papageorgiou, 2007; Pantell et al., 1982; Stewart et al., 1981; Tates and Meeuwesen, 2001; Wassmer et al., 2004).

Demographic characteristics of children, their caregivers, and providers may partially explain children's lack of involvement during medical visits. Although it is clear that older children participate more than younger children (Cox et al., 2009; Hall et al., 1988; McPherson and RedSell, 2009; Pantell et al., 1982; Stivers, 2012; Tates et al., 2002; van Dulmen, 1998), children as young as 2 years old have been able to competently communicate about their health and treatment needs (Curtis-Tyler, 2011; Nova et al., 2005). Additionally, evidence regarding how other variables, such as child gender and provider race, affect child participation is less clear, with some studies finding significant effects for these variables and others finding no effects (Bernzweig et al., 1997; Cox et al., 2007; Pantell et al., 1982; Stivers and Majid, 2007).

Qualitative work has shown that children want to be active partners in their care (Knopf et al., 2008; Robinson, 2010). However, previous studies have not attempted to quantify the extent to which children want their providers to engage them in treatment-related discussions. Furthermore, the extent to which children's desired level of provider engagement in treatment-related discussions varies with demography and clinical characteristics remains unexplored. Finally, to our knowledge, no previous studies have directly compared children's self-reported desire for provider engagement in treatment-related discussions with objective measures of child-provider communication.

Using data from 296 transcripts of audiotaped medical visits. We specifically document children's desired level of engagement with their provider, examine whether providers engage children in treatment-related discussions at the level children prefer (engagement concordance), and determine which child, caregiver, and provider characteristics predict better engagement concordance.

## Methods

### Study design

Data were collected from 2005 to 2008 as part of a larger longitudinal study that examined the relationship between asthma communication and child outcomes. The study was approved by the university's Institutional Review Board (the clinics that participated in our study did not have their own institutional review boards). Data for this manuscript came from four sources: an audiotaped medical visit, a child baseline interview, a caregiver baseline questionnaire, and a provider demographic questionnaire.

### Procedures

A convenience sample of providers, children, and caregivers was recruited at five primary care pediatric practices in nonurban areas of North Carolina. The primary investigator (Dr Sleath) explained the study procedures to 43 providers who worked at the five participating practices. Of the 43 providers, 41 agreed to participate in the study, yielding a provider participation rate of 95.3%. Once enrolled, the providers completed a brief, self-administered demographic questionnaire.

Clinic staff referred interested families to a research assistant, who explained the study, obtained caregiver consent and child assent, and administered the eligibility screener. Clinic staff did not record how many families they referred to the research assistant. Of the 377 families that approached the research assistant, 333 agreed to participate, yielding a family participation rate of 88%. Of the 333 participating families, 296 (89%) had usable audiotape data. These families were seen by 35 of the 41 study providers. Missing audiotape data were primarily due to poor quality recordings.

Children were eligible for the study if they (a) were 8–16 years old, (b) spoke English, (c) could read the assent form, (d) had visited the clinic at least once before, (e) were accompanied by an adult caregiver (parent or legal guardian) who could read and speak English, and (f) had mild, moderate, or severe persistent asthma (Cabana et al., 2004; NHLBI, 2007).

After eligible children and caregivers were enrolled, their medical visit was audiotape recorded. The research assistant accompanied each child and caregiver to the exam room, turned on the recorder after the provider entered, and left the room. Providers turned off the recorder at the end of the visit. After the visit, the research assistant interviewed the child while the caregiver completed a self-administered questionnaire.

Each audiotaped medical visit was transcribed verbatim. Then, two trained coders read the transcripts to code the number of questions the provider directed to the child and the caregiver. More detail about the coding procedures is provided below.

## Measures

**Child’s desired level of provider engagement**—During the baseline interview, children responded to the following question, “How much do you think your provider should ask you about your thoughts and feelings when deciding how to treat your asthma?” Response categories included “*not at all*,” “*a little*,” “*some*,” and “*a lot*.” Because of lack of conceptual clarity between “*a little*” and “*some*” engagement, we combined these two categories, that is, 0 = *no engagement desired*, 1 = *a little/some engagement desired*, and 2 = *a lot of engagement desired*.

**Provider’s engagement of child in treatment-related discussions**—The provider’s engagement of each child was assessed using verbatim transcripts of the audiotaped visit. Coders used a detailed coding tool to specifically document the number of treatment-related questions the provider asked the child. Treatment-related questions included: asthma medication frequency, dose, time of day, inhalers, turbuhalers, diskus, spacers, and allergy medications. We did not code questions that were ambiguously directed (i.e., not clearly directed to the child or caregiver). For example, if the provider used the pronoun “you” and both the child and caregiver responded to this question, then the question was defined as ambiguously directed.

To inspect the reliability of the coding scheme, two coders coded a randomly selected subset of 60 transcripts. Each coder coded the number of treatment-related questions the provider directed to the child. Krippendorff’s  $\alpha$  values indicated good intercoder reliability ( $\alpha = .89$ )

(Hayes and Krippendorff, 2007). We chose Krippendorff's  $\alpha$  as our measure of intercoder reliability because it is more appropriate for ratio data (Hayes and Krippendorff, 2007), such as the number of questions directed to the child by the provider, while Cohen's  $\kappa$  value (1960) is more appropriate for nominal data.

Using the coded transcripts, we then created a three-level categorical provider engagement variable to correspond with the three-level child's desired level of engagement variable. The three levels were: 0 = *no engagement* (0 treatment-related questions asked), 1 = *a little/some engagement* (1–5 treatment-related questions asked), and 2 = *a lot of engagement* (6 or more treatment-related questions asked). Currently, there are no published guidelines describing how many questions constitute a little versus a lot of engagement in treatment-related discussions for pediatric office settings. However, a previous study conducted with children in an emergency department showed that the modal number of medical questions providers asked children with asthma was five. Thus, we used one to five questions as the category indicating a little/some engagement and six or more questions as the category indicating a lot of engagement (Wissow et al., 1998).

**Provider's engagement of caregiver in treatment-related discussions**—Using the same coding procedures described above, the number of treatment-related questions the provider directed to the caregiver was also coded. Krippendorff's indicated excellent intercoder reliability ( $\alpha = .99$ ).

**Engagement concordance**—To create the engagement concordance variable, we determined how well the children's desired level of provider engagement matched the provider's actual engagement of the child. Engagement concordance was defined such that 2 = *provider and child were concordant*, 1 = *provider and child were slightly discordant*, and 0 = *provider and child were very discordant*. Table 2 shows how the provider engagement and child's desired level of engagement variables were linked; white shade = *concordant*, light gray shade = *slightly discordant*, and dark gray shade = *very discordant*. If the child's desired level of engagement matched the provider's engagement of the child (e.g. the child reported not wanting any engagement from the provider and the provider asked the child 0 treatment-related questions), then engagement concordance was scored as 2 (*concordant*). If the child's desired level of engagement was 1 point away from the providers' actual engagement of the child, then engagement concordance was scored as 1 (*slightly discordant*). If the child's desired level of engagement was two points away from the providers' actual engagement of the child (e.g. the child did not want any engagement from the provider and the provider asked 6 or more treatment-related questions), then engagement concordance was scored as 0 or very discordant.

**Child and provider demographic characteristics**—Table 1 lists the child and provider demographic characteristics that were measured as part of this study. Providers self-reported demographic characteristics on the provider demographic questionnaire. The child's asthma severity (mild vs. moderate/severe) was classified by a research assistant based on caregiver report of child's symptoms and medication use and verified by a pediatric pulmonologist (Sleath et al., 2010). All child variables were reported by caregivers with the exception of child age, gender, and race, which were self-reported by children. For child

race, the “Other” category includes Hispanic, Asian American, and other. However, for the generalized estimating equation (GEE), child race was recoded into a dichotomous variable (White vs. non-White). How well the child thinks the provider knows him/ her as a person was measured with the following categories: hardly at all, slightly, moderately well, and very well.

### Statistical analyses

All analyses were conducted using SPSS version 14. First, descriptive statistics were calculated. Next, we ran a series of separate logistic regressions to examine bivariate relationships between each demographic and clinical variable and a dichotomous engagement concordance variable. These bivariate logistic regressions were run for descriptive purposes. All independent variables were included in the final models regardless of whether the individual bivariate associations were significant. We dichotomized the three-level engagement concordance variable (0 = *discordant* and 1 = *concordant*) because the number of child–provider dyads who were “very discordant” was small ( $n = 36$ ) and power would have been too limited to explore statistical differences for three levels.

To account for nonindependence of multiple children being seen by one provider, we used a GEE to examine whether demographic and clinical characteristics of children, their caregivers, and their providers predicted engagement concordance. The GEE was clustered by provider. Again, we dichotomized the engagement concordance variable due to the small number of child–provider dyads that were “very discordant.” Because engagement concordance was a dichotomous outcome variable, we reported the results with odds ratios (ORs) and 95% confidence intervals (CIs). If the 95% CI did not contain 1, then the OR was considered significant.

## Results

### Participant and visit characteristics

Table 1 presents the sample’s characteristics. Approximately, half of the children were female and the average age was 11 years. Most children were White and the majority of children had moderate to severe persistent asthma. On average, children felt their provider knew them well. Only three families in the sample did not have health insurance. Most caregivers (83%) had at least 12 years of education, which is equivalent to completing high school in the United States.

The majority of providers were White and approximately half were female (Table 1). Of the 35 providers who saw children with usable audiotape data, 31 were physicians and 4 were nurse practitioners or physician assistants. On average, providers were approximately 45 years old and had been practicing medicine for 17 years. The mean length of the medical visit was approximately 26 min.

### Engagement concordance

Although the majority of children (96.6%) desired at least some provider engagement in asthma treatment-related discussions, approximately one-third of providers (33.4%) did not

ask children any treatment-related questions. The disparity between children's desired level of engagement and the provider's actual engagement resulted in only 107 provider-child dyads (36.1%) being concordant (cells with white shade in Table 2). Of the 189 discordant provider-child dyads, 152 dyads (80.4%) were slightly discordant (cells with light gray shade) and 37 dyads (19.6%) were very discordant (cells with dark gray shade). The majority of discordant dyads can be described as under-engaged (83.1%), where the provider engaged the child in less treatment-related discussion than the child desired. In contrast, only 16.9% of dyads were over-engaged, in which the provider engaged the child in more treatment-related discussions than the child desired.

Table 3 provides some examples of child-provider treatment-related discussions. Readers who would like greater detail about the types of treatment questions asked by children and providers are referred to articles in the *International Journal of Pediatrics* and *Journal of Asthma* (Sleath et al., 2011a; 2011b).

### **Bivariate associations**

Unadjusted logistic regressions revealed that three variables were significantly associated with engagement concordance (Table 4). Older children were more likely to be concordant with their provider (OR = 1.16, 95% CI (1.05, 1.29)). Additionally, older providers (OR = .97, 95% CI (.95, .997)) and providers who had been practicing medicine for more years (OR = .97, 95% CI (.94, .99)) were *less* likely to be concordant with the children.

### **Predictors of engagement concordance**

We did not include provider age in the GEE model because it was highly correlated with provider years in practice ( $r = .92, p < .001$ ). As shown in the adjusted analysis in Table 4, only child age (OR = 1.19, 95% CI (1.07, 1.33)) and provider years in practice (OR = .97, 95% CI (.94, .99)) remained significant predictors of engagement concordance. Additionally, child gender became significant in the adjusted model (OR = .60, 95% CI (.37, .97)). Specifically, older children and males were more likely to be concordant with their providers. Also, providers who had been practicing for fewer years were more likely to be concordant with children.

### **Discussion**

No quantitative studies have documented children's desired level of provider engagement in asthma treatment discussions during medical visits. Our results indicate that more than 95% of children with asthma desired at least some engagement from their provider in treatment-related discussions. Even though children wanted providers to involve them in discussions about asthma treatment, one-third of providers did not ask children any treatment-related questions. Thus, most children were under-engaged in treatment-related discussions.

Of the demographic characteristics included in our regression model, only child age and child gender were significantly related to engagement concordance. The results regarding child age are consistent with previous studies, which found that older children are more likely to actively participate during medical visits than younger children (Cox et al., 2009; Hall et al., 1988; McPherson and RedSell, 2009; Pantell et al., 1982; Tates et al., 2002; van



Dulmen, 1998) and that physicians are more likely to ask older children questions than younger children (McPherson and Redsell, 2009; Stivers, 2012). Our data suggest that younger children want to be active participants during their medical visits. However, providers may deem young children to be less competent in answering treatment-related questions, and for that reason, may select caregivers to answer those questions (McPherson & Redsell, 2009; Stivers, 2012). Even though engaging younger children in asthma treatment discussions may be more difficult and time consuming, providers should attempt to make an extra effort, especially since international professional bodies have called for more active child involvement in medical visits. Specifically, the United Kingdom Department of Health recommends that primary care providers “give children, young people, and their parents increased information, power, and choice over the support and treatment they receive” (2004: p. 2). If available, providers may want to participate in child-centered training interventions, as these have been shown to have positive effects on child outcomes, such as emergency department visits, hospitalizations, and missed school days (Barnes et al., 2012).

As children mature, they are expected to take on more responsibility for self-management of health problems (Horner, 1999). Although communicating effectively with health-care providers is an important domain of asthma self-management (Mammen and Hyekyun, 2012), children may not have been socialized about how to actively participate during medical encounters. One innovative method for encouraging balanced child and parent participation would be through the shared medical appointment, in which a provider addresses disease management and patient education for a small group of four to nine children with asthma and their caregivers (Wall-Haas, 2012). By nature of the group appointment format, children may feel more comfortable sharing their asthma concerns, especially if they see other children actively participating during the appointment.

Our findings about child gender contribute to the mixed evidence base regarding gender and child participation (Cox et al., 2007; Pantell et al., 1982). A previous study has shown that physicians are just as likely to ask girls questions during a medical visit as boys (Stivers and Majid, 2007); however, girls are more likely to answer a physician’s question than boys (Stivers, 2012). This suggests that girls may feel more comfortable interacting with their physician during a medical encounter and, therefore, may desire a higher level of engagement with their provider. If boys are less comfortable interacting with their physician, they may desire less engagement during medical visits, which may explain why boys were more engagement concordant than girls. Further exploration of determinants (e.g. socialization) of engagement concordance for boys and girls is warranted.

We found that providers who had been practicing medicine for a shorter period of time were more likely to engage children in treatment-related discussions at the level that children preferred. This may be because younger providers have been trained at a time when health organizations from multiple countries have called for more active child participation during medical visits (Bush et al., 1999; Department of Health, 2004; Department of Health and Children, 2000). These calls for more active child participation are in line with the United Nations Convention on the Rights of the Child (Shier, 2001), and younger providers may be more aware of the specific strategies they can use to foster shared decision-making than



older providers. Because physicians have reported that they are uncomfortable discussing serious illnesses with children, more education about how to address disease-related discussions with pediatric patients may be warranted (Dube et al., 2003). In particular, providers who have been practicing longer may benefit from additional training about how to effectively engage children in medication-related discussions. Several strategies for engaging children are outlined below.

Butz et al. (2007) make several recommendations for how to maximize the effectiveness of asthma communication between providers, children with asthma, and their caregivers. Two of these recommendations include teaching children to take turns talking with the provider and clarifying communication with the child. Additionally, providers may want to consider these three simple strategies for increasing child participation: (1) ask the child yes–no questions; (2) gaze at children when asking a question; and (3) get children to answer questions early in the visit (Stivers, 2012). Children often want to make important decisions in conjunction with their caregivers; hence, providers should also involve caregivers in treatment-related discussions (Coyne and Harder, 2011).

## Limitations

Our study results should be interpreted with caution for several reasons. First, generalizability is limited because the study was conducted in five pediatric clinics in nonurban areas of North Carolina. It is possible that children's preferences for provider interaction could vary across regions. Second, our ability to accurately capture the number of questions the provider directed to the child was limited by having audiotaped, rather than videotaped, data. Video recordings provide information about providers' nonverbal behavior, such as eye contact, which can be used to more accurately identify whether questions were directed toward the child. Although we were limited by audiotaped data, we still had high interrater reliability for the coding of child-directed and caregiver-directed questions. Third, the tenor of the medical visit (positive/negative) could have influenced children's desired level of provider engagement because children answered the engagement preference question immediately after the medical visit. We measured children's desired level of engagement and providers' actual engagement at baseline, so we cannot be sure that the child's perceptions of how well the provider knew him/her predicted engagement concordance or vice versa. However, engagement concordance could not influence demographic (e.g. child age and child gender) characteristics. Finally, our measure of children's desired level of engagement was limited to treatment-related discussions. It is possible that engagement concordance would be higher for nontreatment-related topics, such as symptom monitoring or environmental (e.g. trigger) control. Moreover, we did not investigate qualitative aspects of treatment-related discussions, such as whether questions were open or close ended.

## Conclusion

As recommended by health organizations in multiple countries (Bush et al., 1999; Department of Health, 2004; Department of Health and Children, 2000), providers should communicate directly with children about their treatment options. Our results indicate that

children with asthma want providers to engage them in treatment-related discussions. Asthma is a persistent chronic disease that requires long-term management; hence, provider engagement of children has the potential to improve children's disease management behaviors and ultimately long-term outcomes (Zolnieriek and Dimatteo, 2009). Our results suggest that providers should make a concerted effort to engage younger children and females in treatment-related discussions. Asking children questions about their treatment preferences may improve provider–child concordance and help children feel like active participants in the medical visit. Moreover, asking treatment-related questions represents more of a child-centered care approach that acknowledges the rights of children, regardless of age, to make their views known about health-care decisions that are important to them (Söderbäck et al., 2011). Future research should document the engagement preferences of children, their caregivers, and their providers to better understand the communication needs of the triad.

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**Table 1**Sample characteristics for children with asthma ( $n = 296$ ) and their providers.

Characteristics	Mean (SD) or % ( $n$ )
Child characteristics	
Age	11.1 (2.4)
	Range: 8–16 years
Percentage male	53.7% (159)
Race	
White	61.5% (182)
African American	30.1% (89)
Native American/American Indian	10.1% (30)
Other	6.1% (18)
Asthma severity	
Mild persistent	28.0% (83)
Moderate/severe persistent	72.0% (213)
Number of years living with asthma	6.00 (3.9)
	Range: 0–16 years
How well child feels provider knows him/her as a person *	3.26 (.96)
	Range: 1–4
Taking an asthma controller medication	64.6% (195)
Insurance type	
Medicaid	51.7% (153)
Private	26.4% (78)
State children's health insurance program	17.6% (52)
Other	2.7% (8)
None	1.0% (3)
Caregiver characteristics	
Years of education	12.8 (2.5)
	Range: 2–20 years
Percentage female	85.8% (253)
Number of questions provider asked caregiver	4.54 (5.7)
	Range: 0–35 questions
Provider characteristics	
Age	45.7 (9.6)
	Range: 29–69 years
Percentage male	49% (17)
Race	
White	77.1% (27)
African American	8.6% (3)
Native American/American Indian	5.7% (2)
Other	8.6% (3)
Type	

Characteristics	Mean (SD) or % (n)
Physician	88.6% (31)
Nurse practitioner or physician assistant	11.4% (4)
Years in practice	17.3 (10.3) Range: 1–43 years
Visit characteristics	
Length of visit (min)	26.03 (16.7)

\* Responses range from 1 = “hardly at all” to 4 = “very well.”

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Engagement concordance: a comparison of children’s desired level of engagement in treatment-related discussions and provider’s actual engagement of the child ( $n = 296$ ).

**Table 2**

	Child’s desired level of engagement $N$ (%)				Total (%)
	Number of questions asked	No engagement	A little/some engagement	A lot of engagement	
0	3 (1.0)	61 (20.6)	35 (11.8)	99 (33.4)	
1–5	5 (1.7)	79 (26.7)	61 (20.6)	145 (49.0)	
6 or more	2 (1.0)	25 (8.7)	25 (8.7)	52 (17.6)	
Total	10 (3.0)	165 (55.7)	121 (40.9)	296	

Note: White shade = child and provider are engagement concordant; light gray shade = child and provider are slightly engagement discordant; dark gray shade = child and provider are very engagement discordant.

**Table 3**

Examples of child–provider treatment-related discussions.

Type of treatment issue discussed	Excerpt of discussion
Current asthma medications	<p>PROVIDER: Now what medications are you taking for your asthma?</p> <p>CHILD: Um ...</p> <p>CAREGIVER: Singulair</p> <p>CHILD: Singulair for my asthma, Allegra for my allergies.</p>
Adherence	<p>PROVIDER: Ok. So you've been using your Advair?</p> <p>CHILD: Yeah.</p> <p>PROVIDER: Twice a day ...pretty much remembering it?</p> <p>CHILD: Yep.</p> <p>PROVIDER: How many doses do you have left on the little purple thing that it says?</p> <p>CHILD: Two or three.</p> <p>PROVIDER: Ok. Good, so you are about right. Most people forget a dose occasionally but you know if you are careful to kind of associate it with something to help you remember then you'll get a dose morning and night and that's what we want you to do. And it's real important to do it regularly.</p>
Use of rescue inhaler	<p>PROVIDER: How often are you needing the Albuterol?</p> <p>CHILD: Last I took it was when I was having gym, which was Thursday, I think, when I ran around.</p> <p>PROVIDER: Ok. So you are using that a lot less then?</p> <p>CHILD: Yeah, only when I need it.</p> <p>PROVIDER: Ok. Now a general rule of thumb what we are trying to get to is needing the Albuterol less than two times a week. Ok, if you are needing the Albuterol two times a week or less that usually means you are in pretty good shape with your asthma. It also means that the Albuterol should work when you take it. You know, you are not so much overusing it that if you get into a situation where you really need it, it is not going to work.</p>
Inhaler technique	<p>PROVIDER: And are you having any problems using it?</p> <p>CHILD: No, not really.</p> <p>PROVIDER: You remember how we talked about using it?</p> <p>CHILD: Yeah.</p> <p>PROVIDER: You blow out ((blowing)) hold it up, press, pull in, hold it for ten seconds, do two puffs ...</p> <p>CHILD: We did two of them.</p> <p>PROVIDER: Right, ten to fifteen minutes before you exercise.</p> <p>CHILD: And we've tried it two times.</p>
Changes to treatment regimen	<p>PROVIDER: Ok. Rather than add a medicine would you do you want to try to do your Pulmicort everyday?</p> <p>CHILD: Um hum.</p> <p>PROVIDER: Ok. You want to start doing that before adding medicines?</p> <p>CHILD: Um hum.</p> <p>PROVIDER: Ok. We'll do that and what I want you to do, if you do your Pulmicort every day and you are still having difficulty in breathing, I want you to call me and we are going to add a medicine called Singulair, ok?</p> <p>CHILD: Um hum.</p>

**Table 4**

Unadjusted and adjusted ORs and 95% CIs for regression equations predicting engagement concordance ( $N=296$ ).

Independent variable	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Child age in years	1.16 (1.05, 1.29)***	1.19 (1.07, 1.33)**
Child gender—female	.72 (.45, 1.16)	.60 (.37, .97)*
Child race—non-White	1.08 (.66, 1.76)	1.19 (.57, 2.49)
Asthma severity—moderate severe	1.45 (.84, 2.50)	1.39 (.78, 2.49)
Years living with asthma <sup>a</sup>	1.06 (.72, 1.55)	1.00 (.72, 1.39)
How well child feels provider knows him/her as a person	.97 (.76, 1.24)	1.09 (.80, 1.47)
Taking an asthma controller medication	.70 (.39, 1.27)	.79 (.43, 1.44)
Caregiver years of education	1.04 (.95, 1.15)	1.06 (.97, 1.17)
Caregiver gender—female	.81 (.42, 1.58)	1.25 (.53, 2.93)
Number of treatment questions provider directs to caregiver	.99 (.95, 1.04)	1.02 (.98, 1.06)
Provider age in years	.97 (.95, .997)*	—
Provider gender—female	1.15 (.71, 1.87)	1.10 (.46, 2.63)
Provider race—non-White	.56 (.23, 1.37)	.59 (.15, 2.35)
Provider type—not physician	1.25 (.46, 3.40)	1.56 (.51, 4.87)
Provider years in practice <sup>b</sup>	.97 (.94, .99)*	.97 (.94, .99)*

OR: odds ratio; CI: confidence interval.

<sup>a</sup>OR per 1 year increase in age.

<sup>b</sup>OR per 1 year increase in provider years in practice.

\*  $p < .05$ ;

\*\*  $p < .01$ ;

\*\*\*  $p < .001$ .