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Intended and unintended consequences: Ethics, communication, and prognostic disclosure in pediatric oncology

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Abstract

Background—Most patients desire all available prognostic information, but some physicians hesitate to discuss prognosis. We aimed to examine outcomes of prognostic disclosure among parents of children with cancer.

Methods—We surveyed 353 parents of children with newly diagnosed cancer at two tertiary cancer centers, and each child's oncologist. Using multivariable logistic regression, we assessed associations between parental report of elements of prognosis discussions with the oncologist (quality of information/communication, prognostic disclosure) and potential consequences of these discussions (trust, hope, peace of mind, prognostic understanding, depression, anxiety). Analyses were stratified by oncologist-reported prognosis.

Results—Prognostic disclosure was not associated with increased parental anxiety, depression, or decreased hope. Among parents of children with less favorable prognoses (<75% chance of cure), receipt of high-quality information from the oncologist was associated with greater peace of mind (OR 5.23 [1.81, 15.16]) and communication-related hope (OR 2.54 [1.00, 6.40]). High-

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Contributions

Marron: Data analysis/interpretation, writing, approval of final version, manuscript guarantor.

Cronin: Data analysis/interpretation, writing, approval of final version.

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quality oncologist communication style was associated with greater trust in the physician (OR 2.45 [1.09, 5.48]) and hope (OR 3.01 [1.26, 7.19]). Accurate prognostic understanding was less common among parents of children with less favorable prognoses (OR 0.39 [0.17, 0.88]). Receipt of high-quality information, high-quality communication, and prognostic disclosure were not significantly associated with more accurate prognostic understanding.

Conclusions—We find no evidence that disclosure is associated with anxiety, depression, or decreased hope. Communication processes may increase peace of mind, trust, and hope. It remains unclear how best to enhance prognostic understanding.

Keywords

prognosis; communication; pediatrics; ethics; disclosure; cancer

INTRODUCTION

Communication is integral to oncology practice,^{1, 2} but prognostic disclosure varies.^{3–9} Some oncologists hesitate to discuss prognosis with patients and their families, citing concerns for upsetting them and diminishing hope,^{4–7} and for the inherent uncertainty of such prognostications.^{8, 9} Prognosis communication is further complicated by the rise of targeted therapeutics, which can add to prognostic uncertainty.¹⁰

Adult cancer patients usually desire all available information about their prognosis.^{11, 12} Accurate prognostic understanding is important for advanced care planning and end-of-life care, but also to inform decisions about treatment and care plans.^{13–15} Routinely discussing prognosis is further supported by the physician's ethical obligation of complete and truthful disclosure out of respect for patient autonomy.^{2, 13} Our prior work suggests that prognostic disclosure to parents of children with cancer has benefits, including increased hope, trust in the oncologist, and peace of mind.^{7, 16, 17} Disclosure is desired by parents, even when it upsets them.¹⁶ That work has limitations, however, including limited analysis of those with less favorable prognoses, cross-sectional design with variability in timing of survey administration, study of only a single site, and lack of rigorous measurement of psychosocial outcomes of disclosure.

To better understand the impact of prognostic disclosure, in this study we evaluated potential outcomes of discussions about prognosis between parents and oncologists of children with cancer at two tertiary cancer centers. We considered both intended consequences – prognostic understanding, trust in the oncologist, and peace of mind – and unintended consequences – depression, anxiety, and decreased hope – of such discussions (Figure 1). We utilized previously validated measures to assess prognostic disclosure, communication between oncologists and parents, and potential psychosocial outcomes of prognostic disclosure.^{7, 16–22} We hypothesized that disclosure would not be associated with negative psychosocial outcomes but rather would yield greater understanding of prognosis and increased peace of mind.

PATIENTS AND METHODS

We queried parents of children with cancer and their child's oncologist between November 2008 and April 2014 at the Dana-Farber/Boston Children's Cancer and Blood Disorders Center and Children's Hospital of Philadelphia. Survey procedures were reported previously.¹⁹ Parents of children with cancer were approached 1 to 6 weeks following diagnosis. The parent who self-identified as primarily responsible for his/her child's decision-making was invited to take part. The child's oncologist then was asked to complete a matched survey. Parent surveys were 75 items and included previously validated scales assessing parental report of communication process measures and potential outcomes of prognosis discussions.^{7, 16–22} Face and content validity was confirmed via 5 parent cognitive interviews; interviewees were selected via purposive selection. Written and electronic surveys were available in Spanish and English, and a \$10 gift card was provided to respondents. The Institutional Review Boards of the Dana-Farber Cancer Institute and Children's Hospital of Philadelphia approved this study.

Of 565 eligible parents, 382 completed surveys (68%). Ninety-five oncologists completed surveys, matching to 361 (95%) parent surveys. 353 parent-oncologist dyads responded to items addressing the child's prognosis, providing our final analytic cohort.

Communication process

Parents were asked to report the quality of information delivered by the oncologist regarding their child's treatment, likelihood of cure, future limitations, cause of the child's cancer, and overall (excellent, good, satisfactory, fair, poor).⁷ Quality of the oncologist's communication style was assessed by asking parents how often he/she provided understandable answers, took enough time to answer parent questions, and conveyed information in a sensitive manner (never, sometimes, usually, always).⁷ Both indices have been previously validated among parents of children with cancer.^{7, 14, 19}

Prognostic disclosure

Parents were asked to report on prognostic disclosure by the oncologist using a five-item summary score previously validated in this population.^{7, 17, 19} Items addressed whether the oncologist discussed the child's prognosis, whether he/she offered the information or the parent had to ask for it, whether prognosis was described generally or numerically, whether prognostic information was written or verbal, and whether the parent was satisfied with the amount of prognostic information received.

Psychosocial outcomes

Symptoms of depression and anxiety were assessed via the Hospital Anxiety and Depression Scale.²² Peace of mind was assessed according to the peace of mind subscale of the FACIT-Sp, developed for cancer patients²¹ and validated with parents of children with cancer.¹⁷ Additional measured outcomes included parental report of hope related to physician communication ("How often has the way your child's oncologist communicated with you about your child's cancer made you feel hopeful?")⁷ and trust ("How much do you trust

your child's oncologist's judgment about your child's medical care?"),²⁰ both validated in this population.⁷

Prognosis

Parents and physicians were surveyed independently about the child's likelihood of cure, with response options of "no chance of cure," "cure very unlikely (<10% chance)," "unlikely (10–24%)," "somewhat likely (25–49%)," "moderately likely (50–74%)," "very likely (75–90%)," and "extremely likely (>90%)."

Statistical methods

Covariates were dichotomized, as in prior work in this field.^{7, 17, 20–22} We dichotomized information quality and communication quality at the median.⁷ Depression and anxiety were dichotomized as scores suggestive (>7) or not suggestive (≤7) of the respective state.²² Peace of mind also was dichotomized, corresponding approximately to the categories ("very" or "extremely") most indicating strong sense of peace of mind.^{17, 21} Communication-related hope was dichotomized such that only "always" was coded as indicative of hope.⁷ Trust in the oncologist was considered similarly, with responses of "completely" coded as positive.^{7, 20} Prognostic disclosure was scored 0 to 5 according to the total summary score.⁷

To assess parental understanding of prognosis, parent and oncologist responses were directly compared. *Accurate* parental understanding of prognosis was defined as any parent response no more than one response category away from the oncologist's response. We employed this strategy to allow responses that were close – but not necessarily identical – to be considered accurate. For example, if the oncologist response was "moderately likely," parent responses of "somewhat likely," "moderately likely," and "very likely" would be classified as *accurate*, with all others *inaccurate*. Defining understanding in this fashion, parental optimism was not possible for the highest two categories. Only one parent was inaccurately pessimistic (responding "unlikely" when the oncologist responded "extremely likely"). Accordingly, parental understanding was analyzed only for those for whom cure was at most "moderately likely" (N=140).

Analyses were stratified by prognosis: less favorable (cure at most moderately likely [likelihood of cure <75%] as reported by the oncologist) and more favorable (cure very or extremely likely, ≥75% likelihood). We stratified by prognosis because understanding of prognosis was applicable only for those with less favorable prognoses (cure at most "moderately likely," as described above), and we hypothesized that the relationship between communication processes and psychosocial outcomes might vary by prognosis. We performed a subgroup analysis considering parents of children whose likelihood of cure was reported as less than "moderately likely" (<50%).

Bivariable associations between communication processes and parental psychosocial outcomes were conducted using Chi-squared tests; those between prognostic disclosure and parental psychosocial outcomes were assessed with a non-parametric test for trend. Multivariable associations between communication processes and parental psychosocial outcomes were assessed by logistic regression with generalized estimating equations (GEE)

to account for multiple parents/patients per oncologist. With a type I error rate of 0.05, our sample size of 353 yielded 80% power to detect an absolute difference in proportions of 7%, corresponding to ORs of 1.33–1.37 for the psychosocial outcomes measured in this study. In the less favorable prognosis subgroup, multivariable logistic regression with GEE was used to evaluate factors associated with inaccurate parental prognostic understanding. Item non-response was <8% for all measures of interest. Multiple imputation by chained equations was used to impute missing values using the `-ice-` command in Stata. Imputed values were used for regression analyses but not for descriptive statistics/bivariable analysis. We expect findings to direct future research and did not apply statistical corrections for multiple testing; results should be interpreted in context of having tested for associations with multiple psychosocial outcomes. Statistical analyses were conducted using Stata version 13.1 (StataCorp, College Station, TX).

RESULTS

Characteristics of the children and parents in the study are provided in Table 1, reported for the overall cohort (N=353) and subdivided by oncologist-reported prognosis: favorable (N=213 [60%]) and less favorable (N=140 [40%]). Participation rates were slightly higher for parents of children with hematologic malignancies and solid tumors than those of children with brain tumors, but not significantly so ($p=0.07$). Psychosocial outcomes were similar regardless of time to survey completion (data not shown).

Communication and prognostic disclosure

Table 2 presents bivariable associations between communication process measures and parent-reported outcomes, stratified by prognosis. In the overall cohort, parents who reported that the oncologist provided high-quality information were more likely to trust him/her “completely” ($p<0.001$), have peace of mind ($p<0.001$), and report that physician communication “always” made them feel hopeful ($p<0.001$) relative to those who reported receiving lower quality information. High-quality information delivery also was associated with decreased anxiety ($p=0.01$). Similarly, high-quality physician communication style was associated with greater trust in the oncologist ($p<0.001$), peace of mind ($p=0.02$), communication-related hope ($p=0.02$), and decreased anxiety ($p=0.02$). Comparable findings were seen in both prognostic subsets, and on subgroup analysis for those with likelihood of cure <50% (Supporting Table 1).

Prognostic disclosure by the oncologist was not, on bivariable analysis, significantly associated with increased depression or anxiety in the overall cohort ($p=0.42$ and 0.64 , respectively) or in parents of children with less favorable prognoses ($p=0.91$, $p=0.49$). Disclosure was associated with greater communication-related hope in the overall and favorable prognosis cohorts ($p<0.001$, $p<0.001$), though this finding was not statistically significant in the less favorable prognosis subgroup ($p=0.76$).

Multivariable relationships between communication processes and psychosocial outcomes are depicted in Figure 2 (raw data in Supporting Table 2). Most bivariable findings persist in these models. In the overall cohort, parents who reported receiving high-quality information more frequently reported peace of mind (OR 3.97 [2.09, 7.57], $p<0.001$), communication-

related hope (OR 3.50 [2.07, 5.92], $p<0.001$), and trust in the oncologist (OR 2.24 [1.24, 4.02], $p=0.01$). They less often reported symptoms of anxiety (OR 0.52 [0.38, 0.87], $p=0.01$). Parents who reported a high-quality physician communication style more frequently reported hope (OR 2.81 [1.71, 4.62], $p<0.001$) and trust in the oncologist (OR 3.93 [2.26, 6.82], $p<0.001$).

Among parents of children with less favorable prognoses, receipt of high-quality information was associated with greater peace of mind (OR 5.23 [1.81, 15.16] $p=0.002$) and communication-related hope (OR 2.54 [1.00, 6.40], $p=0.05$). High-quality physician communication style was associated with increased trust (OR 2.45 [1.09, 5.48], $p=0.03$) and communication-related hope (OR 3.01 [1.26, 7.19], $p=0.01$).

In this multivariable model, among parents of children with less favorable prognoses, disclosure was not significantly associated with increased depression (OR 1.15 [0.81, 1.61], $p=0.43$) or anxiety (OR 1.06 [0.79, 1.44], $p=0.69$) or decreased hope (OR 0.99 [0.70, 1.39], $p=0.94$). Prognostic disclosure also was not significantly associated with increased depression or anxiety or decreased hope in the more favorable prognosis subset or in the overall cohort.

Parental understanding of prognosis

Table 3 demonstrates the results of a multivariable logistic regression model evaluating communication processes associated with accurate versus inaccurate parental understanding of prognosis for the less favorable prognosis cohort. Parents were less likely to have an accurate understanding of their child's prognosis when the oncologist reported that the child's chance of cure was less than 50% (OR 0.39 [0.17, 0.88], $p=0.02$) and when the parent was non-white or Hispanic (OR 0.35 [0.12, 1.04], $p=0.06$), though the latter finding did not achieve statistical significance. No statistical difference was seen according to child's age, gender, or diagnosis; or according to parent's age, gender, marital status, or education level. Disclosure was not significantly associated with greater prognostic understanding (OR 0.89 [0.66, 1.20], $p=0.45$). Accurate understanding of prognosis also was not significantly associated with parental report of receipt of high-quality information (OR 0.45 [0.19, 1.10], $p=0.08$) or high-quality communication (OR 1.06 [0.47, 2.36], $p=0.89$) from the oncologist.

DISCUSSION

We surveyed parents of children with cancer shortly after their child's diagnosis to consider potential outcomes of prognosis communication and found that prognostic disclosure is not significantly associated with adverse psychosocial outcomes, even in parents of children with less favorable prognoses. Instead, delivery of high-quality information and a high-quality communication style can support parents by instilling hope, peace of mind, and trust in the oncologist. Even when adjusting for prognosis, parents more often report hope and peace of mind when provided high-quality information, indicating that even parents of children with a lower likelihood of cure can experience psychological benefit from forthright discussions with the medical team. While we hypothesize that these benefits result from honest prognostic disclosure, it is possible that hope, peace of mind, and trust may emanate

from the communication process rather than disclosure itself. Our study does not allow us to separate these issues. This does not, however, diminish the importance of prognostic disclosure, an ethical responsibility of oncologists^{2, 13, 23} that is supported by parental preferences.¹⁶ Instead, this work highlights the importance of attention to all aspects of communication. Oncologists should pay attention both to what they say and how they say it. Even if positive outcomes primarily are a function of the communication process, these findings reinforce that prognostic disclosure, when occurring within a supportive and caring parent-physician relationship, need not be harmful.

Unfortunately, improved understanding of prognosis – the primary purpose of these discussions – was not associated with prognostic disclosure. Numerous studies in medical oncology have aimed to improve prognostic understanding, but targeted interventions have proven only minimally effective.^{12, 24–26} Even interventions that have improved prognostic understanding do not appear to maintain improvements over time.^{27, 28}

In our cohort, parents of children for whom cure was less likely more frequently demonstrated inaccurate prognostic understanding, a finding previously reported in this field.^{18, 29} This highlights the need for greater understanding of how best to convey prognostic information, regardless of prognosis. That accurate understanding of prognosis was associated with decreased communication-related hope among parents of children with less favorable prognoses lends further support to this need but also highlights uncertainty in the relationship between disclosure and positive psychosocial outcomes. Our finding that inaccurate understanding of prognosis was seen more often – though not statistically significantly – among non-white and Hispanic parents reaffirms results of other studies addressing prognosis communication,^{28, 30–32} raising concerns about justice and equity, particularly given that end-of-life preferences are known to vary by race/ethnicity.^{31, 33}

This work is not without limitations. We focused on parents' reports soon after diagnosis; it is possible that prognostic discussions are perceived differently later in treatment and that these discussions would be perceived differently by an outside/objective party. Parental perception of communication is key, however, so parental report is particularly meaningful. Additionally, it is possible that parental hope and trust support parents' perception of physician communication processes, rather than the reverse; we cannot make determinations of causality or directionality from this work. Furthermore, though the breakdown of cancer diagnoses examined in this cohort is similar to that seen nationally,³⁴ the preponderance of children with hematologic malignancies led to a relative paucity of patients with solid tumors and brain tumors, diagnoses that can portend worse prognoses. Though medical advances have reduced the number of children with very poor prognoses, it is conceivable that parents of children with particularly bleak prognoses have different perspectives on discussions of prognosis that are not adequately captured in this study. That our subgroup analysis considering parents of children with less than a 50% likelihood of cure showed similar results to our primary analyses helps assuage these concerns, however.

Children with up to a 75% likelihood of cure were included in our “less favorable prognosis” cohort, and some might argue that this cohort is not adequately representative of those with very poor prognoses. The similar findings in the aforementioned subgroup analysis and the

similarity of the overall cohort to the characteristics of children diagnosed with cancer nationwide,³⁴ however, support the generalizability of this work. Because parents were enrolled at two large academic centers, it is possible that results are less relevant to children treated in smaller and/or non-academic settings. As is recommended, most children with cancer in the United States are primarily cared for at such pediatric cancer centers,³⁵ so these results should be applicable to most pediatric cancer patients. Finally, this work focused on discussions with parents and did not evaluate children's experiences. As part of a related study, we interviewed older children and adolescents and found that many also desire prognostic information.³⁶

In conclusion, despite oft-cited concerns otherwise, prognostic disclosure does not appear to harm the parent-oncologist relationship in pediatric oncology, but can actually strengthen it. Accordingly, this work strengthens the argument that pediatric oncologists should feel comfortable discussing prognosis with all parents of children with cancer, even when the child's prognosis is less favorable. Disclosure alone appears inadequate to improve parental prognostic understanding, however.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Conceptual model of discussions about prognosis in pediatric oncology

Figure 2.

Forest plot of adjusted odds ratios for the association between communication process measures and negative (Panel A) and positive (Panel B) psychosocial outcomes, stratified by prognosis. Panel 1: Overall cohort; Panel 2: Less favorable prognosis subset; Panel 3: Favorable Prognosis subset

Diamonds represent odds ratios and bars represent associated 95% confidence intervals, with upper bounds truncated at 7. Odds ratios adjusted for all communication process measures shown, plus site, child age, gender, and diagnosis; prognosis (for Panel A); and parent age, gender, race/ethnicity, education, and marital status. Within-physician clustering accounted for by generalized estimating equations (GEE).

Table 1

Demographics of study cohort, overall and stratified by prognosis

	Overall N=353	Less favorable prognosis N=140	Favorable prognosis N=213
<i>Child age at diagnosis</i>			
0 to 2	93(26%)	41(29%)	52(24%)
3 to 6	7(20)	26(19)	45(21)
7 to 12	80(23)	28(20)	52(24)
13 to 18	109(31)	45(32)	64(30)
<i>Child gender *</i>			
Male	154(44)	68(49)	86(40)
Female	198(56)	71(51)	127(60)
<i>Diagnosis</i>			
Hematologic malignancies	175(50)	39(28)	136(64)
Solid tumor	137(39)	71(51)	66(31)
Brain tumor	41(12)	30(21)	11(5)
<i>Physician-rated likelihood of cure</i>			
Extremely likely (>90% chance)	76(22)	0(0)	76(36)
Very likely (75–90% chance)	137(39)	0(0)	137(64)
Moderately likely (50–74% chance)	77(22)	77(55)	0(0)
Less than moderately likely	63(18)	63(45)	0(0)
<i>Site</i>			
Boston	26(74)	98(70)	164(77)
Philadelphia	91(26)	42(30)	49(23)
<i>Parent age *</i>			
< 30	36(10)	17(12)	19(9)
30 to 39	138(40)	53(39)	85(41)
40 to 49	133(39)	51(37)	82(39)
50+	38(11)	16(12)	22(11)
<i>Parent gender *</i>			
Female	283(81)	108(78)	175(83)
Male	66(19)	31(22)	35(17)
<i>Parent race/ethnicity *</i>			
White non-Hispanic	275(79)	112(82)	163(78)

	Overall N=353	Less favorable prognosis N=140	Favorable prognosis N=213
Non-white or Hispanic	71(21)	24(18)	47(22)
<i>Parent education</i> *			
High school graduate or less	122(35)	48(35)	74(36)
College graduate	138(40)	54(39)	84(41)
Graduate/professional school	85(25)	36(26)	49(24)
<i>Parent marital status</i> *			
Married/living as married	289(84)	117(85)	172(83)
Other	57(16)	21(15)	36(17)

* Child gender was missing for 1; parent age was missing for 8; parent gender was missing for 4; parent race/ethnicity was missing for 7; parent education was missing for 8; and parent marital status was missing for 7.

Bivariate associations between communication process measures and psychosocial outcomes*

Table 2

	Number of parents **	Suggestive of depression			Suggestive of anxiety			Strong peace of mind			Hopeful always			Trust completely		
		%	P		%	P		%	P		%	P		%	P	
<i>Entire cohort (N=353)</i>																
Overall		30		53		0.01		30		51		<0.001		71		<0.001
Information quality			0.06													
Low	140	34		58				14		28				56		
High	194	25		43				39		66				79		
Communication quality			0.21		0.02		0.02					<0.001				<0.001
Low	167	32		56				23		35				56		
High	179	25		44				34		65				84		
Prognostic disclosure			0.42		0.64		0.28					<0.001				0.58
0	14	36		36				36		29				86		
1	30	37		60				17		40				63		
2	42	21		57				31		36				57		
3	98	30		46				26		48				73		
4	91	27		52				26		52				67		
5	56	25		45				39		71				77		
<i>Less favorable prognosis subgroup (N=140)</i>																
Overall		30		50		0.28		26		40		0.002		71		0.05
Information quality			0.48				<0.001									
Low	70	33		50				11		27				61		
High	64	28		41				39		53				78		
Communication quality			0.22		0.02		0.27					<0.001				0.01
Low	68	35		54				21		25				60		
High	70	26		39				29		54				80		
Prognostic disclosure			0.91		0.49		0.95					0.76				0.90
0	8	38		38				25		38				100		

	Number of parents**	Suggestive of depression		Suggestive of anxiety		Strong peace of mind		Hopeful always		Trust completely	
		%	P	%	P	%	P	%	P	%	P
1	21	24		57		19		43		67	
2	22	23		55		27		32		55	
3	43	28		35		26		42		67	
4	22	41		55		23		27		73	
5	14	21		36		29		57		79	
Understanding			0.19		0.73		0.01		0.02		0.43
Inaccurate	75	25		45		33		48		73	
Accurate	65	35		49		14		29		66	
Favorable prognosis subgroup (N=213)											
Overall		29		56		33		57		71	
Information quality			0.07		0.003		0.001		<0.001		<0.001
Low	70	36		66		16		29		51	
High	130	23		44		39		72		80	
Communication quality			0.56		0.29		0.04		<0.001		<0.001
Low	99	29		57		24		41		53	
High	109	25		48		38		72		87	
Prognostic disclosure*			0.21		0.60		0.34		<0.001		0.40
0	6	33		33		50		17		67	
1	9	67		67		11		33		56	
2	20	20		60		35		40		60	
3	55	31		55		25		53		78	
4	69	23		51		28		59		65	
5	42	26		48		43		76		76	

* P-values for prognostic disclosure from non-parametric test for trend; all others from Chi-squared test

** Numbers may not sum to 353, as bivariate analyses were performed on non-imputed data

Table 3

Multivariable logistic regression model for parental accurate versus inaccurate understanding of prognosis, less favorable prognosis subset*

	Odds Ratio	95% CI	P value
Information quality (high vs low)	0.45	0.19, 1.10	0.08
Communication quality (high vs low)	1.06	0.47, 2.36	0.89
Prognostic disclosure (per element)	0.89	0.66, 1.20	0.45
Site (Philadelphia vs Boston)	0.76	0.33, 1.74	0.76
Child gender (male vs female)	1.54	0.70, 3.40	0.29
Child age			0.47
0–2	Ref	--	
3–6	0.42	0.13, 1.33	
7 to 12	0.50	0.15, 1.72	
13 to 18	0.44	0.12, 1.64	
Child diagnosis			0.88
Hematologic malignancies	Ref	--	
Solid tumor	0.81	0.31, 2.10	
Brain tumor	0.96	0.33, 2.81	
Child's prognosis (assessed by oncologist)			0.02
Moderately likely (50–74% chance)	Ref	--	
Less than moderately likely	0.39	0.17, 0.88	
Parent age			0.12
<30	Ref	--	
30 to 39	3.00	0.69, 13.1	
40 to 49	1.27	0.23, 6.94	
50+	0.78	0.09, 7.08	
Parent gender (male vs female)	0.92	0.35, 2.41	0.86
Parent ethnicity			0.06
White non-Hispanic	Ref	--	
Non-white or Hispanic	0.35	0.12, 1.04	
Parent education			0.89
High school graduate or less	Ref	--	
College graduate	0.84	0.33, 2.18	
Graduate/professional school	1.07	0.36, 3.17	

	Odds Ratio	95% CI	P value
Parent marital status			0.16
Married/living as married	Ref	--	
Other	0.42	0.13, 1.42	

* OR >1 represent higher likelihood parental report of accurate prognosis.

ORs adjusted for parent-reported information quality, communication quality, prognostic disclosure; site; child age/gender/diagnosis; parent age/gender/race/ethnicity/education/marital status; oncologist-reported prognosis. Within-physician clustering accounted for by GEE