**STRATEGIES TO FACILITATE SHARED DECISION-MAKING ABOUT PEDIATRIC ONCOLOGY CLINICAL TRIAL ENROLLMENT: A SYSTEMATIC REVIEW**

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**Short title:** Shared decision-making about pediatric oncology clinical trials

**Summary:** This review provides an overview of strategies recommended for implementation into clinical practice to facilitate shared decision-making for pediatric oncology clinical trials.

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**Abbreviations**: CINAHL=Cumulative Index of Nursing and Allied Health Literature; EMBASE=Excerpta Medica database; HCP=healthcare professional; MMAT=Mixed-Methods Appraisal Tool; PRISMA=Preferred Reporting Items for Systematic Reviews and Meta-Analyses; SDM=shared decision-making

**Contributions**:

Ms Robertson developed the review aims and search strategy, extracted and analysed data, drafted the initial manuscript, and approved the final manuscript as submitted.

Professor Wakefield provided substantial contributions to the conception of the work and provided manuscript revisions.

Professor Cohn provided substantial contributions to the conception of the work and provided manuscript revisions.

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Professor Claire Foster provided substantial contributions to the conception of the work and provided manuscript revisions.

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Dr Fardell provided substantial contributions to the conception of the work, provided manuscript revisions, and resolved author disagreements in data extraction.

**ABSTRACT**

**Objective**: We conducted a systematic review to identify the strategies that have been recommended in the literature to facilitate shared decision-making regarding enrolment in pediatric oncology clinical trials.

**Methods:** We searched seven databases for peer-reviewed literature, published 1990-2017. Of 924 articles identified, 17 studies were eligible for the review. We assessed study quality using the ‘Mixed-Methods Appraisal Tool’. We coded the results and discussions of papers line-by-line using nVivo software. We categorized strategies thematically.

**Results:** Five main themes emerged: 1) decision-making as a process, 2) individuality of the process; 3) information provision, 4) the role of communication, or 5) decision and psychosocial support. Families should have adequate time to make a decision. HCPs should elicit parents’ and patients’ preferences for level of information and decision involvement. Information should be clear and provided in multiple modalities. Articles also recommended providing training for healthcare professionals and access to psychosocial support for families.

**Conclusion:** High quality, individually-tailored information, open communication and psychosocial support appear vital in supporting decision-making regarding enrollment in clinical trials. These data will usefully inform future decision-making interventions/tools to support families making clinical trial decisions.

**Practice implications**: A solid evidence-base for effective strategies which facilitate shared decision-making is needed.

# 1. INTRODUCTION

In pediatric oncology, many families are faced with a decision about whether or not to enroll their child in a clinical trial. Across the United States and Australia, approximately 60% of young people with cancer are treated on a clinical trial protocol [[1](#_ENREF_1),[2](#_ENREF_2)]. **Phase 1 and 2 trials (also known as early phase trials) are designed to evaluate a new treatment to determine safety and efficacy. Phase 1 and 2 trials are considered experimental, and are not expected to result in a cure. Patients offered experimental trials have usually failed standard treatment or there may not be a standard treatment available. If treatments are proven safe and efficacious in an early phase trial, the treatment is evaluated in a Phase 3 trial which compare the new treatment with the current standard treatment. Phase 3 trials usually involve randomisation [**[**3**](#_ENREF_3)**]. Randomisation occurs as**

Parents can find the decision to enroll difficult [[4](#_ENREF_4)], especially if offered an early phase clinical trial, which have been referred to as one of the most difficult decisions a parent of a child with cancer will make [[5](#_ENREF_5)]. Families can feel overwhelmed with the amount of information provided, and may not fully comprehend what has been said or provided to them [[6](#_ENREF_6),[7](#_ENREF_7)].

In clinical trial decisions, shared decision making (SDM) may be most appropriate given that sometimes there is no single ‘correct’ decision [[8](#_ENREF_8)]. In pediatric oncology, SDM often occurs between the healthcare professional (HCP) and parents. When SDM extends to include the young patient, this results in a triadic relationship between the patient, parent and their HCP. Determining when and how to include the child based on their level of maturity and preferences is a key challenge [[9](#_ENREF_9)]. SDM in pediatric oncology may extend to a quadratic relationship if parents do not agree, or if additional HCPs are involved [[10](#_ENREF_10)]. Although decision-making preferences may vary between and within families, as well as across decisions, SDM is becoming increasingly valued by parents and HCPs [[11](#_ENREF_11)], with a recent review showing that SDM appears to be a preferred model of decision-making for many families coping with a pediatric cancer [[12](#_ENREF_12)].

Given the complexity of clinical trial decision making, there is a need for rapid development and implementation of interventions to better accommodate SDM preferences for parents and young people (where appropriate) [[13](#_ENREF_13)], However, effective SDM interventions need to be developed in accordance with available evidence and recommendations in the field. We therefore systematically examined the results and discussions of all qualitative, quantitative and mixed-methods studies that evaluated SDM in the context of pediatric oncology clinical trials. We then synthesized all strategies recommended in the literature to facilitate SDM regarding clinical trial enrolment for children with cancer. We included studies of parents’, patients’ and/or HCPs perspectives to gain a more comprehensive understanding of best practice clinical trial delivery.

# 2. METHODS

## 2.1 Database search procedure

We conducted a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [[14](#_ENREF_14)]. Two authors (ER, JF) developed the search strategy based on key articles in the field. The search strategy underwent review by all authors. We searched four databases (PsychInfo, Medline, EMBASE and CINAHL), limited to human studies published in English between January 1990 – August 2017. Two authors (ER, CS) searched two grey literature databases (OpenGrey and Grey Literature Report), and reference lists of eligible articles (detailed search strategy in Appendix A). Two authors (ER, CS) also searched Google Scholar as it may provide good international coverage of the literature in pediatric oncology [[15](#_ENREF_15)].

## 2.2 Study selection

**Two authors (ER, CS) screened abstracts and included qualitative, quantitative and mixed-methods studies that focused specifically on the decision-making process for clinical trial enrolment or informed consent process for clinical trials. We included studies that focused on improving the informed consent process given that true consent involves supporting the patient/family to make an informed choice through SDM [**[**16**](#_ENREF_16)**].** While communication and information comprehension play a large role in decision-making, this review focuses on strategies specifically to facilitate the decision making process or improve the consent process for clinical trials. We included original articles if they focused specifically on the SDM process within pediatric oncology (e.g. factors or barriers to SDM, preferences for decisional involvement in SDM). We excluded narrative and systematic reviews. **We excluded cancer survivors (defined as 5 years post-diagnosis) to limit any potential recall limitations.** We developed an eligibility checklist to guide selection of articles (Appendix B). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (Figure 1) presents the screening and selection process for included articles.

## 2.3 Quality assessment

Two authors (ER, CS) assessed the quality of included articles with the Mixed-Methods Appraisal Tool (MMAT; Table 1) [[17](#_ENREF_17)], which is widely used for quality assessment of mixed-methods studies [[18](#_ENREF_18),[19](#_ENREF_19)]. **Studies are evaluated using four criteria specific to qualitative (e.g. is the process of analysing data relevant to address the research question?) or quantitative designs (e.g. are participants recruited to minimise selection bias?). Mixed-methods studies are assessed using both qualitative and quantitative components, as well as an additional three criteria (e.g. is mixed-methods research design relevant to address the research questions?). Total quality score for qualitative or quantitative studies is the number of criteria met, divided by four. Total quality score for mixed-methods studies is the lowest score of the quantitative and qualitative components. For ease of reporting, we referred to studies as low (25%), moderate (50%), moderate-high (75%) or high (100%) quality.** Any disagreements in scores were resolved by discussion.

## 2.4 Data extraction and synthesis

We extracted data following the thematic approach as outlined by Thomas and Harden [[20](#_ENREF_20)]. One author (ER) independently coded the results and discussion sections of all eligible papers line-by-line in nVivo, identifying preliminary themes and subthemes. The author made adjustments as new themes or subthemes emerged. **A second author (CS) independently coded the results and discussions from a random 50% of articles to confirm extraction and coding accuracy.**

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# 3. RESULTS

## 3.1 Study characteristics

See Table 1 for a summary of included articles. Two authors (ER, CS) screened 924 abstracts. Inter-rater reliability between two authors (ER and CS) was high (90.85%; total number of abstracts-number of disagreements/total number of abstracts). Disagreements for inclusion were resolved through discussion with a third author (JF). For abstracts with insufficient information we examined full-text articles. Of the 26 full text articles retrieved, we identified 11 eligible studies. We identified an additional seven articles from Google Scholar and reference lists of included articles. We included **17 studies in the final analysis** (Figure 1).

Of the 17 eligible studies, 10 were qualitative, five were quantitative, and 2 were mixed-methods studies [[21](#_ENREF_21),[22](#_ENREF_22)].[[1]](#footnote-1) Studies reflected a combination of parents’, young peoples’ and/or HCPs’ perspectives on SDM (n=3) [[23-25](#_ENREF_23)], parents’ perspective only (n=6), HCPs’ perspective only (n=3) [[22](#_ENREF_22),[26](#_ENREF_26),[27](#_ENREF_27)], adolescents’ perspective only (n=1) [[28](#_ENREF_28)], or recorded informed consent consultations with interviews and/or questionnaires (n=4) [[21](#_ENREF_21),[29-31](#_ENREF_29)]. Studies represented the perspectives of 452 parents/caregivers (child’s age at diagnosis ranging between 1 and 17 years old), 62 patients/survivors (ranging from 12-19 years old at diagnosis, and 12-21 years old at time of study), and 257 HCPs (with 1-44 years’ experience). Six studies focused on Phase 1 clinical trials, four focused on Phase 3 [[25](#_ENREF_25),[32-34](#_ENREF_32)], and seven considered clinical trials in general.

Whilst all articles acknowledged the importance of SDM (or aspects of SDM) as important in pediatric oncology clinical trial decision-making, only 1 of the 17 papers aligned their data with an official SDM definition [[23](#_ENREF_23)]. Six articles reported a minimum age for inclusion in the decision-making process (ranging from 5-19), and two articles specified an age for inclusion in the informed consent consultation (ranging from 4-18 years old) [[22](#_ENREF_22),[27](#_ENREF_27)].

**3.2 Methodological rigor**

Article quality scores ranged from 50% to 100%, as measured by MMAT. Most articles were rated as moderate-high quality (with a score of 75%; n=10). Two were rated as moderate quality (with a score of 50%) [[30](#_ENREF_30),[35](#_ENREF_35)], and five were rated at high quality (with a score of 100%) (Table 1).

## 3.3. Strategies to facilitate SDM in pediatric oncology clinical trial enrolment

Across the 17 included articles, we identified 35 strategies recommended to facilitate SDM in pediatric oncology clinical trials. These strategies fell into five major themes (Figure 2): 1) Decision making as a process; 2) Individuality of the process; 3) Quality information provision as a necessity for decisional involvement; 4) The nature and clarity of communication, and 5) The need for additional decision and psychosocial support. Agreement between two authors (ER, CS) on thematic categorization of strategies was high (percentage agreement=99.95%; kappa=0.94 [as calculated in nVivo for the 50% of articles that were secondary coded]).

## *3.3.1 Theme 1: decision making as a process (n=11 articles)*

Articles recommended that HCPs should aim to provide sufficient time for families to make the decision (n=7). If possible, informed consent discussions should occur in at least two-stages (n=7) to provide more time for deliberation of information. Two articles recommended informed consent discussions should be timed appropriately to suit the family, ideally when initial distress at diagnosis has reduced [[27](#_ENREF_27),[36](#_ENREF_36)]. Four articles recommended that HCPs should aim to provide anticipatory guidance (i.e. providing advice and support for both the upcoming decision and what informed consent discussions will involve) (n=4) [[23](#_ENREF_23),[30](#_ENREF_30),[32](#_ENREF_32),[36](#_ENREF_36)]. One article also suggested that HCPs should aim to encourage the negotiation of “micro-decisions” (i.e. smaller decisions that do not affect overall care and clinical trial participation, such as administration of pain medication whilst on a clinical trial) (n=1) [[29](#_ENREF_29)].

## *3.3.2 Theme 2: Individuality of the process (n=15 articles)*

Six articles recommended that HCPs should aim to assess parents’ and patients’ information comprehension before providing more information, for example by asking open-ended questions such as “What do you understand?” (n=3) [[29](#_ENREF_29),[32](#_ENREF_32),[37](#_ENREF_37)] or including a tick-box on the consent form to check whether families understand specific aspects of the clinical trial (n=1) [[27](#_ENREF_27)]. Articles suggested that HCPs assess families’ preferences for amount of information provided (n=3) [[30](#_ENREF_30),[36](#_ENREF_36),[38](#_ENREF_38)], and tailor information to individual preferences (n=3) [[23](#_ENREF_23),[27](#_ENREF_27),[32](#_ENREF_32)]. Articles also recommended that HCPs should discuss decision-making involvement preferences with families (n=4) [[25](#_ENREF_25),[31](#_ENREF_31),[38](#_ENREF_38),[39](#_ENREF_39)], and support their preferred decision process (n=2) [[4](#_ENREF_4),[34](#_ENREF_34)]. For decisions about the appropriateness of involving adolescents, one article suggested that psychological assessment may be needed to determine decision-making capacity [[40](#_ENREF_40)]. Several articles noted the importance of encouraging families to consider their values, goals and personal rationale for their decisions (n=3) [[23](#_ENREF_23),[25](#_ENREF_25),[29](#_ENREF_29)] to help parents feel as though they are making the “right decision” for their child [[4](#_ENREF_4)].

## *3.3.3 Theme 3: information provision (n=17 articles)*

Eleven articles recommended providing clear information, with minimal medical jargon. Articles specifically highlighted the need for clear information on randomization (n=1) [[34](#_ENREF_34)], the difference between standard treatment and clinical trials (n=3) [[27](#_ENREF_27),[34](#_ENREF_34),[38](#_ENREF_38)], and likelihood of benefit from the trial (n=2) [[25](#_ENREF_25),[31](#_ENREF_31)]. Articles recommended providing translated materials and/or interpreters (n=4) [[24](#_ENREF_24),[27](#_ENREF_27),[32](#_ENREF_32),[41](#_ENREF_41)]. Six articles recommended using multiple modalities (e.g. visual, video). Articles also recommended that HCPs should repeat information at multiple time-points (n=5), and in segments at a time (n=1) [[35](#_ENREF_35)]. Six articles suggested that providing additional information may facilitate SDM, specifically in regards to the historical perspectives of treatments and disease outcomes (n=1) [[32](#_ENREF_32)], the voluntary nature of the trial (n=1) [[32](#_ENREF_32)], differences between research and treatment (n=2) [[22](#_ENREF_22),[24](#_ENREF_24)], and treatment choices available (n=2) [[22](#_ENREF_22),[35](#_ENREF_35)]. Some articles also recommended providing less information in general (n=1) [[27](#_ENREF_27)], specifically in regards to the consent documents (n=1) [[22](#_ENREF_22)] and lists of risks (n=1) [[24](#_ENREF_24)].

## *3.3.4 Theme 4: the role of communication (n=15 articles)*

Eight articles recommended training for HCPs in obtaining informed consent and engaging in effective communication. A clear theme recommending open communication was identified (n=8): articles recommended that HCPs should promote question-asking from both the parent and patient (n=4) [[32](#_ENREF_32),[33](#_ENREF_33),[39](#_ENREF_39),[41](#_ENREF_41)], ensure all questions are answered openly (n=2) [[23](#_ENREF_23),[41](#_ENREF_41)], ensure there is a discussion of the consent form with the patients (n=1) [[39](#_ENREF_39)], and more generally to communicate honestly (n=2) [[23](#_ENREF_23),[32](#_ENREF_32)]. Articles also recommended that HCPs should solicit thoughts, feelings and opinions of both patients and parents (n=3) [[28](#_ENREF_28),[38](#_ENREF_38),[40](#_ENREF_40)], and where appropriate, communicate directly with the patient (n=2) [[28](#_ENREF_28),[39](#_ENREF_39)].

## *3.3.5 Theme 5: Decision and psychosocial support (n=14 articles)*

Five studies recommended that families should be provided with access to supportive services (e.g. nurses, social workers) throughout the decision making process, as well as clearly provided with contact details if further information is desired/required (n=1) [[24](#_ENREF_24)]. Articles also recommended broadly attempting to reduce parents’ distress [[35](#_ENREF_35)], for example linking families to with other families who have gone through a similar experience (n=2) [[32](#_ENREF_32),[38](#_ENREF_38)]. One article highlighted a comfortable and safe physical environment to encourage families to be more involved in decision making is important [[23](#_ENREF_23)]. Articles emphasized the role of socio-emotional exchanges and partnership building [[4](#_ENREF_4),[34](#_ENREF_34),[39](#_ENREF_39)], with HCPs encouraged to be empathic, physically present, and to acknowledge the potentially stressful nature of making such a decision (n=4) [[4](#_ENREF_4),[23](#_ENREF_23),[36](#_ENREF_36),[38](#_ENREF_38)]. Treating, and empowering, parents to be part of the team (n=2) [[35](#_ENREF_35),[41](#_ENREF_41)], together with giving permission to be involved in decisions (n=1) [[39](#_ENREF_39)] was another suggested strategy. Two articles recommended that families may also feel more capable of being involved in the decision if HCPs provide a recommendation to guide them, whilst remaining neutral [[25](#_ENREF_25),[41](#_ENREF_41)].

# 4. DISCUSSION AND CONCLUSION

# 4.1 Discussion

This systematic review provides an overview of strategies recommended to facilitate SDM. **We organized recommended strategies into five themes**. The themes indicate that decision-making is a process that is individual to each family, and the role of quality information, communication and psychosocial support. Findings from our review support Elwyn and colleagues’ SDM model for clinical practice which includes introducing choice, describing options, and helping patients to explore their preferences and make a decision [[42](#_ENREF_42)]. Our five themes are also similar to those identified more generally in pediatric oncology decision making [[11](#_ENREF_11),[43](#_ENREF_43)]. Our review adds to previous findings by providing recommended strategies to facilitate SDM specifically for clinical trial decisions.

Our findings emphasize that the decision to enroll in a clinical trial should be considered a process, rather than a singular decision. Several articles included in our review recommended that families should be provided with as much time as possible to make a decision – that is, adequate time to allow for the deliberation phase of the decision process.

Elwyn and Miron-Shatz differentiate between two aspects of the decision-making process – the deliberation phase and the determination phase [[44](#_ENREF_44)]. The International Society of Pediatric Oncology (SIOP) working committee’s guidelines on valid informed consent in pediatric oncology specify that information should not be presented under the pressure of the need for a immediate decision [[45](#_ENREF_45)]. If parents feel that they have limited options, feel more uncertain due to lack of comprehension [[46](#_ENREF_46)], or have a sense of urgency for a decision [[47](#_ENREF_47)], they may rely more heavily on HCPs to make treatment decisions [[48](#_ENREF_48)]. Having inadequate time to ask questions may contribute to parents taking a more passive role in decision-making [[49](#_ENREF_49)]. However, in practice allowing sufficient time is difficult due to the clinical urgency to start treatment.

 The approach to decision-making is unique to each family. The need for HCPs to repeatedly assess preferences of both parents’ and young people has been highlighted more generally in the pediatric oncology literature [[50](#_ENREF_50)]. Few articles in this review provided recommendations specifically to facilitate SDM with the patient, however a finding of one article suggested that patients could be involved in the decision to enroll in a clinical trial from as young as 5 years old [[22](#_ENREF_22)]. While the majority of pediatric oncology decisions are made by the parent/s (mainly due to legal age of consent), preferences for information and involvement of the patient (when appropriate) need to be acknowledged. Involvement of young people however requires consideration of their competence for decisional involvement, developmental maturity level, and potential impact of participation on their distress [[51](#_ENREF_51)].

 Studies across pediatric oncology illustrate that parents who experience incongruence between preferred and actual roles in decision-making may experience greater levels of distress, anxiety and decisional regret [[52](#_ENREF_52),[53](#_ENREF_53)]. A new measure of preferences for decision involvement in pediatric oncology that acknowledges the potential triadic approach to decision-making between patient, parent/s and HCP would be a useful aid in this context. Reviewing preferences may allow for more appropriate provision of decisional support and information, although there is a paucity of literature systematically evaluating this.

Information sharing is a prerequisite for involvement in decision-making [[10](#_ENREF_10)]. HCPs should provide information according to family preferences and need for information, whilst still ensuring families have “enough” information to make an informed decision. This is especially important in clinical trials to avoid therapeutic misconception (i.e. the overestimation of potential individual benefit). While more information may increase satisfaction with medical decisions [[54](#_ENREF_54),[55](#_ENREF_55)], some families can experience information-overload [[56](#_ENREF_56)]. Our findings suggest that to improve comprehension, and thus facilitate SDM, information for clinical trials needs to be provided with less medical jargon. Education materials should ideally be written at an eighth-grade readability [[57](#_ENREF_57)], however, improving readability does not guarantee improved comprehension, emphasizing the role of multiple modalities of information, especially visual aids [[57](#_ENREF_57)]. Most information modalities have the potential to be effective, largely dependent upon how well the content and the delivery suits the preferences of the patient or parent [[58](#_ENREF_58)]. In many countries, prior to a clinical trial becoming available to families, ethics committees, which include laypeople (at the state and institutional level), are responsible for reviewing all participant information consent sheets (PICS) developed by the principal investigator/study sponsor. Many hospitals have guidelines regarding the content of PICS, however these guidelines are often open to interpretation, with little advice provided about the specific requirements needed for quality PICS. While a thorough review of PICS is usually conducted prior to the clinical trial reaching the ward, there appears to be a lack of guidance for ethics committees in regards to readability and patient comprehension. Directly involving young patients in clinical trial decisions is also difficult as while in some areas young people can provide ‘assent’ to participate, assent holds no legal standing. A lack of regulation for assent results in variations between ethics committees in consent and assent requirements. As such, facilitating SDM should not solely be the responsibility of HCPs, but rather a combined effort of legislation, ethics committees and at an individual practitioner level. Ensuring quality information provision is essential. It can provide decision-makers with a greater sense of control as it allows for deliberation of this information and determination of choice [[54](#_ENREF_54)]. Lack of quality information may lead to increased distress around medical decisions, long-term psychological distress [[59](#_ENREF_59)] and decisional regret [[34](#_ENREF_34),[52](#_ENREF_52)]. In inability to fully inform families may also result in medico-legal issues for HCPs.

Our findings highlight the importance of communication between HCPs, and the patient and parents. Future research should consider developing and evaluating pediatric oncology-specific question prompt lists for clinical trials, as trialled in adult cancer care [[60](#_ENREF_60)]. Communication skills training may significantly improve the quality of HCPs’ communication skills, as seen in adult oncology clinical trials [[61](#_ENREF_61),[62](#_ENREF_62)]. For early phase clinical trials, ethical concerns arise for HCPs in conducting informed consent consultations (e.g. balancing hope for a cure and realistic expectation) [[63](#_ENREF_63)]. Many HCPs also feel too much information is provided to families, yet report families do not understand key clinical trial concepts [[64](#_ENREF_64)]. More educational support may be needed for HCPs to better obtain quality informed consent. Such training needs to consider HCPs’ time constraints, and be tailored to their patients and their current clinical practice [[65](#_ENREF_65)].

Providing greater access to supportive and psychological services may reduce family distress, and thus facilitate decisional involvement. Psychological symptoms such as fear, denial and distress, can potentially adversely affect patients’ and parents’ ability to make complex treatment decisions [[66-68](#_ENREF_66)]. Parent-HCP relationships may also influence parents’ role in the decision process, with trust and a perceived clear-partnership facilitating involvement [[69](#_ENREF_69),[70](#_ENREF_70)]. However, some families often trust their treating team to make major decisions on their behalf without fully understanding elements to the clinical trial protocol [[7](#_ENREF_7)]. Our findings suggest that HCPs should provide recommendations for treatment, but should aim to remain as neutral as possible. Tools such as decision aids may prove useful in facilitating SDM in this context. **We suggest future research consider developing a decision tool for pediatric oncology clinical trial enrolment incorporating clinical trial information pamphlets and booklets [**[**71**](#_ENREF_71)**,**[**72**](#_ENREF_72)**], and pediatric decision aids for other illnesses and decisions [**[**73**](#_ENREF_73)**,**[**74**](#_ENREF_74)**].**

Tools should incorporate aspects of the five themes identified in this review. Future studies investigating the psychosocial aspects of decision-making in pediatric oncology clinical trials should consider incorporating their research as a sub-study within the clinical trial treatment consent process.

## 4.2 Strengths and limitations

Our review was able to systematically identify strategies recommended by experts in the field, however the impact of these strategies is yet to be rigorously evaluated. None of the included articles specifically aimed to identify strategies to facilitate SDM limiting the strength of our findings. Only strategies acknowledged to play a role in SDM or improving the quality of informed consent were included, resulting in the exclusion of studies focusing specifically on communication, a subpart of SDM. Our findings however were able to identify key aspects of communication that play a role in SDM.

Due to the limited research in this area, we were unable to refine strategies based on phase of clinical trial, age of child, or take into account the influence culture, religion or varying socio-economic status. We were also unable to separate strategies directed toward the patient, parent or HCP given the generally broad nature of the recommendations. **The majority of strategies were targeted at the HCP, signifying a major gap in the current literature.** There were few strategies specifically noted to facilitate triadic SDM or with the patient. Our review primarily included recommendations focused on strategies that the HCP can implement to facilitate SDM between the HCP and parent.

## 4.3 Practice implications

SDM may require a combined approach that acknowledges the decision to enroll as a process unique to each family, as well as the role of quality information provision, open communication exchange and psychosocial support. **Given the collective role of HCPs, parents and potentially the young person in SDM, strategies targeted towards the parents and/or young person to also participate in SDM need to be further considered**.Until there is stronger evidence supporting specific strategies to facilitate SDM in clinical trial enrolment decisions, **we recommend that HCPs rely on their individual judgement to implement strategies provided in this review within the unique context of their patient and the patients’ family.** Future interventions that assess the efficacy of strategies identified in this review are warranted.

## 4.4 Conclusion

SDM in pediatric oncology clinical trials is critical to improve quality of care. Engaging in SDM and eliciting and acknowledging individual family preferences, can improve patient/parent knowledge, decision satisfaction, and reduce decisional conflict [[43](#_ENREF_43)]. This review highlights strategies to facilitate SDM in pediatric oncology clinical trials that can be incorporated by HCPs in current clinical practice to improve quality decision-making.

# References

1. Kids Cancer Alliance. *Clinical trials*. 2013 [cited 2017 7th November ]; Available from: <http://www.kidscanceralliance.org.au/clinical-trials.html>

2. Children's Oncology Group. *What is a clinical trial?* . 2017 [cited 2017 7th November ]; Available from: <https://www.childrensoncologygroup.org/index.php/what-is-a-clinical-trial>.

3. Bond, M.C. and S. Pritchard, *Understanding clinical trials in childhood cancer.* Paediatrics & child health, 2006. **11**(3): p. 148-150.

4. Woodgate, R.L. and R.A. Yanofsky, *Parents' experiences in decision making with childhood cancer clinical trials.* Cancer nursing, 2010. **33**(1): p. 11-18.

5. Hinds, P.S., L. Oakes, W. Furman, A. Quargnenti, M.S. Olson, P. Foppiano, and D.K. Srivastava, *End-of-life decision making by adolescents, parents, and healthcare providers in pediatric oncology: research to evidence-based practice guidelines.* Cancer nursing, 2001. **24**(2): p. 122-134.

6. Cousino, M.K., S.J. Zyzanski, A.D. Yamokoski, R.A. Hazen, J.N. Baker, R.B. Noll, S.R. Rheingold, J.R. Geyer, S.C. Alexander, and D. Drotar, *Communicating and understanding the purpose of pediatric phase I cancer trials.* Journal of Clinical Oncology, 2012. **30**(35): p. 4367-4372.

7. Chappuy, H., A. Baruchel, G. Leverger, C. Oudot, B. Brethon, S. Haouy, A. Auvrignon, D. Davous, F. Doz, and J. Tréluyer, *Parental comprehension and satisfaction in informed consent in paediatric clinical trials: a prospective study on childhood leukaemia.* Archives of disease in childhood, 2010. **95**(10): p. 800-804.

8. Pollard, S., N. Bansback, and S. Bryan, *Physician attitudes toward shared decision making: A systematic review.* Patient education and counseling, 2015. **98**(9): p. 1046-1057.

9. Whitney, S.N., A.M. Ethier, E. Frugé, S. Berg, L.B. McCullough, and M. Hockenberry, *Decision making in pediatric oncology: who should take the lead? The decisional priority in pediatric oncology model.* Journal of Clinical Oncology, 2006. **24**(1): p. 160-165.

10. Charles, C., A. Gafni, and T. Whelan, *Shared decision-making in the medical encounter: what does it mean?(or it takes at least two to tango).* Social science & medicine, 1997. **44**(5): p. 681-692.

11. Coyne, I., D.P. O’Mathúna, F. Gibson, L. Shields, and G. Sheaf, *Interventions for promoting participation in shared decision-making for children with cancer.* Cochrane Database Syst Rev, 2013. **6**.

12. Day, E., L. Jones, R. Langner, and M. Bluebond-Langner, *Current understanding of decision-making in adolescents with cancer: A narrative systematic review.* Palliative medicine, 2016. **30**(10): p. 920-934.

13. Oshima Lee, E. and E.J. Emanuel, *Shared decision making to improve care and reduce costs.* New England Journal of Medicine, 2013. **368**(1): p. 6-8.

14. Moher, D., A. Liberati, J. Tetzlaff, and D.G. Altman, *Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement.* Annals of internal medicine, 2009. **151**(4): p. 264-269.

15. Arora, R.S. and T.O. Eden, *Assessing the impact of paediatric oncology publications using three citation databases.* Pediatric blood & cancer, 2011. **56**(1): p. 152-153.

16. White, M.K., V. Keller, and L.A. Horrigan, *Beyond informed consent: the shared decision making process.* JCOM, 2003. **10**(6).

17. Pace, R., P. Pluye, G. Bartlett, A.C. Macaulay, J. Salsberg, J. Jagosh, and R. Seller, *Testing the reliability and efficiency of the pilot Mixed Methods Appraisal Tool (MMAT) for systematic mixed studies review.* International journal of nursing studies, 2012. **49**(1): p. 47-53.

18. Ellis, S., C. Wakefield, G. Antill, M. Burns, and P. Patterson, *Supporting children facing a parent's cancer diagnosis: a systematic review of children's psychosocial needs and existing interventions.* European journal of cancer care, 2016.

19. Donovan, L.A., C.E. Wakefield, V. Russell, and R.J. Cohn, *Hospital-based bereavement services following the death of a child: A mixed study review.* Palliative medicine, 2015. **29**(3): p. 193-210.

20. Thomas, J. and A. Harden, *Methods for the thematic synthesis of qualitative research in systematic reviews.* BMC medical research methodology, 2008. **8**(1): p. 1.

21. Olechnowicz, J.Q., M. Eder, C. Simon, S. Zyzanski, and E. Kodish, *Assent observed: Children's involvement in leukemia treatment and research discussions.* Pediatrics, 2002. **109**(5): p. 806-814.

22. Yap, T.Y., A.D. Yamokoski, S. Hizlan, S.J. Zyzanski, A.L. Angiolillo, S.R. Rheingold, J.N. Baker, and E.D. Kodish, *Informed consent for pediatric phase 1 cancer trials: physicians' perspectives.* Cancer, 2010. **116**(13): p. 3244-3250.

23. Baker, J.N., A.C. Leek, H.S. Salas, D. Drotar, R. Noll, S.R. Rheingold, and E.D. Kodish, *Suggestions from adolescents, young adults, and parents for improving informed consent in phase 1 pediatric oncology trials.* Cancer, 2013. **119**(23): p. 4154-4161.

24. Kodish, E.D., R.D. Pentz, R.B. Noll, K. Ruccione, J. Buckley, and B.J. Lange, *Informed consent in the childrens cancer group.* Cancer, 1998. **82**(12): p. 2467-2481.

25. Ingersgaard, M.V., M. Tulstrup, K. Schmiegelow, and H. Bækgaard Larsen, *A Qualitative Study of Decision‐Making on Phase III Randomized Clinical Trial Participation in Pediatric Oncology: Adolescents’ and Parents’ Perspectives and Preferences.* Journal of Advanced Nursing, 2017.

26. De Vries, M.C., J.M. Wit, D.P. Engberts, G.J.L. Kaspers, and E. Van Leeuwen, *Pediatric oncologists' attitudes towards involving adolescents in decision-making concerning research participation.* Pediatric Blood and Cancer, 2010. **55**(1): p. 123-128.

27. Simon, C., M. Eder, P. Raiz, S. Zyzanski, R. Pentz, and E.D. Kodish, *Informed consent for pediatric leukemia research.* Cancer, 2001. **92**(3): p. 691-700.

28. Unguru, Y., A.M. Sill, and N. Kamani, *The experiences of children enrolled in pediatric oncology research: implications for assent.* Pediatrics, 2010. **125**(4): p. e876-e883.

29. Marshall, P.A., R.V. Magtanong, A.C. Leek, S. Hizlan, A.D. Yamokoski, and E.D. Kodish, *Negotiating decisions during informed consent for pediatric phase i oncology trials.* Journal of Empirical Research on Human Research Ethics, 2012. **7**(2): p. 51-59.

30. Miller, V.A., J.N. Baker, A.C. Leek, D. Drotar, and E. Kodish, *Patient involvement in informed consent for pediatric phase I cancer research.* Journal of Pediatric Hematology/Oncology, 2014. **36**(8): p. 635-640.

31. Miller, V.A., J.N. Baker, A.C. Leek, S. Hizlan, S.R. Rheingold, A.D. Yamokoski, D. Drotar, and E. Kodish, *Adolescent perspectives on phase I cancer research.* Pediatric blood & cancer, 2013. **60**(5): p. 873-878.

32. Eder, M.L., A.D. Yamokoski, P.W. Wittmann, and E.D. Kodish, *Improving informed consent: suggestions from parents of children with leukemia.* Pediatrics, 2007. **119**(4): p. e849-e859.

33. Olechnowicz, J.Q., M. Eder, C. Simon, S. Zyzanski, and E. Kodish, *Assent observed: children’s involvement in leukemia treatment and research discussions.* Pediatrics, 2002. **109**(5): p. 806-814.

34. Simon, C.M., L.A. Siminoff, E.D. Kodish, and C. Burant, *Comparison of the informed consent process for randomized clinical trials in pediatric and adult oncology.* Journal of Clinical Oncology, 2004. **22**(13): p. 2708-2717.

35. Kupst, M.J., A.F. Patenaude, G.A. Walco, and C. Sterling, *Clinical trials in pediatric cancer: parental perspectives on informed consent.* Journal of pediatric hematology/oncology, 2003. **25**(10): p. 787-790.

36. Johnson, L.-M., A.C. Leek, D. Drotar, R.B. Noll, S.R. Rheingold, E.D. Kodish, and J.N. Baker, *Practical communication guidance to improve phase 1 informed consent conversations and decision-making in pediatric oncology.* Cancer, 2015. **121**(14): p. 2439-2448.

37. Simon, C.M., L.A. Siminoff, E.D. Kodish, and C. Burant, *Comparison of the informed consent process for randomized clinical trials in pediatric and adult oncology.* Journal of Clinical Oncology, 2004. **22**(13): p. 2708-2717 10p.

38. Levi, R.B., R. Marsick, D. Drotar, and E.D. Kodish, *Diagnosis, disclosure, and informed consent: learning from parents of children with cancer.* Journal of pediatric hematology/oncology, 2000. **22**(1): p. 3-12.

39. Miller, V.A., J.N. Baker, A.C. Leek, D. Drotar, and E. Kodish, *Patient involvement in informed consent for Pediatric Phase I Cancer Research.* Journal of pediatric hematology/oncology, 2014. **36**(8): p. 635.

40. de Vries, M.C., J.M. Wit, D.P. Engberts, G.J. Kaspers, and E. van Leeuwen, *Pediatric oncologists' attitudes towards involving adolescents in decision‐making concerning research participation.* Pediatric blood & cancer, 2010. **55**(1): p. 123-128.

41. Johnson, L.M., A.C. Leek, D. Drotar, R.B. Noll, S.R. Rheingold, E.D. Kodish, and J.N. Baker, *Practical communication guidance to improve phase 1 informed consent conversations and decision‐making in pediatric oncology.* Cancer, 2015. **121**(14): p. 2439-2448.

42. Elwyn, G., D. Frosch, R. Thomson, N. Joseph-Williams, A. Lloyd, P. Kinnersley, E. Cording, D. Tomson, C. Dodd, and S. Rollnick, *Shared decision making: a model for clinical practice.* Journal of general internal medicine, 2012. **27**(10): p. 1361-1367.

43. Sung, L. and D.A. Regier, *Decision making in pediatric oncology: Evaluation and incorporation of patient and parent preferences.* Pediatric blood & cancer, 2013. **60**(4): p. 558-563.

44. Elwyn, G. and T. Miron‐Shatz, *Deliberation before determination: the definition and evaluation of good decision making.* Health Expectations, 2010. **13**(2): p. 139-147.

45. Spinetta, J.J., G. Masera, M. Jankovic, D. Oppenheim, A.G. Martins, B. Arush, M. Weyl, J. van Dongen‐Melman, C. Epelman, and G. Medin, *Valid informed consent and participative decision‐making in children with cancer and their parents: A report of the SIOP working committee on psychosocial issues in pediatric oncology.* Medical and pediatric oncology, 2003. **40**(4): p. 244-246.

46. Stewart, J.L., K.A. Pyke-Grimm, and K.P. Kelly. *Parental treatment decision making in pediatric oncology*. in *Seminars in oncology nursing*. 2005. Elsevier.

47. Liaschenko, J. and S.M. Underwood, *Children in research: Fathers in cancer research—Meanings and reasons for participation.* Journal of Family Nursing, 2001. **7**(1): p. 71-91.

48. Gruccio, D. and L. Steinkrauss. *Challenges of decision making for families of children with single or multiple chronic conditions*. in *Nurse practitioner forum*. 2000.

49. Mack, J.W., J. Wolfe, E.F. Cook, H.E. Grier, P.D. Cleary, and J.C. Weeks, *Parents' roles in decision making for children with cancer in the first year of cancer treatment.* Journal of Clinical Oncology, 2011. **29**(15): p. 2085-2090.

50. Zwaanswijk, M., K. Tates, S. van Dulmen, P.M. Hoogerbrugge, W.A. Kamps, A. Beishuizen, and J.M. Bensing, *Communicating with child patients in pediatric oncology consultations: a vignette study on child patients', parents', and survivors' communication preferences.* Psycho‐Oncology, 2011. **20**(3): p. 269-277.

51. Joffe, S., C.V. Fernandez, R.D. Pentz, D.R. Ungar, N.A. Mathew, C.W. Turner, A.J. Alessandri, C.L. Woodman, D.A. Singer, and E. Kodish, *Involving children with cancer in decision-making about research participation.* The Journal of pediatrics, 2006. **149**(6): p. 862-868. e1.

52. Mack, J.W., A.M. Cronin, and T.I. Kang, *Decisional Regret Among Parents of Children With Cancer.* Journal of Clinical Oncology, 2016. **34**(33): p. 4023-4029.

53. Ruccione, K., R.F. Kramer, I.K. Moore, and G. Perin, *Informed consent for treatment of childhood cancer: factors affecting parents' decision making.* Journal of Pediatric Oncology Nursing, 1991. **8**(3): p. 112-121.

54. Pyke-Grimm, K.A., L. Degner, A. Small, and B. Mueller, *Preferences for participation in treatment decision making and information needs of parents of children with cancer: a pilot study.* Journal of Pediatric Oncology Nursing, 1999. **16**(1): p. 13-24.

55. Miller, *Monitoring versus blunting styles of coping with cancer influence the information patients want and need about their disease. Implications for cancer screening and management.* Cancer, 1995. **76**(2): p. 167-177.

56. Wakefield, C.E., P. Butow, C.A. Fleming, G. Daniel, and R.J. Cohn, *Family information needs at childhood cancer treatment completion.* Pediatric blood & cancer, 2012. **58**(4): p. 621-626.

57. Grootens-Wiegers, P., M.C. De Vries, T.E. Vossen, and J.M. Van den Broek, *Readability and visuals in medical research information forms for children and adolescents.* Science Communication, 2015. **37**(1): p. 89-117.

58. Bradlyn, A.S., I.L. Beale, and P.M. Kato, *Psychoeducational interventions with pediatric cancer patients: Part I. Patient information and knowledge.* Journal of Child and Family Studies, 2003. **12**(3): p. 257-277.

59. Vetsch, J., C.S. Rueegg, M.E. Gianinazzi, E. Bergsträsser, N.X. von der Weid, and G. Michel, *Information needs in parents of long‐term childhood cancer survivors.* Pediatric blood & cancer, 2015. **62**(5): p. 859-866.

60. Dimoska, A., M.H. Tattersall, P.N. Butow, H. Shepherd, and P. Kinnersley, *Can a “prompt list” empower cancer patients to ask relevant questions?* Cancer, 2008. **113**(2): p. 225-237.

61. Wuensch, A., T. Goelz, G. Ihorst, D.D. Terris, H. Bertz, J. Bengel, M. Wirsching, and K. Fritzsche, *Effect of individualized communication skills training on physicians’ discussion of clinical trials in oncology: results from a randomized controlled trial.* BMC cancer, 2017. **17**(1): p. 264.

62. Moore, P.M., S. Rivera Mercado, M. Grez Artigues, and T.A. Lawrie, *Communication skills training for healthcare professionals working with people who have cancer.* The Cochrane Library, 2013.

63. Estlin, E., S. Cotterill, C. Pratt, A. Pearson, and M. Bernstein, *Phase I trials in pediatric oncology: perceptions of pediatricians from the United Kingdom Children’s Cancer Study Group and the Pediatric Oncology Group.* Journal of clinical oncology, 2000. **18**(9): p. 1900-1905.

64. Mitchell, R., Wakefield, C.E., Robertson, E.G., Lewis, P., Cousens, N., Marshall, G.M., Russel, S.J., Ziegler, D.S., Anazodo, A.C., Trahair, T.N., Barbaric, D., Cohn, R.J., Alvaro, F., O'Brien, T.A., *Paediatric oncology clinical trial enrolment: the health care professionals’ perspective.* *Under review*, 2017.

65. Légaré, F., S. Ratté, D. Stacey, J. Kryworuchko, K. Gravel, I.D. Graham, and S. Turcotte, *Interventions for improving the adoption of shared decision making by healthcare professionals.* Cochrane Database Syst Rev, 2010. **5**(5).

66. McCabe, M.A., *Involving children and adolescents in medical decision making: developmental and clinical considerations.* Journal of Pediatric Psychology, 1996. **21**(4): p. 505-516.

67. Dunsmore, J. and S. Quine, *Information, support, and decision-making needs and preferences of adolescents with cancer: implications for health professionals.* Journal of Psychosocial Oncology, 1996. **13**(4): p. 39-56.

68. Buchanan, N.D., R. Block, A.W. Smith, and E. Tai, *Psychosocial barriers and facilitators to clinical trial enrollment and adherence for adolescents with cancer.* Pediatrics, 2014. **133**(Supplement 3): p. S123-S130.

69. Kilicarslan-Toruner, E. and E. Akgun-Citak, *Information-seeking behaviours and decision-making process of parents of children with cancer.* European Journal of Oncology Nursing, 2013. **17**(2): p. 176-183.

70. Pyke-Grimm, K.A., J.L. Stewart, K.P. Kelly, and L.F. Degner, *Parents of children with cancer: factors influencing their treatment decision making roles.* Journal of pediatric nursing, 2006. **21**(5): p. 350-361.

71. Children's Cancer and Leukaemia Group, *Taking part in clinical trials: Information for parents and carers of a child or young person with cancer*. 2017.

72. Australian and New Zealand Children's Haematology/Oncology Group, *Clinical trials information sheet*. 2010.

73. Shirley, E., C. Bejarano, C. Clay, L. Fuzzell, S. Leonard, and T. Wysocki, *Helping families make difficult choices: creation and implementation of a decision aid for neuromuscular scoliosis surgery.* Journal of Pediatric Orthopaedics, 2015. **35**(8): p. 831-837.

74. Sajeev, M., J. Cohen, C.E. Wakefield, J.E. Fardell, and R.J. Cohn, *Decision Aid for Nutrition Support in Pediatric Oncology: A Pilot Study.* Journal of Parenteral and Enteral Nutrition, 2016: p. 0148607116661840.

1. To improve readability, sentences with five or more references have not had these references listed. [↑](#footnote-ref-1)