TITLE:
Insomnia prevention in children with Acute Lymphoblastic Leukemia

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National Cancer Institute 1R03CA259894-02

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1. OBJECTIVES

1.1 Study Design

Insomnia is a common sequela of pediatric acute lymphoblastic leukemia treatment (ALL), with significant health consequences. Prior literature demonstrates that effective methods of dealing with medically disrupted sleep include[1]: (1) parent education (teaching parents about sleep norms in children with cancer and setting appropriate expectations)[2]; (2) extinction (addressing problematic sleep onset associations)[3]; (3) bedtime fading (increasing sleep drive)[4]; (4) stimulus control (leaving the bed if not asleep)[4]; (5) positive routines (calming activities that cue sleep)[5]; and (6) sleep hygiene (improving sleep environment)[6]. Despite evidence that preventive interventions are effective at reducing insomnia development, this forward-thinking approach has not been taken with ALL populations.

We conducted a mixed methods study (DFCI 21-005) of 15 parents of children in active ALL maintenance therapy to elicit stakeholder perspectives on optimal sleep interventions to prevent insomnia. Parents thematically emphasized that they felt unprepared for the extent of sleep disruptions that their child would experience, and how to communicate this with their oncology team. Parents voiced a strong desire for more information to learn more about sleep in ALL patients, and to be able to access the information from home, without the need for additional medical/psychological appointments.

The information collected from these qualitative data, informed the development of a stake-holder informed program called Sleep ALL Night. The program will be comprised of a sleep action plan, coupled with a psychoeducational website that provides families with information critical to understanding their child's sleep, as well as evidence-based strategies to reduce the impact of ALL treatment on sleep.

We will conduct a single-arm pilot study to determine the acceptability and feasibility of Sleep ALL Night in a cohort of children with ALL receiving maintenance therapy on or as per Dana-Farber ALL Consortium trials. We are interested in study acceptability both prior to, and following the program period, defined as the extent to which people receiving a healthcare intervention consider it appropriate based on their anticipated and experiential response to the program.[7] We are also interested in study feasibility, defined as the practicality of delivering the program and conducting clinical research about the program in the setting in which it will be implemented in the future. Data from this pilot study will inform a subsequent RCT to evaluate efficacy in insomnia prevention among this highly vulnerable patient population.

1.2 Primary Objectives

1. To evaluate the acceptability and feasibility of the Sleep ALL Night intervention in a single arm pilot study of N=30 pediatric patients with ALL.
    a. Acceptability will be defined as (1) ≥30% of eligible participants who are approached agree to participate, and (2) participants report an average score ≥4 ("Agree") on the Acceptability of Intervention Measure scale.[8]
    b. Feasibility will be defined as: (1) ≥70% of participants report reviewing the study

action plan, (2) ≥50% of participants report accessing the psychoeducational website, and (3) ≥80% of participants complete the Intervention Assessment.

2. To refine the program materials based on participant feedback.
3. To collect preliminary data assessing the impact of the program on increasing frequency of sleep health conversations during Jimmy Fund Clinic medical appointments based on electronic medical record review of clinic notes and parent survey response.

2. BACKGROUND

2.1 Study Disease(s)

Pediatric acute lymphoblastic leukemia (ALL).

3. PARTICIPANT SELECTION

Children with a diagnosis of de novo ALL receiving treatment in the Maintenance phase of therapy either on or as per DFCI 16-001 will serve as the population for study recruitment. Selection of participants from this cohort will ensure standardized chemotherapy exposures and medical management by their oncology team. We will recruit across low-risk, high-risk and very high-risk groups as dexamethasone (a chemotherapy known to impact sleep) dosing on or as per DFCI 16-001 is identical across risk groups in the maintenance phase of therapy (6 mg/m^2 BID administered in 5-day pulses at the start of each 3-week chemotherapy cycle). Given known disparities in disordered sleep due to low socioeconomic status and its associated adverse social determinants of health, we will utilize available data from the open sociodemographic banking protocol DFCI 19-796 and from DFCI 16-001 embedded HMH study to ensure appropriate representation of children from low socioeconomic status homes. Annually, ~50 children are diagnosed with de novo ALL at DFCI, of whom 30% live in low-SES households, and we plan to recruit a population representative of these local data. Patients in the maintenance phase of therapy will be recruited for study participation as per the below outlined eligibility criteria.

3.1 Eligibility Criteria

Eligibility will be determined as follows:

1. Patient in the Maintenance Phase of therapy on or as per DFCI 16-001 and has completed at least two cycles of maintenance therapy to allow adequate recovery from the more intensive Consolidation phase.
2. English or Spanish speaking child and primary caregiver (parent/guardian).
3. Child aged 4-12 years.

3.2 Exclusion Criteria

1. Primary team declines permission to approach.
2. Children with critical illness (defined as ICU admission)

3.3 Inclusion of Children and Minorities

Both male and female children of all races and ethnic groups are eligible for this study. This study focuses on children with ALL with their parents as survey informants. Surveys are

available in both English and Spanish. This study will enroll racial and ethnic minorities in a manner that is reflective of the proportion of racial and ethnic minorities diagnosed with childhood ALL at DFCI. This study does not focus on any race, ethnicity, or sex. No potential research subjects will be excluded from enrollment based on race, ethnic origin, or sex; nor will any race, ethnicity or sex be preferentially enrolled. All children and their families receiving chemotherapy on or as per DFCI 16-001 who meet the inclusion criteria will be considered eligible for participation.

3.4 Planned enrollment

The overall study will enroll a total of 30 pediatric patients with ALL being treated on or as per DFCI 16-001 over 1-year. Eligible families will be offered an opportunity to consent/assent to enrollment by experienced research assistants in the hospital or clinic following permission from the primary oncology team. This strategy removes recruitment burden from busy clinical staff and has been successfully implemented in prior insomnia treatment research conducted by MPI Dr. Zhou[9]. We will recruit a patient sample representative of the racial, ethnic, and socioeconomic diversity of our patient population to ensure data from this study are generalizable. This will be operationalized by utilizing parent-reported sociodemographic data from the currently open sociodemographic banking protocol DFCI 19-796 and from the DFCI 16-001 embedded HMH study as part of our screening processes. Should COVID-19 restrictions limit in-person clinic visits during the funding period, we will implement a remote recruitment and consent strategy involving phone calls/emails after medical appointments in our center successful in previous studies by MPI Dr. Zhou (NCT #03613519).

3.5 Recruitment and consent

Patients being treated on or as per DFCI 16-001 in the maintenance phase of chemotherapy who meet the above specified inclusion criteria will be identified via DFCI 16-001 study database and the Heme Malignancy clinical tracking system, which is reviewed monthly. Sociodemographic data from 16-001 and 19-796 will be used to monitor representativeness of enrolling cohort by race, ethnicity, and socioeconomic status to ensure a representative sample.

This study will follow procedures currently in place for other protocols at DFCI (e.g., 17-515, 17-402) in order to identify potentially eligible participants for recruitment purposes. These procedures have been developed in consultation with multiple disease centers and have proven to be effective and non-burdensome for clinicians and patients. Study investigators will collaborate with clinicians in the Jimmy Fund Clinic at Dana-Farber Cancer Institute in order to identify and recruit eligible participants. Recruitment materials and a study information sheet can be found in Appendix D, E and F. After getting permission to approach the subject from their oncology provider, subjects will be approached, screened for eligibility, and recruited by a member of the study staff. This may occur in-person during a hospitalization or at a scheduled clinic visit, or alternatively, via telephone, videoconference, email, or mail, as some medical visits are currently conducted as telehealth visits. These “remote” potential participants will receive the Study Information Sheet by email or mail.

Informed Consent: We are requesting a Waiver of Documentation of Informed Consent for this pilot study, as it is a minimal risk study involving procedures common in routine clinical and non-clinical practice for which signed consent is generally not required outside of the research context. All elements of informed consent will be provided verbally prior to study enrollment by study staff utilizing the Study Information Sheet (Verbal Informed Consent)) and will be provided to families.

Recruitment and Consent methods will include both in-person and remote options:

In-person:
Following provider permission to approach, eligible parents/guardians will be approached by the study staff while in clinic at DFCI or inpatient at BCH and offered an opportunity to participate following verbal informed consent. Study staff will offer discussion in a private setting (e.g., consult room) and explain details of the study including all elements of informed consent including study procedures, study risks and benefits and study goals and methods. The voluntary nature of participation will be highlighted. If, after being introduced to the study and having had the opportunity to ask questions, parent/guardians are willing to participate, they will be asked to verbally communicate their intent to participate which will be documented by study staff. Participants ages 10-12 years will provide verbal assent with the parent/guardian present, and the parent/guardian will provide verbal consent on the child's behalf. Records of all instances of verbal consent/assent, including date, will be stored in a secure study database managed by the study team. Parent/guardians will be provided with a copy of the Sleep Study Information Sheet for their reference. The patient's designated Oncology Nurse Navigator (ONN) will be informed of the consent. During the ONN's visit with the patient and guardian, the family will be provided with the sleep action plan and introduced to its use (Appendix C). The sleep action plan will be available in both English and Spanish.

Remote:
In addition to in-person recruitment, study staff may also conduct the consent process remotely. For these procedures, email addresses, mailing addresses, and phone numbers will be obtained from the patient's medical record. Eligible participants will be emailed a Sleep Study Invitation (see Appendix D) that includes the following:

- An invitation letter, that will explain the purpose and characteristics of the study and an opt out message stating they decline to participate at this time

Study staff will then follow up with a phone call after a few days to ensure that the documents have been received and gauge the family's interest in learning more. We will attempt to contact them a maximum of three times. No phone messages with the full name Dana-Farber Cancer Institute will be used. The phone call will give the parents the opportunity to opt-out or hear additional information about the study.

If the family expresses interest in participating, the study staff will provide details on the study, walk through the Sleep Study Information Sheet to ensure that all elements of informed consent are provided, and offer the family the opportunity to ask questions. If the parent and child (when applicable by age) decide to participate, they will provide verbal consent/assent in place of written documentation of informed consent. Children ages 10-12 years will provide verbal assent with the parent present, and

the parent will provide verbal consent on behalf of the child.

During the patient's next ONN visit, the family will be provided with the sleep action plan.

We request a waiver of documentation of consent/assent for parents and children based on the following considerations: (i) participating in the study constitutes "no more than minimal risk"; (ii) the rights and welfare of the subjects will not be adversely affected, since parents and children will be given all elements of informed consent both in writing and verbally; (iii) increased study feasibility: we would like to minimize the burden that may result from signing a consent form.

3.6 HIPAA Authorization

A partial HIPAA Waiver of Authorization will be requested to enable thorough screening for eligibility. This process involves no more than a minimal risk to subjects' privacy because identifiers will be collected in a secure way and destroyed after the study is closed. In addition, the protected health information collected will not be reused or disclosed to any other person or entity other than the research team, except as required by law. Because we aim to enroll participants within a specific window of maintenance therapy, we have a relatively narrow timeframe in which to identify eligible participants. Without such a waiver, we would have to rely solely on provider-generated referrals or patient and parent self-referral, which would add an undue burden to pediatric hematology/oncology providers and potentially lead to such slow participant accrual that the research would be rendered infeasible. Alternatively, requesting consent from each potential study participant prior to review of preliminary eligibility would result in an unnecessary burden for families.

We will review the participant's medical records for documentation of any discussion related to sleep during routine (non-emergency) JFC clinic appointments for the 12-week period prior to and following the ONN baseline visit at study. To obtain permission for the medical record abstraction portion of the study, we will have participants provide a signature for HIPAA Authorization. As we wish for documented consent to be waived, the HIPAA authorization form will be a standalone document. Signed HIPAA authorization will be obtained in person alongside the verbal consent.

3.7 Strategies for Retention

We will actively retain families in this study by utilizing ongoing study team contact to maintain engagement as well as modest remuneration for participation. Families enrolled will receive small remuneration to off-set the cost of their time participating in the baseline and intervention assessment ($20 gift-card at baseline and a $40 gift-card for the intervention assessment). Due to the relatively low-participant burden, modest remuneration, and patient-centered nature of the intervention we do not anticipate problems with recruitment and retention.

4. REGISTRATION PROCEDURES

4.1 Registration Process for DF/HCC Institutions

A member of the study team will confirm eligibility criteria and complete the protocol-specific eligibility checklist. Institutions will register eligible participants in the Clinical Trials Management System (CTMS) OnCore as required by DF/HCC Policy REGIST-101.

4.2 General Guidelines for Other Investigative Sites

N/A.

4.3 Registration Process for Other Investigative Sites

N/A.

5. STUDY DESIGN

5.1 Overall Study Design

We will conduct a single arm, pilot acceptability and feasibility study of the sleep intervention (Sleep ALL Night).

Intervention Structure: As pediatric cancer services are centralized, travel burden for clinical care is a treatment barrier.[10] It is important that the program content be accessible for those who do not live near an academic medical center. While this does not address all family-level obstacles to accessing sleep care, this is a vital first step. Further, we recognize that parents of pediatric cancer patients are overwhelmed and exhausted from the many medical appointments their child has had during treatment[11,12] As adherence to multi-session sleep interventions is poor in pediatric oncology[13] and we have previously demonstrated that a brief psychoeducational program is efficacious[14] we plan to implement a sleep action plan tool, in conjunction with an interactive psychoeducational website. Enrollment in the intervention will take place at the initial visit with the ONN and will be followed by the Intervention Survey (administered at Week-3) and the overall website monitoring that will occur from Week 1 up until Week 12 (end of study).

The sleep action plan will be presented on a single page (Appendix B), resembling action plans that are commonly implemented for children with other chronic medical conditions (e.g., asthma).[15] The action plan is separated into three 'zones': 1) a green zone, indicating that the child is sleeping well, reminding families that sleep is something to monitor; 2) a yellow zone, indicating that the child's sleep is worsening, encouraging families to begin tracking their child's sleep; and 3) a red zone, indicating that the child's sleep is problematic, providing concrete steps to take in order to initiate further evaluation and any necessary treatment(s).

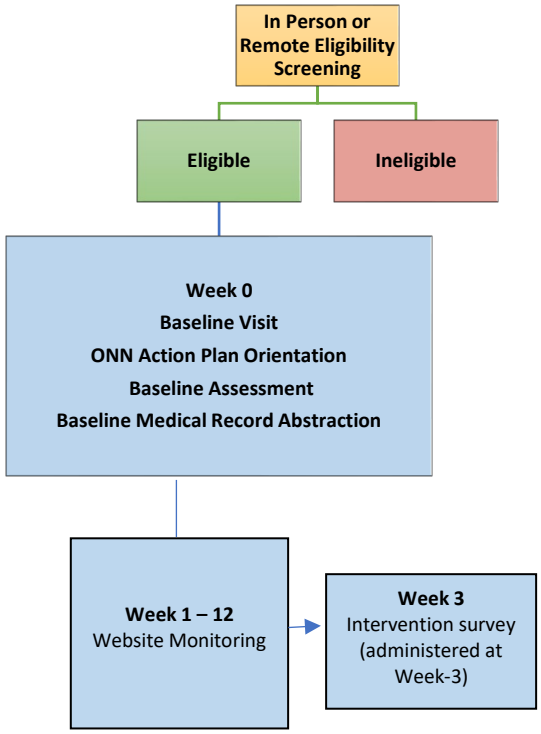
ONNs will introduce families to the sleep action plan immediately after study enrollment. Spanish interpreters will aid ONNs in explaining the sleep action plan to Spanish speaking caregivers. If this is not a feasible time to meet with the families, (i.e., someone has to leave right after enrollment), the study team will coordinate a time for the family meet with the ONN at the time of their next in person visit. ONNs will explain that if they are interested in further information regarding their child's sleep, that they should review the intervention website. On

the website, families will be provided with comprehensive information on how to successfully navigate the many potential disruptors of their child's sleep as they complete maintenance therapy. Feedback will be solicited through an Intervention survey (administered at Week-3) focused on the acceptability and feasibility of the intervention materials and delivery format for a family of a child with cancer. These materials are based on the American Academy of Sleep Medicine's clinical guidelines for managing disordered sleep, and child and family feedback that was provided during Phase 1 of this project. Data collection will occur over 3 months via the intervention website and during the intervention survey (administered at Week-3). To maximize data collection, families will preferably complete the intervention survey (administered at Week-3) in-person via REDCap or paper/pencil. However, surveys may also be completed using alternative methods, including, but not limited to, REDCap link texted/emailed to participants and phone/Zoom administration (read aloud by site personnel with answers recorded). Reminders to complete the survey will be sent as needed via various methods, including, but not limited to, emails, phone calls, and text messages. An Amazon gift card will also be sent to families as modest remuneration for their time completing the survey.

5.2 Study processes

Study procedures are designed to accommodate both in-person, fully remote, or hybrid approaches to consent, orientation, study conduct and data collection.

Screening for eligibility: Prior to approach for consent, eligible patients (see Inclusion Criteria) will be identified from existing DFCI 16-001 study databases and the Heme Malignancy clinical tracking system.



Data Collection:

All self-reported outcomes will be [illegible]t-report.

Week 12
End of Study Medical Record Abstraction

Acceptability

- Study staff: Number of eligible participants who are approached who agree to participate in the study. *Not administered to participants*
- Parent-completed survey: Self-report to single-items querying current level of concern about their child's sleep, and their interest in learning more about how to improve their child's sleep, on a 10-point scale. *Administered during the Baseline Assessment only.*
- Parent-completed survey: Acceptability of Intervention scale[16]. *Administered during the Intervention Assessment only.*

Feasibility

- Parent-completed survey: Self-report of frequency of reviewing the study action plan. *Administered during the Intervention Assessment only.*
- Parent-completed survey: Self-report of frequency of reviewing the study website. *Administered during the Intervention Assessment only.*
- Study Staff: Website tracking of frequency of access and time of day of access. *Not administered to participants.*
- Study Staff: Number of enrolled participants who complete the Intervention Assessment. *Not administered to participants.*

Program material feedback

- Parent-completed survey: Open-ended Intervention survey (administered at Week-3) regarding sleep action plan and website. *Administered at Intervention Assessment only.*

Program impact

- Parent-completed: Self-efficacy for Sleep scale (SES)[17]. The SES is a 9-item scale used to assess an individual's sense of self-efficacy with regards to sleep. Our modified version will ask parents to rate how confident they feel about helping their child accomplish a behavior, such as "lie in bed feeling mentally relaxed" or "Fall asleep at night in less than 30 minutes" on a 5-point scale, with higher scores reflecting greater self-efficacy relating to sleep. *Administered at Baseline (week 0) and Intervention (week 3) Assessment.*
- Parent-completed Patient-Reported Outcomes Measurement Information System (PROMIS) Sleep Disturbance and Sleep-Related Impairment.[18] The PROMIS Sleep Disturbance and Sleep-Related Impairment scales are a 16-item measure used to assess the extent of a child's poor sleep and the consequences of their poor sleep *Administered at Baseline (week 0) and Intervention (week 3) Assessment.*
- Parent-completed Sleep Knowledge Scale. This scale is a 10-item scale designed to determine the extent of a parent's knowledge about sleep in children. *Administered at Baseline (week 0) and Intervention (week 3) Assessment.*
- Study Staff: CRC review of participant's medical records for documentation of any discussion related to sleep during routine (non-emergency) JFC clinic appointments for

the 12-week period prior to and following the ONN baseline visit at study enrollment.

5.3 Agent Administration
N/A.

5.4 General Concomitant Medication and Supportive Care Guidelines
N/A.

5.5 Criteria for Taking a Participant Off Protocol Therapy
N/A.

5.6 Duration of Follow Up
Participants will be followed for 3-weeks after their initial ONN baseline visit for the Intervention survey; and a total of 12 weeks for any website activity.

5.7 Criteria for Taking a Participant Off Study
Participants will not be removed from study, unless they express a desire to do so.

6. DOSING DELAYS/DOSE MODIFICATIONS
N/A.

7. ADVERSE EVENTS: LIST AND REPORTING REQUIREMENTS
If families choose to implement behavioral strategies to try and improve their child's sleep, they may encounter brief periods of resistance from their child, as well as a brief period (<2 weeks) of further sleep disruption. This can create increased stress for families. However, the strategies described in the program materials are all evidence-based strategies that are commonly used in pediatric sleep centers to help children improve their sleep in the long-term, recognizing that there may be short-term challenges. In addition, there is a theoretical possibility of anxiety or emotional distress as a result of reviewing materials that discuss a common side effect of maintenance therapy (sleep disturbance). The emotional risk of anxiety as a result of discussing this topic is expected to be minimal based on data from prior qualitative research conducted with parents of pediatric cancer patients. Specifically, prior work on this topic has revealed that parents are often engaged in discussing this subject because they feel as though their experiences can help inform care for other parents who are going through the experience of having a child be diagnosed with cancer, and do not report significant stress or anxiety as a result of participation.

8. PHARMACEUTICAL AND/OR IMAGING AGENT INFORMATION
N/A.

9. BIOMARKER, CORRELATIVE, AND SPECIAL STUDIES
N/A.

10. MEASUREMENT OF EFFECT

10.1 Data Safety Monitoring and Data Management
Data Safety Monitoring is not applicable to this acceptability and feasibility pilot study.

All information collected for research purposes will be de-identified prior to analysis. Identifying information will include data (names, addresses, phone numbers, emails) necessary to identify subjects initially to ask for consent as well as to contact for follow-up survey administration if necessary, child's demographic and disease information. The data will be coded, databases secured with a password, and contact information and medical record numbers will be kept in a separate database accessible only to the study team, which has undergone HIPAA Certification and the training mandated by the IRB. Study databases will not contain identifying information, and will be linked to identifying information by a unique study ID. A separate password protected key file containing the link between identifying information and research data will be maintained by the PI behind the DFCI firewall. We have extensive experience in maintaining confidentiality utilizing these methods.

All survey data will be stored in institutionally coordinated databases, including Research Electronic Data Capture (REDCap) and Excel. REDCap offers a secure web application. A tracking log will also be kept as an Excel spreadsheet. These spreadsheets will be located on HIPAA-compliant DF/HCC servers. Physical study documents (i.e. paper surveys) will be stored in locked cabinets, and will only be identified by study ID. Study data will be entered, stored, and managed in a password-protected database structured for this study on a secured server. Data will be verified both at point-of-entry and subsequently by a series of range checks, logical between-items checks, and outlier checks.

Safety Monitoring: There are no physical risks to this study. While extremely unlikely, any serious event (SAE), defined as an adverse event that results in death, is life threatening, results in hospitalization, or results in another important medical event, will be reported to the IRB and to the study investigators within 24 hours of occurrence.

11. STATISTICAL CONSIDERATIONS

Quantitative data regarding patient and family sociodemographic and disease data; parent survey responses regarding sleep self-efficacy and child sleep will be described by summary statistics.

11.1 Study Design/Endpoints

11.2 Sample Size, Accrual Rate and Study Duration

This study is an acceptability and feasibility study, intended to collect data to inform the design of a fully powered clinical trial. We intend to achieve a recruitment target of N=30 over a study recruitment period of 12-months. This results in an anticipated recruitment rate of approximately 3 families per month.

11.3 Stratification Factors

N/A.

11.4 Interim Monitoring Plan

N/A.

11.5 Analysis of Primary Endpoints

Patient sociodemographic, disease, and treatment characteristics will be analyzed with descriptive statistics.

Primary study outcomes of acceptability and feasibility will be assessed based on the Implementation Outcomes Framework and best practice metrics for clinical trials.[19,20] The study will be deemed acceptable if: (1) ≥30% of eligible participants who are approached agree to participate, and (2) participants report an average score ≥4 ("Agree") on the Acceptability of Intervention Measure scale. The study will be deemed feasible if: (1) ≥70% of participants report reviewing the study action plan, (2) ≥50% of participants report accessing the psychoeducational website, and (3) ≥80% of participants complete the Intervention Assessment.

Primary study outcomes (Self-efficacy for Sleep and Patient-Reported Outcomes Measurement Information System Sleep Disturbance and Sleep-Related Impairment total scores; proportion of routine visits with a discussion of sleep pre/post ONN baseline visit) will be presented descriptively.

11.5.1 Evaluation of Toxicity

NA

11.5.2 Evaluation of the Primary Efficacy Endpoint

NA

12. PUBLICATION PLAN

Findings will be published in a peer-reviewed journal that is focused on the quality-of-life of pediatric cancer patients (e.g., Pediatric Blood and Cancer).

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13. APPENDICES

Appendix A: Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), PROMIS and Sleep Knowledge Survey, Sleep Self-Efficacy Scale
Appendix B: Sleep Action Plan and Sleep Diary
Appendix C: ONN Script
Appendix D: Sleep Study Invitation Email/Letter
Appendix E: Recruitment Script

13.1 **Appendix A.** Survey measures

Please circle the number that best reflects your current feelings about the following statements.

In the past 7 days…

	Never	Almost never	Sometimes	Almost always	Always
My child had difficulty falling asleep	◯	◯	◯	◯	◯
My child slept through the night	◯	◯	◯	◯	◯
My child had a problem with his/her sleep	◯	◯	◯	◯	◯
My child had trouble sleeping	◯	◯	◯	◯	◯
It took my child a long time to fall asleep	◯	◯	◯	◯	◯
My child worried about not being able to fall asleep	◯	◯	◯	◯	◯
My child woke up at night and had trouble falling back to sleep	◯	◯	◯	◯	◯
My child tossed and turned at night	◯	◯	◯	◯	◯

In the past 7 days...

	Never	Almost never	Sometimes	Almost always	Always
My child was sleepy during the daytime	◯	◯	◯	◯	◯

My child had a hard time concentrating because he/she was sleepy	◯	◯	◯	◯	◯
My child had a hard time getting things done because he/she was sleepy	◯	◯	◯	◯	◯
My child had problems during the school day because of poor sleep	◯	◯	◯	◯	◯
My child had trouble staying awake during the day	◯	◯	◯	◯	◯
It was hard for my child to have fun because he/she was sleepy	◯	◯	◯	◯	◯
My child could not keep his/her eyes open during the day	◯	◯	◯	◯	◯
My child was in a bad mood because he/she was sleepy	◯	◯	◯	◯	◯

Sleep Knowledge

Please indicate whether you believe the following statements to be True or False.

	True	**False**
Children who do not get enough sleep are more likely to be underweight than overweight.	◯	◯
Snoring indicates a child is sleeping well.	◯	◯
Being under- or overactive can be warning signs that a child is not getting enough sleep.	◯	◯

Watching TV in the bedroom makes it more difficult for children to fall asleep.	◯	◯
Children should have the same bedtime and wake time on the weekdays and weekends.	◯	◯
Children only need a bedtime routine if they are having trouble falling asleep.	◯	◯
Well-rested children do not need an alarm clock to wake up in the morning.	◯	◯
The average school-aged child needs 1 nap per day.	◯	◯
Being overweight can increase a child's risk of sleep problems.	◯	◯
The average school-aged child needs ~8 hours of sleep/24 hours.	◯	◯

Sleep Self-Efficacy Scale

For the following 9 items, please rate (by circling a number from 1 to 5) your ability to help your child carry out each behavior. If you feel able to accomplish a behavior some of the time but not always, you should indicate a lower level of confidence.

Indicate how confident you are that you can help your child:

1. Lie in bed, feeling physically relaxed.

1	2	3	4	5
Not confident				Very confident

2. Lie in bed, feeling mentally relaxed.

1	2	3	4	5
Not confident				Very confident

3. Lie in bed with their thoughts "turned off".

1	2	3	4	5
Not confident				Very confident

4. Fall asleep at night in under 30 minutes.

1	2	3	4	5

Not confident Very confident

5. Wake up at night fewer than 3 times.

1	2	3	4	5
Not confident				Very confident

6. Go back to sleep withing 15 minutes of waking in the night.

1	2	3	4	5
Not confident				Very confident

7. Feel refreshed upon waking in the morning.

1	2	3	4	5
Not confident				Very confident

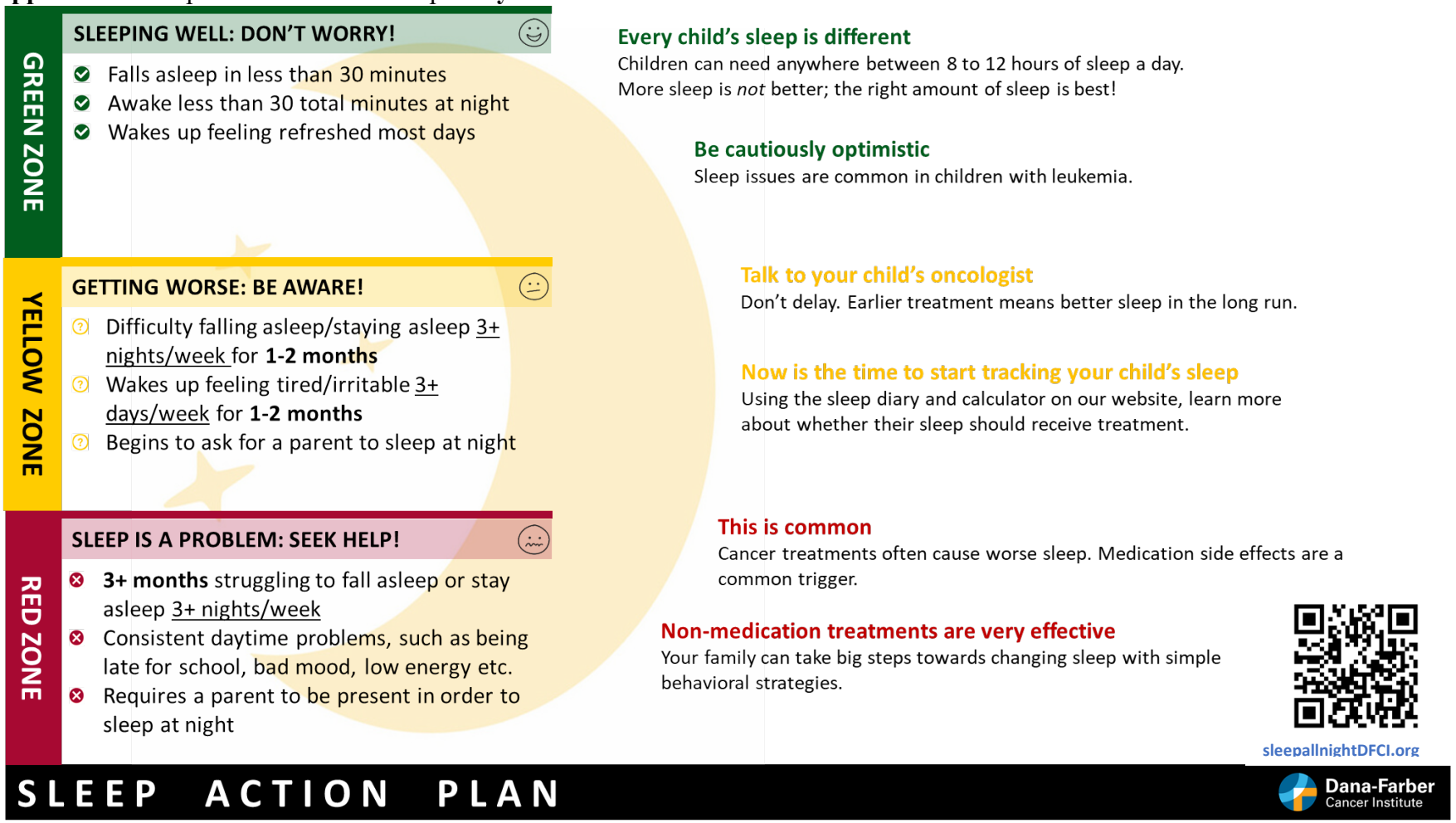
8. Wake after a poor night's sleep without feeling upset about it.

1	2	3	4	5
Not confident				Very confident

9. Not allow poor night's sleep to interfere with their daily activities.

1	2	3	4	5
Not confident				Very confident

13.2 **Appendix B.** Sleep Action Plan and Sleep Diary



Sleep Diary

Please use this sleep diary track your child's sleep.

1. Mark when your child gets into bed at night with a down arrow: ↓
2. Shade in periods when child is asleep (including naps):
3. Mark when your child gets out of bed in the morning with an up arrow: ↑

The online sleep diary calculator can provide you with more information about their sleep averages: **sleepallnightDFCI.org**

	midnight											noon																		
	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm						
Day: FRI **Date:** 01/16																										↓				
Day: SAT **Date:** 01/17																														
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13.3 **Appendix C.** Oncology nurse navigator script.

The child's oncology nurse navigator will provide the parent/guardian with the Sleep Action Plan and Sleep Diary (Appendix B).

"Hello. I wanted to chat quickly about sleep for [child's name]. I am bringing this up because by the end of leukemia treatment, about 1 in 3 children will have had a hard time with sleep. Rather than waiting until the issues with sleep become a big deal, I'm hoping that we can help families learn the warning signs to look for. Do you have any questions?"

Showing the Sleep Action Plan.

"This is what we call a "Sleep Action Plan" and is designed to help you think about [child's name] sleep. There are 3 zones. The green zone is when your child is sleeping well, and there isn't anything to worry about. You can see here some suggested guidelines for what good sleep typically looks like. **Point to left hand side in green zone**
On the other end is the red zone. This zone means that your child is struggling, and here are the common signs to watch out for when it comes to their poor sleep. **Point to left hand side in red zone**
Where do you think [child's name] would be right now?"

"We want families to talk with us as soon as they think their child's sleep is in the yellow zone or worse. It doesn't necessarily mean that anything needs to be done, but it means that now your child's medical team will keep sleep at the top of their mind in case we need to do something differently to help them sleep and feel better. Does this make sense?"

"Have you ever used a QR code before? At the bottom right of this Sleep Action Plan, you will see one. Point your phone or tablet camera and a link appears.
Show how to do on patient's phone, if available; otherwise show on ONN phone
Tap this link and it will take you to our special website. I suggest that you take a look at this website in the next few days, even if sleep is going well for your family. It provides a lot of really good information about what is normal for a child's sleep, what issues to look out for, and tips and strategies that can help your family deal with any sleep issues."

Navigate to Sleep Diary calculator on website. Show physical Sleep Diary.

"This is a Sleep Diary, which is a tool that may be helpful for your family to use to get a sense of how your child is sleeping on average. What you will want to do is follow the instructions on the sleep diary to track their sleep for about a week, then enter that information into this online calculator, which will give you some key sleep facts that ."

"That's it! We're hoping that this can be something you put on your fridge, so that it can remind you of what to keep a lookout for when it comes to sleep issues. Do you have any last questions?"

13.4 **Appendix D.** Sleep Study Invitation Email/Letter.

Dear <name>,

We are contacting you because you may be eligible to participate in a research study we are conducting to better understand how we can help families navigate potential sleep problems for children during medical treatment. Your child's doctor is aware of this study and has agreed for his/her patients and their families to be contacted.

Your and/or your child's participation would include:

- Completing a brief, baseline survey (about 10 minutes)
- Talking with an oncology nurse navigator for 5-10 minutes about informational materials that are available to help families understand sleep during treatment for acute lymphoblastic leukemia
- Completing a brief intervention survey (about 10 minutes)

To thank you for your time, study participants will receive a $20 gift card after completing the baseline survey and a $40 gift card after completing the intervention survey. You may opt out of any study activities or withdraw from the study at any time.

If you do not wish to participate, you may opt out by emailing *sleepallnight@dfci.harvard.edu* or calling us at 617-632-6221.

If we do not hear from you, a member of our study team will contact you by phone to provide additional details about the study and see if you are willing to participate.

Thank you for your consideration and please let us know if you have any questions about the study.

Sincerely,

- *Jimmy Fund Clinical Leadership*
- Eric Zhou, PhD and Kira Bona, MD, MPH (PIs)
- Lucille Lokko (primary study contact/CRC)
    - Email: sleepallnight@dfci.harvard.edu

13.5 **Appendix E.** Recruitment scripts.

Phone Call Script (Voice message for no answer)
"Hello. My name is _____, and I am part of the research study team. I am sorry that we were not able to reach you. Please call us back at 617-582-7607 at your earliest convenience. Thank you."

Phone Call Script (Recruitment)

"Hello. My name is _____, and I am part of a research study team at Dana-Farber and Boston Children's Hospital. Would now be an okay time to talk?

Thank you for taking the time to chat with me. Our team is conducting a study to learn more about how to reduce the risk of sleep problems during therapy for acute lymphoblastic leukemia. We know that about 1 in 3 children will wind up having some difficulty with their sleep during ALL treatment. You may have received a letter from us recently. The reason you are eligible for this study is because your child is receiving maintenance chemotherapy for ALL on or as per Dana-Farber Cancer Institute Protocol 16-001, and they are between the ages of 4 and 12 years. The goal of this study is to understand the acceptability and feasibility of the Sleep ALL Night intervention to help lower the chances that children will develop sleep problems during ALL therapy.

Would you be interested in hearing a little more about the details of this study?
[If no] Thank you for your time. We will not contact you about this study again.

[If yes] As you may have noticed in the pre-notice letter, there are three parts to this study. If you agree the participate, the first part of the study includes 1) completing a brief baseline survey (about 5 minutes); 2) talking with an oncology nurse navigator for 5-10 minutes about informational materials that are available to help families understand sleep during treatment for acute lymphoblastic leukemia; 3) completing an intervention assessment. As a thanks for your time, we will send you a $20 gift card after the baseline survey and a $40 gift card after completing the intervention assessment survey.

Do you have any questions about that or does this sound like something you would be interested in participating in?

[If no] Thank you for your time. We will not contact you about this study again.

[If yes] Great. If you do not have any questions right now, I can email you a copy of the study information sheet and we arrange a time to go over it to obtain your consent to participate. Please note that for this study, we will request your verbal consent, instead of asking that you sign a consent form.
May I have your email address?
Would you like to go ahead and set up a time to meet?

Thank you for your time today. Please know that you can contact our team via email or over the phone if you have any additional questions or concerns. Would you like me to give you the contact information?