



Practices to promote wellness during and after childhood cancer treatment

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This book is dedicated to all of the participants from Yoga Thrive for Youth.

We will always practice with you in our hearts.

Thank you for sharing your light.



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Part 1

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**Welcome to
Yoga Thrive
for Youth**

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Part 1: Welcome to Yoga Thrive for Youth



1. Introduction to Yoga Thrive for Youth
2. How to use this Manual
3. Meet the Models
4. Meet the Authors

Introduction to Yoga Thrive for Youth

Yoga Thrive for Youth (YTY) is a fun, beneficial, and safe program for pediatric cancer patients and survivors. The goal of this mind-body program is to improve participants' health and wellness by increasing physical fitness, cultivating greater self-esteem, and promoting relaxation. There are three main aspects of Yoga Thrive for Youth:

- **Breathing Practices:** Breathing practices enable participants to learn strategies to decrease anxiety, balance energy levels, and create a feeling of peace.
- **Mindful Movement:** Yoga poses provide opportunities for participants to learn body awareness and maintain physical function during and after cancer treatment. The poses are intended to develop physical strength, flexibility, and balance, as well as release muscular tension. By linking each movement with the breath, participants are better able to focus their mind. Mindful movement is also an opportunity to practice motor planning because participants learn to execute a series of steps for each pose.
- **Relaxation:** Relaxation offers participants an opportunity to rest and recharge by drawing their awareness inward and practicing stillness. Rest is important for all children and adolescents, and it can be especially beneficial if they experience fatigue or pain as a result of cancer treatment. Relaxation is included at the end of each yoga session. Relaxation practices can also be done independently to promote a feeling of peacefulness throughout the mind and body.

Collectively, these three aspects encourage participants to cultivate a stronger sense of connection with themselves and greater awareness of and control over their emotions. Yoga

Thrive for Youth emphasizes fun, non-competitive opportunities for participants to build greater self-esteem by discovering their inner potential. An underlying philosophy of the program is self-acceptance and compassion for where our minds and bodies are each day. Yoga Thrive for Youth also invites participants to practice at their own pace and move in and out of each posture with awareness. This form of attentive participation encourages them to learn and work within their physical capabilities and boundaries. This awareness can establish a foundation for children and adolescents to engage in other forms of activity, such as strength training and aerobic exercise. Finally, the practices taught in Yoga Thrive for Youth are tools that participants can draw upon throughout their day. For example, participants learn how to breathe more slowly if they are feeling anxious or worried, or use stretches if their back feels tense. These strategies are particularly beneficial when children and their parents must deal with emotional or physical stressors.

History of Yoga Thrive for Youth

Yoga Thrive for Youth is part of the Health and Wellness Lab, at the University of Calgary, directed by Dr. S. Nicole Culos-Reed. This laboratory is dedicated to researching the physical, mental, and emotional benefits of an active lifestyle for cancer patients and survivors. Yoga Thrive for Youth was started in 2012 as a study with pediatric outpatients from the Alberta Children's Hospital¹. This study found that participating in yoga for 12 weeks increased children and adolescents' quality of life, including mental, emotional, and social functioning. Practicing yoga also improved their physical functioning and flexibility. Based on these findings and positive feedback from participants and their families, the study transitioned into an ongoing community program.

Participants in Yoga Thrive for Youth range from 5 to 18 years old and have a wide range of pediatric cancers. Many of them attend yoga classes in between chemotherapy or radiation therapy appointments. Some of the participants with leukemia joined the program during their maintenance therapy. Regardless of when they started yoga, participants have all shared that practicing regularly helps them feel relaxed and grounded, and have a deeper sense of peace.

Why We Created this Manual

We created this manual because participants in Yoga Thrive for Youth have expressed a need for resources to use during their hospital stays or at home. Their parents have voiced a need for tools to support their children’s emotional well-being and physical health. We were inspired by their eagerness to practice yoga regularly and thus created this manual as an engaging, easy-to-navigate resource filled with yoga practices. We were thrilled that Yoga Thrive for Youth participants wanted to be models for the sequences and share reflections on why they enjoy yoga. They continue to infuse the program with creative yoga names and modifications for poses. It is our hope that this manual will be a source of motivation for you and your child to practice yoga, thereby promoting your children’s healing at the physical, emotional, mental, and spiritual levels.

References

1. Wurz A, Chamorro-Vina C, Guilcher GM, Schulte F, Culos-Reed SN. The feasibility and benefits of a 12-week yoga intervention for pediatric cancer out-patients. *Pediatric blood & cancer*. Oct 2014;61(10):1828-1834.

How to Use this Manual



It is wonderful that you and your child are interested in practicing yoga during or after cancer treatment. This manual is intended to be a resource for child and adolescent cancer patients and survivors, as well as their families. You do not need to have any background in yoga to use this manual. You and your child know your child’s needs, preferences, and abilities. This manual includes step-by-step instructions for a variety of practices that you can share with your child.

We have designed and shared a range of practices so that your child has an opportunity to do yoga each day. This can mean doing a three-minute breathing practice in the morning, visualization before bedtime, or a full sequence with several yoga poses – or combining breathing practices and yoga sequences. There are gentle practices focused on relaxation as well as practices intended to increase concentration and strength. The sequences are simple enough that they can be performed in a hospital room, or at home with minimal props and equipment.

As with all physical activity, **check with your child’s doctor before starting yoga to determine if yoga is appropriate for your child.** If your child has a physiotherapist or other rehabilitation specialist, you should also talk with them about yoga. While this manual is intended to promote overall wellness, it is not a supplement to professional rehabilitation.

The sections of this book are divided into a background on childhood cancer and yoga, followed by details about three types of practices – breathing, yoga sequences, and relaxation. This book is intended to be read in small sections and to offer practical approaches for promoting wellness throughout the cancer experience.

Starting in the next section, **Part 2: Yoga and Pediatric Oncology**, you will learn about the various types of cancers and treatments, as well as side effects relevant to practicing yoga. This

section also has information on the benefits of yoga, including scientific research on yoga during and after cancer treatment. The section *Guidelines for Practicing* outlines how your child can practice yoga at different points in time during the cancer treatment. This is an important section because it lists the special considerations, cautions, and modifications needed for various side effects that children and adolescents often experience during cancer treatment. Sections *Overview of Yoga Practices* and *Sharing Yoga with Your Child* outline practical considerations for starting yoga, including necessary props, as well as tips.

Part 3: Breathing Practices is a selection of practices that can be done individually or in combination with a yoga practice. Many of the breathing practices can be helpful to do before a medical procedure or before going to bed because they promote relaxation. Other practices are energizing and great to do for extra energy if your child feels tired.

In **Part 4: Yoga Practices**, you will discover a range of yoga sequences to build strength, increase balance, and promote relaxation. Before beginning any practice, we suggest that you read *About Yoga Practices* and *Key Poses and Modifications*. These sections outline options for modifying yoga for different physical needs (for example, doing yoga poses in a chair). Your child's energy can vary from day to day – and throughout the day. Some days she or he may feel stronger and on other days they may feel more tired. We suggest that your child does poses in a chair on days when their energy is lower; this will help prevent over-exhaustion. Once you are familiar with options for modifying yoga poses, review the lengths and purposes of each yoga practice. Thereafter, you and your child can select practices each day depending on how much time you have and what focus you want (for example, more relaxation or more balance). The yoga practices have step-by-step instructions with photos. We aimed to keep the instructions simple enough that adolescents could follow them after learning proper form with a parent. There are “*Tips!*” throughout the practices that offer ideas for how to make a pose easier or more challenging. Over time, you and your child will learn which variations of the poses are most enjoyable and beneficial for your child. See *Continuing Your Yoga Practice* for ideas on how to locate community classes or create your own home sessions.

In **Part 5: Relaxation Practices**, you will learn relaxation and visualization techniques to foster a sense of calm and inner-peace. While breathing and yoga sequences can also promote relaxation, these practices are even gentler and often performed at the end of a yoga sequence. They can also be done independently, just like the breathing practices, before your child goes to bed. Some relaxation practices are simple enough for your child to do independently, while others may be more beneficial if you or another family member reads aloud. We have specified these details before each practice.

Part 6: References has a list of medications and side effects, and a glossary of terms that are bolded throughout the manual (for example, medical terms). There is also a calendar to log yoga practices. It is important to record when your child practiced, for how long, and how they felt afterwards. This log can become a personal guide for selecting practices as well as monitoring progress for you and/or your health care professional (i.e., doctor or physiotherapist).

We hope that this manual will leave you and your child feeling inspired to practice yoga. Yoga is about promoting connection with oneself. It is a positive activity for your child to do as a means to promoting his or her own health. A very important benefit of practicing yoga regularly is that, over time, it empowers your child with practical tools that she or he can draw upon to change how they feel. There is also a special connection in sharing yoga with your child. Over time, you will create a unique practice that is practical for your family and your routines. Even better – all of the yoga poses are appropriate and beneficial for adults, so you can practice alongside your child and promote health and wellness benefits for yourself as well. We hope these practices provide you with a tangible resource for supporting your child through their treatments, as well as planting seeds for healthy patterns into survivorship.

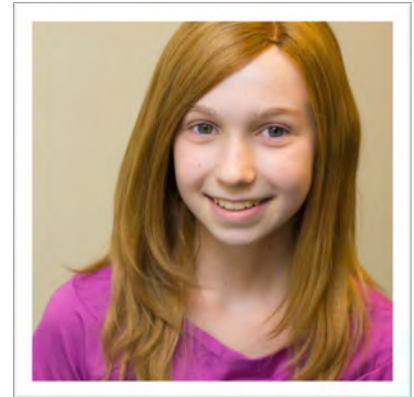
Meet the Models

Colette Benko

Age: 13 Diagnosis: Synovial sarcoma

What I like about yoga: It is fun and you can work at your own pace, so you can improve and challenge yourself as you get stronger and when you feel good. It is very relaxing so you feel refreshed afterward. You gain flexibility!

Why Colette's mom thinks yoga is a good activity: Yoga gives a comforting support in recovery. It brings quiet and calm to times when feeling unwell, and strength and confidence to days when a full yoga practice is possible. For Colette, I think it helps bring normalcy to her life as well as the feeling of doing something positive for her recovery.



Helen Liu

Age: 7 Diagnosis: Leukemia

What I like about yoga: I like how it relaxes me. I like how it makes my bones comfortable. My favorite poses are Mountain Pose and Triangle Pose.

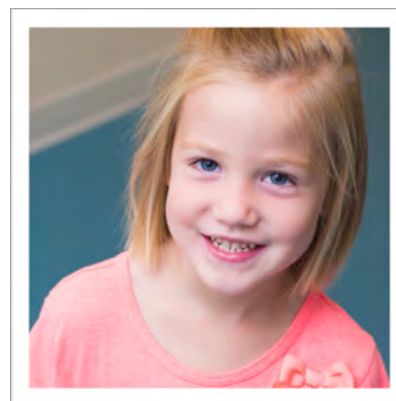
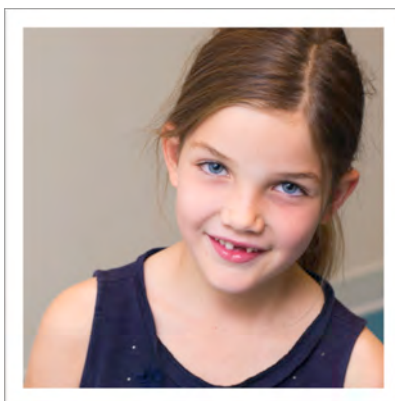
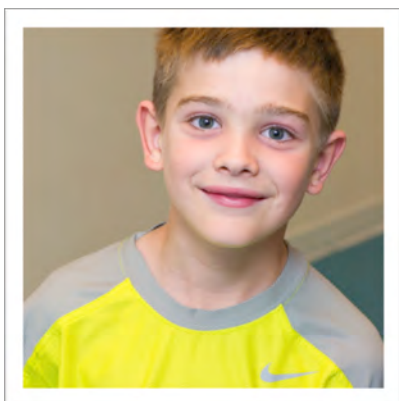
Why Helen's mom thinks yoga is a good activity: It helps Helen relax, stretch her muscles, and it relieves stress. Helen is motivated to do yoga to improve her health.



Meet the Models



Bennett, Lucie, and Maeve Killam



Bennett Age: 9 Diagnosis: Dyskeratosis Congenita

What I like about yoga: I love yoga because it is fun. The poses are really fun. I like the games in yoga. My favorite pose is Tree Pose.

Lucie Age: 7

What I like about yoga: I love to do poses. My favorite poses are Bridge, Tree, and Handstands.

Maeve Age: 4.5

Why their mom thinks yoga is a good activity: It is calming – it gives them strategies to calm down and relax. It is fun, varied, and interactive. They can do it on their own at home. They love to invent new poses. They are motivated to do yoga because they have enthusiastic instructors that keep them engaged.



Meet the Authors



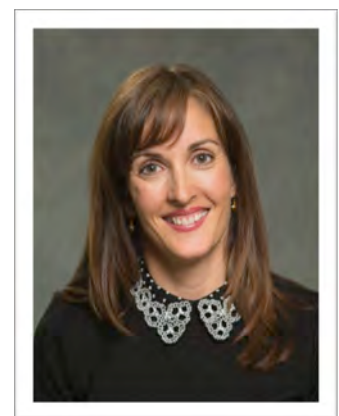
Robyn Long, Certified Yoga Instructor, MA

Robyn is a Yoga Thrive for Youth instructor and teacher trainer who has worked and studied in the Health and Wellness Lab since 2013. Robyn has more than 1,000 hours of training in teaching therapeutic practices for a range of conditions, including certifications from the Krishnamacharya Healing Yoga Foundation (Chennai, India), the New England School of Integrative Yoga Therapeutics, and Yoga Thrive for Cancer Survivors. Robyn has been teaching yoga to children for five years, including children with cancer and other chronic conditions. She leads workshops for yoga teachers internationally and developed a school-based yoga program for children with disabilities. Robyn holds a BA and a MA in International Development & Social Change from Clark University. She is passionate about combining her skills in yoga training with her global background by developing community yoga programs in low-resource settings. She is currently collaborating with pediatric oncology clinics in the Middle East to establish yoga programs and train local instructors.



S. Nicole Culos-Reed, PhD, University of Calgary, Calgary, Canada

Dr. S. Nicole Culos-Reed is an Associate Professor in Health and Exercise Psychology in the Faculty of Kinesiology, and Adjunct Associate Professor in the Department of Oncology in the Faculty of Medicine, University of Calgary. Dr. Culos-Reed also holds a Research Associate appointment with the Department of Psychosocial Resources, Tom Baker Cancer Centre. She created and runs the Health & Wellness Lab, which offers programming and researches the effects of physical activity for cancer survivors. The lab



focuses on utilizing an interdisciplinary perspective to understand and improve the quality of life of cancer patients and survivors. Specifically, the goal of her research is to develop physical activity programs that positively impact the myriad of physical and psychosocial factors that cancer survivors experience, ultimately enhancing their quality of life. Dr. Culos-Reed has been undertaking research on the benefits of yoga during and after cancer treatment since 2003. She was a member of the Scientific Committee for the International Association of Yoga Therapists' Symposium on Yoga Research (SYR; 2012-14). Dr. Culos-Reed is the Director of the Thrive Centre, a fitness facility for cancer survivors.

Gregory Guilcher, MD, FRCPC, FAAP, Alberta Children's Hospital, Calgary, Canada

Dr. Greg Guilcher received his BSc in Biochemistry at Queen's University and went on to complete his MD and residency in pediatrics at Memorial University. He then completed a Pediatric Hematology/Oncology/BMT fellowship at the University of British



Columbia with a focus in blood and marrow transplantation (BMT) and hematopathology. He has been an attending MD at Alberta Children's Hospital and faculty at the University of Calgary since 2007, and his clinical practice includes general pediatric oncology and BMT. Dr. Guilcher is currently a Children's Oncology Group (COG) Steering Committee member for Bioethics and Adolescent/Young Adult (AYA) Oncology and sits on the COG BMT Late Effects Taskforce. His research interests include exercise and pediatric oncology, late effects of BMT, BMT for sickle cell disease, and AYA oncology.

Part 2

Yoga and Pediatric Oncology

Part 2: Yoga and Pediatric Oncology

1. Overview of Childhood Cancer
2. Research on Yoga and Cancer
3. Guidelines for Practicing
4. Overview of Practices
5. Sharing Yoga with Your Child

Overview of Childhood Cancer*



Cancer is the growth of cells in which normal regulation has been altered or inactivated entirely¹. **Malignant** cells multiply without control, either due to abnormally increased growth signals or impaired mechanisms to slow or stop cell growth. Cancer cells often live beyond the normal life of a cell, yet do not grow into normal tissue structures and may even revert to a more primitive form of cell. Finally, cancer cells may not respect normal cell and tissue boundaries. They are prone to invade nearby tissues or enter the bloodstream to access distant sites – a process referred to as **metastasis**. These abnormal cells ultimately grow to cause a tumor or pressure effect on normal tissues, resulting in the symptoms and signs of cancer.

Cancer can exist as local disease in the area where the tumor originated, or as advanced disease that has spread to other areas of the body. Various staging systems have been developed, with more advanced staging representing more aggressive disease. Staging systems typically correlate with prognosis, with more advanced stages often requiring more intensive therapy. Some pediatric tumors (e.g., Hodgkin lymphoma and neuroblastoma) are further divided into low, intermediate, and high-risk groups to incorporate biological tumor markers. These categories correlate with prognosis and the need for less or more intensive interventions.

Childhood Cancer: How common is it? How common is cure?

Pediatric cancer comprises only 2% of all cancer cases, and the types of cancer seen in children differ from those diagnosed in adolescents and adults^{1,3}. Refer to *Figures 1.1* and *1.2* for a summary of common childhood cancers^{1,3-5}. While cancer is relatively rare in children, it remains the most common cause of death due to disease in children over the age of 1 year¹.

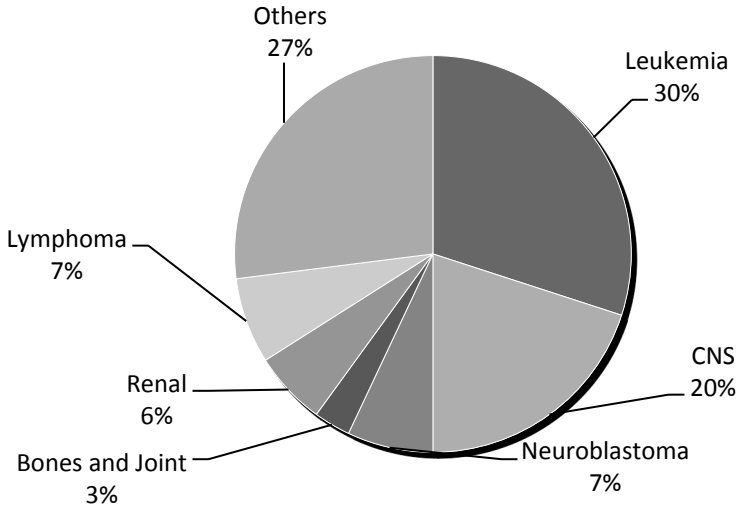
- Globally, 160,000 children under 15 years of age are diagnosed with cancer each year⁶.
- Approximately 1 in 7,000 children under 15 years of age in North America are diagnosed with cancer each year¹.

* This chapter has been adapted from Guilcher, G. (2014) *Chapter 1: Pediatric Oncology: An Overview*. POEM: Pediatric Oncology Exercise Manual. Eds. Chamorro-Vina, C.C. Keats, M. Culos-Reed, S.N. University of Calgary.

- In Canada, an average of 900 new cases per year are identified in those under 15 years, and 1,300 cases annually in children under 19 years of age ¹.
- The incidence is highest in children 3 years of age and younger.

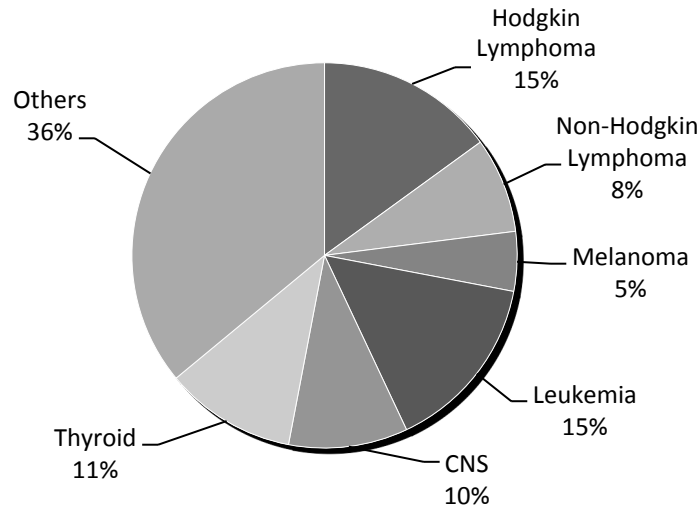
Leukemias and lymphomas are the most common malignancies diagnosed in children, followed by central nervous system (CNS) tumors then various solid tumors. Embryonal tumors (arising from immature tissue) are more common in children compared to adults, while carcinomas (arising from epithelial cells) are common in adults and are uncommon in the pediatric age range. Tumors of bone or muscle comprise a small proportion of childhood cancers, and can impact musculoskeletal integrity due to either the tumor itself or its treatment. This means that the bone and muscle structures may be weakened.

Figure 1.1 Cancer diagnoses in children 0-14 years of age, **2007 - 2011**.



Note. Data taken from ⁴. CNS: central nervous system tumor.

Figure 1.2. Cancer diagnoses in adolescents 15-19 years of age, **2007 - 2011.**



Note. Data taken from ^{4,5}. CNS: central nervous system tumor.

While the causes of most childhood cancers remain unknown, approximately 10% of cases are associated with a known genetic cancer predisposition ^{1,5,7}. There is a growing body of research exploring the role of the environment and its impact on human genes and gene expression. At present, most cases of childhood cancer occur for reasons we do not understand.

Cure rates for childhood cancer in high-income countries now exceed 80%, and there are approximately 30,000 adult survivors of childhood cancer in Canada ^{1,5,8}. It is estimated that one in 300 – 350 young adults in North America are survivors of childhood cancer ³.

Unfortunately, the reality is vastly different for children who live in low-income countries. More than 60% of children with cancer worldwide are unable to access life-saving therapies and treatments ⁹. As a result, childhood cancer survival rates are lower in these countries due to a lack of access to timely diagnosis, care, and essential medicines.

Treatment of Childhood Cancer and Implications for Yoga

Optimal treatment of cancer in children and adolescents often involves multiple types, or modalities of therapy. The goal of treatment is to maximize the chance of cure while minimizing both **short-term** and **long-term toxicities**. For those young people for whom cure is not

believed to be achievable, therapy can be given to prolong life and maximize quality of life (QOL) - a goal that is a cornerstone of medical practice.

Treatment modalities typically include one or more of chemotherapy, immunotherapy, surgery, radiation therapy, and hematopoietic stem cell transplant (HSCT). Therapies are chosen with consideration of multiple factors including the best published data regarding effective therapies for a given tumor and the associated risks for a given child or adolescent. Intensive supportive care has greatly improved survival for children with cancer but is associated with tremendous financial costs, as well as resources of time and space for provision of care. The prevention of complications of therapy such as physical deconditioning can allow for therapy to be more safely administered, as well as improve the quality of life of the child/adolescent undergoing treatment. Research has demonstrated that physical activity during and after childhood cancer treatment is one encouraging type of supportive care service that can alleviate treatment side effects and promote overall health and wellbeing. As discussed in the chapter *Research on Yoga and Cancer*, yoga is a form of physical activity that can help achieve these important goals.

Chemotherapy

Chemotherapy involves the administration of medicines by various routes to destroy cancer cells. Chemotherapy has historically referred to cytotoxic medications or those drugs that destroy cells. Unfortunately, many such therapies greatly impact cells in other healthy tissues, particularly cells that divide quickly such as skin, hair, and blood cells¹⁰.

Potential Side Effects

- ✓ Inhibit growth of health cells
- ✓ Fatigue
- ✓ Nausea
- ✓ Vomiting
- ✓ Diarrhea
- ✓ Immune suppression
- ✓ Loss of appetite

The combinations of chemotherapy drugs chosen and the doses given may require individualization, depending on the child's health and ability to tolerate the therapy. Many therapies often result in lower blood cell counts, such as **anemia** (low red blood cell or hemoglobin levels) which can cause low energy levels and **leukopenia** (low measures of white blood cells), which predisposes the child to infection. Other side effects relevant to yoga include muscular deconditioning, **osteopenia** (low bone mineral density), and fatigue. **Fatigue**, even

after cancer therapy has been completed, is common in children and youth undergoing chemotherapy. Several studies, including the large Childhood Cancer Survivor Study, have identified fatigue as not only common in survivors of childhood cancer through adulthood, but as an identified barrier to participation in physical activity¹¹⁻¹³.

There are several drugs with potential side effects relevant to yoga. Corticosteroids, commonly used to treat leukemias and lymphomas, cause central obesity (excessive fat around the stomach), muscle atrophy (muscle wasting), **osteopenia/osteoporosis** (bone weakening), and can even result in **osteonecrosis** (bone death)¹⁰. Vincristine and vinblastine are drugs used to treat many leukemias, lymphomas, brain and solid tumors. These drugs commonly cause **peripheral neuropathy**, which can be sensory (e.g., sensations on the skin are reduced or altered) or motor (e.g., the control of muscles) in nature. Methotrexate, used to treat many childhood cancers including leukemias, lymphomas and some bone tumors, can cause adverse effects on the central nervous system as well as osteopenia/osteoporosis. Some drugs such as bleomycin and nitrogen mustard compounds are toxic to the lungs and can result in oxygen-diffusion abnormalities and pulmonary fibrosis (scarring of lung tissue). It has also been well established that a class of drugs known as anthracyclines are known to cause numerous cardiac late effects, including cardiomyopathies (weakened heart), arrhythmias (irregular heart rate or heart rhythm), with the potential for cardiac failure. Future goals are to find more selective drugs with anti-tumor effect and fewer systemic side effects.

Radiation Therapy

Radiation can be a highly effective treatment modality for certain pediatric cancers¹⁴. It involves the use of photons, electrons, or protons with precision to target cancer cells. Radiation is typically used in combination with other forms of treatment, and consideration is given to the child's age and the area (or field) to be radiated.

Potential Side Effects

- ✓ Local tissue and/or skin inflammation
- ✓ Fatigue
- ✓ Atrophy of tissue within the radiation field
- ✓ Radiation-induced second malignancy
- ✓ Neurocognitive delay (for cranial radiation)

Radiation therapy is toxic to healthy tissues as well as cancer cells, so significant efforts are made to spare children from radiation whenever possible. Growth and normal tissue development can be significantly impacted. Cognition is vulnerable when the developing brain is exposed to radiation, and typically children under the age of three are spared cranial radiation. Blood vessels, muscles, and bones are also at risk, and each tissue has a different capacity to tolerate radiotherapy. Complex treatment plans are made to effectively treat the cancer while sparing healthy tissue as much as possible, with efforts to avoid tissues and organs that are particularly vulnerable such as the lungs or heart.

Cranial radiation carries the risks of growth and neurologic complications, and children who receive radiation to the brain are at greater risk for obesity^{15,16}. Learning issues might impact socialization and participation in organized activities. Radiation fields that include the lungs or heart can carry risks of scarring, and cardio-respiratory long term effects can impact the ability to engage in physical activity that stresses the cardiac and respiratory systems¹⁷.

Surgery

Surgery is often required for most solid tumors in order to maximize the chances of cure. Commonly resected lesions include CNS tumors, abdominal masses and musculoskeletal tumors. Primary tumors

or metastases in the chest may also require surgical resection. The morbidity of such a surgery depends on the specifics of each individual case, but often such operations are complex and require specialized expertise.

Potential Side Effects

✓ Many complications and side effects depend on the site of the tumor and specific surgical procedure

Communication between orthopedic surgeons, physiotherapists, and yoga instructors is essential to ensure the benefits of yoga are maximized while avoiding activities that may put musculoskeletal structures at risk. Pathological fractures (i.e., those related to the cancer) can have serious consequences both in terms of tumor control and resultant surgical interventions.

For example, an amputation might be required after a pathological fracture, whereas saving the limb might have been possible had the fracture been prevented.

Immunotherapy

Immunotherapy involves harnessing immune mechanisms and responses to destroy cancer cells. Such therapies are the focus of intense research, and are now becoming standard of care for diseases such as neuroblastoma and some lymphomas¹⁸⁻²⁰. The use of viruses to both destroy cancer cells directly and to prime the child's immune system to fight the tumor is of growing interest and entering the realm of clinical trials¹⁸.

Potential Side Effects

- ✓ Allergic reactions
- ✓ **Capillary leak syndrome**
- ✓ Immune suppression
- ✓ Risk of secondary lymphoma

Hematopoietic stem cell transplantation (HSCT)

HSCT involves the infusion of blood stem or progenitor cells to facilitate recovery from high doses of chemotherapy and/or radiation, or as a form of cellular therapy to correct an underlying blood or immune disorder. There are two types of HSCT:

Potential Side Effects

- ✓ Immune suppression
- ✓ Deconditioning
- ✓ Nutritional support often required
- ✓ GVHD for allogeneic HSCT
- ✓ Infertility
- ✓ Second malignancy

- **Autologous HSCT.** The stem cells may be re-infused into the same individual from whom they were collected. This strategy is typically used as a rescue from high doses of chemotherapy to allow such medication doses to be given safely and to facilitate recovery.
- **Allogeneic HSCT:** The donor and recipient of the blood stem cells are different people. This type is used to treat leukemias and to correct bone marrow failure (aplastic anemia) and various immunologic disorders.

Given the intensity of both autologous and allogeneic HSCT, physical deconditioning is common and efforts to study the potential benefits of physical activity to promote recovery and perhaps improve immune cell function are underway²¹⁻²⁴. In addition, such therapies involve prolonged

time in hospitals and outpatient clinics, with tremendous stress related to complications of such intensive therapy.

Allogeneic HSCT carries a unique complication called **graft versus host disease (GVHD)**, a condition in which the donor immune cells cause inflammation in host tissues that are identified as foreign ²⁵. In the acute form, GVHD can cause skin rash, diarrhea and/or liver abnormalities. While the chronic form is less commonly seen in children, it can be a devastating and a potentially fatal complication, which might require years of therapy before resolution ²⁶. Manifestations of chronic GVHD are many and can include fatigue, infection, anemia, joint stiffness, tightening of soft tissue structures with resultant decreased range of motion, as well as impaired lung function. Treatment of GVHD includes immune suppressing drugs, with steroids being one of the most effective agents. The side effects of corticosteroids can be significant, as previously discussed.

Late Effects and Childhood Cancer

As previously mentioned, cancer therapy can have significant long-term effects on the ability to maintain an active lifestyle. Toxicity to the cardiovascular system is the most common long-term effect seen in survivors of childhood cancer therapy ^{27,28}. Pulmonary toxicities might also impact a child's tolerance in physical activity ¹⁷. Fatigue is relatively common in childhood cancer survivors and is related to decreased activity, yet these survivors might be less symptomatic if physically active ^{11-13,29-31}. CNS tumors are commonly associated with long-term neurologic deficits and sequelae such as visual loss, gross and fine motor deficits which can clearly impact PA levels ^{32,33}. Muscle weakness from steroid exposure, surgery or radiation is clearly related to strength and conditioning. Bone integrity may be compromised, either from a primary bone tumor or a surgical procedure required to resect such a lesion.

Survivors of childhood **acute lymphoblastic leukemia (ALL)** are especially at risk of reduced bone mineral density, particularly due to steroid exposure with methotrexate implicated to a lesser extent ³⁴. The leukemia itself may damage bone integrity ³⁵. While all youth with a

history of ALL are prone to long-term bone health issues, females, adolescents and those who become deficient in growth hormone (often due to cranial radiation) are particularly at risk³⁶⁻³⁸. Sedentary lifestyle is a modifiable risk factor to prevent reduced bone mineral density^{32,39,40}.

Childhood obesity has become a global epidemic over the last decades and is now noted as one of the great public health challenges of the 21st century. Poor nutrition and excess “empty” calories from poor quality food has made this problem a reality in both economically affluent and economically poor countries. Children and adolescents with cancer who are also obese often experience increased toxicities of therapy and are less likely to tolerate and survive some cancer therapies^{41,42}. Moreover, survivors of childhood cancer who have received cranial radiation for leukemia are at higher risk of becoming obese or overweight compared to their healthy siblings¹⁶. Survivors of HSCT are also at greater risk of becoming relatively obese⁴³. Historic measures of obesity, such as **body mass index (BMI)**, may underestimate disproportionate body composition in cancer and HSCT survivors. Specifically, some survivors might have normal or low BMI, yet their bodies are low in muscle mass and relatively high in fat content, a state called **sarcopenic obesity**⁴⁴.

Summary of Cancer Therapy in Children

Although significant advances have been made in childhood cancer treatment, cancer therapy at present is, unfortunately, not without both short and long-term toxicities. In fact, few therapies are without acute side effects and such toxicities can be significant and life-limiting. **Supportive care** is critical in the provision of good cancer therapy, and advances in supportive care have resulted in some of the improved cure rates seen in childhood cancer therapy over the last 50 years⁴⁵. Extensive efforts are underway to identify children who need more intensive therapy while sparing children who can be cured with less toxic treatment¹.

Long-term effects of therapy are also common and often life-limiting in survivors of childhood cancer^{27,28}. While it is estimated that 60% of childhood cancer survivors will have at least one

long-term side effect of therapy, many have multiple long-term morbidities and as many as 27% having a life-threatening complication²⁸. Dedicated programs to follow survivors are essential in Canada and worldwide to address their many unique medical and psychosocial issues^{8,46}.

The Value of Yoga

Deconditioning in addition to musculoskeletal, cardio-respiratory and psychological side effects of a cancer diagnosis and therapy can make physical activity challenging and it may be viewed as not possible by someone undergoing therapy. However, physical activity is essential to promote wellbeing, to maximize the opportunity for cure, and to minimize the adverse effects of cancer and its treatment. Yoga is a safe and an ideal form of physical activity to achieve these goals, and allows for practice in almost any setting (inpatient, outpatient, home) as well as almost any stage of therapy and recovery.

Since yoga can be very gentle, it can be practiced when feeling fatigued, and may even result in less fatigue. Yoga poses can be modified for a range of medical situations, including practiced in a chair or lying down, rendering yoga a safe form of physical activity in any setting. Your child can benefit from participating in yoga. Refer to the chapter *Research on Yoga and Cancer* for an overview of potential benefits.

It is important to practice yoga carefully and take into consideration side effects your child may experience during treatment. As previously discussed, many side effects may put children at risk for fractures, loss of balance, or difficulty breathing. Refer to the chapter *Guidelines for Practicing Yoga* for details on necessary modifications before you and your child use this manual. This section discusses modifications necessary for balance, weight bearing, fatigue, and other side effects. The section *Key Poses and Modifications* has instructions and corresponding photos to illustrate safe modifications.

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Research on Yoga and Cancer



Yoga has gained recognition as an effective means to improve overall health as well as decrease symptoms of depression, anxiety, stress, and posttraumatic stress disorders ¹. Systematic reviews of yoga programs with pediatric populations demonstrate that yoga has been associated with significant neuromuscular, cardiopulmonary, musculoskeletal, and psychological improvements for children who were healthy as well as children with chronic conditions ^{2,3}.

Emerging evidence demonstrates that yoga is beneficial for both adult and childhood cancer patients and survivors. To date, four published studies have investigated the effects of yoga for children during and post cancer treatment ⁴⁻⁷. One study explored the effect of yoga on the health-related quality (HRQL) of life for pediatric survivors and found a significant improvement in child perceived physical function after five weeks of practicing yoga ⁵. In a chart review of pediatric patients who practiced yoga, findings revealed that yoga was an effective intervention for managing patients' pain and anxiety ⁶. Similarly, in a study investigating the acute effects of a single yoga class, researchers reported significant reductions in adolescents' anxiety through a pre-post test survey ⁷. Finally, in a 12-week yoga intervention, researchers from the Health and Wellness Lab, at the University of Calgary, demonstrated that yoga improved patient and parent reported HRQL, functional mobility, and hamstring flexibility ⁸. All of these studies had small sample sizes and short intervention periods, thus it is important that yoga research continues to build on these positive, initial findings.

While research on yoga and pediatric oncology is a developing field, a large body of evidence demonstrates that yoga is associated with significant improvements in the health and well-being of adult cancer patients and survivors ⁹⁻¹². Authors of one meta-analysis examined 10 randomized controlled trials (RCTs) exploring yoga's effects on the psychological health of cancer patients ¹¹. The authors concluded that participants in the yoga groups exhibited

significant improvements in anxiety, depression, and stress in comparison to participants in the control groups. Similarly, yoga has been found to benefit cancer-related fatigue. In a meta-analysis of yoga studies on fatigue and chronic diseases, researchers identified four yoga interventions on cancer that demonstrated significant improvements in cancer-related fatigue¹³.

Benefits of Yoga During and After Cancer Treatment

While the research is only beginning to emerge, it appears that similar to physical activity, yoga has the potential to offer both physical and psychological (mental and emotional) benefits to children both during and after cancer treatment.

Physical Benefits

The benefits of physical activity for childhood cancer patients and survivors are well-established (for more information, see the POEM manual and website¹⁴). While the role of yoga for physical benefits is only starting to be published, it appears there is the potential to improve the physical deconditioning that occurs with cancer treatment. In addition, the physical practice of yoga (i.e., the poses) may enhance flexibility, balance, body awareness (e.g., w/ regards to peripheral neuropathy) and motor planning (the ability to engage in a planned order of movements).

Mental and Emotional Benefits

The psychosocial benefits of physical activity in children during and after cancer treatment include mental health benefits (i.e., reductions of depression, anxiety, and stress), enhanced self-confidence and self-esteem, and potentially provision of emotional regulation. The limited yoga research in pediatric oncology to date potentially highlights the mental and emotional benefits, including calming of the mind and reduction of stress and anxiety. This can result in better sleep, a key aspect for controlling the fatigue experienced both during and after cancer treatment.

A key outcome often associated with yoga is the “connection” or “peacefulness” that may be experienced. While this is often difficult to understand, both anecdotal and some limited qualitative work indicates that yoga can provide both a sense of purpose and an opportunity for the participant to connect back to their body. This may result in reducing the sense of uncertainty that is often a part of the cancer journey, if only for the moments of practice, and a sense of peacefulness may be experienced. The postures, breath work, and relaxation components of yoga might all contribute to these potentially powerful benefits.

Further research is necessary to better understand the mental and emotional benefits of yoga in this population, but the preliminary research in adults suggests such benefits might occur via stimulation of the **parasympathetic nervous system**¹⁵. Regardless of the mechanisms, the sense of personal control that the child gains through practicing yoga and the enhancing of their self-efficacy (i.e., confidence) to use their body in a healthy manner can positively impact their overall sense of well-being and quality of life.

The Fun Factor

Clearly, yoga has the potential to provide both physical and mental/emotional benefits to your child during and after cancer treatments. The following sections in this manual highlight the importance of your child working at their “own pace”, and within the limitations that they might experience as the result of the immediate and long-term side effects of their cancer treatment. The beauty of yoga is that it can be adapted to meet any and all of these potential limitations, allowing your child to experience success in their yoga practice. This “success” doesn’t necessarily mean that they can do all poses to look exactly like the model. Rather, it means that they are connecting with their body, moving it in a healthy manner, and potentially achieving many of the physical, mental, and emotional benefits. When this occurs, the result is that your child will HAVE FUN during their yoga practice. And this FUN will be what makes them want to practice again...and again. So please enjoy the practice and have fun, either watching your child, or participating with them. All of the potential benefits that they can gain are available to you too!

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Guidelines for Practicing



Yoga is a safe and beneficial activity for children and adolescents during and post cancer treatment. There are, however, general precautions and modifications that should be accounted for depending on your child’s cancer diagnosis and any treatment-related side effects. The guidelines discussed below are based on available research, best practices in yoga therapy, and our experience with the Yoga Thrive for Youth program. As always, check with your child’s doctor prior to engaging in yoga to ensure it is appropriate.

General Areas of Caution and Modifications

Below is a list of general areas of caution and modifications. This section has been adapted from *Chapter 14: Yoga in Pediatric Oncology, POEM: Pediatric Oncology Exercise Manual* ¹.

Fatigue: There are several options for your child to practice yoga, even if they tire more quickly than they did prior to cancer treatment.

- ✓ Start with shorter yoga sessions such as the 5-Minute Relaxer or 7-Minute Wake Up.
- ✓ Do some or all of the poses in a chair (see *Key Poses and Modifications* for general ideas and the Chair Sequence). The Lying Sequence is also an excellent set of poses if your child is more comfortable practicing in bed or on the floor.
- ✓ Focus on yoga sequences that emphasize relaxation instead of strength or balance.
- ✓ Do a smaller number of repetitions for each pose.
- ✓ Do not hold poses for an extended period, as this requires more energy.
- ✓ Rest for 15 – 30 seconds between each pose.
- ✓ Never skip Relaxation Pose at the end of the yoga sequences, as this is when your child gets to absorb the benefits of their practice.
- ✓ Opt for breathing or relaxation practices instead of the active yoga poses.

Weight Bearing: Children and adolescents at risk of fractures or who have recently completed surgery for a bone tumor diagnosis should not do any weight bearing activity that has not been approved by their doctor. Follow these suggestions if you have approval to practice.

- ✓ Do some or all of the poses in a chair (see the section *Key Poses and Modifications* for general ideas and the Chair Sequence).
- ✓ Specifically, poses that require your child to place more weight on one foot than the other should be avoided or done in a chair. Poses in this book include Warrior 1, Warrior 2, Tree, Eagle, and Triangle.

Balance: Your child may experience dizziness, peripheral neuropathy, nerve weakness, altered sensation, or a general decreased sense of balance as a result of cancer and its treatments.

- ✓ Perform poses in a chair, or by placing hands on a chair or wall for support.
- ✓ Avoid moving up and down too quickly (with the head dropping below the heart) since this may affect balance or dizziness. To lessen the bend, your child can bring their hands to blocks or a chair instead of the ground. See the section *Key Poses and Modifications*.
- ✓ Cue your child to focus their gaze on the ground a few feet in front of them, or on one point directly in front of them.

Stiffness, Immobility, and Pain: If your child's joints are stiff or their muscles are tight, remind them never to go beyond what feels comfortable. It is important that yoga is not associated with pain. If your child experiences pain, it may be appropriate to talk with your doctor.

- ✓ Follow modifications for balance to promote increased stability.
- ✓ Avoid deep forward bends. The section *Key Poses and Modifications* has instructions and pictures for how to use blocks or chairs to modify forward bends.
- ✓ Avoid placing stress on key joint areas such as the knees or hips. Photos throughout the practice highlight safe alignment for the knees, such as in Warrior 1.
- ✓ Use a folded towel or blanket under the knees for kneeling poses.
- ✓ Do poses slowly with the breath as outlined in this manual.
- ✓ When holding standing poses, only do so for a short period of time.

Osteosarcoma, Ewing Sarcoma: There are additional considerations for practicing yoga if your child has had bone tumor surgery.

- ✓ Within the first few weeks of surgery, only do weight bearing as instructed by your bone surgeon. Follow the Weight Bearing suggestions above.
- ✓ Avoid extreme ranges of motion during the first few months after surgery.
- ✓ In instances of a total hip replacement, avoid hip flexion past 90 degrees (i.e., bending forward from the waist or raising a leg up to the chest). Poses in this book to avoid would include Forward Bend, Triangle, Twisting Triangle, Mountain Climber, Leg Raises, Knee Hugs, Grasshopper, Windshield Wipers, Cocoon to Butterfly, and Cat/Cow.

Practical Considerations: Your child can practice yoga if they have a central line catheter. We have not included any poses on the abdomen (e.g., Cobra) in this book because they require greater caution and are generally not comfortable with a central line. Your child can also practice very gentle, modified yoga poses while chemotherapy or hydration is administered intravenously. Recommended practices during this period include breathing practices, the Chair Sequence, or seated relaxation practices.

Other Modifications Relevant to Yoga

Inversions: Inversions are challenging poses and since many place excessive pressure on the head, should be avoided during and shortly after cancer treatment. This book includes only one inversion, Bridge Pose, which should be avoided if your child has recently had surgery or radiation therapy to their head or neck.

Breathing Practices: Any breathing practice should be stopped immediately if there is any difficulty breathing, tension or discomfort in the chest. This book does not include rapid yoga breathing practices, such as Kapalabhati (Shining Breath) or Bhastrika (Bellows Breath). We recommend that such practices be avoided entirely due to risks associated with cardiotoxicity.

Modifications for Specific Side Effects

The areas of caution mentioned above provide an overview of how to modify yoga for your child’s needs. The table below highlights potential side effects of childhood cancer treatment, symptoms relevant to yoga, and implications for practicing yoga. Refer to the section above for details on how to modify the practice. Information in this table has been adapted from Chapters 1 and 5 in POEM: Pediatric Oncology Exercise Manual^{2,3}.

Side effect and symptoms relevant to yoga	Implications for practicing yoga <i>(refer to the descriptions of modifications above for details)</i>
<p>Muscle deconditioning: loss of muscle mass</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> physical weakness, prone to early fatigue during yoga 	<ul style="list-style-type: none"> - Rest between poses throughout the practice - Modify weight bearing and balancing poses to provide increased support - Avoid holding standing poses for a prolonged period of time to prevent fatigue
<p>Osteopenia/osteoporosis: minor/severe loss of bone mass</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> Prone to fractures 	<ul style="list-style-type: none"> - Focus on balance and core strength - Modify weight bearing and balancing poses to provide increased support - Avoid or modify poses that involve rotation/twisting (e.g., Twisting Triangle), side-bending (e.g., Triangle Pose), or spinal flexion (e.g., Standing Forward Bend)
<p>Osteonecrosis: death of a portion of the bone, often affecting the hip or knees</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> pain, decreased mobility, joint replacement 	<ul style="list-style-type: none"> - Your physician may have specific recommendations and restrictions - Emphasize progressive flexibility - Stay within the affected joint’s range of motion - Modify weight bearing and balancing poses to provide increased support - Stop any poses when there is pain
<p>Peripheral neuropathy: damage to nerves, often in the hands or feet</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> can be sensory (impacting sensations to the skin) or motor (impacting how muscles are controlled); - Feelings of weakness, numbness, pain 	<ul style="list-style-type: none"> - Focus on balance and core strength - Modify weight bearing and balancing poses to provide increased support - Ensure rooms are at an adequate temperature and/or your child has layers of clothing - Stop any poses when there is pain

<p>Cardiotoxicity: cardiomyopathies (weakened heart muscle), arrhythmias (irregular heart rate or rhythm), or cardiac failure</p>	<ul style="list-style-type: none"> - Your cardiologist may have specific recommendations or restrictions - If symptoms are present, consult a trained healthcare professional prior to continuing yoga - Move in and out of poses with the breath - Emphasize breathing throughout each pose - Avoid holding the breath - Avoid rapid breathing practices as noted above - Stop any breathing practice if there is any difficulty inhaling or exhaling
<p>Anemia: low hemoglobin</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> weakness, shortness of breath, headaches, poor concentration 	<ul style="list-style-type: none"> - Rest between poses throughout the practice - Incorporate dynamic poses (moving in and out of a pose with the breath) - Avoid holding standing poses for a prolonged period to prevent fatigue - Take your time getting up when lying or sitting
<p>Leukopenia/neutropenia: low white blood cell count</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> predisposed to infection 	<ul style="list-style-type: none"> - Clean your yoga mat regularly - Ensure all other yoga props are sterilized - Follow proper hand-washing guidelines - Follow suggestions for fatigue
<p>Graft-versus-host disease: when cells from a donated stem cell graft attack the transplant patient's normal tissue</p> <ul style="list-style-type: none"> - <i>Symptoms/risks lined to the organ affected, can include:</i> joint swelling and stiffness, skin rashes, gastrointestinal pain, lung damage, muscle weakness in hips and shoulders 	<ul style="list-style-type: none"> - Emphasize gentle stretching to prevent joint stiffness but avoid extreme stretching - Gentle breathing and relaxation practices if lungs are affected - Avoid twisting poses if there is gastrointestinal pain - Progressively build endurance in the shoulders and hips (e.g., arms overhead in poses)
<p>Skin sensation: damage to nerves</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> decreased proprioception (knowing where one's limb is in space/movement without looking), increased sensation to pain 	<ul style="list-style-type: none"> - Provide support for balance and stability - Emphasize alignment so your child learns how to move their body in space - Be aware of rashes or sensitivity to any yoga props
<p>Ototoxicity: damage to cells within the inner ear</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> decreased balance and hearing 	<ul style="list-style-type: none"> - Provide support for balance and stability - Model poses with your child so they can see the pose and movement
<p>Hypertension: elevated blood pressure</p> <ul style="list-style-type: none"> - <i>Symptoms/risks:</i> elevated risk with corticosteroids, renal toxicity (damage to the kidneys) 	<ul style="list-style-type: none"> - Avoid holding the breath - Avoid rapid breathing practices as noted above

References

1. Wurz, A.J., Long, R.B., Arnason, T., Chamorro-Viña, C., Culos-Reed, S. N. (2014). Chapter 14: Yoga in Pediatric Oncology. POEM: Pediatric Oncology Exercise Manual, Eds. Chamorro-Vina C.C., Keats M., Culos-Reed, S.N., University of Calgary.
2. Guilcher, G. (2014). Chapter 1: Pediatric Oncology: An Overview. POEM: Pediatric Oncology Exercise Manual, Eds. Chamorro-Vina C.C., Keats M., Culos-Reed, S.N., University of Calgary.
3. Tanner, L., Kurt, Thompson, K. (2014). Chapter 5: Practical Aspects of Physical Activity in Pediatric Oncology. POEM: Pediatric Oncology Exercise Manual, Eds. Chamorro-Vina C.C., Keats M., Culos-Reed, S.N., University of Calgary.

Overview of Practices



Practices in this manual are grouped into three categories: breathing, yoga, and relaxation. The manual is designed so that you can select a practice based on how your child is feeling and how much time they have to practice. The practices are not progressive so you can try any of them at any point. We do, however, suggest that you read this overview and the “About” pages before each section before doing any practices since they highlight important considerations.

Your child can chose to perform only one practice, or combine a practice from two or all three categories. Some practices are excellent tools that your child can draw upon throughout their day. A practice such as Peace Breath, for example, could be practiced before a medical procedure to promote a sense of calmness. Similarly, your child could do the relaxation practice *Tense and Let Go* before bedtime in order to promote more restful sleep.

1. Breathing Practices

Breathing practices help focus and quiet the mind. They take only a few minutes to perform and can be done sitting, standing, or lying down. Each practice has a beginning section that tells you what the practice is good for (such as generating more energy or relaxing), where you can do the practice, and what to know before you begin.

- ✓ *What you need to practice:* Your child may feel most comfortable practicing in a chair. Your child can also sit on a folded blanket or pillow on the ground.
- ✓ *What to wear:* Your child can wear any comfortable clothing.

2. Yoga Practices

Yoga practices include a sequence of poses that range from gentle, therapeutic movements to more challenging poses for strength and balance. Practices range from five to 25 minutes. The beginning of each yoga practice starts with lists of the practice’s primary benefits/purpose, the approximate time needed, general modifications to consider, props necessary for a comfortable

practice, and abbreviations for cues. The time allocated for each sequence is an estimation that accounts for the active poses and a few minutes in the final Relaxation Pose. Your child can always stay in Relaxation Pose longer, or skip other poses if they are feeling tired. All of the poses have a suggested number of repetitions. Generally, this number ranges from three to five times. Start with a smaller number and increase gradually as your child's energy levels permit.

- ✓ *What you need to practice:* The following props will promote your child's safety and comfort in yoga. The section *Key Poses and Modifications* outlines how to use props.
 - A yoga mat can help your child practice standing poses without slipping. If you do not have a yoga mat, try standing poses on a nonslip surface and then use a towel or blanket for seated and lying poses.
 - The most essential prop is a chair, which your child can sit in for selected (or all) poses, as well as use for balance in standing poses.
 - A bolster or pillow to place under their legs while lying down. This is an excellent way to support their low back and hips.
 - A yoga strap can also be useful; a scarf or a belt are excellent substitutes.
- ✓ *What to wear:* Your child can wear any comfortable clothing that does not restrict movement. If comfortable, your child should practice without shoes and socks. Practicing barefoot promotes balance and prevents slipping in standing poses.

3. Relaxation Practices

Relaxation practices enable your child to rest and recharge. These practices range from five to 10 minutes. They are excellent to incorporate at the end of a yoga sequence, or perform as a stand-alone practice before bed. In the beginning, it may be helpful for you to read the practice to your child. Over time, your child may learn to do the shorter practices independently.

- ✓ *What you need to practice:* Any comfortable place to lie down and pillows to place under the head and legs. Your child may also want a blanket to cover up with.
- ✓ *What to wear:* It is important to be warm during relaxation, so your child may want to wear additional layers of clothing and socks.

Sharing Yoga with Your Child



Sharing yoga with your child is a wonderful opportunity for you both to engage in a positive activity during and after cancer treatment. It offers your child tangible tools for relieving some of the side effects they may experience as a result of treatment. Moreover, yoga practices are effective for redirecting your child's focus from their illness to their inner strengths and positive steps towards greater wellness. Yoga also creates space for you and your child to connect.

As previously mentioned, **check with your child's doctor before starting yoga to determine if yoga is appropriate for your child.** When you begin to use this manual, start with short practices to build your child's confidence and positively impact their energy levels. If your child feels tired because of the cancer treatment, they may feel discouraged if they cannot do a full yoga practice. Let them know that any and all practice – even one minute of yoga breathing – is beneficial for their health. They will be able to do more as their strength and energy returns. The tips below offer more detailed ideas on how to effectively share yoga with your child.

- ✓ **Approach** each practice with curiosity and openness. There is no defined way that your child should feel.
- ✓ **Build** in short periods of rest between poses (e.g., 15 to 30 seconds). This will promote mindfulness and help prevent fatigue.
- ✓ **Create** a routine with your child so that they develop a habit of practicing. This can vary with treatment schedules and side effects, but strive towards a regular practice as much as possible.
- ✓ **Cue** your child to breathe comfortably and, if possible, link each movement with their breath, as outlined in the photos.
- ✓ **Include** relaxation at the end of a yoga sequence. This is the time when your child gets to absorb the restorative benefits of their practice.

- ✓ **Integrate** short yoga practices into other daily events or activities. For example, doing a calming breathing practice before going to bed each night, or two stretches when waking up in the morning.
- ✓ **Invite** siblings or other family members to practice yoga as well.
- ✓ **Encourage** your child to do poses in a chair if he or she feels tired, and to take rest between poses as needed.
- ✓ **Experiment** with modifications. Your child knows what feels best in his or her body – and you know your child best.
- ✓ **Explore** a new practice each day – even a simple two-minute breathing practice can be beneficial for energy levels and focus.
- ✓ **Focus** on how your child feels in a pose instead of the form – the “feel” is more important than the “look”.
- ✓ **Give** regular positive affirmations – tell your child that they are healthy, strong, and balanced.
- ✓ **Model** poses for your child to help her or him learn alignment.
- ✓ **Practice** with your child! Then you will both experience the benefits of yoga.
- ✓ **Praise** your child for their courage to try something new and continue practicing.
- ✓ **Record** your child’s practices and make notes about how they feel afterwards.
- ✓ **Remind** your child that negative feelings will not last forever – everything they do during yoga helps them move towards greater health.
- ✓ **Stop** any practice if your child experiences pain, anxiety, or difficulty breathing, and consult their doctor.
- ✓ **Tailor** each pose to how your child feels that day.
- ✓ **Teach** your child basic anatomy so they learn to recognize what body parts are engaged in each pose.
- ✓ **Wait** one to two hours to practice yoga after a large meal.

Most importantly: Enjoy the time you have connecting through yoga!

Part 3

Breathing Practices

Part 3: Breathing Practices

1. About Breathing Practices
2. Balloon Breath
3. Bee Breath
4. Peace Breath
5. Flying Bird Breath
6. Sun Breath
7. Lotus Flower Breath
8. Extended Exhalation

About Breathing Practices



Breathing exercises are great tools you can use throughout the day. Some breathing exercises, such as *Balloon Breath*, promote relaxation. Others, such as *Sun Breath*, can help wake up the body and energize the mind. Each of the breathing exercises included describes the purpose of the practice, the best position to practice (e.g., sit or lie in), and how to do the practice.

Breathing Basics

The most important part of any breathing exercise is to **be comfortable**. Most of the breathing exercises can be done sitting, lying down in Relaxation Pose, or standing in Mountain Pose. If you are sitting for a breathing exercise, you can use a chair or sit on a pillow or folded blanket on the ground. Each breathing exercise has detailed notes on the best position.

Unless the directions say otherwise, try to breathe in and out through your nose. This allows you to breathe deeper into your belly and chest. It takes regular practice to learn how to breathe through your nose. If it doesn't feel comfortable then breathe through your mouth. Don't worry – it will get easier over time. A few other tips:

- ✓ Follow these cues in the practices:
IN = inhale (breathing in) EX = exhale (breathing out)
- ✓ Keep your back as tall as possible
- ✓ Let your shoulders be relaxed
- ✓ Do a breathing practice at the beginning or end of the yoga practice
- ✓ Try to do one breathing practice each day
- ✓ Use the Practice Chart to make notes about which practices you tried and what you liked

Areas of Caution

Stop any breathing exercise if you feel uncomfortable, dizzy, light-headed, or if it feels hard to breathe. Talk to your parents, nurse, or doctor to let them know.

Balloon Breath

What it's good for

Balloon Breath is a relaxing practice.

Where to do this practice

You can do Balloon Breath lying down in Relaxation Pose or sitting on the ground or in a chair.

What to know before you begin

If comfortable, breathe in and out through your nose during Balloon Breath. When you breathe in, visualize a balloon filling with energy. When you exhale, imagine that energy spreading throughout your entire body.

Let's practice!

1

- Sit in any comfortable position or lie down in Relaxation pose
- Close your eyes or lower your gaze

2

- Place your palms over your belly and begin breathing through your nose at a slow, comfortable pace

3

- **Inhale** feel your belly press into your hands and your chest expand

4

- **Exhale** feel your belly relax and drop away from your hands



IN
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5

- Repeat steps 3 and 4 a few times

6

- After you finish, take a few breaths at your own pace

Tip!

Practice Balloon Breath lying down before bed



Bee Breath



What it's good for

Bee Breath helps you buzzzzz your way to relaxation and have restful sleep.

Where to do this practice

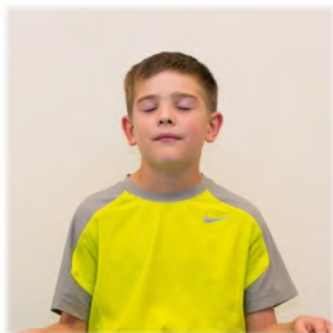
You can practice Bee Breath sitting on the ground or in a chair, or standing up.

What to know before you begin

In this practice you will make the sound of a honeybee. Try to make the sound at a low to medium level – but don't force the noise. Always keep your jaw and other face muscles relaxed.



Let's practice!



- 1 - Sit in any comfortable position
- Close your eyes, take a few breaths at your own pace
- 2 - **Inhale** through your nose
- 3 - **Exhale** through your mouth and make the sound of the letter "M", as if you are humming
- 4 - Repeat steps 2 and 3 a few times. Try to do it 6 times. Focus on the vibration in your throat.
- 5 - After you finish, take a few breaths at your own pace and slowly open your eyes

Try a new version!!

You can feel the humming sound even more if you gently block your ears.

- Bring your hands to your head.
- Use your thumbs to softly press down on the bump of hard skin between your cheeks and ears.
- Another option is to cup your palms over your ears like earmuffs.



Peace Breath



What it's good for

Peace Breath is a fun practice that teaches you a cool word in a new language. It will help you focus internally.

Where to do this practice

You can practice Peace Breath sitting on the ground, or in a chair, or standing up.

What to know before you begin

For this practice we will say the word "**Shanti**". Shanti means "peace" in Sanskrit. Sanskrit is a language from India. Shanti is the kind of peace where you feel calm AND happy!

How to say Shanti

Start by making the sound "shhh" and slowly saying "aawwn". Just like the name Shawn! Then say the word "tee", and make the "ee" sound at the end last a long time.



Let's practice!

1

- Sit on the ground or in a chair
- Close your eyes
- Breathe in and out slowly through your nose

2

- **Breathe in** and imagine that your heart is filling up with peace and joy

3

- **Breathe out** and slowly and softly say Shanti
- You can also say it silently

4

- Repeat several times
- Imagine your heart filling up with peace and then sharing that peace with others



Flying Bird Breath



What it's good for

Flying Bird Breath stretches and strengthens your arms and back while helping you relax at the same time.

Where to do this practice

You can do Flying Bird Breath standing up, or sitting on the ground, or in a chair.

What to know before you begin

In this practice you will coordinate your breath with each movement. With regular practice your movements will be as strong and smooth as an eagle flying over mountains.



Let's practice!



- Stand in Mountain Pose with your feet hip width apart, or sit in a chair



- Bring your hands together at your chest and take a few deep breaths



- **Inhale** through your nose and stretch your arms open. Your palms will face away from your body



- **Exhale** bring your palms back together at your chest



IN
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Tip!

You can bend your arms or straighten them. See what feels best for you!



- Repeat steps 3 and 4 a few times



- After you finish, take a few breaths at your own pace



Sun Breath



What it's good for

Sun Breath is an energizing practice that stretches your arms.

Where to do this practice

You can do Sun Breath standing up, sitting on the ground, or sitting in a chair.

What to know before you begin

When you do Sun Breath, visualize all of the brightness of the sun and the power it gives us and the world. You are gaining some of that power when you do this exercise.



Let's practice!

- 1 - Stand in Mountain Pose with your feet hip width apart or sit in a chair
- 2 - Bring your hands to your belly and make small fists as though you are holding chocolates in your palms
- 3 - **Inhale** through your nose and reach your arms high up to the sky
- 4 - **Exhale** out your mouth and say "HA!" while you bring your hands back down



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Tip!

You can bring your hands to your sides or down to your belly. Do what feels best for you!

- 5 - Repeat steps 3 and 4 a few times
- 6 - After you finish, take a few breaths at your own pace



Lotus Flower Breath



What it's good for

Lotus Flower Breath promotes relaxation. This is a great practice to do before bed or during Relaxation Pose.

Where to do this practice

You can practice Lotus Flower Breath lying down, sitting on the ground, or sitting in a chair.

What to know before you begin

Lotus flowers are some of the strongest flowers in the world. During the day, they open their petals to take in sunlight and energy. In the evening, they close their petals to rest and absorb strength from the sun's energy.



Let's practice!

1

- Get comfortable in any position, such as Relaxation Pose
- Close your eyes
- Bring your hands to your belly and take a few slow breaths through your nose



2

- Extend your hands out to your sides with your palms facing the sky

3

- **Inhale:** Open both of your hands and stretch your fingers out



4

- **Exhale:** Bring your fingertips together to close your palm

EX
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IN
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5

- Repeat as many rounds as you would like to do



Extended Exhalation



What it's good for

Extended Exhalation promotes focus by extending how long you breathe out. This is a great practice to do before bed or during Relaxation Pose.

Where to do this practice

You can practice Extended Exhalation lying down, sitting on the ground, or sitting in a chair.

What to know before you begin

The goal of this practice is to have a comfortable smooth exhale. You will slowly count as you breathe out. If it feels difficult or uncomfortable, then count to a lower number that day.



Let's practice!

1

- Get comfortable in any position, such as Relaxation Pose or sitting in a chair
- Close your eyes
- Bring your hands to your belly and take a few slow breaths through your nose



2

- Continue to focus on your breath. When you are ready, count your exhale. Use the table below as a guide. Only count to the number that feels good for you.

3

- Inhale slowly | Exhale, count 1, 2
- Inhale slowly | Exhale, count 1, 2, 3
- Inhale slowly | Exhale, count 1, 2, 3, 4
- Inhale slowly | Exhale, count 1, 2, 3, 4, 5



Complete each repetition 3 times until you find a comfortable number for your exhale

When you find your comfortable number, try to repeat 3 more times!

4

- When you finish counting, take a few normal breaths

Note: Never force an exhalation. It should never feel difficult to breathe. Just practice a smaller number if it feels difficult one day. It will become easier as you practice!

Part 4

Yoga Practices

Part 4: Yoga Practices

1. About Yoga Practices
2. Key Poses and Modifications
3. 5-Minute Relaxer
4. Head to Toe Stretching
5. Building Balance
6. Twist it Out
7. Side Stretching
8. Strength Sequence
9. Chair Sequence
10. Lying Sequence
11. 7-Minute Wake Up
12. Continuing Your Yoga Practice

About Yoga Practices



Yoga is an excellent form of physical activity to promote relaxation and improve physical well-being. Many yoga poses are intended to promote flexibility, balance, strength, and body awareness. Yoga poses are also a fun activity for participants to engage in with friends, siblings, parents, and other family members.

Each sequence in this manual has a specific focus, for example: twisting, balancing, or strengthening. Before each sequence there are a few notes:

- ✓ Benefits: The overall purpose of the sequence, such as balance or twisting.
- ✓ Time: How long the practice may take. There are practices ranging from 5 to 25 minutes. You can always extend the practice by resting longer in Relaxation Pose.
- ✓ Modifications: General modifications for that sequence. Always refer to the “Tips!” throughout the book as well as the list of yoga poses.
- ✓ Props: Most of the poses can be done with minimal props or simple items in your room such as a chair. The following section has a list of modifications to make poses more comfortable.
- ✓ Cues: Abbreviations for any cues listed, such as IN = Inhale and EX = Exhale.

The Breath and Movement in Yoga Poses

Linking the breath with movement in yoga helps to promote awareness and relaxation. If comfortable, inhale and exhale through the nose unless otherwise indicated. If this is difficult, then breathe through the mouth. The basic rule of thumb for linking breath and movement is:

- ✓ Exhale when you compress, or bring in, your stomach (for example, bend forward) or twist.
- ✓ Inhale when you expand the body (for example, reach your arms overhead or out).

Areas of Caution and Modifications

As with all physical activity, it is important to tailor yoga poses to your needs. What feels good one day might feel different another day. Keep a log so you can remember what poses you like and the

different variations you try. If you are currently undergoing or recently finished treatment, ask your doctor for permission to do any form of physical activity, including yoga poses. Refer to the section *Guidelines for Practicing Yoga* for details on modifications for treatment-related side effects.

The following section on Key Poses and Modifications has details on specific yoga poses. This is a general list of suggestions that applies to all poses:

- ✓ Balance: If you feel tired or dizzy, then modify poses by doing them against a wall, sitting on a chair, or touching a chair or wall for extra support and stability.
- ✓ Forward bends: Avoid moving up and down too quickly, and deep forward bends. If the backs of your legs feel tight, then bend your knees. You can also bring your hands onto a chair or blocks, or rest them on your thighs, to make a pose easier.

Other Tips for Your Practice

- ✓ The most important part of yoga is to be comfortable.
- ✓ Experiment with the poses so you can find a variation that you like.
- ✓ You can close your eyes in kneeling and lying poses to promote relaxation.
- ✓ Resting in between poses can help prevent you from getting too tired.
- ✓ Always rest in Relaxation Pose at the end of each practice. This is when your body absorbs all of the hard work you did earlier – so don't skip it!
- ✓ Try to do one breathing practice before or after your yoga sequence. Many of the breathing practices can be done in Relaxation Pose. Refer to the Yoga Breathing Practices chapter for details.

Most of all, HAVE FUN!

Key Poses and Modifications



The most important part of yoga is being comfortable and feeling stable. There are several ways to modify every pose – so you can always find something that you like! This section outlines modifications for most of the poses. There are also “Tips!” throughout each yoga practice that have ideas for more variations.

Mountain Pose

Purpose

- Beginning position for many poses
- A place to rest in between different standing poses

Pose Basics

- Your feet are hip width apart
- Big toes pointing forward
- Arms at your sides
- Palms can face in to your sides or to the front
- Keep your chin parallel with the floor



Chair Version

- Sit with a tall spine
- Rest your hands on your thighs
- Feet flat on the ground
- Use a block or blanket under your feet if they do not reach the floor



Expert Ideas!

- ✓ Keep your shoulders relaxed and your legs strong
- ✓ Practice building core strength by gently drawing your belly button towards your back
- ✓ Press your palms together to strengthen the muscles in your chest and back



Key Poses and Modifications

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Comfort Pose

- Purpose
- Beginning position for many seated poses
 - A place to rest in between different seated poses
 - A sitting position for breathing practices

Pose Basics

- Sit cross-legged on the ground
- Rest your hands over your knees or fold them in your lap with your palms facing up
- Keep your back tall and your shoulders relaxed
- Keep your chin parallel with the ground



On a Blanket

- It is important that your hips are equal to or higher than your knees. If your knees are pointing up to the sky, fold a towel or blanket and sit on the edge.
- This modification will help your body relax. It will also help you do sitting poses (such as Washing Machine) more comfortably.

On a Chair

- Sit with a tall spine
- Rest your hands on your thighs
- Feet flat on the ground. Use a block or blanket under your feet if they do not reach the floor



Expert Ideas!

Make a Mudra: A mudra is a hand gesture. Making a mudra is a great way to strengthen concentration because it takes focus to hold a mudra while you are in Comfort Pose.

Knowledge Mudra

- Bring the tip of your pointer finger to the tip of your thumb
- Rest with palms up to the sky or facing down to your knees



Key Poses and Modifications

Cat Cow Pose (Variation) – Kneeling

Purpose

- Stretch the back and relax the neck
- Transition from standing to sitting or lying down, or vice versa
- An excellent pose to do when you wake up or before you go to sleep because it relaxes your entire body

Start in Table Top

- Put a towel under your knees if the ground is hard
- Place your knees under your hips and your arms under your shoulders
- Keep your back long and flat
- Keep your belly pulled in gently towards your back
- You can have the shoelace side of your foot down or tuck your toes
- Close your eyes to make the pose more relaxing



- 1
- Reach your head and tailbone up to the sky
 - Draw the muscles together between your shoulders



- 2
- Round your back and move towards your heels
 - Keep your neck relaxed and bring your forearms to the mat

EX
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- When you move down, go in stages so that your back stays rounded – this will give you a nice stretch!
- When you move back up, simply come back into Table Top and then #1 to spread your shoulders open wide

Key Poses and Modifications

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Cat Cow Pose – Chair

Purpose

- Stretch the back and relax the neck
- Promote relaxation through gentle movements
- An excellent pose to do when you wake up or before you go to sleep because it relaxes your entire body

Start in seated Mountain Pose

- Sit comfortably on a chair
- Feet flat on the ground; use a block or blanket under your feet if they do not reach the floor
- Rest your hands on your thighs
- Sit tall with the top of your head towards the sky
- Your chin is parallel to the floor
- Close your eyes to promote relaxation



- 1
- Tilt your chin and nose up to the sky
 - Draw your chest forward
 - Draw the muscles together between your shoulders
 - Move your elbows to the wall behind you
 - Slide your hands towards your body

- 2
- Round your back
 - Draw your chin towards your chest
 - Lengthen your arms
 - Slide your hands towards your knees
 - Keep your neck relaxed and your head heavy



EX
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Key Poses and Modifications

Forward Bend

Purpose

- Stretch the back and legs
- Relax the head and neck

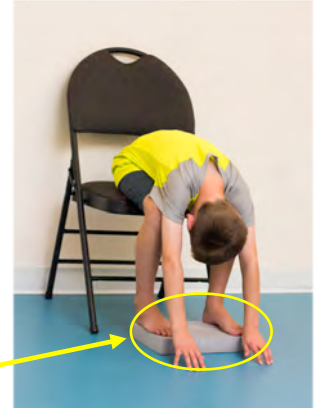
Pose Basics

- Feet are hip width apart with big toes pointing forward
- Arms reach down to the ground, or hold your legs
- Belly moves towards the chest
- Head stays relaxed



Chair Version

- Sit back far enough so that you are stable
- Bring your hands down your legs or to the floor
- Use a block or blanket under your feet if they do not reach the floor



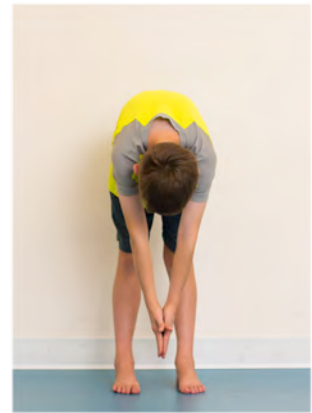
Try these variations!



Supported: use blocks or a chair under your hands



Rag Doll: hands hold opposite elbows



Elephant: stretch your arms down and together

Watch your knees!

You can bend your knees as much as you want



Don't lock your knees

Key Poses and Modifications

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Relaxation Pose

Purpose

- The final resting position at the end of a yoga practice
- Beginning position for many lying poses
- A place to rest in between different lying poses
- A position for most relaxation practices and some breathing practices

Pose Basics

- Lie on your back with your legs extended out and slightly apart
- Extend your arms out, slightly away from your body, palms facing up
- Place a towel under your head if the ground is hard



Focused Breathing

- Rest your hands over your stomach
- You can also have one hand over your heart and the other over your stomach
- Feel your stomach and chest rise when you breathe in
- Feel your stomach and chest relax when you breathe out



Knees Up

- This version relaxes the low back
- Bring your knees up and the bottoms of your feet onto the mat
- Take your feet wide apart
- Drop your knees in so they lean against one another



Supported Relaxation Pose

- This version relaxes the low back
- Place a rolled blanket, pillow, or another yoga mat under your thighs
- Drop your knees in towards one another



Key Poses and Modifications

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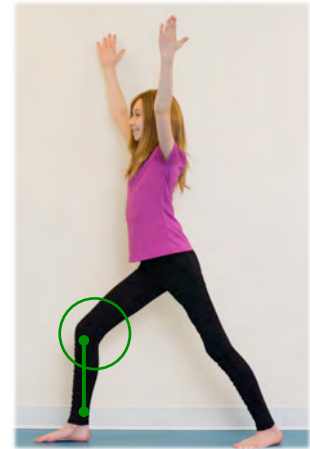
Warrior 1

Purpose

- Strength building pose
- Works your arms, shoulders, back, and legs

Pose Basics

- Keep your feet hip width apart
- Bring one foot forward
- Your front foot points forward and your back foot is turned out slightly
- Your front knee is bent over – but not beyond – your ankle
- Your arms are raised, shoulder distance apart or more
- Keep your back leg strong and your shoulders relaxed



- ✓ Your knee is above your ankle and not forward

Try these variations!



- If your shoulders are tired, bring your palms to your chest



- If you want to work on back strength, bring your arms into Cactus Pose, palms facing forward
- Keep your elbows in line with your wrists

Seated Warrior

- You can do Warrior 1 in a chair, which is a great option if you feel tired or cannot bear weight on one or both legs.
- Sit in a chair and do the arm movements – this is an excellent way to stretch and strengthen your upper body!

Key Poses and Modifications

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Warrior 2

- Purpose
- Strength building pose
 - Works your arms, shoulders, back, and legs

Pose Basics

- Your feet are wide apart and heels are lined up
- Your right foot points to the right
- Your left foot points slightly towards the right too
- Bend your right knee so it is just over the right ankle
- Bring your arms into a "T"
- Keep your shoulders over your hips – don't reach too far forward
- Look over your right middle finger
- Keep your chin parallel with the mat
- Keep your weight even between both feet and your back leg strong
- If your low back is swaying, try taking a bigger step!



- ✓ Your knee is above your ankle and not forward (green line)
- ✓ Your heels are lined up (yellow line)

Try these variations!

Warrior 2 – Chair Version

- The set up is just like standing Warrior 2, except your front thigh and pelvis rest on a chair
- Place blocks or folded towels under your feet if they do not reach the ground

Give the shoulders a break!

- If your shoulders are tired, bring your palms to your chest – just like in Warrior 1



5-Minute Relaxer

About	This practice has movements to wake up the arms, neck, and back. It is a great practice to do in the morning as well as the evening.
Time	5 minutes
Modifications	<ul style="list-style-type: none">- You can do this sequence sitting on the ground or in a chair.- You can keep your eyes closed to promote relaxation.
Props	<ul style="list-style-type: none">- A blanket or chair to sit on
Cues	IN = Inhale EX = Exhale

1 Comfort Pose



- Sit in any comfortable position and take a few breaths at your own pace

5-Minute Relaxer

.....

2 Comfort Pose with Arm Stretches

Remain seated in Comfort Pose.



IN
→

EX
←



Repeat
5
times

- Rest with hands over the knees
- Tuck your chin slightly down to your chest

- Sweep arms up from the sides and overhead
- Bring your chin up and parallel to the mat
- Your hands can be together or wide apart

3 The Great Seal Pose (Variation)

Remain seated in Comfort Pose. Turn your stomach and chest to face your left leg. Place your right hand on your left knee, and your left hand on top.



IN
→

EX
←



Repeat
5
times

- Tuck your chin to your chest and keep your spine long

- Lift your chest, chin and nose up slightly

Tip!

If it is uncomfortable to have your hands on your knees then bring them up your leg and closer to your body.

5-Minute Relaxer

.....

4 The Great Seal Pose (Variation)

Repeat on the opposite side by turning to your right. This time the left hand goes down first, right hand on top.



IN
→



Repeat
5
times

- Tuck your chin
towards your chest

- Lift your chest, chin
and nose up slightly

5 Eye Palming

Rub your palms together to create warmth between your hands. Gently cup them over your eyes. You can close your eyes when they are covered.



Repeat
3 - 5
times

6 Relaxation Pose

Rest for a few minutes in your favorite version of Relaxation Pose. You can do Lotus Flower Breath here too.



Rest here
as long as
you want

Head to Toe Stretch

- Benefits** This practice stretches everything from your head to your fingers and toes.
- Time** 20 minutes
- Modifications**
- All of these poses can be done in a chair.
 - See the full list of Chair Poses for more ideas.
- Props**
- A blanket or towel to fold under your knees
 - A chair bench to sit on
- Cues** IN = Inhale | EX = Exhale

1 Comfort Pose and Breathing



- Sit in any comfortable position and take a few breaths at your own pace
- Close your eyes to focus on your breath

2 Seated Side Stretch



- Take a deep breath in and stretch one arm overhead
- Switch and do the other arm

Head to Toe Stretch

.....

3 Spider Fingers

Bring the bottoms of your palms together and open your hands. Starting with the thumb, press the tips of each finger together to close your hands. When you get to the pinky finger, go backwards to open your hands again.



Try starting at the thumbs a few times, then switch and try starting to close your hands from the pinky finger first.

4 Palm Presses

Press your palms together and point your shoulders to the sides.



EX
→

IN
←



Repeat
5
times

- Point your fingers straight ahead and draw your shoulder blades together

- Turn your fingers in towards your chest so your elbows reach up and away

Head to Toe Stretch

5 Shoulder Shrugs



- Bring your shoulders up towards your ears

EX
→
IN
←



- Draw your shoulders to the wall behind you and down

Repeat
5 times

6 Wrist Circles



- Roll your hands in towards one another five times



- Roll your hands away from one another five times

Repeat
5 times
in each
direction

7 Shooting Star (Seated)



- Press your palms together with fingers pointing up

IN
→
EX
←



- Reach your arms up from the front
- You can separate your hands if it feels better

Repeat
5 times

Head to Toe Stretch

8 Ankle Stretches



- Point your toes to the sky

IN →
EX ←



- Point your toes to the floor

Repeat 5 times then switch feet

Tips!

✓ Use blocks or a blanket under your feet if they don't reach the floor when you sit in a chair.

✓ You can do ankle stretches on the floor too. Sit on a folded blanket for extra comfort.



9 Kneeling Lunges

Place a folded towel or blanket under your knees if the ground is hard. This pose requires balance. If you wobble a little, just take your front foot out more so you have a wide base.



- Bring one foot forward

IN →
EX ←



- Reach your arms up with hands wide apart

EX →
IN ←



- Bring palms together overhead

Repeat 5 times then switch legs

Head to Toe Stretch

.....

8 Sun Breath

Stand in Mountain Pose with your feet hip width apart.



EX
→



IN
←

Repeat 5 times

Tip!

You can bring your hands to your sides or down to your belly. Do what feels best for you!

- Reach your arms high up to the sky

- Say "HA!" while you bring your hands down

9 Mountain Climber Pose

Keep your stomach and back muscles strong in this pose. Switch practicing from one side to the other side on each turn.



IN
→



EX
→



IN
←

Try to stay in the final pose a few breaths

- Focus on the muscles around your stomach

- Reach one arm up to the sky

- Lift the opposite knee up and balance

Tips!

✓ You can do this pose in a chair if you feel tired or do not want to balance standing up.



✓ **Don't** point your toes down. Keep the bottom of your foot facing the floor.



Head to Toe Stretch

.....

10 Warrior Pose

Start with your left leg forward and your feet hip width. Turn your back foot out to the side slightly. Keep your back leg strong in this pose.



- Stand with your arms down at your sides

IN →
EX ←



- Raise your arms up from the front and bend your front knee



✓ Keep your knee above your ankle and not forward

Repeat 5 times, then repeat the other side

Tip!

11 Forward Bend, Rag Doll Variation



- Stand in Mountain Pose with your feet hip width

IN →
EX ←



- Raise your arms up from the sides

EX →
IN ←



- Bend forward and hold your elbows

Repeat 3 times

Tips!

- ✓ Try these variations of a Forward Bend.
- ✓ Be sure to keep your knees bent!



Head to Toe Stretch

.....

Transition to the ground from Rag Doll. Bend your knees and place your hands on the ground. Walk your hands forward and bring your knees onto the mat. Rest on the ground by lying on your back. Take a few deep breaths.

12 Reclined Head to Toe Stretch



- Extend your legs and rest your arms by your sides

IN
→

EX
←



- Stretch your arms overhead and reach your fingers and toes in opposite directions

Repeat
5
times

13 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→

EX
←



- Extend your arms so your knees move away from your chest

Repeat
5
times

Head to Toe Stretch

14 Relaxation Pose

- Take any variation of Relaxation Pose that you want.
- **Legs:** You can rest on your back with your legs extended out. Or you can place a pillow under your thighs.
- **Hands:** Extend your arms out with palms up to the ceiling. Or place them over your belly.
- Close your eyes and breathe at your own pace.

Rest as long as you want in Relaxation Pose.



Try doing Lotus Flower Breath in Relaxation Pose



- **Inhale:** Open both hands and stretch your fingers out.

EX
→
IN
←



- **Exhale:** Bring your fingertips together to close your palm.

Building Balance

Benefits This sequence builds balance by strengthening the muscles around your stomach, back, and ankles.

Time 20 minutes

Modifications

- You can do this sequence sitting on the ground or in a chair.
- You can keep your eyes closed to promote relaxation.

Props

- A blanket or towel to fold under your knees
- A chair or wall to rest your hand on for balance

Cues IN = Inhale | EX = Exhale

1 Comfort Pose and Breathing



- Sit in any comfortable position and take a few breaths at your own pace
- Close your eyes and focus on your breath

Building Balance

.....

2 Cat/Cow Pose

Start in Table Top with your knees under your hips and your arms under your shoulders. You can have the shoelace side of your foot down or tuck your toes.



EX
→

IN
←



Repeat
5
times

- Reach your head and tailbone up to the sky
- Draw the muscles together between your shoulders

- Round your back and move towards your heels
- Keep your neck relaxed and bring your forearms to the mat

3 Sunbird Pose

Start in Table Top. Keep your stomach strong as you try these four variations of Sun Bird. Feel free to rest in Child's pose before you do the other side.



- A** - Extend your right leg behind you with toes on the ground



- B** - Lift the leg off the ground and keep the toes pointing down

Stay in
each
version
for a
few
breaths



- C** - Extend your left arm in front, point your thumb up to the ceiling



- D** - Extend the opposite arm and leg out – keep your core engaged!

Building Balance

4 Child's Pose



- Rest in Child's Pose for a few breaths
- Open your knees so your stomach has space

5 Mountain Pose



- Stand with your feet hip width apart, toes pointed forward
- Take a few breaths with your hands at your heart

6 Moving Mountain



- Stand in Mountain Pose with your arms down



- Raise your arms up from the sides and lift up onto the front of your feet

Repeat
5
times

Tip!

- ✓ **Don't** roll on the outside edges of your feet like this photo



- ✓ Press down through your big toes and keep your legs strong – just like the photo above

Building Balance

.....

7 Warrior Pose

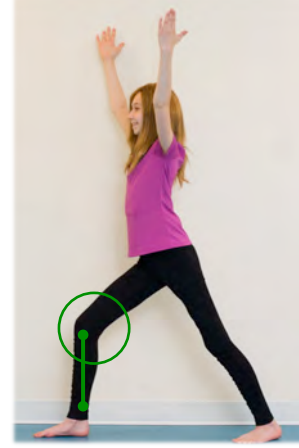
Start with your left leg forward and your feet hip width. Turn the toes on your back foot out to the side. Keep your back leg strong in this pose.



IN
→



EX
←



Repeat
5
times,
then
repeat
the
other
side

- Stand with your arms down at your sides

- Raise your arms up from the front and bend your front knee

✓ Keep your knee above your ankle and not beyond it

Tip!

8 Tree Pose

Start in Mountain Pose with your feet hip width apart. Bring your hands to your hips or press your palms together. Imagine growing roots through your feet into the ground. Try one or all of the Tree Pose variations below then switch sides.

A



- Place your left heel against the other ankle
- Point your left knee to the left side of the room

B



- Place the bottom of your left foot against the other calf

C



- Place the bottom of your left foot against the inside of the other thigh

Tips!

✓ Keep your gaze on the ground in front of you; this will help you balance.

✓ You can keep your hands at your chest or on your hips if you feel tired. Taking them up is a balance challenge!

Building Balance

.....

9 Forward Bend, Rag Doll Variation



IN
→



EX
→



Repeat
3
times

- Stand in Mountain Pose

- Raise your arms up from the sides

- Bend forward and hold your elbows

10 Transition to the floor

- Come down to the ground and sit in any comfortable position for a few breaths

Tip!

✓ Bend your knees if your legs feel tight



11 Boat Pose



EX
→



IN
←

Stay in Boat Pose a few breaths. Repeat 2 -3 times.

- Place hands behind you, fingers pointing forward

- Lift your feet off the ground as you engage your stomach

Tips!

✓ Rest your feet on a block if you feel tired or this is a new pose



✓ Keep your back tall and chest lifted



✓ You can try holding the back of your thighs to practice with no hands!

Building Balance

12 Seated Butterfly Pose



- Bring the bottoms of your feet together
- Let your knees drop out to the sides
- Hold your feet, ankle, or shins
- **Inhale** reach your head to the sky
- **Exhale** relax your shoulders
- Repeat reaching up and relaxing a few times

Tips!

- ✓ Your knees can be closer to the ground or higher up – it's what feels best for your legs!
- ✓ Sit on a folded blanket to help your posture
- ✓ You can gently move your knees up and down – like butterfly wings!

13 Relaxation Pose

- Rest on your back with your legs extended out
- Or, bring your feet on the mat, wide apart, and drop the knees in towards each other
- Take a few deep breaths to let yourself rest after the balancing poses



14 Grasshopper Pose



IN
→

←
EX



Repeat
3 - 6 times
on each
side.

Switch
sides each
time!

- Bring your knees into your chest with one hand over each knee

- Extend one leg to the sky and the opposite arm overhead

Building Balance

.....

15 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→
EX
←



- Extend your arms so your knees move away from your chest

Repeat
6
times

16 Relaxation Pose

- Do any variation of Relaxation Pose that you want.
- **Legs:** You can rest on your back with your legs extended out. Or you can place a pillow under your thighs.
- **Hands:** Extend your arms out with palms up to the ceiling. Or place them over your belly.
- Close your eyes and breathe at your own comfortable pace.



Rest as long as you want in
Relaxation Pose.

Twist it Out

Benefits This sequence twists tension out of your shoulders and back.

Time 15 minutes

Modifications

- Be careful when you twist – don't twist too much. If something doesn't feel good in your neck or back then stop the pose.
- Let out a deep breath when you twist into a pose.
- Almost all of these poses can be done in a chair.

Props

- A blanket or towel to fold under your knees
- A chair if you want to sit in some or all of the poses

Cues IN = Inhale | EX = Exhale

1 Comfort Pose and Breathing

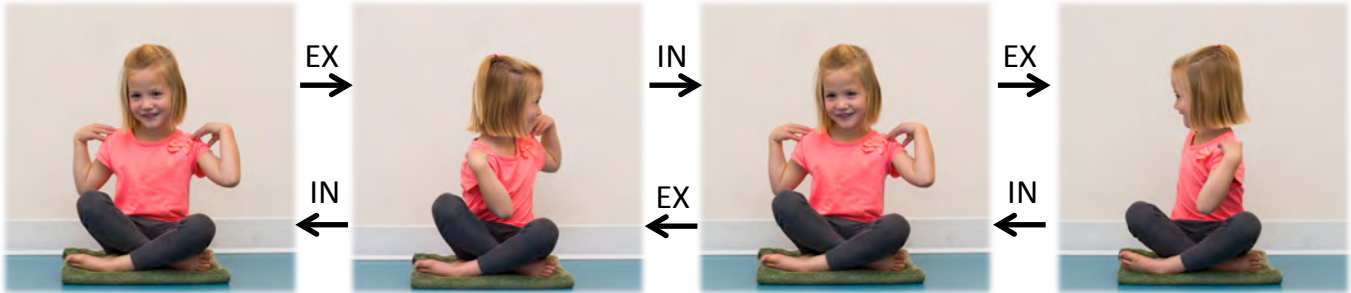


- Sit in any comfortable position and take a few breaths at your own pace
- Close your eyes to focus on your breath

Twist it Out

2 Washing Machine

Bring your fingertips onto your shoulders and point your elbows to the sides.



- Reach your elbows out to the side

- Twist to one side as you breathe out

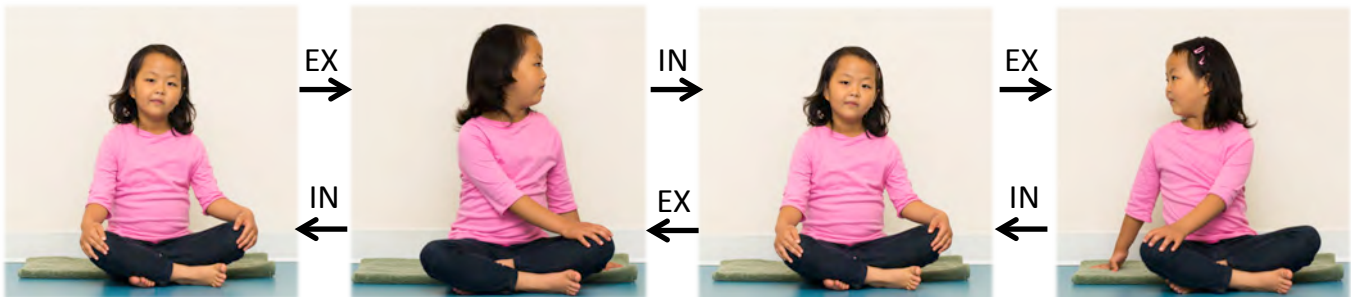
- Come back to center

- Twist to the other side

Twist to each side 4 times

3 Owl Pose

In this twist focus on turning to look over your shoulder. You can place an arm behind you for more stability in the pose.



- Rest your hands over your knees

- Reach one hand to the opposite knee and twist

- Bring your hands back to center

- Twist to the other side

Twist to each side 2 times
Stay in the twist for a few breaths

Try the poses in a chair!

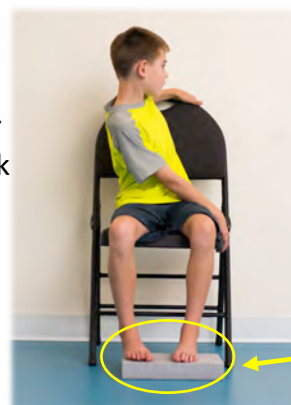
A

- Cross your arm over your opposite leg
- This version is a gentle twist



B

- Hold the chair with your back hand
- This twist is deeper – do it carefully



- Keep your feet flat on the floor.
- Use a block or fold a towel if needed.

Twist it Out

4 Cat/Cow Pose

Start in Table Top with your knees under your hips and your arms under your shoulders. You can have the shoelace side of your foot down or tuck your toes.



EX
→

IN
←



Repeat
5
times

- Reach your head and tailbone up to the sky
- Draw the muscles together between your shoulders

- Round your back and move towards your heels
- Keep your neck relaxed and bring your forearms to the mat

5 Mountain Pose



IN
→

EX
←



Repeat
5
times

- Stand in Mountain Pose with your feet hip width apart
- Take a few breaths before beginning the arm movement

- Stretch your arms to the sky as you take in a deep breath
- Stay balanced between both feet!

Tips!

✓ Keep your shoulders relaxed as you reach up

✓ You can keep your arms wide apart (like you are holding a beach ball) if that feels better for your shoulders

Twist it Out

6 Windmill Pose

In this pose you bend forward and twist at the same time. Keep your knees slightly bent throughout the pose – this will protect your back leg muscles from overstretching.



- Stand with your feet wide apart and your big toes pointing forward



- Extend your arms out into Star Pose

EX
→

←
IN



- Bring one hand under your shoulder and the other overhead

Tips!

- ✓ The palm of your top hand and your nose face the same direction

- ✓ Rest your bottom hand on a block if it is difficult to touch the floor

- ✓ Don't have a block? Use a chair! Or take your bottom hand to the opposite thigh

After you twist to one side, return to Star Pose and twist to the other side. Twist to each side 4 times.

7 Forward Bend, Rag Doll Variation



- Stand in Mountain Pose with your feet hip width

IN
→

←
EX



- Raise your arms up from the sides

EX
→

←
IN



- Bend forward and hold your elbows

Repeat
3
times

Twist it Out

Transition to the ground from Rag Doll. Bend your knees and place your hands on the ground. Walk your feet back and bring your knees onto the mat.

8 Child's Pose



OR



- Rest in Child's Pose for a few breaths. You can have your hands behind you or out in front. Keep your knees apart so your belly has someplace to rest.

9 Windshield Wipers



EX
→



IN
←

- Rest on your back, stretch your arms out into a "T"
- Bend your knees and keep your feet in line with your hips

- Slowly bring your knees down to one side of the mat and face your nose in the opposite direction
- Keep your shoulders on the mat

Tips!

After you twist to one side, return to center and twist to the other side. Twist to each side 4 - 6 times.

- ✓ Only twist as far as comfortable for you!
- ✓ If you want a more gentle twist, take your feet wider apart – towards the edges of the mat
- ✓ Want to rest in the pose for a few breaths? Place a pillow under your knees! This will help your back relax.
- ✓ Close your eyes to make it more relaxing.



Twist it Out

.....

10 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→

←
EX



- Extend your arms so your knees move away from your chest

Repeat
6
times

11 Relaxation Pose

- Do any variation of Relaxation Pose that you want.
- **Legs:** You can rest on your back with your legs extended out. Or you can place a pillow under your thighs.
- **Hands:** Extend your arms out with palms up to the ceiling. Or place them over your belly.
- Close your eyes and breathe at your own pace.

Rest as long as you want in
Relaxation Pose.



Side Stretching

Benefits This sequence releases tension by stretching both sides of your body.

Time 15 - 20 minutes

Modifications

- All of these poses can be done in a chair.
- See the Tips! Ideas and list of Chair Poses for more ideas.

Props

- A blanket or towel to fold under your knees
- A chair or bench to sit on

Cues IN = Inhale | EX = Exhale

1 Comfort Pose and Breathing



- Sit in any comfortable position and take a few breaths at your own pace
- Close your eyes to focus on your breath

2 Side Stretch Seated



- Take a deep breath in as you stretch one arm overhead
- Switch and do the other arm
- Repeat two times on each side

Side Stretching

3 Cat / Cow Pose

Start in Table Top with your knees under your hips and your arms under your shoulders. You can have the shoelace side of your foot down or tuck your toes.



EX
→

IN
←



Repeat
5
times

- Reach your head and tailbone up to the sky
- Draw the muscles together between your shoulders

- Round your back and move towards your heels
- Keep your neck relaxed and bring your forearms to the mat

4 Moving Mountain



IN
→

EX
←



Repeat
5
times

Tip!



- Stand in Mountain Pose with your feet hip width apart and arms down

- Raise your arms up from the sides and lift up onto the front of your feet

- ✓ **Don't** roll on the outside edges of your feet – press down through your big toes

Side Stretching

5 Side Stretch Standing



- Stand in Mountain Pose with your feet hip width apart and arms down

IN
→
EX
←



- Raise your arms overhead to the right
- Hold your right wrist with your left hand
- Keep your chest lifted

Stay a few breaths in the pose

Repeat 2 times on each side

6 Triangle Pose

Stand with your feet wide apart and line up your heels. Turn your left foot to face the left. Turn the right foot a little to the left as well. This takes balance!



- Bring your arms into Star Pose and reach them far to the sides

EX
→
IN
←



- Lower your left hand to your left thigh and raise your right hand
- Press evenly between both feet

Stay a few breaths in the pose

Repeat 2 times, then do the other side

Side Stretching

Tips!

- ✓ This pose stretches your side (where the line is by Lucie) and your legs
- ✓ If you feel like you are tipping forward then slide your bottom hand higher up your body
- ✓ You can look straight ahead or, if comfortable, you can turn to look at your raised hand
- ✓ Keep your leg muscles strong and engaged
- ✓ **Don't** lock your knees – keep them relaxed



Triangle Pose Variations



- Rest your bottom hand on a chair or a block if you feel tired or it feels hard to balance



- Rest your top hand on your hip if your arm feels tired

Triangle Pose – Chair Version

- Sit in a chair and place blocks under your feet if they do not reach the ground
- Turn one leg out and point your toes to that side
- Reach your opposite arm overhead and slide the other hand down your leg
- **Don't** let your hips lift off the chair



Side Stretching

7 Forward Bend, Rag Doll Variation



- Stand in Mountain Pose with your feet hip width

IN
→

EX
←



- Raise your arms up from the sides

EX
→

IN
←



- Bend forward and hold your elbows

Repeat
3
times

8 Deep Seated Twist



- Sit on the ground with your legs out in front
- Keep your back tall and head to the sky; if this feels hard then sit on the edge of a folded towel
- Bend your right knee and bring your foot by the left knee or thigh
- Place your right hand behind you, fingers pointing away from your body



- Inhale and raise your left arm up

EX
→

IN
←



- Twist to look over your right shoulder
- Hug the right leg in towards your body

Stay a few
breaths,
then
repeat on
the other
side

Tips!

- ✓ Each time you breathe in, reach the top of your head to the sky
- ✓ Each time you breathe out, gently twist a little more
- ✓ Keep your extended leg active by pointing your toes up and towards your body
- ✓ Only turn your neck as far as it feels good

Side Stretching

.....

9 Lying Rest

- Lie on your back and take a few breaths
- You can extend your legs or bring your knees up and place your feet to the outside
- Taking a few breaths after you lie down helps your body adjust from sitting or standing – this will prepare you for the next poses



10 Banana Pose



Stay a few breaths then repeat on the other side

- Lie on your back with your legs extended out

- Slide your legs over to the left
- Keep your back and hips on the ground
- Reach your right arm overhead and turn your nose to the arm

11 Grasshopper Pose



IN →
EX ←



Repeat 3 - 6 times on each side. Switch sides each time!

- Bring your knees into your chest with one hand over each knee

- Extend one leg to the sky and the opposite arm overhead

Side Stretching

.....

12 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→

EX
←



- Extend your arms so your knees move away from your chest

Repeat
5
times

13 Relaxation Pose

- Do any variation of Relaxation Pose that you want.
- **Legs:** You can rest on your back with your legs extended out. Or you can place a pillow under your thighs.
- **Hands:** Extend your arms out with palms up to the ceiling. Or place them over your belly.
- Close your eyes and breathe at your own pace.



Rest as long as you want in
Relaxation Pose.

Strength Sequence

Benefits	This sequence works all of the muscles in your legs, stomach, back, and arms. Resting at the end is very important after working hard!
Time	25 – 30 minutes
Modifications	- Almost all of these poses can be done in a chair – check Tips throughout and the Chair Sequence for details
Props	- A blanket or towel to fold under your knees - A chair for balance and support in some poses
Cues	IN = Inhale EX = Exhale

1 Opening Breathing



- Rest on your back and take a few deep breaths
- Focus on feeling your belly rise when you inhale and relax when you exhale
- Take 6 – 8 breaths

Strength Sequence

.....

2 Cocoon to Butterfly Pose



- Bring your knees into your chest with one hand over each knee

IN
→
EX
←



- Extend your arms overhead and your legs to the sky

Repeat
5
times

3 Bridge Pose

Bring your feet onto the mat. Line your heels up with your hips. Rest your arms along your sides with the palms facing down.



- Keep your back and arms pressing into the mat

IN
→
EX
←



- Lift your hips to the sky and keep your legs strong and engaged

Repeat
5
times

4 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→
EX
←



- Extend your arms so your knees move away from your chest

Repeat
5
times

Strength Sequence

.....

5 Palm Presses

Press your palms together and point your shoulders to the sides.



EX
→

IN
←



Repeat
5
times

- Point your fingers straight ahead and draw your shoulder blades together

- Turn your fingers in towards your chest so your elbows reach up and away

Transition to Mountain Pose by standing with your feet hip width apart and toes pointing forward. Stand tall and reach your head to the sky.

6 Mountain Pose with Arm Reaches



IN
→

EX
←



Repeat
5
times

- Stand in Mountain Pose
- Take a few breaths here before reaching your arms up and down

- Stretch your arms to the sky as you take in a deep breath
- Stay balanced between both feet!

Strength Sequence

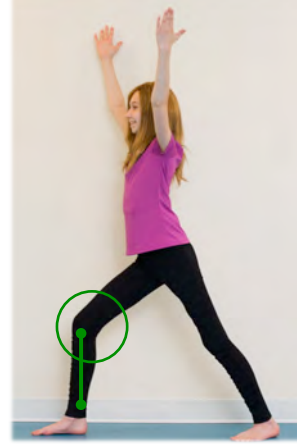
.....

7 Warrior 1

Start with your left leg forward and your feet hip width. Turn your back foot out to the side a little. Keep your back leg strong in this pose.



IN
→
EX
←



Repeat 5 times, then repeat on the other side

- Stand with your arms down at your sides

- Raise your arms up from the front and bend your front knee

✓ Keep your knee above your ankle and not forward

Tip!

Strength Builder Exercise

Have extra energy? If so, try this variation! Stay in Warrior 1 with your front knee bent and do arm exercises.



IN
→
EX
←



Do 5 presses then go to the other leg

- Press your palms together
- Squeeze your shoulder blades together

- Bring your hands into Cactus Pose, palms facing forward
- Keep your elbows in line with your wrists
- Keep your back strong and your shoulders relaxed

Strength Sequence

8 Warrior 2

Stand with your feet wide apart and line up your heels. Turn your left foot to face the left. Turn the right foot a little to the left as well. This takes balance!



- Bring your arms up, like Star Pose, with palms down
- Bend your left knee and lean forward slightly
- Press evenly through both feet
- Look over your middle left finger
- You can do Warrior 2 in a chair as well – see the list of poses!

Stay in the pose for a few breaths

9 Forward Bend, Rag Doll Variation



IN
→

EX
←



EX
→

IN
←



Repeat
3
times

- Stand in Mountain Pose

- Raise your arms up from the sides

- Bend forward and hold your elbows

Strength Builder Exercise

Want to strengthen the muscles in your back? Try this exercise before you come back up to standing:

- Extend your arms in front of you – try to have them in line with your ears – with the palms facing each other
- Keep reaching your arms in front and press through your feet while you bring the arms overhead again

Strength Sequence

10 Eagle Pose

This pose requires a lot of strength and balance. First try doing just the arm movement, then add in the leg balance. Stay in the pose for a few breaths then switch sides.



- Stand in Mountain Pose



- Cross your left arm over your right arm
- Cross your right leg over your left leg



- Bend your elbows and raise your hands up



- Press the back of the hands together, or wrap them around one more time

New Variations!

- ✓ Take it easy on your shoulders by pressing your palms together instead of wrapping the arms
- ✓ Press your palms firmly to build chest strength
- ✓ Draw your shoulder blades together to build back strength



- ✓ Do Eagle Pose in a chair if you feel tired
- ✓ This variation lets you focus on stretching the arms
- ✓ If you want a stronger stretch in your back then lift your arms up to the sky more



When you finish Eagle Pose then take a rest in Mountain Pose. Then transition onto your hands and knees to Table Top Pose.

Strength Sequence

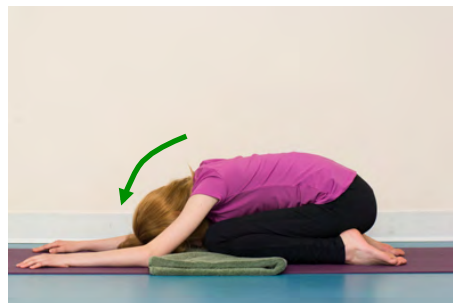
11 Cat/Cow Pose

Start in Table Top with your knees under your hips and your arms under your shoulders.



EX
→

IN
←



Repeat
5
times

- Reach your head and tailbone up to the sky
- Draw the muscles together between your shoulders

- Round your back and move towards your heels
- Keep your neck relaxed and bring your forearms to the mat

12 Rest

- Rest on your back with your legs extended out and take a few deep breaths to transition onto the ground.



13 Windshield Wipers



EX
→

IN
←



- Rest on your back, stretch your arms out into a "T"
- Bend your knees and keep your feet in line with your hips

- Slowly bring your knees down to one side of the mat and face your nose in the opposite direction
- Keep your shoulders on the mat

After you twist to one side, return to centre and twist to the other side.
Twist to each side 4 – 6 times.

Strength Sequence

.....

14 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→

EX
←



- Extend your arms so your knees move away from your chest

Repeat
6
times

15 Relaxation Pose

- Do any variation of Relaxation Pose that you want.
- **Legs:** You can rest on your back with your legs extended out. Or you can place a pillow under your thighs.
- **Hands:** Extend your arms out with palms up to the ceiling. Or place them over your belly.
- Close your eyes and breathe at your own pace.

Rest as long as you want in Relaxation Pose.



Chair Sequence

Benefits

This sequence lets you stretch and relax while sitting in a chair. There are also strength building poses in this sequence too.

Time

15 - 20 minutes

Modifications

- Your feet should be flat on the ground when you are sitting in a chair
- If your feet are not flat on the floor, then place a block or folded towel underneath them

Props

- A chair
- A blanket, towel, or block to place under your feet if needed

Cues

IN = Inhale | EX = Exhale

1 Comfort Pose and Breathing



- Sit in a chair with your feet on the floor
- If your feet do not reach, place a block or folded blanket under them
- Close your eyes to focus on your breath

Chair Sequence

2 Mountain Pose



IN
→
EX
←

- Sit tall and bring your palms together at your chest



- Sweep your arms out to the sides and overhead

Repeat
5
times



- ✓ You can keep your arms wide apart (like you are holding a beach ball) if that feels better for your shoulders

3 Side Stretch



IN
→
EX
←

- Sit tall with your arms by your sides



- Raise your arms overhead to the left
- Hold your right wrist with your left hand
- Keep your chest lifted

Stay a few
breaths in
the pose

Repeat
2 times on
each side

Try this
variation!



- Keep your bottom hand on the chair for more balance
- This option helps keep the bottom shoulder relaxed too!

Chair Sequence

4 Forward Bend



- Sit tall with your arms on your legs

IN
→
EX
←



- Raise your arms up from the front

EX
→
IN
←



- Bend forward and rest your hands on your legs, a block, or the ground

Repeat
4
times

5 Eagle Pose



- Sit tall with your arms on your legs



- Cross your right arm over your left arm



- Bend your elbows and bring your hands up
- You can keep your arms here or try the next step



- Wrap your hands one more time so the fingers on your bottom hand touch the palm of the top hand

Tip!

- ✓ If you want a stronger stretch in your back, lift your arms up to the sky

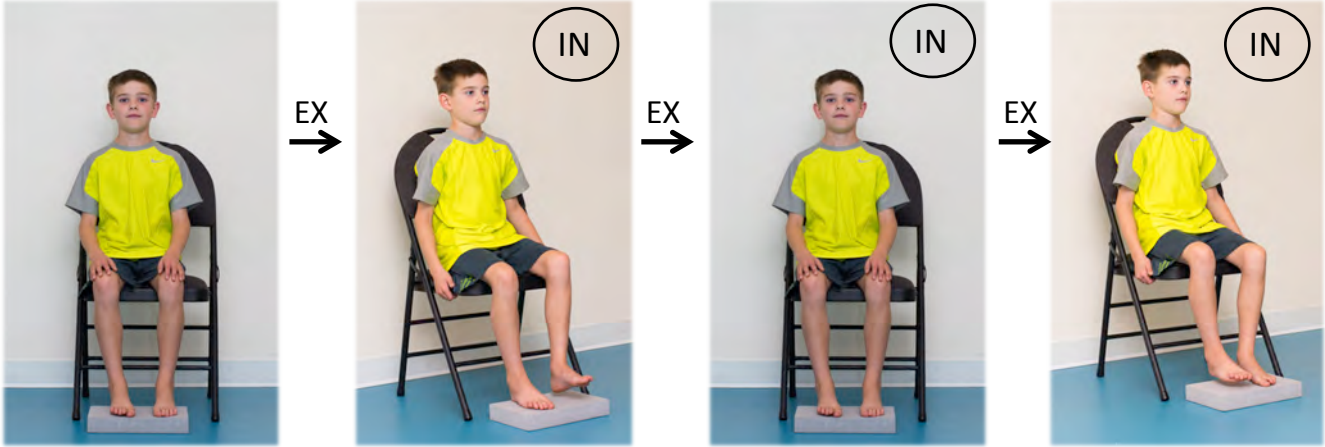
Stay in the pose a few breaths, then switch arms

Chair Sequence

.....

6 Leg Lifts

Leg lifts strengthen your stomach muscles. Focus on keeping your belly engaged each time you lift a leg.



- Sit tall with your hands on your knees or the chair

- Engage your core and lift one foot off the floor

- Bring the foot back down

- Lift the other foot off the floor

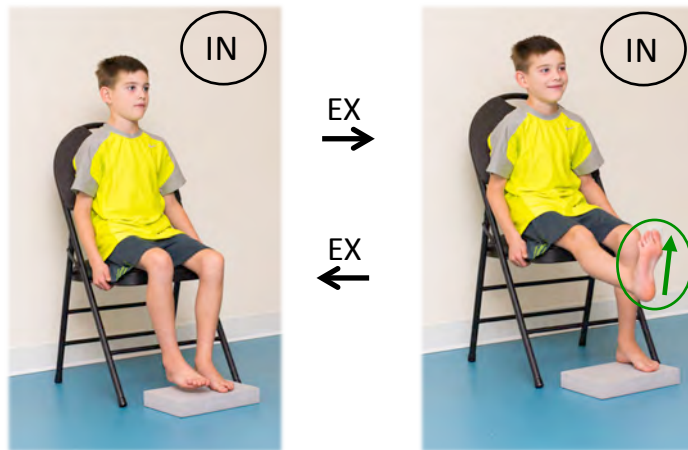
Tips!

- ✓ Hold onto the sides of the chair for more stability
- ✓ **Breathing** is important
- ✓ **Exhale** each time you move your foot, **inhale** and hold your foot in place, **exhale** move your foot back

Repeat 4 – 6 times on each leg

Want an extra challenge? Try leg extensions!

- Extend your leg after the leg lift
- Be sure to keep your stomach muscles strong and your belly drawn in!
- Rest in between each side



- Lift one foot off the floor

- Extend the leg
- Keep the leg strong
- Point your toes to the sky

Chair Sequence

.....

7 Grasshopper Pose | Leg Lifts Variation

Leg lifts strengthen your stomach muscles. Focus on keeping your belly engaged each time you lift a leg.



EX →



EX →



EX →



- Sit tall with your hands on your knees or the chair

- Engage your core and lift one foot off the floor

- Extend the leg
- Keep the leg strong
- Point your toes to the sky

- Raise the opposite arm from the lifted leg

8 Cat / Cow Pose



EX →

IN ←



You can try extending your arm and leg at the same time, too!

Switch sides each time
Repeat 3 times on each side

Rest in between sides as needed

Repeat
6 times

- Tilt your chin to the sky
- Draw your chest forward
- Draw the muscles together between your shoulders
- Slide your hands towards your body

- Round your back
- Draw your chin towards your chest
- Lengthen your arms
- Slide your hands to your knees
- Keep your neck relaxed

Chair Sequence

9 Seated Twist

Focus on turning to look over your shoulder. You can place an arm behind you for more stability in the pose.



EX →
IN ←



Stay in the pose a few breaths
Do each side 2-3 times
Switch sides each time



- Sit tall with your hands on your knees

- Cross your arm over your opposite leg
- Twist to look over your shoulder

Tip!

- If you want a deeper twist, hold the chair with your back hand

Tips!

- ✓ Each time you breathe in, reach the top of your head to the sky
- ✓ Each time you breathe out, gently twist a little more

10 Forward Bend



IN →
EX ←



EX →
IN ←



Stay in the pose 2 breaths
Repeat 2 times

- Sit tall with your arms on your legs

- Raise your arms up from the front

- Bend forward and rest your hands on your legs, a block, or the ground

Chair Sequence

.....

11 Mindful Breathing



- Close your eyes and rest your hands over your heart

IN →
EX ←



- Reach your arms out to the side and expand your chest

EX →
IN ←



- Bring your hands to your belly

Repeat 6 times

12 Relaxation Pose

You can do Relaxation Pose sitting in the chair. Or you can move to the floor, a bed, or a couch if you prefer to lie down.

- Sit in the chair with your feet on the ground
- Relax your shoulders, jaw, and forehead
- Close your eyes to focus on your breath
- You can do a breathing practice here too – such as Peace Breath, Extended Exhalation, or Lotus Flower Breath



Lotus Flower Breath



Inhale: Open both of your hands and stretch your fingers out.



Exhale: Bring your fingertips together to close your palm.

Lying Sequence

Benefits This is a great practice that you can do in bed or lying on the floor.

Time 15 minutes

Modifications - If your low back is uncomfortable in any pose, bend your knees and bring the bottoms of your feet onto the floor.

Props - A pillow to place under your legs
- A strap for stretching your legs (a scarf or belt will work great!)

Cues IN = Inhale | EX = Exhale

1 Opening Breathing



- Extend your legs or bend your knees
- If you bend your knees, take your feet wide apart and rest your knees on one another
- Focus on feeling your belly rise when you inhale and relax when you exhale
- Take 6 – 8 breaths

Lying Sequence

.....

2 Reclined Head to Toe Stretch



- Rest your arms by your sides

IN
→
EX
←



- Stretch your arms overhead and let them rest on the around

Repeat
4
times

Tips!

- ✓ Stretch your arms at different angles. This will help warm your shoulders up.
- ✓ For example, try:
 - Arms to the side (red line)
 - Arms wide (Colette's arms)
 - Arms in a "V" (yellow line)
 - Arms by the ears (green line)



3 Grasshopper Pose



- Bring your knees into your chest with one hand over each knee

IN
→
EX
←



- Extend one leg to the sky and the opposite arm overhead

Repeat
4 times on
each side

Switch
sides each
time!

Lying Sequence

.....

4 Single Leg Stretch

Rest one foot onto the floor and wrap a strap around the other foot. Keep your upper arms resting on the floor so your shoulders stay relaxed.



EX
→

IN
←



Stay a few breaths in the pose

Repeat 2 times on each side

- Bring your leg halfway up to the sky

- Press your foot strongly into the strap and extend your leg to the sky
- Press the bottom of your foot to the sky – so your toes point to the wall behind you

Tips!

- ✓ Stretch your leg at different angles, starting lower and bringing it up higher. This will warm up the muscles in the back of your leg.
- ✓ For example, extend your leg to the red line, bring it back down, then extend it to the yellow line, bring it back down, etc.
- ✓ Only stretch as far as it feels comfortable!



5 Banana Pose



Stay a few breaths then repeat on the other side

- Lie on your back with your legs extended out

- Slide your legs over to the left
- Keep your back and hips on the ground
- Reach your right arm overhead
- Face your nose to the right arm

Lying Sequence

6 Cocoon to Butterfly Pose



→
EX
←



Repeat
6
times

- Bring your knees into your chest with one hand over each knee

- Extend your arms overhead and your legs to the sky

7 Windshield Wipers



EX →
← IN



- Rest on your back, stretch your arms out into a "T"
- Bend your knees and keep your feet in line with your hips

- Twist your knees and nose in opposite directions
- Keep your shoulders on the mat
- Only twist as far as comfortable

After you twist to one side, return to centre and twist to the other side.
Twist to each side 4 – 6 times.

Tips!

- ✓ Want to rest in the pose for a few breaths? Place a pillow under your knees! This will help your back relax.
- ✓ Close your eyes to make this pose more relaxing.



Lying Sequence

.....

8 Knee Hugs



- Bring your knees into your chest with one hand over each knee

IN
→
EX
←



- Extend your arms so your knees move away from your chest

Repeat
6
times

9 Relaxation Pose

- Do any variation of Relaxation Pose that you want.
- **Legs:** You can rest on your back with your legs extended out. Or you can place a pillow under your thighs.
- **Hands:** Extend your arms out with palms up to the ceiling. Or place them over your belly.
- Close your eyes and breathe at your own pace.

Rest as long as you want in
Relaxation Pose.



7-Minute Wake Up Sequence



Benefits Start your day with these stretches. They are excellent to do when you wake up in the morning.

Time About 7 minutes

Modifications - You can do all of these poses in a chair – check the list of poses and modifications for ideas.

Props - A blanket or towel to place under your knees for kneeling poses

Cues IN = Inhale | EX = Exhale

1 Cat/Cow Pose

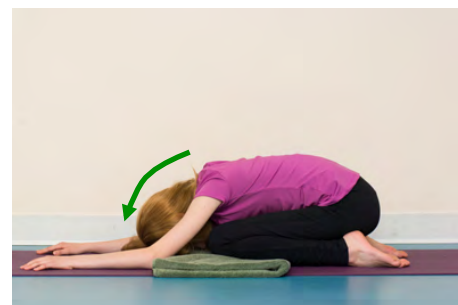
Start in Table Top with your knees under your hips and your arms under your shoulders.



- Reach your head and tailbone up to the sky
- Draw the muscles together between your shoulders

EX
→

IN
←



- Round your back and move towards your heels
- Keep your neck relaxed and bring your forearms to the mat

Repeat
5
times

7-Minute Wake Up Sequence

.....

2 Sun Breath

Stand in Mountain Pose with your feet hip width apart.



EX
→

IN
←



Repeat 5 times

Tip!

You can bring your hands to your sides or down to your belly.

Do what feels best for you!

- Reach your arms high up to the sky

- Say "HA!" while you bring your hands down

3 Side Stretch Standing



IN
→

EX
←



Stay a few breaths in the pose

Repeat 2 times on each side

- Stand in Mountain Pose with your feet hip width apart and arms down

- Raise your arms up and to the left
- Hold your right wrist with your left hand
- Keep your chest lifted

7-Minute Wake Up Sequence

.....

4 Forward Bend, Rag Doll Variation



- Stand with your feet hip width apart

IN →

← EX



- Raise your arms up from the sides

EX →

← IN



- Bend forward and hold your elbows

Repeat
3
times

Tips!

- ✓ Try these variations of a Forward Bend.
- ✓ Be sure to keep your knees bent!



5 Moving Mountain



- Stand in Mountain Pose with your arms down

IN →

← EX



- Raise your arms up from the sides and lift up onto the front of your feet

Repeat
5
times

Tip!

- ✓ **Don't** roll on the outside edges of your feet like this photo



Press down through your big toes and keep your legs strong

7-Minute Wake Up Sequence

.....

6 Mountain Pose



- Stand with your feet hip width apart, toes pointed forward
- Press your palms together at your chest
- Focus on balancing on both feet evenly and standing tall
- Keep the top of your head reaching to the sky

Rest in Mountain Pose for a few breaths.
Then sit on the ground or a chair.

7 Mindful Breathing



- Close your eyes and rest your hands over your heart

IN →
EX ←



- Reach your arms out to the side and expand your chest

EX →
IN ←



- Bring your hands to your belly

Repeat 6 times

Rest for a few breaths with your eyes closed after you finish Mindful Breathing.
You are now ready to start the day!

Continuing Your Yoga Practice



Once you have tried all of the practices in this manual, you and your child might start looking for ‘next steps’. As a beginning point, ask your physician and other health care professionals about yoga or other physical activity programs for childhood cancer patients and survivors. You can also search for youth yoga classes in the community. In your search, avoid hot, warm, or ‘heated’ yoga classes beyond normal room temperature. It is a contraindication to practice in this type of environment during and shortly after cancer treatment. Bring your own yoga mat to class for better hygiene, and arrive early so that you can clean any other yoga props before using them.

Try building your own yoga sequence. After using this manual a few times, you and your child will identify poses that they enjoy most. Keep a list of your child’s favorite poses, and invite your child to rename them. Prior to making your own sequence, it can be helpful to set a theme or focus. This could be a playful story for younger children (e.g., around animals) or a simple concept to direct attention for older children (e.g., calming). Here are tips for sequencing:

- ✓ *Opening*: start by taking a few deep breaths and doing gentle stretches – perhaps seated if your child needs a few moments to focus before starting the session.
- ✓ *Active poses*: select a mix of poses. You can start standing, then move to kneeling or sitting, and end lying down (or do lying then seated postures).
- ✓ *Rest*: invite your child to rest in between poses to prevent fatigue. This also promotes mindfulness when moving into a new pose.
- ✓ *Breathing*: include a breathing practice near the end of your home yoga session.
- ✓ *Ending*: always leave room for Relaxation Pose at the end. This is when your child gets to absorb the benefits of their practice.

Most importantly, make it FUN – this is why your child will really want to practice.

Part 5

Relaxation Practices

Part 5: Relaxation Practices

1. About Relaxation Practices
2. Positive Affirmations
3. Breathing and Visualization
4. Healing Hands
5. Tense and Let Go
6. "I Am, I Am" Meditation
7. River Meditation

About Relaxation Practices



Learning the skill of relaxation is beneficial for everyone – especially children and adolescents who have a difficult time focusing their attention, or experience distress, fatigue, or disrupted sleep. Developing tools to relax one’s body and mind can promote a sense of peacefulness as well as restful sleep. Relaxation practices, such as visualization and meditation, also offer children and adolescents an opportunity to be present in the moment and focus their attention inward. This inner focus allows them to experience stillness and self-awareness.

The practices in this section will help your child learn the skill of relaxation. They include visualization (e.g., River Meditation), children’s meditation practices (e.g., Healing Hands), and progressive muscle relaxation (e.g., Tense and Let Go). Before each practice there are a few notes:

- ✓ Benefits: The overall purpose of the practice and a short description.
- ✓ Time: How long the practice may take. There are practices ranging from 5 to 15 minutes.
- ✓ Modifications: General modifications for that practice. All of the practices can be done in a chair or lying down.
- ✓ Props: Suggestions for simple items that promote comfort.

Each of these practices can be performed independently, or at the end of a yoga sequence during final Relaxation Pose.

Before Beginning

Learning relaxation is a process. It can be difficult for anyone regardless of their age. This is why tools such as visualizations and affirmations are useful – they help your child focus their mind, rather than being carried away by each thought that arises. Once they learn these tools, they can apply them in daily life.

Tips for Relaxation Practices

- ✓ The most important part of relaxation is to be comfortable. Ask your child to lie in whichever position feels the best to them (e.g., lying on their back or sitting).
- ✓ Dimming the lights can promote relaxation.
- ✓ Invite your child to close their eyes in order to draw their focus inward.
- ✓ Covering up with a warm or heavy blanket can be comforting and helpful if your child has difficulty lying still.
- ✓ Ask your child about their experience at the end of each practice. Ask what they enjoyed and what was difficult. This can help you select or adapt future practices.
- ✓ Reassure your child that it is normal to have a lot of thoughts.
- ✓ Create new affirmations with your child that they find special and meaningful.
- ✓ Try to do one relaxation practice each day. Before going to bed or taking a nap are excellent times to practice.

Explaining Meditation to Your Child

Learning how to focus their attention is a great exercise for children of any age. Depending on their age, it may be difficult to understand what it means to have distracting thoughts or to focus and meditate. Here is one tangible example you can offer your child:

- Fill a glass jar half way with sand or dirt. Swirl the jar around and explain to them that our minds are like the jar and each little piece of sand is a different thought. When the sand is swirling our mind is trying to follow each of the thoughts.
- Set the jar down and tell them that when we are still and focus our mind, it becomes easier to see each of the thoughts. This is why we do relaxation practices – to let our thoughts settle down.

Positive Affirmations

Affirmations are positive statements that describe a feeling or quality that we wish to have or be more of (e.g., I am strong). You can also pick one word (e.g., Peace). Affirmations focus the mind during relaxation and meditation. They are also tools for replacing negative thoughts with positive ones. You can repeat an affirmation during relaxation practices by saying them softly or silently. If you say them softly, it is helpful to take a breath in and say the affirmation as you breathe out.

Examples of Affirmations

- I am strong
- I am brave
- I am full of light
- I am full of peace
- I am full of energy
- I am at ease
- I am loved
- I feel calm
- I feel happy
- I am beautiful, inside and outside
- I am healthy
- I can face any challenge
- I am the best at healing
- I am becoming healthier every day
- I take good care of myself
- My body knows how to heal

Create an affirmation box

Sometimes it can be difficult to pick an affirmation. It can help to brainstorm a list of affirmations before you practice. Start with the examples above and then make up other affirmations that are special to you. It can be any word or phrase that reminds you to feel positive. Write down each affirmation on a small piece of paper. Place all of the pieces of paper into a box or bag. Now whenever you need an affirmation, you just have to reach inside and pull one out!

Breathing and Visualization

Combining affirmations with the breath and visualization can be helpful for relaxation. Below is a list of affirmations that you can say silently as you breathe in and out. You can say the entire sentence or leave out the “breathing in” and “breathing out” words.

Affirmations with the Breath

Breathing in I feel joy	Breathing out I feel happiness
Breathing in I feel peace	Breathing out I feel love
Breathing in I feel calm	Breathing out I feel ease
Breathing in I smile	Breathing out I release
Breathing in I feel joyful	Breathing out I celebrate
Breathing in I feel gratitude	Breathing out I give thanks
Breathing in I feel loved	Breathing out I offer love
Breathing in I am still	Breathing out I am peace

Affirmations, Breathing, and Visualization

You can also use visualizations with the affirmation and breath. Here are some examples.

- **Inhale:** Imagine light from the sun surrounding you.
Exhale: visualize the same bright light shining from your heart.
- **Inhale:** Imagine clouds floating peacefully.
Exhale: Imagine thoughts you don’t want are just like those clouds – they float away.
- **Inhale:** Imagine breathing in positive energy.
Exhale: Feel the energy move throughout my body
- **Inhale:** Imagine growing roots into the ground like an enormous tree.
Exhale: Feel your body become stronger and more stable because of those roots.
- **Inhale:** Imagine breathing in healthy cells.
Exhale: Feel those healthy cells spread to your fingers, toes, and everywhere in between.

Healing Hands

About This practice generates positive feelings and directs them throughout your body. You will inhale your arms open wide and, while you exhale, bring positive feelings to different parts of your body. In this practice you can select an affirmation. There are examples below, and you can refer to the section Positive Affirmations for more ideas.

Time 5 minutes

Modifications

- You can do this sequence sitting in a chair or lying down.
- You can keep your eyes closed to promote relaxation.

Props - A chair to sit on.

Cues IN = Inhale | EX = Exhale

1 Focused Breathing



- Sit on a chair with your feet on the floor (use a towel or block under your feet if they don't touch the ground)
- Close your eyes
- Bring your hands to your belly, focus on your breath
- Breathe in and out through your nose (if this is not comfortable, breathe through your mouth)

2 Pick an Affirmation

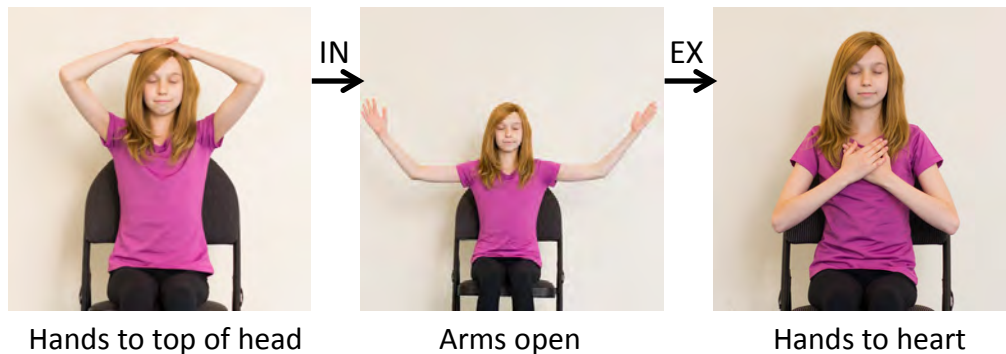
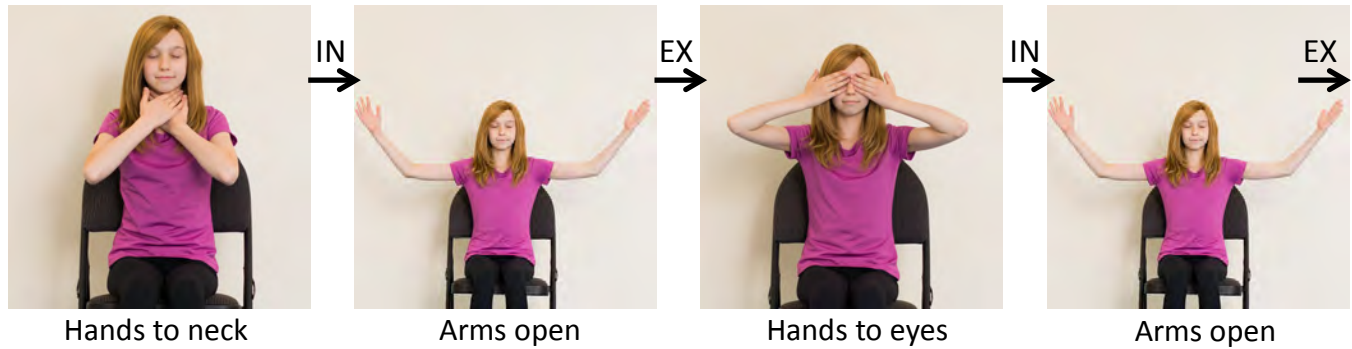
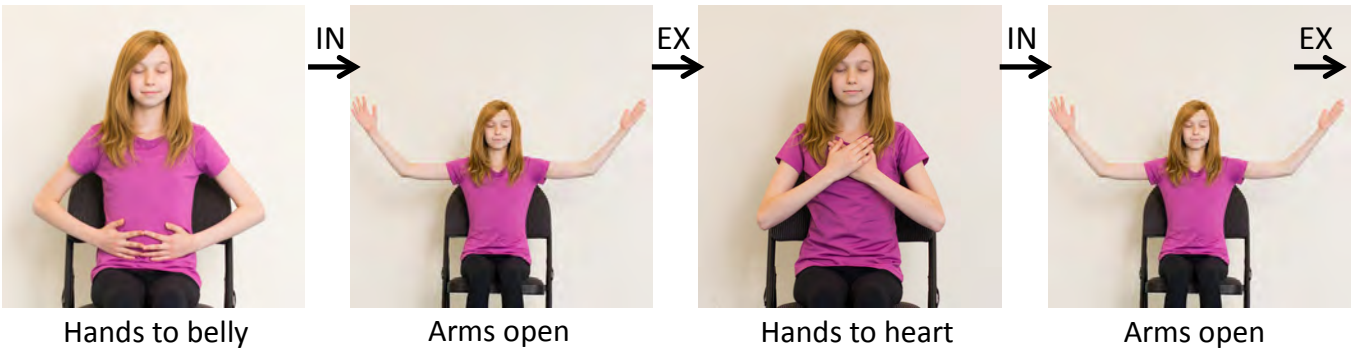
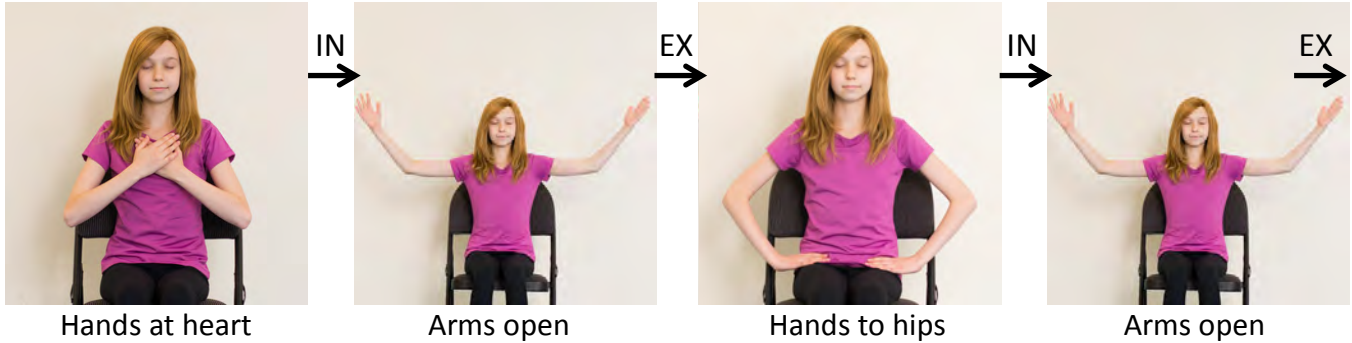


- Place your palms over your heart
- Think of one quality or feeling that you would like to have or be – for example, strength or energy
- Make that quality a statement about yourself – e.g., “I am strong” or “I have energy”
- Use that affirmation in the next set of poses

Healing Hands



- 3 - As you inhale and reach your arms open, imagine drawing in all of the strength or energy from the world.
 - As you exhale, imagine bringing that strength or energy to wherever your hands go.



- Repeat the sequence 2 – 4 more times.
- When you finish, rest your hands in your lap and take a few breaths.
- Slowly open your eyes.

Tense and Let Go

About

In this practice you learn how to relax your muscles through two steps. First, you bring attention to an area of your body, such as your feet, and make the muscles tense by squeezing them. Then you release the muscles and feel them relax. You start at your toes and go slowly up to your head.

This practice is helpful because sometimes we don't know that we are tense in certain parts of our bodies. This practice lets us learn the difference between tension and relaxation, which promotes a feeling of calmness in the mind as well.

You can do this practice at any time of the day. It is especially good to do before going to bed.

Time

10 – 15 minutes

Modifications

- This sequence is done lying down. You can place a pillow or bolster under your thighs if you want.

Props

- A pillow or bolster for your legs and/or head

1 Relaxation Pose



- Lie on your back with your legs extended out and slightly apart
- Extend your arms out, slightly away from your body, palms up
- Place a towel or pillow under your head if the ground is hard
- Place a pillow or bolster under your legs if you want extra support for your back
- Close your eyes and take a few deep breaths at your own pace

Tense and Let Go

2 Progressive Relaxation

Follow the individual steps below to bring awareness to each part of your body. As a general rule of thumb, you can inhale when you flex your muscles and exhale when you relax them. Flexing your muscles can feel like they are being squeezed.

1. Curl your **toes** into your **feet** and squeeze them as tight as possible. Hold them for a few seconds then let them go. Repeat one more time.
2. Flex the muscles of your **lower legs** (your **calves**) by pulling your toes towards your face with straight legs. Hold for a few seconds and then let them go. Repeat, but this time tighten your calves by pointing your toes away from your face. Then let go and relax your lower legs.
3. Now flex the muscles in your **upper legs** (your **thighs**) by straightening out your legs and pressing your feet away from your body. Hold for a few seconds. Your feet and legs might lift off the floor slightly if you do this really hard. Release all the muscles in your legs and relax. Repeat again, then let your legs stay relaxed.
4. Tighten the muscles around your **stomach** and pull your **belly button** in. Hold for a few seconds, then let your belly fully relax. Repeat one more time.
5. Make fists with your **hands** and clench them tightly for a few seconds. Release the fists, let your hands open and fingers relax. Make fists, clench, and relax them one more time.
6. Tighten your upper **arms** (your **biceps**) and make fists again. Your arms might lift off the floor slightly. Hold for a few seconds then let your arms relax. Repeat one more time.
7. Bring your **shoulders** up to your ears and scrunch them tightly for a few seconds. Relax your shoulders and let them fall away from your ears. Repeat one more time.
8. Open your **mouth** wide and stretch your **jaw**, then bring your lips together and squeeze them together. Repeat this movement a few times – open and stretch your mouth, squeeze your lips. Then relax your mouth and jaw entirely.
9. Scrunch up your **entire face**: close your eyes tightly, squeeze your nose, and draw your eyebrows together. Wiggle your nose from side to side while your face is scrunched up. Release all the muscles in your face. Repeat one more time.
10. Stay in **Relaxation Pose** for several minutes after you have finished. Bring your attention to each of the body parts that you relaxed earlier. If there is any tension left somewhere, repeat the “tense and let go” practice on that area. Then enjoy your final relaxation.

Adapt this practice! Try doing a full body “tense and let go” practice! This is when you flex and tighten all of the muscles in your body at the same time then let go with one big exhale.

“I Am, I Am” Meditation

About

This is a meditation practice that helps focus your mind on positive thoughts and energy. Life can be very busy, and sometimes we can get sad or worry about things. These thoughts take up space in our mind.

Meditation is a way of relaxing our mind so we can connect with ourselves and feel more peaceful. This practice helps us remember and appreciate that we are each a unique person with special qualities. There is a longer description of the meaning of this specific meditation at the end of the practice.

Time

10 minutes

Modifications

- You can do this meditation seated in a chair or on the ground

Props

- A chair or blanket to sit on

1

Comfort Pose and Breathing



- Sit in any comfortable position, on the ground or in a chair
- Rest your hands over your knees or in your lap
- Close your eyes or lower your gaze
- Take a few breaths at your own pace

“I Am, I Am” Meditation

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2 Come into the meditation position

- Rest your right palm on your right knee
- Raise your left hand up and face your palm to your heart
- Keep your left fingers together and pointed to the right
- With your eyes just slightly open, look down at your left hand
- You will focus on your left hand throughout the practice



3 Meditation

Follow the breathing and movement directions below

- **Inhale:** keep your left hand a few centimeters away from your heart
- **Exhale:** bring your left hand towards your heart and say “I Am”
- **Inhale:** move your hand away from your heart slightly and say “I Am”
- **Exhale:** bring your left hand towards your heart and say “I Am”
- Repeat the sequence a few times.
- *Note:* You can say “I Am” softly or silently



4 Final breathing

- When you finish, bring your left hand back to your knee
- Keep your eyes closed and take a few breaths at your own pace

What the meditation means

When we say “I am” with our hands close to our hearts it means we are recognizing ourselves. It symbolizes that “I know myself to be”, meaning that we are perfect and unique just as we are. When we move our hand away from our hearts it means that we are recognizing our connection to the world and everyone around us. It means “I am that which is greater than I know myself to be.”

River Meditation

About

This is a meditation practice that helps let go of thoughts and feelings you don't want. Life can be very busy, and sometimes we can get sad or worry about things. These thoughts take up space in our mind – they can swirl around and around. Having lots of thoughts is normal, but sometimes it is hard to focus on other things.

Meditation is a way of relaxing our mind so we can connect with ourselves and feel more peaceful. The River Meditation is an opportunity to let go of swirling thoughts.

Time

5 – 10 minutes

Modifications

- This sequence is done lying down or seated

Props

- A pillow or bolster for your legs and/or head

1 Relaxation Pose



- Lie on your back with your legs extended out and slightly apart
- Place a towel or pillow under your head if the ground is hard
- Place a pillow under your legs if you want extra support for your back
- Place your hands over your belly
- Close your eyes and take a few deep breaths at your own pace

River Meditation

2 Visualizing a River

1. Continue to focus on your breath. As you inhale, feel your belly rise into your hands. As you exhale, feel your belly relax away from your hands. Imagine that each breath brings you further and further into relaxation.
2. As you focus on your breath, imagine that you are next to a river. The river is flowing at a gentle pace and it is bringing you a refreshing breeze. The sound of the river is relaxing. As you look into the river, you can see pieces of branches and leaves floating by.
3. If any thoughts come up and distract you from focusing on your breath, picture yourself dropping those thoughts into the river. Let those thoughts float away, just like the branches and leaves.
4. After placing any thoughts into the river, come back to focusing on your breath. As you inhale, feel your belly rise into your hands. As you exhale, feel your belly relax away from your hands.
5. If more thoughts come up and distract you, you can place them in the river and let them float away. As they float away, know that you can find them later if you need to. Letting them float away for the moment lets you focus on your breath and relax your mind.

3 Final Breathing

1. Before you finish the meditation, inhale to stretch your arms overhead and exhale to bring your arms back to your belly. Repeat this movement a few times.
2. When you finish, slowly open your eyes.

Remember: You can always place thoughts in the river anytime you feel overwhelmed. You can do this practice during the day, before big events, or each night before going to bed.

Part 6

Appendices

Part 6: Appendices

1. Yoga Practice Log
2. Glossary of Terms
3. List of Medications and Side Effects

Glossary of Terms

*This list was originally developed for POEM: Pediatric Oncology Exercise Manual (2014)
(Eds. Chamorro-Viña, C.C., Keats, M., Culos-Reed, S.N.).*

Absolute Neutrophil Count (ANC): A measure of the number of neutrophils in the blood. Neutrophils are a type of white blood cell. They help the body fight infection. An absolute neutrophil count may be used to check for infection, inflammation, leukemia, and other conditions. Cancer treatment, such as chemotherapy, may reduce the absolute neutrophil count.

Activities of Daily Living (ADLs): Things done in normal living including activities performed for self-care (feeding, bathing, dressing, grooming), work, homemaking and leisure.

Acute Lymphoblastic Leukemia (ALL): An aggressive (fast-growing) type of leukemia (blood cancer) in which too many lymphoblasts (immature white blood cells) are found in the blood and bone marrow. Also called acute lymphoblastic leukemia and ALL.

Acute Myeloid Leukemia (AML): An aggressive (fast-growing) disease in which too many myeloblasts (immature white blood cells that are not lymphoblasts) are found in the bone marrow and blood. Also called acute myeloblastic leukemia, acute myelogenous leukemia (AML), acute nonlymphocytic leukemia (ANLL).

Advanced Cancer: Cancer that has spread to other places in the body and usually cannot be cured or controlled with treatment.

Adolescent and Young Adult (AYA): AYA is defined in several ways. However there is agreement that AYA includes those 15+ to 29 years of age (at diagnosis) and up to 39 years of age for survivors of childhood/AYA cancers.

Amputation: The removal by surgery of a limb (arm or leg) or other body part because of injury or disease.

Anemia: A condition in which the number of red blood cells is below normal.

Attention: The act or faculty of attending, especially by directing the mind to an object.

Arterial Hypertension: Characterized by high blood pressure (hypertension) of the main artery of the lungs (pulmonary artery) for no apparent reason. The pulmonary artery is the blood vessel that carries blood from the heart through the lungs. Symptoms of PAH include shortness of breath (dyspnea) especially during exercise, chest pain, and fainting episodes. WebMD

Autologous HSCT. The stem cells may be re-infused into the same individual from whom they were collected. This strategy is typically used as a rescue from high doses of chemotherapy to allow such medication doses to be given safely and to facilitate recovery.

Allogeneic HSCT: The donor and recipient of the blood stem cells are different people. This type is used to treat leukemias and to correct bone marrow failure (aplastic anemia) and various immunologic disorders.

Biopsy: The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue. There are many different types of biopsy procedures. The most common types include (NCI):

1. **Incisional biopsy:** Only a sample of tissue is removed.
2. **Excisional biopsy:** An entire lump or suspicious area is removed.
3. **Needle biopsy:** A sample of tissue or fluid is removed with a needle. When a wide needle is used, the procedure is called a **core biopsy**. When a thin needle is used, the procedure is called a **fine-needle aspiration biopsy**.

Biological Reconstruction: a procedure wherein limb-sparing surgery is performed using biological (usually one's own) tissue to reconstruct a limb. An example of this would be a fibular auto-graft, where one's own fibula is used to replace a portion of a removed (cancerous) femur.

Body composition: it quantify total body fat and fat-free body mass (includes muscle, water, and bone) in the body.

Body mass index (BMI): the weight in kilograms divided by the square of the height in meters. It is commonly used to identify underweight and obesity.

Bone Mineral Density (BMD): A measure of the amount of minerals (mostly calcium and phosphorous) contained in a certain volume of bone. Bone mineral density measurements are used to diagnose osteoporosis (a condition marked by decreased bone mass), to see how well osteoporosis treatments are working, and to predict how likely the bones are to break.

Brain Tumour: A brain tumor begins when normal cells in the brain change and grow uncontrollably, forming a mass. A brain tumor can be low grade (generally not cancerous and slower growing) or high grade (more likely to grow and spread quickly). In general, primary brain tumors, meaning those that start in the brain, do not spread outside of the central nervous system.

Capillary Leak Syndrome: A condition in which fluid and proteins leak out of tiny blood vessels and flow into surrounding tissues, resulting in dangerously low blood pressure. Capillary leak syndrome may lead to multiple organ failure and shock.

Cardiometabolic Risk: Refers to an increased risk for a cluster of diseases (diabetes, heart disease or stroke).

Cardiomyopathy: Cardiomyopathy refers to diseases of the heart muscle. These diseases have many causes, signs and symptoms, and treatments. In cardiomyopathy, the heart muscle becomes enlarged, thick or rigid. In rare cases, the muscle tissue in the heart is replaced with scar tissue. See also Restrictive Cardiomyopathy.

Cancer-Related Fatigue (CRF): Also referred to as fatigue. In the book, these terms are used interchangeably. It is a condition marked by extreme tiredness and inability to function due lack of energy. Fatigue may be acute or chronic.

Cachexia: a state characterize for severe weight loss and tissue wasting secondary to underlying disease—e.g., terminal cancer.

Central Nervous System (CNS) Tumors: A tumor of the central nervous system, including brain stem glioma, craniopharyngioma, medulloblastoma, and meningioma.

Chemotherapy: Treatment with drugs that kill cancer cells.

Chemotherapy Cycle: Some chemotherapy regimens (schedules) consist of a specific number of cycles given over a specific period of time, while others are given for as long as they are effective against the cancer.

Chemotherapy Induced Peripheral Neuropathy (CIPN): Characterized by damage to the peripheral nervous system from a chemotherapeutic agent, with each agent manifesting slightly different pathologic changes and symptomatic effects.

Central Nervous System (CNS) Prophylaxis: Chemotherapy or radiation therapy given to the central nervous system (CNS) as a preventive treatment. It kills cancer cells that may be in the brain and spinal cord, even though no cancer has been detected there. Also called central nervous system sanctuary therapy, CNS prophylaxis, and CNS sanctuary therapy Treatment directed to the CNS. See also ALL Treatment Phases.

Childhood cancer: Also known as pediatric cancer, is cancer in a child. An arbitrarily adopted standard of the ages used are 0–14 years inclusive of age. However, the definition of childhood cancer sometimes includes young adults between 15–19 years old. For the purpose of this manual childhood cancer is define a cancer diagnosed between 0-18 years old.

Clinical Trial (CTs): Clinical trials are research studies that test new ways to prevent, detect, treat or manage cancer or other diseases.

Cognition: The mental process of knowing, thinking, learning and judging; the psychological result of perception and learning and reasoning.

Cognitive Function: Pertaining to or characterized by **cognition**. That operation of the mind which we become aware of objects of thought or perception; it includes all aspects of perceiving, thinking, or remembering.

Cognitive Executive Deficits: Impairments in cognitive function, particularly in executive functioning

Collapsed Joint: Joints are the part of the skeleton where two bones joint, when a joint collapses it is the flattening of the articular surface of a bone.

Concentric Contraction: is a type of muscle contraction in which the muscles shorten while

generating force. This occurs when the force generated by the muscle exceeds the load opposing its contraction.

Congenital Heart Failure (CHF): is a complex clinical syndrome that can result from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood. The cardinal manifestations of HF are dyspnea and fatigue, which may limit exercise tolerance, and fluid retention, which may lead to pulmonary congestion and peripheral edema.

Consolidation: Treatment that is given after cancer has disappeared following the initial therapy. Consolidation therapy is used to kill any cancer cells that may be left in the body.

Coordination: is a skill-related component of physical fitness that relates to the ability to use the senses, such as sight and hearing, together with body parts in performing motor tasks smoothly and accurately.

Cortical Tumor: A tumor found in the cortex of the brain.

Cytopenia: A condition in which there is a lower-than-normal number of blood cells.

Differentiate: Describes the processes by which immature cells become mature cells with specific functions. In cancer, this describes how much or how little tumor tissue looks like the normal tissue it came from. Well-differentiated cancer cells look more like normal cells and tend to grow and spread more slowly than poorly differentiated or undifferentiated cancer cells. Differentiation is used in tumor grading systems, which are different for each type of cancer.

Demyelination: The state resulting from the loss or destruction of myelin. Myelin is a mixture of proteins and phospholipids forming an insulation around many nerve fibers, increasing the speed at which impulses are conducted.

Dyspnea: Difficult, painful breathing or shortness of breath. See **Exertional Dyspnea**.

Eccentric Contraction: A type of muscle contraction that occurs as the muscle fibres lengthen, such as when a weight is lowered through a range of motion. The contractile force generated by the muscle is weaker than an opposing force, which causes the muscle to stretch. Compare to **Concentric Contraction**.

Ejection Fraction (EF): The proportion of the volume of blood in the ventricles at the end of diastole that is ejected during systole; it is the stroke volume divided by the end-diastolic volume, often expressed as a percentage.

End-of-Life (EOL): The last and final stage of the cancer continuum.

Endoprosthesis: An artificial device to replace a missing bodily part that is placed inside the body.

Ewing Sarcoma: A type of cancer that forms in bone or soft tissue.

Executive Function: Executive function is a set of mental processes that helps connect past experience with present action. People use it to perform activities such as planning, organizing, strategizing, paying attention to and remembering details, and managing time and space.

Exertional Dyspnea: Difficult, painful breathing or shortness of breath as a result of exertion. See **Dyspnea**.

Graft versus Host Disease (GvHD): A disease caused when cells from a donated stem cell graft attack the normal tissue of the transplant patient.

Graft versus Leukemia (GvL): the donor's immune cells may recognize residual leukemia, lymphoma or cancer cells as being different and destroy them.

Graft versus Tumor (GvT): the donor's immune cells may recognize residual leukemia, lymphoma or cancer cells as being different and destroy them.

Growth Hormone: A protein made by the pituitary gland that helps control body growth and the use of glucose and fat in the body. Also called somatotropin.

Hematopoietic Stem Cell Transplant (HSCT): Also known as bone marrow transplant (BMT). The transplant of an immature cell that can develop into all types of blood cells, including white blood cells, red blood cells, and platelets. Hematopoietic stem cells are found in the peripheral blood and the bone marrow.

Hematopoiesis: The formation of new blood cells.

High-Dose Chemotherapy: An intensive drug treatment to kill cancer cells, but that also destroys the bone marrow and can cause other severe side effects. High-dose chemotherapy is usually followed by bone marrow or stem cell transplantation to rebuild the bone marrow.

High-Dose Radiation: An amount of radiation that is greater than that given in typical radiation therapy. High-dose radiation is precisely directed at the tumor to avoid damaging healthy tissue, and may kill more cancer cells in fewer treatments.

Hippocampus: A layer of gray matter lying along the floor of the lateral ventricle of the brain, comprised of cholinergic and possibly glutamatergic fibers, believed to be the critical brain structure underlying learning and memory.

Immunotherapy: A type of biological therapy that uses substances to stimulate or suppress the immune system to help the body fight cancer, infection, and other diseases. Some types of immunotherapy only target certain cells of the immune system. Others affect the immune system in a general way.

Induction Therapy: The first treatment given for a disease. It is often part of a standard set of treatments, such as surgery followed by chemotherapy and radiation. When used by itself, induction therapy is the one accepted as the best treatment. If it doesn't cure the disease or it causes severe side effects, other treatment may be added or used instead.

In-Patient: Admitted to hospital and assigned a hospital bed/room.

Intrathecal therapy (IT): Treatment in which anticancer drugs are injected into the fluid-filled space between the thin layers of tissue that cover the brain and spinal cord.

Isolation Phase: State of being separated from others due to lowered immunity.

Late-Effects: are those that were not apparent during primary treatment, but become apparent at some later time.

Left Ventricular (LV) Systolic Function: The ability of the left side of the heart to contract and drive blood to the aorta.

Left Ventricle: The left side of the heart that receives the arterial blood from the left atrium and contracts to force it into the aorta.

Leukopenia: A condition in which there is a lower-than-normal number of leukocytes (white blood cells) in the blood.

Long-Term Effects (Toxicities): Synonymous with **Late Effects (Toxicities)**. Occur months or years after treatment cessation.

Long-Term Survivor: a survivor who has been cancer free for at least 5 years.

Limb Sparing Surgery: also called limb-salvage surgery is a surgery to remove a tumor in a limb (arm or leg) without removing the whole limb. The bone and tissue around the tumor may also be removed, and an implant may be used to replace the part of the limb removed. Limb-sparing surgery is done to help save the use and appearance of the limb. It is used to treat cancers of the bone and soft tissue.

Limb Biological Reconstruction: could be defined as a procedure wherein limb-sparing surgery is performed using biological (usually one's own) tissue to reconstruct a limb. An example of this would be a fibular auto-graft, where one's own fibula is used to replace a portion of a removed (cancerous) femur.

Limb Salvage Surgery: The removal of a neoplasm that otherwise would be treated by amputation. Limb salvage usually requires two separate but equally important procedures: (a) "adequate" removal of the tumor and (b) bone and soft-tissue reconstruction.

Lymphoid: Referring to lymphocytes, a type of white blood cell. Also refers to tissue in which lymphocytes develop.

Maintenance Chemotherapy: Treatment that is given to help keep cancer from coming back after it has disappeared following the initial therapy. It may include treatment with drugs, vaccines, or antibodies that kill cancer cells, and it may be given for a long time. See also ALL Treatment Phases.

Maintenance Phase: This is the third phase of acute lymphoblastic leukemia (ALL) treatment. The goal is to kill any remaining leukemia cells that may regrow and cause a relapse. Often this phase of treatment is given in lower doses than those used during the remission induction and consolidation/intensification phases. Not taking medication as ordered by the doctor during maintenance therapy increases the chance the cancer will come back. This is also called the continuation therapy phase.

Malignant: Cancerous. Malignant cells can invade and destroy nearby tissue and spread to other parts of the body.

Metabolic Syndrome: A condition marked by extra fat around the abdomen, high levels of blood glucose (sugar) when not eating, high levels of triglycerides (a type of fat) in the blood, low levels of high-density lipoproteins (a type of protein that carries fats) in the blood, and high blood pressure. People with metabolic syndrome are at increased risk of diabetes mellitus and diseases of the heart and blood vessels.

Metastasis: The spread of cancer from one part of the body to another. A tumor formed by cells that have spread is called a “metastatic tumor” or a “metastasis.” The metastatic tumor contains cells that are like those in the original (primary) tumor.

Muscle Atrophy: is the wasting or loss of muscle tissue.

Muscular Endurance: is the ability of the muscle to continue to perform without fatiguing

Muscular Strength: is the ability of the muscle to exert force during an activity.

Myeloid: Having to do with or resembling the bone marrow. May also refer to certain types of hematopoietic (blood-forming) cells found in the bone marrow.

Myocardial Fibrosis: is defined by a significant increase in the collagen volume fraction of the myocardium and leads to impaired cardiac diastolic and systolic function and is related to adverse cardiovascular events.

Neo-Adjuvant Chemotherapy: Chemotherapy that enhances the effect of a particular medical treatment.

Nephroblastoma: Synonymous with Embryoma, or Wilms’ tumour. Malignant renal (kidney) tumour of early childhood.

Neuroblastomas: Cancer that arises in immature nerve cells and affects mostly infants and children.

Neurocognitive Outcomes: This term encompasses a large number of problems and issues associated with intellectual functioning and information processing.

Neurogenesis: Involves proliferation, differentiation, and/or maturation of neural cells.

Neuron: A type of cell that receives and sends messages from the body to the brain and back to the body. The messages are sent by a weak electrical current.

Neutropenia: is an abnormally low count of neutrophils, a type of white blood cell that helps fight off infections.

Non-Curative Cancer: A form of cancer where a procedural cure has yet to be identified.

Osteonecrosis: A condition in which there is a loss of blood flow to bone tissue, which causes the bone to die.

Osteopenia: A condition in which there is a lower-than-normal bone mass or bone mineral density (the amount of bone mineral contained in a certain amount of bone). Osteopenia is a less severe form of bone loss than osteoporosis.

Osteoporosis: A condition that is marked by a decrease in bone mass and density, causing bones to become fragile.

Osteosarcoma: A cancer of the bone that usually affects the large bones of the arm or leg.

Out-Patient: Accessing ambulatory hospital services but not assigned bed/room for the purpose of staying day/night.

Palliative Care: An approach that improves the quality of life (QOL) of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.

Peripheral Neuropathy: *See Chemotherapy Induced Peripheral Neuropathy*

Peripheral Blood Stem Cell Transplant (PBSCT): is a type of HSCT in which stem cells are obtained from the peripheral blood by apheresis.

Physical Activity (PA): Any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level.

Physical Fitness: The ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies. Physical fitness includes a number of components consisting of cardiorespiratory endurance (aerobic power), skeletal muscle endurance, skeletal muscle strength, skeletal muscle power, flexibility, balance, speed of movement, reaction time, and body composition.

Physical Therapy: The use of exercises and physical activities to help condition muscles and restore strength and movement.

Proprioceptive Neuromuscular Facilitation (PNF): a method of stretching muscles to maximize their flexibility that is often performed with a partner or trainer and that involves a series of contractions and relaxations with enforced stretching during the relaxation phase.

Prosthesis: an artificial body part, such as a leg, a heart, or a breast implant.

Pulmonary Fibrosis: scarring throughout the lungs that can be caused by many conditions.

Prophalaxis: An attempt to prevent disease.

Quality of Life (QOL): World Health Organization defines Quality of Life as individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.

Radiation Therapy: The use of high-energy radiation from x-rays, gamma rays, neutrons, protons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that travels in the blood to tissues throughout the body.

Range of motion (ROM): is a measurement of movement around a joint.

Reinduction Therapy: Treatment for relapse. Using either a four-drug reinduction regimen (similar to that administered to newly diagnosed high-risk patients) or an alternative regimen including high-dose methotrexate and high-dose cytarabine.

Remission: Disappearance (not a cure) of detectable disease.

Rotationplasty: Surgery used to remove a tumor in or near the knee joint, often in young people who are still growing. The knee and part of the thigh are removed. The part of the leg that remains below the knee is then attached to the part of the leg above the knee, with the foot facing backward and the ankle joint acting as a new knee. The patient is then fitted with an artificial lower leg and foot.

Sarcopenic Obesity: A form of obesity which is operationally defined as excess weight and reduced muscle mass and/or strength, a combination that occurs in 4 to 9% of obese patients.

Short-Term Effects (Toxicities): Synonymous with **Acute Effects (Toxicities)** and early effects. Occur during or shortly after cancer treatment.

Soft Tissue Sarcoma: A cancer that begins in the muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body.

Strength: A health and performance component of physical fitness that is the ability of a muscle or muscle group to exert force.

Supportive Care: Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the

symptoms of a disease, side effects caused by treatment of a disease, and psychological, social, and spiritual problems related to a disease or its treatment. Also called comfort care, palliative care, and symptom management.

Thrombocytopenia: Lower-than-normal number of platelets in the blood. It may result in easy bruising and excessive bleeding from wounds or bleeding in mucous membranes and other tissues.

Valsalva Maneuver: The Valsalva maneuver is performed by attempting to forcibly exhale while keeping the mouth and nose closed.

Weight-Bearing: Describes the amount of weight a body part is applying against any given surface. Standing on one leg, a person applies 100% weight bearing through that foot. A weight bearing status or restriction refers to a limitation imposed by a surgeon to protect an operated or broken limb from injury, deformity or instability. These are further categorized as:

- **Full Weight Bearing (FWB):** No limitation in weight.
- **Weight-Bearing as Tolerated (WBAT):** Limited only by the person's own perception of discomfort or pain. From a safety and practical perspective, functionally equivalent to FWB (above).
- **Partial Weight Bearing (PWB):** Classically understood as about 50% on one's own body weight, but sometime surgeon will specify a specific weight (i.e. "up to 30lbs of pressure). Teaching of this easiest by using a weight scale.
- **Feather Weight Bearing (FeWB):** Toe-touch or light weight, often described as "imagine there is an egg under your foot that you cannot crush". Practically the person is allowed to touch the floor only enough to help with balancing themselves. Will require crutches or other ambulatory device to walk.
- **Non-Weight Bearing (NWB):** Not allowed to put weight through a body part. Will require crutches or other ambulatory device to walk.

Weight-Bearing Exercise: exercise during which the body works against the force of gravity and the feet and legs carry a person's weight. Weight-bearing exercise can be high impact as jump and run or low impact as climb stairs or walk.

Working Memory: Short-term memory related to the storage, processing and recall of information required for the accomplishment of immediate cognitive tasks.

List of Medications and Side Effects

This list is abstracted from POEM: Pediatric Oncology Exercise Manual (2014) (Eds. Chamorro-Viña, C.C., Keats, M., Culos-Reed, S.N.).

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Adderall	Amphetamine	ADHD	Hyper/hypotension, headache, abdominal pain, insomnia, weight loss, dry mouth, Raynaud's phenomenon mood swings, nervousness, dizziness, bruxism, diaphoresis, enuresis and incontinence	Seizures and eyesight changes
Adryamicin	Doxorubicin	Various tumors (inhibit DNA synthesis)	Nausea, vomiting, burning at site of injection, hypotension, hyperpigmentation and alopecia anemia	Hypersensitivity reactions, ulceration, heart failure, renal failure, cellulites vesication and tissue necrosis
Advair	Fluticasona + Salmeterol	Asthma	Allergic reactions, upper respiratory tract infection, throat irritation, nausea, vomiting, chills, fever and increased mucus production	Fever, hives, rash, breathing problems, chest pain, increased BP and tremors
Afinitor	Everolimus	Sub ependymal giant cell astrocytoma (Tuberous sclerosis complex)	Anemia, increased blood glucose, cholesterol and triglyceride, creatinine, mouth ulcers, infection, weakness, cough, diarrhea and constipation	Skin problems (rash, acne and dry skin), pancytopenia, nausea and vomiting, dyspnea, fever, fatigue, nosebleeds, itching, chest pain, diaphoresis, joint pain, abnormal behaviour and decreased blood phosphate level
Ambisome	Anphoterin B	Fungal infections	Nausea, vomiting, chest pain, hypocalcaemia, hypomagnesemia, confusion, headache and rash	Nephrotoxicity, anemia, leukopenia and thrombocytopenia
Amikin	Amikacin	Infections	Nausea, vomiting, arthralgia and rash	Ototoxicity, nephrotoxicity and neuromuscular block
		Various types of tumors; interferes with DNA replication	Mycotic superinfections, headache, dizziness, nausea, vomiting, GI and abdominal pains, diarrhea, increase in transaminases, injections and infusion site reactions	
Anexsia	Codeine + Acetaminophen	Pain Relief	Anxiety, dizziness, nausea, vomiting, headache, mood changes, blurred vision, Xerostomia and ringing in ears	Shallow breathing and slow HR, fainting, paranoia, seizures, problems with urination and jaundice
Anzemet	Dolasetron	Nausea/Vomiting (Anti-emetic)	Headache, fatigue, diarrhea/constipation, dyspepsia, chills, dizziness, fever, myalgia sweating, rash/urticarial, arthralgia	Tachycardia, light headedness, chest pain, bradycardia, hypotension, sinus arrhythmia, urinary retention

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Arranon	Nelarabine	T-cell acute lymphoblastic leukemia and T-cell lymphoblastic lymphoma	Anemia, neutropenia, thrombocytopenia, and leukopenia, cough, headache, nausea, vomiting, diarrhea/constipation, redness and pain around needle, dizziness and fatigue	Confusion or clumsiness, loss of coordination, weakness, numbness in extremities, blurred vision and seizure
Aspirin	Acetyl-salicylic acid	Pain relief (mild to moderate)	Reye's syndrome, nausea and GI bleeding	Allergic reaction, chest pain, swelling faces/hands, dizziness, vomiting and hearing loss
Astagraft	Tacrolimus	Organ transplant – rejection reversal, graft versus host disease	Dyspnea, headache, tremors, dysesthesias, insomnia, anemia, hyperkalemia, hyperglycemia, hypertension, nausea, vomiting, diarrhea and constipation	Pleural effusion, nephrotoxicity, rash, dizziness, seizures, neuropathy, edema, arrhythmias, anorexia, dysphagia, dyspepsia, flatulence, jaundice, pruritus
Ativan	Lorazepam	Anxiety disorders, Chemotherapy-Induced Nausea/Vomiting	Clumsiness, unsteadiness, dizziness, light headedness, drowsiness, slurred speech, headache, constipation and Xerostomia	Abnormal thinking, anxiety, behavioural change, memory problems, muscle spasm, rash, trembling, unusual bleeding and yellow eyes or skin
Avastin	Bevacizumab	Glioblastoma, leukemia (ALL, AML)	Mild headache, back pain, diarrhea, loss of appetite, cold symptoms, dry eyes or skin, taste changes, jaw pain, swelling, numbness, fatigue, infection and hypertension	Easy bruising, numbness, severe headache, foamy urine, epistaxis, thromboembolic events, GI perforations and proteinuria
	Beta-blockers: Acebutolol, atenolol, bisoprolol, metoprolol, nadolol, nebivolol, propranolol	Beta-adrenergic blocking agents	Diarrhea, stomach cramps, nausea, vomiting, rash, blurred vision, muscle cramps and fatigue	Bradycardia, hypotension, heart failure and heart attack
Bexxar	Tositumumab	Non-Hodgkin's Lymphoma	Cytopenias, infections, back pain, constipation, diarrhea, dizziness, drowsiness, headache, muscle pain, nausea, vomiting and weakness	Pneumonia, pleura effusion, severe allergic reactions, chest pain, bloody stools, fainting, pallor, shortness of breath, coffee ground vomit and myelodysplasia
Blenoxan	Bleomycin	Antitumor antibiotic (breaks DNA strands)	Hyperpigmentation, hypersensitivity reactions, hyperkeratosis, nail changes, alopecia, stomatis, fever, chills, vomiting, anorexia, weight loss, anemia, leukopenia and thrombocytopenia	Pulmonary adverse reactions, pneumonitis, pulmonary fibrosis, death, stomatitis and mucositis

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Busulfex	Bussulfan (Alkyl sulfonates)	Leukemia (Bone Marrow Transplantation)	Headache, diarrhea, constipation, nausea and flushing	Pulmonary fibrosis, hyperpigmentation, seizures, and veno-occlusive disease
	Calcium	Hypocalcaemia	Dyspepsia, constipation, interferes with Fe and Zn intake, may increase risk of kidney stones	Milk alkali syndrome
	Calcium channel blockers: Amlodipine, diltiazem, felodipine, isradipine, nifedipine, nisoldipine, verapamil	Heartburn and Pediatric High BP	Constipation, nausea, headache, rash, enema, low BP, drowsiness and dizziness	Liver dysfunction and heart failure
Celebrex	Colecoxib	Inflammation and pain	Abdominal pain, constipation, diarrhea, gas, heartburn, nausea, vomiting, dizziness	Heart attack, stroke, high BP, swelling, vomit blood, skin rashes, asthma attack, yellow skin or eyes, slurred speech
	Cephalosporin	Infections (Antibiotic)	Hypersensitivity reactions, mild stomach cramps or upset, nausea, vomiting, diarrhea, sore tongue and sores inside mouth	Black, tarry stools, chest pain, fever, painful or difficult urination, allergic reactions, colitis, severe stomach cramps and fever
Citovene	Gancyclovir	CMV Prophylaxis	Neutropenia, thrombocytopenia, anemia, diarrhea, anorexia, hypertension	Nausea, abdominal pain, stomatitis, urinary frequency, hypersensitivity reactions, pruritus, retinal detachment, neuropathy and sweating
Clolar	Clofarabine	Leukemia (ALL)	Nausea, vomiting, diarrhea, headache, fatigue, anxiety, mild rash and warmth/tingly skin	Myelosuppression, tumor lysis syndrome, SIRS, veno-occlusive hepatic disease, hepatotoxicity and nephrotoxicity
	Codeine	Pain relief	Heartburn, nausea, upset stomach and urinary retention	Psychotic symptoms, mental and respiratory depression, stupor, delirium, somnolence, dysphoria, hypotension and dizziness

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Decadron	Dexamethasone	Inflammation (anti-inflammatory)	Insomnia, irritability, increase in appetite, weight gain, hirsutism, heartburn, muscle weakness, swelling, impaired wound healing, peptic ulcer with potential perforation and hemorrhage, abdominal distention and nausea	Fever, shortness of breath, severe hot flashes, chest or jaw pain, irregular heartbeat, bradycardia, cardiac arrest, cardiac arrhythmias, cardiac enlargement, circulatory collapse, congestive heart failure, fat embolism, hypertension, myocardial rupture following recent myocardial infarction, edema, pulmonary edema, syncope, tachycardia, thromboembolism, thrombophlebitis and vasculitis, steroid myopathy, loss of muscle mass, osteoporosis, vertebral compression fractures, aseptic necrosis of femoral and humeral heads, pathologic fracture of long bones, tendon rupture, pancreatitis, convulsions, increased intracranial pressure with papilledema, vertigo, arthralgia and thromboembolism
Dilantin	Phenytoin	Prevents seizures	Walking problems, slurred speech, dizziness, nervousness, insomnia, tremor, headaches, nausea, constipation, confusion, nausea, vomiting, swelling and rapid weight gain	Suicidal thoughts, swelling, trouble swallowing, skin rash, hives, fever, painful sores, unusual bruising, severe fatigue or weakness, muscle pain, upper stomach pain, loss of appetite, dark urine, jaundice, chest pain, irregular heart rhythm and feeling short of breath
Dilaudid	Hydromorphone	Pain management	Nausea, vomiting, constipation, dizziness, headache, xerostomia, sweating and itching	Seizures, confusion, weakness, fainting, hallucinations, respiratory depression, apnea, bronchospasm or laryngospasm, alterations in heart rate and blood pressure, anorexia, diarrhea, urinary retention or hesitancy and skin rashes

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Dilaudid	Diuretics (Thiazides: chlorothiazide, hydrochlorothiazide, indapamide metalazone. Loop Diuretics: bumetanide, ethacrynic acid, furosemide, torsemide. Potassium Sparing: Amiloride, Eplerenone, Spironolactone, triamterene	Hypertension, edema	Dizziness, light-headedness, blurred vision, loss of appetite, itching, stomach upset, headache and weakness	Rash, itching, swelling, trouble breathing, muscle cramps, pain, nausea and vomiting
Domperidone	Domperidone	Nausea and vomiting management (anti-emetic)	Allergic reactions, xerostomia, hot flashes, and uncontrolled movements	Headache, Parkinson like symptoms and anxiety
Elitek	Rasburicase	Hyperuricemia secondary to chemotherapy	Nausea, vomiting, diarrhea, headache, fatigue, anxiety, mild rash, fever and swelling in hands and feet	Shortness of breath, faint headedness, bradycardia, seizure, tachycardia, sores in mouth, jaundice, hypocalcaemia, respiratory distress, pulmonary edema, pulmonary hypertension, pneumonia, arrhythmia, heart failure, cardiac arrest, chest pain and neutropenia
Emend	Aprepitant	Nausea/Vomiting management	Nausea, vomiting, heartburn, diarrhea or constipation, loss of appetite, hiccups, hair loss, headache, dizziness, fatigue, mild rash, ringing in ears and insomnia	Passing out, very thirsty/hot, unable to urinate, heavy sweating, fever, chills and bone ache.
Erbix	Cetuximab	Head and neck cancer	Rash, general weakness, fever and low magnesium levels	Nausea, vomiting, diarrhea, constipation, poor appetite, headache, abdominal pain, mouth sores, insomnia, shortness of breath, wheezing and swelling of facial features.

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Erwinaze	Asparaginase	Leukemia (ALL)	Mild nausea, vomiting diarrhea and mild stomach pain	Severe pain in upper stomach, thrombosis, hemorrhage, , fever, seizure, weakness, severe headache, pain, hyperglycemia and pancreatitis
Erythrocin	Erythromycin	Infections (Antibiotic)	Upset stomach, diarrhea, nausea, stomach pain, dry mouth, loss of appetite and constipation	Severe skin rash, itching, hives, difficulty breathing, wheezing, yellowing of the skin or eyes, dark urine, pale stools, fatigue, pancreatitis, arrhythmias, hepatotoxicity, hypersensitivity reactions, hepatitis and nephritis
	Fentanyl	Pain Management (breakthrough pain)	Dry mouth, nausea, vomiting, constipation, headache, drowsiness, fatigue, sores inside mouth, pruritus and hypersensitivity reactions	Slow HR, weak or shallow breathing, severe drowsiness, confusion, extreme fear, light headedness, stupor, delirium, somnolence, dysphoria, seizures, muscle rigidity, hypotension, bradycardia, arrhythmias, urinary retention, pulmonary edema and hemolysis
Flagyl	Metronidazol	Infections (Antibiotic)	Dizziness, headache, dizziness diarrhea, nausea, stomach pain, dry mouth, loss of appetite, constipation. Taste perversion, bacterial infection, influenza-like symptoms and moniliasis	Seizures, numbness, shortness of breath, chest pain, mood changes, encephalopathy, aseptic meningitis, optic and peripheral neuropathy, serum sickness-like reaction and thrombocytopenia
Fludara	Fludarabine	Leukemia, bone marrow transplantation	Myelosuppression, fever, infection, fatigue nausea and vomiting	Anorexia, headache, paresthesias, stomatitis, esophagitis, mucositis, constipation, taste disturbances, abdominal pain, gastrointestinal bleeding, cough, dyspnea, diaphoresis and back pain
Gengraf	Cyclosporine	Organ transplant – rejection prophylaxis	Infections, hyperuricemia, seizures, tremors, headache, hypertrichosi and pruritus	Renal insufficiency, leukopenia, thrombocytopenia, anemia, hyperkaliema, diarrhea, nausea and vomiting

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Genoxal	Cyclophosphamide	Leukemias, lymphomas, neuroblastoma, retinoblastoma	Nausea, vomiting, alopecia, infections, changes in nails and skin colour, leukopenia, anemia and thrombocytopenia	Anaphilatic reactions, blood in urine and stools, pallor, chest pain, interstitial pneumonitis, wheezing, extreme thirst with headache, weakness, anorexia, abdominal pain, diarrhea, skin rash and cystitis
	Imatinib	Leukemia (CML, ALL)	Mild nausea, stomach pain, vomiting, diarrhea, skin rash, joint pain, headache, fatigue, muscle cramps and edema	Fever, unusual bleeding, swelling, rapid weight gain, shortness of breath, nausea, bloody stool, low back pain, numbness around your mouth, dyspepsia, anorexia, constipation, brady or tachycardia, hypokalemia, neutropenia, thrombocytopenia and anemia
Imatinib	Leukemia (CML, ALL)	Mild nausea, stomach pain, vomiting, diarrhea, skin rash, joint pain, headache, fatigue, muscle cramps and edema	Nausea, vomiting, diarrhea, fatigue, alopecia, leukopenia, thrombocytopenia and anemia	Wheezing, fever, pallor, petechial, painful urination, constipation, abdominal pain, anorexia, stomatitis, rash, dyspnea, cough, headache, myalgias and arthralgias
Idamycin	Idarubicin	Leukemia, Solid tumors (inhibit DNA synthesis)	Nausea, vomiting, mucositis, diarrhea, abdominal cramps, anorexia, alopecia, rash and leukopenia	Bone marrow suppression, infection or bleeding, myocardial toxicity and heart failure
	Imatinib	Leukemia (CML, ALL)	Mild nausea, stomach pain, vomiting, diarrhea, skin rash, joint pain, headache, fatigue, muscle cramps and edema	Fever, unusual bleeding, swelling, rapid weight gain, shortness of breath, nausea, bloody stool, low back pain, numbness around your mouth, dyspepsia, anorexia, constipation, brady or tachycardia, hypokalemia, neutropenia, thrombocytopenia and anemia
Imovane	Zopiclone	Insomnia	Drowsiness, dizziness, light headedness, xerostomia, headache and upset stomach	Irregular heartbeat, rash, slurred speech, incoordination, memory loss, depression and irritability

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Intron A	Interferon alfa	Angioblastoma	Headache, dizziness, muscle pain, fatigue, nausea, vomiting, diarrhea, anorexia, xerostomia, dyspnea, cough, alopecia, mild rash, burning at injection site, "influenza-like" symptoms and neutropenia	Severe depression, aggressive behaviour, fast, slow or uneven HR, fever, vision or hearing problems, unusual urination, severe stomach pain and jaundice, thrombocytopenia and anemia
Kadian	Morphine	Pain relief	Anorexia, constipation, diarrhea, nausea, vomiting, flushing, headache, memory loss and insomnia	Bradycardia, seizures, myoclonic spasms, cold skin, confusion, severe weakness, addiction and pruritus
Keppra	Levetirecetam	Seizures (anti-epileptic)	Sleepiness, weakness, dizziness, infection, insomnia, irritability, asthenia, headache and fatigue	Depression, anxiety, suicide, cough, anorexia, nausea and pain
Kytril ()	Granisetron	Nausea/Vomiting management	Headache, stomach pain, nausea, vomiting, anorexia, diarrhea, dizziness and insomnia	Fast pounding heartbeats, fever, asthenia, easy bruising or bleeding, anxiety and dyspepsia
Leukine	Sargamostrim	Aplastic anemia, bone marrow transplantation, neutropenia associated with chemotherapy(Increase WBC for Leukemia patients)	Nausea, stomach pain, vomiting, diarrhea, loss of appetite, fatigue, hair loss, weight loss, headache, mild rash, bone pain, joint or muscle pain and "flu-like" symptoms	Eosinophilia, thrombocytopenia and anemia, easy bruising, swelling, rapid weight gain, chest pain, tachycardia, weakness or fainting, coughing up blood, painful urination and problems with vision, speech, balance or memory
Lyrica	Pregabalin	Neuropathic pain	Dizziness, somnolence, ataxia, edema, weight gain, dry mouth and blurry vision	Abnormal thinking, hypoglycemia, , trouble breathing, hives, rash, suicidal thoughts and allergies
Glucophage	Metformin	Type 2 diabetes (control blood sugar)	Nausea, anorexia, diarrhea, loss of appetite, metallic taste in mouth, nausea, flatulence, stomach ache and difficulty concentrating	Weight loss, vomiting, shallow breathing, irregular heartbeat, shakiness, slurred speech, cold sweats, mood changes, pale skin and lactic acidosis
Mesnex	Mesna	Hemorrhagic cystitis prophylaxis	Disgnesia, diarrhea, nausea, vomiting, hypotension and joint/ limb pain	Mild rash and hypokalemia

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Mycamine	Micafungin	Prophylaxis of candidiasis	Diarrhea, nausea, vomiting, abdominal pain, neutropenia, thrombocytopenia, headache, tachycardia, skin rash and fever	Constipation, dyspepsia, seizures, dizziness, insomnia, arrhythmia, urticarial, hypoglycemia, hypernatremia and hyperkalemia
Mycostatin	Nystatin	Candidiasis	Skin rash, pruritus and eczema	Hypersensitivity reaction
Neulasta	Pegfilgastrim	Neutropenia associated with chemotherapy	Bone pain, pain in arms or legs, bruising, swelling, pain, redness, or hard lump by injection site, nausea, fatigue, alopecia, diarrhea, vomiting, constipation, fever, anorexia, skeletal pain, headache, taste perversion, dyspepsia, myalgia, insomnia, abdominal pain, arthralgia, generalized weakness, peripheral edema, stomatitis and mucositis	Severe sudden pain in left upper stomach, severe dizziness, skin rash or flushing, rapid BR and signs of infections
Neumega	Oprelvekin	Thrombocytopenia Drug-induced	Edema, redness in eyes, headache, dizziness, insomnia, nausea, vomiting, diarrhea, mucositis, runny nose, cough and dyspnea	Shortness of breath, swelling, weight gain, chest pain, tachycardia, palpitations, syncope, numbness, fainting, fever, unusual urination, xerostomia and sudden vision loss
Neupogen	Filgastrim	Neutropenia associated with chemotherapy	Nausea, vomiting, diarrhea, constipation, bone pain, muscle aches, hair loss, headache, fever, fatigue, mild skin rash and itching at site of injection	Sudden severe pain in left upper stomach spreading up to shoulder, dyspnea, cough, signs of infection, thrombocytopenia, anemia, myelodysplasia and hyperuricemia
Nexium	Omeprazol	Gastro esophageal reflux	Headache, diarrhea, nausea, gas, stomach pain, constipation and dry mouth	Skin rash, hives, itching swelling, irregular heartbeat, muscle spasms, seizures, confusion, dizziness, hypoesthesia, insomnia, migraine aggravation, paresthesia, sleep disorder, somnolence, tremor, vertigo, conjutivitis, dyspnea, cough, muscle spasms, arthralgias and myalgias

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Pantoloc	Pantoprazol	Gastro esophageal reflux	Headache, diarrhea, nausea, gas, stomach pain, constipation and dry mouth	Skin rash, hives, itching swelling, irregular heartbeat, muscle spasms, seizures, confusion, dizziness, hypoesthesia, insomnia, migraine aggravation, paresthesia, sleep disorder, somnolence, tremor, vertigo, conjutivitis, dyspnea, cough, muscle spasms, arthralgias and myalgia
	Penicillin	Infections (antibiotic)	Hypersensitivity reactions, mild stomach cramps or upset, nausea, vomiting, diarrhea, sore tongue and sores inside mouth	Black tarry stools, chest pain, fever, painful or difficult urination, allergic reactions, colitis, severe stomach cramps and fever
Platinol	Cisplatin	Refractory solid tumors (Inhibit DNA synthesis)	Severe nausea and vomiting, nephrotoxicity, ototoxicity, mild bone marrow toxicity, anaemia, hypomagnesaemia hypocalcaemia, hypokaliema, hyponatremia, hyperuricemia, muscle irritability, cramps, clonus, tremor and peripheral neuropathies	Vascular toxicities, anaphylactic reactions, hepatotoxicity and ocular toxicity
Rayos	Prednisone	Inflammation, immunosuppression	Convulsions, distended abdomen, face redness, glaucoma, headache, hives and other allergic type reactions, increased pressure inside eyes or skull, inflamed oesophagus or pancreas, bone fractures, bruising, bulging eyes, congestive heart failure, muscle weakness, osteoporosis, ulcer and sweating	Insomnia, mood changes, personality changes, euphoria, psychotic behaviour and severe depression
Purinethol	Mercaptopurine	Leukemia (inhibit cell division)	Myelosuppression, hyperuricemia and intestinal ulceration	Bone marrow toxicity, hepatotoxicity, skin rashes, alopecia, and hyperpigmentation
Sancuso	Granisetron	Nausea/Vomiting management	Headache, stomach pain, nausea, vomiting, anorexia, diarrhea, dizziness and insomnia	Fast pounding heartbeats, fever, asthenia, easy bruising or bleeding, anxiety and dyspepsia

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Septin	Cotrimoxazol	Pneumocystis pneumonia prophylaxis	Nausea, vomiting, anorexia, rash, urticarial and hyperkalemia	Anorexia, stomatitis, abdominal pain, hypersensitivity reactions, anemia, leukopenia, thrombocytopenia, seizures, tremors, dizziness, lightheadness, interstitial nephritis, crystalluria, fatigue, fever, facial edema, hallucinations, confusion, insomnia and cough
	Salbutamol	asthma attacks associated with bronchitis	Nausea, vomiting, skin rash and dry mouth	Headache, tremor, tachycardia, chest pain, hypertension, anxiety, dizziness and cough
Synthroid	Levotiroxyn	Hypothyroidism	Irregular heartbeat, muscle weakness, irritability, tremors, weight loss, heat intolerance, decreased bone density, fever, sleepiness and nervousness	Chest pain, vomiting and excessive sweating
Taladine	Ranitidine	Ulcers, gastro esophageal reflux, dyspepsia	Headaches, constipation, diarrhea, nausea, vomiting and stomach pain	Hypersensitivity reaction, tachycardia/ bradycardia, myalgia, arthralgia, leukopenia, thrombocytopenia, and anemia
Taxol	Palitaxel	Will's tumor	Neutropenia mild nausea, vomiting, diarrhea, constipation, weakness, joint pain, darkening of skin or nails, temporary hair loss and hypersensitivity reactions	Fever, chills and body aches, easy bruising, unusual bleeding, bradycardia, light headedness seizure, chest pain and numbness
Taxotere	Docetaxel	Solid tumors	Fatigue, nausea, vomiting, diarrhea, constipation, muscle pain, altered sense of taste, temporary hair loss, fingernail or toenail changes, leukopenia, hypersensitivity reactions and edema	Bone marrow suppression, severe vomiting or diarrhea, fever chills body aches, pallor, light headedness, shortness of breath and hyponatremia
Temodar	Temozolomide	Brain tumors	hair loss, fatigue, diarrhea, constipation, mild rash, dizziness, blurred vision, insomnia and cough	Seizure, numbness or tingling, signs of infection, dry cough, painful urination, white patches in mouth and black tarry stools

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
	Tramadol	Pain reliever	Nausea, constipation, dizziness, headache and drowsiness,	Vomiting, diarrhea, dyspepsia, pruritus, urinary retention, hyponatremia and seizures
Trexall	Methotrexate	Acute lymphoblastic leukemia, non-Hodgkin's lymphoma, meningeal leukemia, and osteosarcoma (inhibit cell division)	Nausea, vomiting, diarrhea, leukopenia, inflammation, fever stiffness and headache	Bone marrow suppressions, aplastic anemia, hepatotoxicity, mucositis, renal dysfunction, skin rash and seizures
Trisenox	Arsenic trioxide	Acute promyelocytic leukemia	Stomach pain, nausea, vomiting, constipation, diarrhea, headache, dizziness, anxiety, , joint or muscle pain, fatigue, edema, mild rash, tachycardia, QT prolongation, cough, dyspnea, dermatitis, pruritus and leukocytosis	Fever, weight gain, , light headedness, hyperglycemia, hypotension chest pain, paresthesia, anxiety, leukopenia, thrombocytopenia and anemia
Tylenol	Acetaminophen	Pain reliever	Nausea, vomiting, headache, insomnia and hypersensitivity reactions	Acute renal failure, acute tubular necrosis, interstitial nephritis, thrombocytopenia, erythematous skin rash and dyspnea
Vidaza	Azacitidine	Myelodysplastic syndrome	Nausea, vomiting, diarrhea, constipation. Anorexia, anemia leukopenia, thrombocytopenia, fever, fatigue, pain, erythema, ecchymosis, petechial, pruritus, cough, dyspnea, arthralgia and headache	Stomatitis, dyspepsia, hemorrhoids, dysphagia, tongue ulceration, dizziness, insomnia, syncope, edema, tachycardia and hypotension
Vincristine (oncovin)	Vincristine	Various tumors	Neuropathy, temporary alopecia, decreased weight, jaw pain, bone pain, nausea, vomiting, constipation, diarrhea, fatigue and weakness	Pallor, easy bruising, numbness, burning, pain and tenderness in stomach, spinning sensation, seizure, leukopenia, thrombocytopenia and anemia

List of Medications and Side Effects

DRUG NAME	ACTIVE INGREDIENT	TARGET	PRIMARY SIDE-EFFECTS	RARE SIDE-EFFECTS
Zofran	Ondansetron	Nausea and vomiting management	Headache, stomach pain, nausea, vomiting, anorexia, diarrhea, dizziness and insomnia	Fast pounding heartbeats, fever, asthenia, easy bruising or bleeding, anxiety and dyspepsia
Zovirax	Acyclovir	Infection – Varicella and Herpes Virus (Antiviral)	Dizziness, headache, fatigue, diarrhea, abdominal pain, skin rashes, pruritus, tiredness and photosensitivity	Renal dysfunction, drowsiness, confusion, hallucinations, seizures, anxiety, tremors, erythema multiform, and Stevens Johnson syndrome toxic epidermal necrosis

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