Pediatric Nursing

A CASE-BASED APPROACH

Second Edition

Pediatric Nursing

A CASE-BASED APPROACH

Second Edition

Catherine Gannon Tagher, EdD, MSN, RN, APRN

Interim Dean and Associate Professor
College of Health and Human Services
Northern Kentucky University
Highland Heights, Kentucky

Lisa Marie Knapp, DNP, MEd, RN, CCRN

Registered Nurse IV
Pediatric Intensive Care Unit
Cincinnati Children's Hospital Medical Center
Cincinnati, Ohio

Wolters Kluwer

Philadelphia • Baltimore • New York • London
Buenos Aires • Hong Kong • Sydney • Tokyo

Vice President and Segment Leader, Health Learning & Practice: Julie K. Stegman
Director, Nursing Education and Practice Content: Jamie Blum
Senior Acquisitions Editor: Jodi Rhomberg
Senior Development Editor: Meredith L. Brittain
Editorial Coordinator: Remington Fernando
Marketing Manager: Brittany Clements
Editorial Assistant: Sara Thul
Production Project Manager: Matthew West
Manager, Graphic Arts and Design: Stephen Druding
Art Director: Jennifer Clements
Manufacturing Coordinator: Margie Orzech-Zeranko
Prepress Vendor: S4Carlisle Publishing Services

Second Edition

9 8 7 6 5 4 3 2 1

Printed in Mexico

Library of Congress Cataloging-in-Publication Data

ISBN-13: 978-1-975209-06-3
ISBN-10: 1-975209-06-0

Cataloging in Publication data available on request from publisher.

shop.lww.com

Dedication

I would like to dedicate this book to my family, my parents, and my friends. To my husband, in addition to being a loving husband and father, for supporting me through this journey again, listening to what I am sure was more than he wanted to hear about what it takes to revise a textbook. To my children, for being supportive of me while they are learning how to navigate college and become adults. To my parents, for teaching me to have the courage to put myself out there and try something new. To my friends, for always asking me how the revisions were going; thank you for listening. Finally, a special dedication to my dad, for always encouraging me to shoot for the moon. Thank you all for believing in me. I love you.

—Catherine Gannon Tagher

This book is dedicated to my family and friends. Without them in my life as I traveled this journey, I am sure I would not have been successful. To my husband, Nate, for once again being present and listening to me as I asked for the hundredth time, "Does this sound right?" and for being so flexible when I needed to spend extra time writing. To my daughter, Kasey Marie, for being supportive of me while she conquers becoming a teenager. To my mom, for enduring my long phone calls about book-writing life. To all my friends and coworkers, for always believing in me and asking me how revisions were going; thank you for listening. And finally, to my friend and colleague, Tina Fettig, for showing so much love and understanding as I navigated the last 2 years of my life, which included so many conversations about this book. Thank you all for being part of my journey. Love to you all.

—Lisa Marie Knapp

About the Authors

Catherine Gannon Tagher, EdD, MSN, RN, APRN

Catherine Gannon Tagher is the interim dean for Northern Kentucky University's College of Health and Human Services, which is home to the School of Nursing, the School of Allied Health, the School of Social Work, and the School of Kinesiology, Counseling, and Rehabilitative Services. She received her BSN from the University of Kentucky in 1997. As a registered nurse, she worked in pediatric oncology at Kentucky Children's Hospital and subsequently Cincinnati Children's Hospital. She earned her MSN from the University of Kentucky in 2001 and has been licensed as a pediatric nurse practitioner since. She has worked as a nurse practitioner in hematology/oncology and primary care. Her areas of expertise include pediatric growth and development, health promotion, and care coordination.

Dr. Tagher earned an EdD in educational leadership with a focus in nursing education from Northern Kentucky University in 2014. Her research focused on students' perceptions of stress in a high-stakes testing environment as well as helping students to view standardized testing as a challenge rather than a threat. She has published her research as well as presented at both national and international conferences.

Dr. Tagher has been a member of the faculty at Northern Kentucky University since 2005. She has taught pediatrics in the undergraduate BSN program as well as primary care of children with chronic illness and pediatric pharmacology in the MSN program. While teaching undergraduate nursing, she has used a flipped-classroom approach, teaching through cases and storytelling. She has served as the director of the BSN program and the chair of the Department of Nursing, overseeing the RN-BSN program, BSN program, MSN program, post-master's DNP program, and nurse anesthesia program. Additionally, Dr. Tagher worked with a team to develop and open the First-Year Student Success Hub at Northern Kentucky University. In addition to first-year advising, this hub provides coordinated support to all first-year students.

Dr. Tagher is married to Dr. Robert Tagher, a primary care pediatrician in Northern Kentucky. Together they have three young adult children: Maggie, Mollie, and Andrew. They have two dogs and a cat. Dr. Tagher enjoys reading, hiking, kayaking, paddleboarding, and anything to do with the ocean.

Lisa Marie Knapp, DNP, MEd, RN, CCRN

Lisa Marie Knapp is a registered nurse in the pediatric intensive care unit (PICU) at Cincinnati Children's Hospital Medical Center in Cincinnati, Ohio. She received her BSN from Hartwick College in 1997. As a registered nurse, she has worked her entire career at Cincinnati Children's Hospital Medical Center caring for critically ill pediatric patients in the intensive care unit. In 2002, she earned her MSN and MEd from Xavier University. Additionally, for many years, she worked part-time as an RN in an adult intensive care unit and emergency room at Mercy Hospital, Cincinnati, Ohio. She was a member of the faculty at Northern Kentucky University from 2011 to 2016, teaching pediatric nursing, medical–surgical clinicals, advanced medical–surgical nursing, and several other undergraduate courses.

Dr. Knapp earned a DNP, with a focus on nurses' perceptions of parent participation in the pediatric hospital setting, from Northern Kentucky University in 2016. While completing her DNP, she spent a year as a trainee in the Leadership Education in Neurodevelopmental and Related Disabilities (LEND) program, immersed in learning about providing health and related services for children with neurodevelopmental disabilities and their families. During LEND, she collaborated with team members to continue a research project titled "Cincinnati Homelessness Study: The Family Point of View." Additionally, she completed an in-depth assessment of a community resource for those with developmental disabilities.

As a PICU RN in a level I pediatric trauma center, Dr. Knapp cares for critically ill patients with medical diagnoses including septic shock, respiratory failure, hematology/oncology disorders, congenital and chronic disease, and multiple system organ failure, as well as trauma patients and patients who are pre- and post-organ transplant, and postsurgery. She is a preceptor for new staff and an active member in house-wide shared governance. She also started a clinical coaching program in the PICU in which select, expert nurses work one-on-one with nurses who have been out of orientation for 6 months to 1 year and are ready to be challenged with more complex, critically ill patients and to be mentored in critical thinking, communication, and understanding the multiple complexities of severely ill children.

Dr. Knapp is married to Nathan Knapp. Together, they have a teenage daughter, Kasey Marie. They live in a log cabin in the country with a dog and three cats. Dr. Knapp enjoys working out, walking, camping, and being involved in Kasey's extracurricular activities including being a Girl Scout troop leader.

Contributors

Contributors to the Second Edition

Darla Davidson, EdD, MSN, RN
Nursing Faculty: Course Coordinator, Clinical, Classroom, and Online Instructor
Pennsylvania College of Health Sciences
Lancaster, Pennsylvania

Christin N. Diller, DNP, RN, CPNP-AC
Pediatric Acute Care Nurse Practitioner
Heart Institute Education Consultant
Cincinnati Children's Hospital Medical Center
Cincinnati, Ohio

Shelly Morning, MSN, RN, PCCN, CCRN, WCC
Registered Nurse IV
Pediatric Intensive Care Unit
Cincinnati Children's Hospital Medical Center
Cincinnati, Ohio

Contributors to the First Edition

Josie Bidwell, DNP, RN, FNP-C, DipACLM
Associate Professor
Department of Preventive Medicine
School of Medicine
University of Mississippi Medical Center
Jackson, Mississippi

Julie A. Hart, DNP, RN, CNE
Associate Professor
School of Nursing
College of Health and Human Services
Northern Kentucky University
Highland Heights, Kentucky

Lisa Marie Knapp, DNP, MEd, RN, CCRN
Registered Nurse IV
Pediatric Intensive Care Unit
Cincinnati Children's Hospital Medical Center
Cincinnati, Ohio

Laura Kubin, PhD, RN, CPN, CHES
Associate Professor
The Houston J. and Florence A. Doswell College of Nursing
T. Boone Pickens Institute of Health Sciences—Dallas Center
Texas Woman's University
Denton, Texas

Rebecca Logan, PhD, RN
Assistant Professor
Department of Nursing
Berry College
Mount Berry, Georgia

Jennifer L. Nahum, DNP, RN, PNP-BC, CPNP-AC
Clinical Assistant Professor
Rory Meyers College of Nursing
New York University
New York, New York

Karen A. Ripley, PhD, RN
Assistant Professor
School of Nursing
Loma Linda University
Loma Linda, California

Erin M. Robinson, EdD, MSN, RN
Associate Director of Undergraduate Studies
School of Nursing
College of Health and Human Services
Northern Kentucky University
Highland Heights, Kentucky

Catherine Gannon Tagher, EdD, MSN, RN, APRN
Interim Dean and Associate Professor
College of Health and Human Services
Northern Kentucky University
Highland Heights, Kentucky

Trisha L. Wendling, DNP, APRN, CNP
Pediatric Nurse Practitioner
Education Consultant
Cincinnati Children's Hospital Medical Center
Cincinnati, Ohio

Anita Kay Williams-Prickett, PhD, RN
Retired Professor of Nursing
Jacksonville State University
Jacksonville, Alabama
Former Nurse
Children's Hospital of Alabama
Birmingham, Alabama

Cecilia Elaine Wilson, PhD, RN, CPN
Associate Clinical Professor
Texas Woman's University
Denton, Texas

Reviewers

Electra Allen, MSN, RN, CPN
Associate Professor of Nursing
Biola University
La Mirada, California

Kate Brashears, DNP, APRN, PC-PNP
Assistant Professor of Nursing
University of Central Oklahoma
Edmond, Oklahoma

Jill M. Bregovi, RN, MSN, CPNP-PC/AC, CNE
Assistant Professor of Nursing
Montgomery County Community College
Blue Bell, Pennsylvania

Jean Coffey, PhD, APRN, CPNP, FAAN
Clinical Professor
University of Connecticut
Storrs, Connecticut

Judy M. Comeaux, DNP, APRN/PNP, CRNI
Freshman Admit and Regular Prelicensure Program Director
Associate Professor of Nursing
University of North Florida School of Nursing
Jacksonville, Florida

Kimberly Erwin, MSN, RN, CCRN
Simulation Coordinator/Lecturer
Wilson College
Chambersburg, Pennsylvania

Jennifer Frank, DNP, RN, PCNS, BC
Assistant Professor
Department of Nursing
School of Health Professions and Wellness
Jacksonville State University
Jacksonville, Alabama

Maria Grandinetti, PhD, RN, BSBA, CNE
Associate Professor and Chair, Undergraduate Nursing Program
Passan School of Nursing
Wilkes University
Wilkes-Barre, Pennsylvania

Indra Hershorin, PhD, RN, CNE
Associate Professor of Nursing
School of Nursing
College of Health and Wellness
Barry University
Miami Shores, Florida

Erin Kelley, DNP, RN, CNE
Assistant Professor
School of Nursing
Northern Kentucky University
Highland Heights, Kentucky

Jennifer Limongiello, PhD, FNP-BC
Assistant Professor
Family Nurse Practitioner Program
Rivier University
Nashua, New Hampshire

Nancy Marc, DNP, RN
Assistant Professor
Florida Southern College
Lakeland, Florida

Jill Matthes, DNP, RN, CHSE
Associate Professor
Ashland University
Ashland, Ohio

Darci McCall, PhD, RNC-OB, C-EFM
Clinical Associate Professor
Boise State University
Boise, Idaho

Takenya McDonald, RN, MSN
Associate Professor
Benjamin Leon School of Nursing
Miami Dade College
Miami, Florida

Michael J. Mooney, DNP, MBA, CPNP-AC/PC, CNE
Instructor (Clinical)
Wayne State University
Detroit, Michigan

Dawn Moore, DNP(c), MS, RNC-OB
Assistant Professor, Clinical Instructor
Pace University
Pleasantville, New York

Sydney L. Moran, PhD, RN, CPN
Assistant Professor
Nursing Department
AdventHealth University
Orlando, Florida

Audrey K. Myers, DNP, RN, CPNP-PC
Assistant Professor
Eastern Mennonite University
Harrisonburg, Virginia

Kathleen McFarlain Pender, MSNEd, RN
Assistant Professor and Clinical Coordinator
Undergraduate Nursing Degree Program
McNeese College of Nursing and Health Professions
Lake Charles, Louisiana

Morgan Shahan, DNP, MPH, FNP-C
Assistant Teaching Professor
Sinclair School of Nursing
University of Missouri
Columbia, Missouri

Debbie Stayer, PhD, RN-BC, CPN, CCRN-K
Assistant Professor
Bloomsburg University
Bloomsburg, Pennsylvania

Geraldine Tyrell, DNP, RN, CNE
Dean, School of Healthcare Professions
Newman University
Newton, Kansas

Preface

In today's world of health care, nurses care for complex pediatric patients in myriad situations. Pediatric nurses are expected to provide care for children and families with multifaceted medical and social situations within inpatient, outpatient, and community settings. As a result of current drivers of curricular design, nursing faculty continue to devote less time to specialty nursing areas such as pediatrics in the nursing curriculum. However, the ability of students to apply pediatric concepts and analyze complex scenarios is a necessary skill to provide safe, quality care; to promote health; and to optimize growth and development for children of all ages and their families in a variety of healthcare settings.

Most students entering a pediatric nursing course have a base knowledge of medical–surgical principles. This textbook facilitates the application of these nursing concepts in the pediatric setting, allowing students to maximize learning within a limited amount of time. The book builds on students' prior knowledge to differentiate the care of children from that of adults. By using engaging, chapter-length case studies to highlight evidence-based practice, patient safety, prioritization of care, and interprofessional teamwork, the text helps students develop skills such as clinical judgment, patient advocacy, and patient education in any pediatric setting.

In addition to decreasing the amount of class time allotted to pediatric nursing, many programs are also reducing clinical time. Furthermore, many students start the pediatric clinical rotation before having any substantial didactic course time. As a way to help students prepare for clinical, the first unit of this book is made up entirely of fully developed case scenarios based on some of the most common types of problems seen in pediatric acute care or outpatient settings. These scenarios are start-to-finish case studies with concise explanations and rationales for interventions. The scenarios follow fictional pediatric patients from the home to the clinic to the emergency department and then through hospitalization, if needed, and discharge. Students learn health promotion, growth and development, and care of the pediatric patient. Nursing interventions, patient education, and safety are emphasized throughout each scenario, helping to promote clinical decision-making. The information provided in these scenarios is expanded upon in later chapters of the textbook. In addition, characters introduced in these scenarios appear in later chapters to reinforce the principles of care for these children.

Organization

The book has a case-based theme. Patients are introduced in Unit 1, Scenarios for Clinical Preparation, and then threaded through the remainder of the book where appropriate to provide reinforcement and deeper learning of the material. Unit 2, Care of the Developing Child, provides an overview of growth and development. Unit 3, Care of the Hospitalized Child, is organized by body system.

Unit 1: Scenarios for Clinical Preparation

The first unit consists of case-based scenarios. The purpose of this unit is to provide a clinical overview so that students are prepared to manage the pediatric patient in the concurrent clinical course. Common scenarios that are seen in general pediatric units or in outpatient settings, along with pertinent concepts of growth and development, are introduced here, early in the book. These cases enable students entering clinical to have a solid base for clinical practice. Every scenario is thorough enough to be used for clinical preparation. Clinical instructors can use the scenarios for discussion points in either the pre- or postconference setting. In addition, instructors can use the end-of-chapter "Think Critically" questions from the scenario chapters to enhance the didactic portion of the course.

Each scenario introduces the story of a child at a certain age with a common medical diagnosis seen either on pediatric acute care units or in outpatient clinic settings. Relevant information regarding social background, ethnicity, growth and development, diagnosis, concepts of nursing care, and treatment is provided in a conversational tone that facilitates understanding the care of a pediatric patient within a contextual situation. When appropriate, cultural norms and preferences are discussed, enabling students to incorporate culturally sensitive, family-centered care into their nursing practice.

The scenarios begin outside of the hospital and continue through the clinic visit or the emergency department visit and, if warranted, the hospitalization of the child, with discharge teaching and follow-up as indicated. Pertinent growth and development concepts are included based on the age of the child. The nursing care provided in the scenarios is based on current and accurate evidence. Appropriate pharmacotherapy for the scenario is included, allowing students to focus only on the care of the child in the scenario.

NEW! New to the second edition is Chapter 15, Nevaeh McClure: Cerebral Palsy. This chapter tells the story of a medically complex teenager with cerebral palsy who is nonverbal and wheelchair bound. The story begins at home, relating the complexities of caring for a teenager who is dependent upon others for basic necessities such as feeding, continence care, and medication administration. As the story unfolds, issues such as pressure injury, feeding tube challenges, and contending with respiratory illness are addressed. In addition, the chapter discusses nursing assessment and care as well as caregiver stress and the burden of caring for a medically complex child.

The unique approach of Unit 1 allows each specific problem to be discussed as a discrete entity. For example, programs implementing a concept-based curriculum could use the patient case on asthma in Chapter 2 as an exemplar in lieu of or in conjunction with covering the full chapter on alterations in respiratory function (Chapter 21).

Unit 2: Care of the Developing Child

The second unit discusses care of the developing child. This unit includes two major themes. The first theme is growth and development, which includes the concepts of growth, development, and health promotion. This information, although not exhaustive, incorporates normal growth and development and developmental concerns. This knowledge can be applied in any pediatric setting.

The second theme of this unit is common problems seen in an ambulatory setting. Chapters are organized by developmental stage: newborn and infant, toddler, preschooler, school-age child, and adolescent. The patients introduced in Unit 1 are referred to in chapters of this unit where appropriate when discussing the principles of growth and development, once again providing context and reinforcement of these principles to promote meaningful learning.

Unit 3: Care of the Hospitalized Child

The third unit is centered on the care of the hospitalized child. The chapters in this unit focus on body systems, including relevant problems in each. Each chapter begins by presenting body system–specific information related to pediatric assessment, variations in pediatric anatomy and physiology from those of an adult, and concept-based general nursing interventions for the conditions covered. This introductory content is followed in each chapter by sections covering conditions affecting the given body system that are commonly seen in children. Each condition section is further divided into the following standard subsections:

- Etiology and Pathophysiology
- Clinical Presentation
- Assessment and Diagnosis
- Therapeutic Interventions
- Evaluation
- Discharge Planning and Teaching

Pharmacological therapy (in addition to being presented in The Pharmacy feature, discussed in the User's Guide) is primarily covered in the Therapeutic Interventions subsection of the relevant condition. Although this approach results in some repetition of pharmacology content, it also provides much-needed reinforcement of the drugs pertinent to the treatment of pediatric conditions and the nursing care involved in the administration of these drugs.

Patients from the scenarios in the first unit are reintroduced in chapters of this unit on the basis of their diagnosis to reinforce priority nursing care, promote deeper learning, and enhance clinical judgment.

Features of This Book

Please refer to the User's Guide (which immediately follows this preface) for explanations of this book's features, including the two features new to this edition—"Building Clinical Judgment" and "Spotlight on Essential Nursing Competencies"—and the "Clinical Judgment: The Nurse's Point of View" feature, which has been revised for this edition to emphasize clinical judgment.

Building Clinical Judgment Skills

Nursing students are required to obtain nursing knowledge and apply foundational nursing processes to practice effective clinical judgment. Being able to apply clinical judgment in practice is critical for patient safety and optimizing outcomes. The content provided in this text includes features such as "Clinical Judgment: The Nurse's Point of View," "Building Clinical Judgment," and "Think Critically" that strengthen students' clinical judgment skills by giving them opportunities to apply knowledge and practice critical thinking. Additionally, accompanying products CoursePoint+ and Lippincott NCLEX-RN PassPoint provide an adaptive experience that allows students to build confidence by answering questions like those found on the Next Generation NCLEX (NGN) examination.

Inclusive Language

A note about the language used in this book. Wolters Kluwer recognizes that people have a diverse range of identities, and we are committed to using inclusive and nonbiased language in our content. Please note that whenever "male" is used in this book, it refers to a person assigned male at birth, and whenever "female" is used, it refers to a person assigned female at birth. In line with the principles of nursing, we strive not to define people by their diagnoses, but to recognize their personhood first and foremost, using as much as possible the language diverse groups use to define themselves, and including only information that is relevant to nursing care.

We strive to better address the unique perspectives, complex challenges, and lived experiences of diverse populations traditionally underrepresented in health literature. When describing or referencing populations discussed in research studies, we will adhere to the identities presented in those studies to maintain

fidelity to the evidence presented by the study investigators. We follow best practices of language set forth by the *Publication Manual of the American Psychological Association,* 7th Edition but acknowledge that language evolves rapidly, and we will update the language used in future editions of this book as necessary.

A Comprehensive Package for Teaching and Learning

Ancillary Package

To further facilitate teaching and learning, a carefully designed ancillary package has been developed to assist faculty and students.

Instructor Resources

Tools to assist you with teaching your course are available upon adoption of this book on thePoint® at http://thepoint.lww.com/Tagher2e.

- A **Test Generator** features National Council Licensure Exam (NCLEX)-style questions mapped to chapter learning objectives.
- An extensive collection of materials is provided for each book chapter:
  - **PowerPoint Presentations** provide an easy way to integrate the textbook with your students' classroom experience; multiple-choice and true/false questions are included to promote class participation.
  - **Guided Lecture Notes** are organized by outcome and provide corresponding PowerPoint slide numbers to simplify preparation for lecture.
  - **Discussion Topics** (and suggested answers) can be used in the classroom or in online discussion boards to facilitate interaction with your students.
  - **Assignments** (and suggested answers) include group, written, clinical, and Web assignments to engage students in varied activities and assess their learning.
  - **Case Studies** with related questions (and suggested answers) give students an opportunity to apply their knowledge to a patient case similar to one they might encounter in practice.
- **Answers to the Think Critically questions in the book** reinforce key concepts.
- Sample **Syllabi** are provided for 7-week and 15-week courses.
- **Maps Linking Cases With Chapters** provide a visual representation of the links between the content covered in Unit 1 with the content covered in Units 2 and 3.
- A **Quality and Safety Education for Nurses (QSEN) Competency Map** identifies content and special features in the book related to competencies identified by the QSEN Institute.
- An **American Association of Critical-Care Nurses (AACN) Essentials Competency Map** identifies book content related to the AACN Essentials.
- A **Bachelor of Science in Nursing (BSN) Essentials Competency Map** identifies book content related to the BSN Essentials.
- An **Image Bank** lets you use the photographs and illustrations from this textbook in your course materials.
- **Learning Objectives** from the book are provided for your convenience.
- An **ebook** serves as a handy resource.
- Access to all **Student Resources** is provided so that you can understand the student experience and use these resources in your course as well.

Student Resources

An exciting set of free learning resources is available on thePoint® to help students review and apply vital concepts in pediatric nursing. Multimedia engines have been optimized so that students can access many of these resources on mobile devices. Students can access all these resources at http://thepoint.lww.com/Tagher2e using the codes printed in the front of their textbooks.

- **Journal Articles** offer access to current research relevant to each chapter and available in Wolters Kluwer journals to familiarize students with nursing literature.
- **Watch & Learn Videos** (and accompanying **Video Skill Checklists**) reinforce skills from the textbook and appeal to visual and auditory learners.
- **Heart and Breath Sounds** are provided for your convenience.

vSim for Nursing

Available for separate purchase, vSim for Nursing, jointly developed by Laerdal Medical and Wolters Kluwer Health, offers innovative scenario-based learning modules consisting of Web-based virtual simulations, course learning materials, and curriculum tools designed to develop critical thinking skills and promote clinical confidence and competence. vSim for Nursing | Pediatric includes 10 of the 12 cases from the *Simulation in Nursing Education—Pediatric Scenarios*, authored by the National League for Nursing. Students can progress through suggested readings, pre- and post-simulation assessments, documentation assignments, and guided reflection questions and will receive an individualized feedback log immediately upon completion of the simulation. Throughout the student learning experience, the product offers remediation back to trusted Lippincott resources, including Lippincott Nursing Advisor and Lippincott Nursing Procedures—two online, evidence-based clinical information solutions used in healthcare facilities throughout the United States. This innovative product provides a comprehensive patient-focused solution for learning and integrating simulation into the classroom.

Contact your Wolters Kluwer sales representative or visit wltrsklwr.com/vsimfornursing for options to enhance your pediatric nursing course with vSim for Nursing.

Lippincott DocuCare

Available for separate purchase, Lippincott DocuCare combines Web-based academic electronic health record (EHR) simulation software with clinical case scenarios, allowing students to learn how to use an EHR in a safe, true-to-life setting while enabling instructors to measure their progress. Lippincott DocuCare's nonlinear solution works well in the classroom, simulation lab, and clinical practice.

Contact your Wolters Kluwer sales representative or visit wltrsklwr.com/DocuCare for options to enhance your pediatric nursing course with DocuCare.

A Comprehensive, Digital, Integrated Course Solution: Lippincott® CoursePoint+

Lippincott® CoursePoint+ is an integrated, digital curriculum solution for nursing education that provides a completely interactive experience geared to help students understand, retain, and apply their course knowledge and be prepared for practice. The time-tested, easy-to-use, and trusted solution includes engaging learning tools, evidence-based practice, case studies, and in-depth reporting to meet students where they are in their learning, combined with the most trusted nursing education content on the market to help prepare students for practice. This easy-to-use digital learning solution of *Lippincott® CoursePoint+*, combined with unmatched support, gives instructors and students everything they need for course and curriculum success!

Lippincott® CoursePoint+ includes the following:

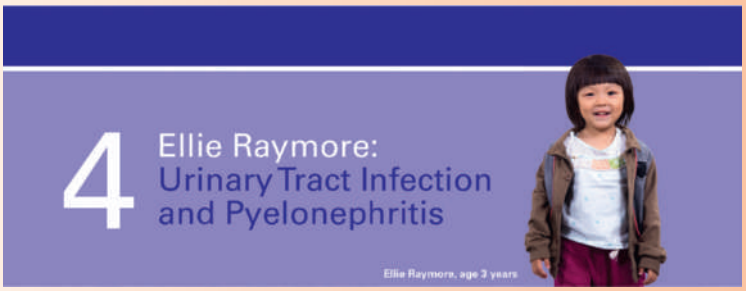
- Leading content provides a variety of learning tools to engage students of all learning styles.
- A personalized learning approach gives students the content and tools they need at the moment they need it, giving them data for more focused remediation and helping to boost their confidence and competence.
- Powerful tools, including varying levels of case studies, interactive learning activities, and adaptive learning powered by PrepU, help students learn the critical thinking and clinical judgment skills to help them become practice-ready nurses.
- Preparation for Practice tools improve student competence, confidence, and success in transitioning to practice.
  - vSim® for Nursing: Codeveloped by Laerdal Medical and Wolters Kluwer, vSim® for Nursing simulates real nursing scenarios and allows students to interact with virtual patients in a safe, online environment.
  - Lippincott® Advisor for Education: With over 8,500 entries covering the latest evidence-based content and drug information, Lippincott® Advisor for Education provides students with the most up-to-date information possible, while giving them valuable experience with the same point-of-care content they will encounter in practice.
- Unparalleled reporting provides in-depth dashboards with several data points to track student progress and help identify strengths and weaknesses.
- Unmatched support includes training coaches, product trainers, and nursing education consultants to help educators and students implement CoursePoint+ with ease.

User's Guide

Pediatric Nursing: A Case-Based Approach, Second Edition contains many accessible features to help students grasp the important content.

Case-Based Features That Build Clinical Judgment and Emphasize Essential Nursing Competencies

Chapter-length **Clinical Scenarios** make up Unit 1, as mentioned in the preface. Each of the 15 scenarios in Unit 1 presents the story of a different pediatric patient with one or several conditions related to a given body system, told from the point of view of the patient's caregiver (or, for a few of the older patients, from the patient's point of view). Together, the cases cover patients of a diverse range of ages, levels of growth and development, backgrounds, and conditions and body systems involved, as well as a variety of aspects of pediatric nursing assessment, diagnosis, and intervention.



In Chapter 4, Ellie Raymore presented with signs and symptoms of a urinary tract infection. What were these signs and symptoms? Was her assessment normal or abnormal? Why was further testing warranted in Ellie's case?

Greater breadth and depth of content emerge as the reader continues; Units 2 and 3, although still striving for compelling context, offer a more traditional textbook format, which provides a greater wealth of information. Through the case snippets in these units, which prompt students to recall patients from Unit 1, students can link these later units to those scenarios.

NEW! As nursing students think through patient scenarios, it is imperative for them to keep essential nursing competencies in mind. Throughout the case scenarios in Unit 1, the **Spotlight on Essential Nursing Competencies** feature allows students to see how the competencies can be put into practice.

Spotlight on Essential Nursing Competencies

Interprofessional Collaboration

- Provide an example of how interprofessional collaboration helped improve an outcome for Natasha.

Quality and Safety

- Provide two examples of how Jill practiced safety measures to improve safety for Natasha during her hospitalization.
- What could happen if these safety measures were not used?

Informatics and Technology

- Explain how informatics and real-time charting of vital signs for a blood transfusion can provide a better way to identify a blood transfusion reaction.

REVISED TO EMPHASIZE CLINICAL JUDGMENT! Clinical Judgment: The Nurse's Point of View feature in Unit 1 changes the narrator from the patient to a knowledgeable nurse preceptor who picks up the story from the nursing perspective, including information about how and why particular aspects of care are provided to a patient. These features have been revised to indicate which steps of the National Council of State Boards of Nursing Clinical Judgment Measurement Model (NCJMM) the nurse and nurse practitioner are thinking through related to the patient situation.

Clinical Judgment: The Nurse's Point of View

Kai:

ANALYZE CUES: I'm so glad that Andrew took the bottle. If he hadn't, I would have had to arrange for an occupational therapist to come to the house to help him learn how to eat, and I'm not sure how Dezba would feel about that.

PRIORITIZE HYPOTHESES: Andrew most likely just needs developmental surveillance and social work (Priority Care Concepts 8.1). If he has trouble with solid foods and textures, I will discuss with Dezba the need for occupational therapy.

GENERATE SOLUTIONS: Often, children who suffer from failure to thrive need a multidisciplinary team of health-care workers to provide nutrition intervention and feeding behavior education (Tang et al., 2021). However, because the Hocktochee family lives in a rural area and has difficulty with transportation, it is unlikely they would be able to make multiple visits to different specialists. I will try to arrange for members of the team to conduct home visits for Andrew.

TAKE ACTION: Now that Dezba has overcome the first hurdle by giving Andrew a bottle, I think I'll take the visit one step further and see whether I can persuade her to take advantage of other resources to help Andrew with his development.

NEW! Building Clinical Judgment features in Units 2 and 3 relate the steps of the NCJMM to the patient scenarios in Unit 1. They are presented in SBAR (situation, background, assessment, and recommendation) format.

Building Clinical Judgment 28.1 David Torres (Ulnar Fracture), Part 1

SBAR

- **Situation:** David is a 12-y-old boy presenting to the emergency department (ED) with complaints of pain and swelling in his right wrist.
- **Background:** David fell while riding his bike the night before. His mother called David's pediatrician, who recommended that David be assessed in the ED and have the wrist X-rayed. David is part of a traveling baseball team.
- **Assessment:** Weight 92 lb (41.7 kg), height 5 ft 1 in (154.94 cm), temperature 99.4°F (37.4°C), pulse 92 beats/min (bpm), respirations 22 breaths/min, blood pressure (BP) 130/80 mm Hg, pain level 6/10 on pain scale. Radial pulse on right wrist is palpable, the right wrist is cool to the touch, bruising and mild edema noted, and capillary refill is brisk. Patient states wrist feels better when held above the level of the heart, and he says he feels like he is "being poked with pins and needles" when he lowers his arm to a dependent position. David has no known drug allergies.
- **Recommendation:** Ice, elevation, and pain medication

Clinical Judgment Development

- **Recognize Cues:** What are the most significant cues? Which cues require immediate follow-up? What cues are important but do not require immediate follow-up?
- **Analyze Cues:** Which cues are consistent with a possible fractured wrist? What additional problems is David at risk for developing? What additional information would be helpful for interpreting David's assessment findings? Develop a problem list for David.
- **Prioritize Hypotheses:** Based on David's problem list, which problem is the most serious? Why? Which concern should the nurse address first? Why?
- **Generate Solutions:** After identifying the concern the nurse should address first, write a SMART (specific, measurable, achievable, realistic, and time-bound) outcome. What orders do you anticipate for David? What nursing interventions should be included in David's plan of care?

What If...

- How would you change your plan of care if David was a 3-y-old and fell off his tricycle?

Note: The steps of the NCSBN Clinical Judgment Measurement Model are from National Council of State Boards of Nursing (NCSBN®). (2022). *NCSBN clinical judgment measurement model.* www.ncsbn.org/14798.htm

Unfolding Patient Stories, written by the National League for Nursing, are an engaging way to begin meaningful conversations in the classroom. These vignettes, which appear at the end of the first chapter in each unit, feature patients from Wolters Kluwer's *vSim for Nursing | Pediatric* (codeveloped by Laerdal Medical) and DocuCare products; however, each Unfolding Patient Story in the book stands alone, not requiring purchase of these products.

For your convenience, a list of all the case studies, along with their location in the book, appears in the "Case Studies in This Book" section later in this front matter.

Unfolding Patient Stories: Brittany Long • Part 1

Brittany Long is a 5-year-old child diagnosed with sickle cell anemia who lives with her mother, 7-year-old sister, and grandmother. Her pain crises are mostly managed at home, and she has been hospitalized twice. How can the nurse help Brittany and her family cope with a long-term illness and the management of acute crises? How can the reactions of family members influence Brittany's adjustment to sickle cell disease? What effect can a long-term illness have on her sister, and what actions can support her sister's understanding and cooperation? (Brittany Long's story continues in Unit 3.)

Care for Brittany and other patients in a realistic virtual environment: ***vSim*** *for Nursing* (thepoint.lww.com/vSimPediatric). Practice documenting these patients' care in DocuCare (thepoint.lww.com/DocuCareEHR).

Chapter-Beginning Features

Learning Objectives state clear and concise learning goals for each chapter.

Objectives

After completing this chapter, you will be able to:

1. Describe normal growth and development of the 14-year-old.
2. Discuss an appropriate teaching plan for a healthy 14-year-old.
3. Identify triggers of a sickle cell crisis.
4. Identify signs and symptoms of impending sickle cell crisis in children.
5. Describe the treatment of acute chest syndrome in children and teenagers.
6. Create a nursing plan of care for a teenager with sickle cell anemia.

Key Terms are listed at the beginning of each chapter, boldfaced on first use in the chapter text, and included in a glossary at the back of the book.

Key Terms

Acute chest syndrome (ACS)
Acute splenic sequestration
Atelectasis
Dactylitis
Vasoocclusive crisis

Features That Teach Skills and Concepts

For your convenience, a list of all the features that teach skills and concepts, along with their location in the book, appears in the "Special Features in This Book" section later in this front matter.

Growth and Development Check features throughout the text alert students to the importance of a child's age and developmental stage when using clinical judgment and implementing plans of care.

Growth and Development Check 25.1

Milestones in the Development of Bladder Control

Age (y)	Milestone
1½	Passes urine at regular intervals
2	Verbalizes when they are urinating
2½	Can hold urine; knows when they need to void
2½–3½	Achieves nighttime control of urine
3	Holds urge to void when preoccupied with play or activities; uses bathroom by themselves
5	Prefers privacy; is able to initiate urination regardless of fullness of bladder; voids approximately seven times a day

How Much Does It Hurt? boxes incorporate principles of pediatric pain management.

How Much Does It Hurt? 1.1

Chip's FLACC Score*

Chip's total FLACC (face, legs, activity, cry, and consolability) score is a 2, based on the following ratings:

- Face: 0
- Legs: 1
- Activity: 0
- Cry: 0
- Consolability: 1

*For a description of the FLACC scale, see Chapter 16.

Patient Safety reminders, as well as important signs and symptoms to which the nurse needs to pay attention, are highlighted as appropriate throughout the text.

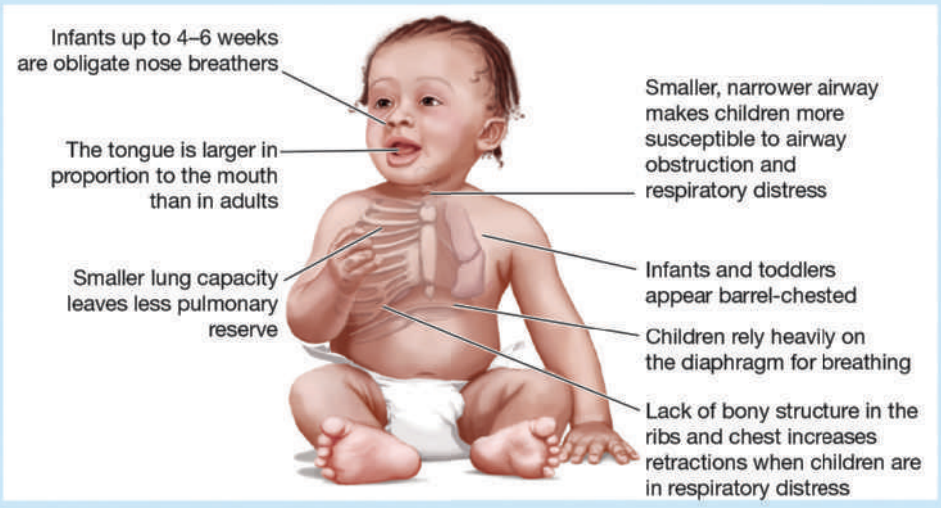
Patient Safety 28.3

A Fracture That May Indicate Abuse

The toddler fracture is an accidental twisting injury, typically to the lower extremities in ambulating toddlers during normal activities (e.g., sliding down a slide and getting the leg caught). Twisting injuries in nonambulating children should raise a red flag indicating potential child abuse (Souder, 2021).

Let's Compare boxes throughout the text differentiate between adult and pediatric anatomy, physiology, and assessment techniques.

Let's Compare 1.1 **Airway Structures and Risk of Obstruction**



An infant's tongue is larger in proportion to the mouth than in adults, increasing the risk for obstruction with narrowing of the airway. The trachea is cartilaginous and the neck is shorter in an infant, further increasing the risk for airway obstruction and collapse.

Because the bronchi and bronchioles are smaller in infants, they are more easily obstructed than those of adults. Infants also have fewer **alveoli** than adults, leaving even less room for air exchange when mucus is obstructing the bronchioles. Even slight obstruction can have a large impact on an infant's work of breathing.

Image adapted with permission from Ateah, C. A., Scott, S. D., & Kyle, T. (2012). *Canadian essentials of pediatric nursing* (1st ed., Fig. 19.1). Lippincott Williams & Wilkins.

Priority Care Concepts provide a quick overview of prioritization of care for pediatric patients.

Priority Care Concepts 32.1

Taking Your Medication

Vomiting in children with adrenal insufficiency is not an excuse to skip a dose of medication. Injectable hydrocortisone should be available for these patients during illness. It is important that the patient continues to take the prescribed doses of medications at the specified times because the drugs mimic a healthy body's secretion of steroids.

Whose Job Is It, Anyway? sections underscore roles of different members of the healthcare team.

Whose Job Is It, Anyway? 5.1

Medical Interpreter

Most hospitals have access to interpreters for many different languages. These interpreters are trained in medical terminology and are often referred to as medical interpreters. Nurses are able to request an interpreter when families do not speak English or there is concern that a family may not understand instructions given to them. If there is any doubt whether a family fully understands their child's care and discharge instructions, enlist the help of an interpreter, if available, to prevent the child from harm.

Hospital Help boxes give tips for promoting the continued growth and development of children while they are in the hospital by addressing the unique needs and challenges of each stage.

Hospital Help 1.1

Building Infant Trust

Infants are in the Erikson stage of trust versus mistrust. When an infant is in the hospital, it is important to keep feeding routines the same as much as possible. Allowing caregivers to hold an infant whenever they can helps the infant maintain a sense of trust. If parents or caregivers cannot stay at the hospital, they can leave a recording of themselves singing a song or talking to the infant. They can also leave an object, such as a blanket, that has their scent on it. If they cannot stay, it is important that the nurses make sure the infant's needs are met to continue to establish a sense of trust.

Analyze the Evidence compares sometimes conflicting and contradictory research that supports or challenges current pediatric nursing practice.

Analyze the Evidence 5.1 Using Diluted Apple Juice for Rehydration

Traditionally, fluids high in sugar content have been discouraged for use in oral rehydration therapy. The thought has been that these types of fluids can induce osmotic diarrhea; therefore, only electrolyte solutions should be used for rehydration. However, caregivers indicate that children do not like the taste of electrolyte solution and often refuse to drink it. Therefore, they end up in the emergency department for intravenous rehydration.

Researchers performed a single-center randomized trial with 647 children. They found that, for mild dehydration, caregivers who gave their children diluted apple juice actually experienced less treatment failure than those who used commercial electrolyte solutions. Furthermore, the children who received the diluted apple juice had no more diarrheal episodes than those who received the electrolyte solution. The greatest benefit was among children older than 24 mo.

The researchers concluded that for mild dehydration, promoting fluid consumption is more important than the amount of sugar in the fluid.

Adapted from Freedman, S. B., Willan, A. R., Boutis, K., & Schuh, S. (2016). Effect of dilute apple juice and preferred fluids vs electrolyte maintenance solution on treatment failure among children with mild gastroenteritis: A randomized clinical trial. *Journal of the American Medical Association, 315*(18), 1966–1974. https://doi.org/10.1001/jama.2016.5352

Patient Teaching includes important points nurses must cover with patients and their family to effectively educate them.

Patient Teaching 16.1

Abnormal Stools

Teach the caregiver the differences between normal and abnormal stools. If the infant is having infrequent stools, such as every third day, yet the stools are soft and either pasty brown or seedy yellow, there is no cause for concern. Instruct the caregiver to call the healthcare provider if stools are hard, red, mucousy, frothy, or extremely foul smelling.

The Pharmacy provides must-know pharmaceutical information, including, where appropriate, drug classification, route of administration, action, and nursing considerations.

The Pharmacy 20.1 Fluoxetine

Classification	Route	Action	Nursing Considerations
Antidepressant	Oral	Inhibits serotonin reuptake in the central nervous system	• Assess for restlessness, hyperactivity, and agitation. • May cause nausea, vomiting, and diarrhea • Monitor for gastrointestinal bleeds. • Monitor for dizziness, headaches, and dry mouth. • Do not discontinue abruptly.

Adapted from Taketomo, C. K. (2021). *Pediatric & neonatal dosage handbook* (28th ed.). Lexicomp.

Chapter-Ending Features

Think Critically offers short, often multipart questions requiring students to synthesize information found in the chapter. Suggested answers are available to instructors at http://thepoint.lww.com/Tagher2e.

Think Critically

1. What can the nurse and caregivers do to help promote optimal development in an infant with a cranial malformation?
2. Develop a care plan that focuses on the child who has had a VP shunt placed. How will the nurse know that the shunt is functioning properly? What types of signs and symptoms would indicate that there is a shunt malfunction?
3. What are some potential seizure triggers and how can they be eliminated to reduce the risk of seizure activity in a child with epilepsy?
4. Create a home plan of care focusing on safety for the child with epilepsy. What types of measures should the caregivers incorporate into daily life to prevent serious injury?
5. What are some priorities the nurse should recognize when caring for an infant who may be a victim of SBS?
6. Develop a plan of care that focuses on helping a child cope with chronic headaches.
7. What types of interventions can the nurse initiate to improve communication for a hospitalized child who has hearing loss?

References cited are listed at the end of each chapter and include updated, current sources.

References

Al Nasiri, Y., Jacob, E., Lee, E., Nyamathi, A., Brecht, M. L., Robbins, W. A., & Al Mawali, A. (2020). Parent educational intervention program for improving parental knowledge, self-efficacy and health related quality of life in children with sickle cell disease using smartphone technology: A randomized controlled trial. https://doi.org/10.21203/rs.2.20544/v1

Al-Zhrani, F. S., Ghoneim, S. H., Makin, M., Alsukhayri, N. A., & Alshaynawi, S. A. (2020). Hydroxyurea adherence in adolescents and young adults with Sickle Cell Disease: An exploration of barriers to adherence in relation to health-related quality of life. *Current Pediatric Research, 24*(6), 281–284. https://www.alliedacademies.org/articles/hydroxyurea-adherence-in-adolescents-and-young-adults-with-sickle-cell-disease-an-exploration-of-barriers-to-adherence-in-relation-15050.html

Beck, C. E., Trottier, E. D., Kirby-Allen, M., & Pastore, Y. (2022). Acute complications in children with sickle cell disease: Prevention and management. *Paediatrics & Child Health, 27*(1), 50–62. https://doi.org/10.1093/pch/pxab096

Creary, S., Chisolm, D., Stanek, J., Hankins, J., & O'Brien, S. H. (2019). A multidimensional electronic hydroxyurea adherence intervention for children with sickle cell disease: Single-arm before-after study. *JMIR mHealth and uHealth, 7*(8), e13452. https://doi.org/10.2196/13452

Inparaj, S., Buckingham, M., Oakley, L., Seed, P. T., Lucas, S., & Oteng-Ntim, E. (2020). Pulmonary complications for women with sickle cell disease in pregnancy: Systematic review and meta-analysis. *Thorax, 75*(7), 568–575. https://doi.org/10.1136/thoraxjnl-2019-213796

Lotterman, S., & Sharma, S. (2022). *Blood transfusion*. StatPearls. https://www.statpearls.com/ArticleLibrary/viewarticle/18403

National Institutes of Health. (2022). *What is sickle cell disease?* https://www.nhlbi.nih.gov/health/sickle-cell-disease

Ogu, U. O., Badamosi, N. U., Camacho, P. E., Freire, A. X., & Adams-Graves, P. (2021). Management of sickle cell disease complications beyond acute chest syndrome. *Journal of Blood Medicine, 12*, 101–114. https://doi.org/10.2147/JBM.S291394

Pecker, L. H., & Lanzkron, S. (2021). Sickle cell disease. *Annals of Internal Medicine, 174*(1), ITC1–ITC16. https://doi.org/10.7326/AITC202101190

Reader, S. K., Rockman, L. M., Okonak, K. M., Ruppe, N. M., Keeler, C. N., & Kazak, A. E. (2020). Systematic review: Pain and emotional functioning in pediatric sickle cell disease. *Journal of Clinical Psychology in Medical Settings, 27*(2), 343–365. https://doi.org/10.1007/s10880-019-09647-x

Shah, V., Patel, A., Bambharoliya, P., & Patadia, J. (2021). Sexual maturity in adolescents suffering from sickle cell disease: A cross-sectional study. *Journal of Clinical & Diagnostic Research, 15*(6), SC01–SC04. https://doi.org/10.7860/JCDR/2021/47287.14981

Shih, S., & Cohen, L. L. (2020). A systematic review of medication adherence interventions in pediatric sickle cell disease. *Journal of Pediatric Psychology, 45*(6), 593–606. https://doi.org/10.1093/jpepsy/jsaa031

Smaldone, A., Manwani, D., & Green, N. S. (2019). Greater number of perceived barriers to hydroxyurea associated with poorer health-related quality of life in youth with sickle cell disease. *Pediatric Blood & Cancer, 66*(7), e27740. https://doi.org/10.1002/pbc.27740

Yang, M., Elmuti, L., & Badawy, S. M. (2022). Health-related quality of life and adherence to hydroxyurea and other disease-modifying therapies among individuals with sickle cell disease: A systematic review. *BioMed Research International, 2022, 2122056*. https://doi.org/10.1002/pbc.27740

Contents

Unit 3
Care of the Hospitalized Child 317

Case Studies in This Book

Cases in Unit 1 That Are Referred Back to in Later Units

Adelaide Wilson (age 11 years; obesity)

Nevaeh McClure (age 15 years; cerebral palsy)

Cases That Unfold Across Units

Unfolding Patient Stories: Brittany Long

Unfolding Patient Stories: Eva Madison

Unfolding Patient Stories: Jackson Webber

Special Features in This Book

Analyze the Evidence

Building Clinical Judgment

Growth and Development Check

Hospital Help

How Much Does It Hurt?

Let's Compare

Patient Safety

Patient Teaching

The Pharmacy

Priority Care Concepts

Spotlight on Essential Nursing Competencies

Whose Job Is It, Anyway?

6 Abigail Hanson: Leukemia

Abigail Hanson, age 4 years

Objectives

After completing this chapter, you will be able to:

1. Describe normal growth and development of the 4-year-old.
2. Discuss an appropriate teaching plan for the healthy 4-year-old.
3. Identify presenting signs and symptoms of leukemia.
4. Apply principles of growth and development to the 4-year-old in the hospital.
5. Describe the psychological impact of a pediatric cancer diagnosis on the family.
6. Explain the progression from infection to sepsis.
7. Plan nursing interventions for the child undergoing chemotherapy treatment.

Key Terms

Absolute neutrophil count (ANC)
Alopecia
Central venous catheter (CVC)
Hepatosplenomegaly
Lymphadenopathy
Lymphoblast
Petechiae
Stomatitis

Background

Abigail Hanson is a 4-year-old girl who lives at home with her father, mother, and older sister. Abigail's father, Jack, is an investment banker who travels a great deal for work. When he is home, he is involved with his children and loves to take the girls to the zoo. Abigail's mother, Lucy, is a teacher but currently stays at home. She volunteers on two different community boards and plans on going back to work when both of the girls are in school full time. Isabelle, Abigail's sister, is almost 6 years old and is in half-day kindergarten. The family lives in the suburbs, about 30 minutes outside of a large metropolitan area.

Abigail is a typically developing 4-year-old (Growth and Development Check 6.1). She and Isabelle play well together most of the time but fight from time to time, as all siblings do. Abigail loves to play pretend. Her favorite game to play is "zoo." She has a stuffed animal for almost every animal that she has seen in the zoo with her dad. Abigail sets out the animals around her playroom and has the animals act out different scenes. She can occupy herself for a couple of hours with her stuffed animals, and Isabelle often plays with her.

When she is not playing "zoo," Abigail likes to play outside with her friend next door. She plays on her swing set and loves to go down the slide. Abigail is a fast runner and loves to climb on things so much that Lucy is afraid that she is going to fall off of something and break a limb. Although Lucy wishes Jack were home more, she feels that she can't complain. She has healthy and happy girls, a nice house, and good friends.

Growth and Development Check 6.1 Four-Year-Old Milestones

Social/Emotional

- Likes to do new things
- Engages in creative and imaginative play
- Likes to play with other children
- Is able to cooperate
- Talks about interests
- Comforts other children
- Likes to help

Language/Communication

- Uses "he" and "she" correctly
- Sings songs
- Tells stories
- Answers simple questions
- Uses sentences that have four or more words
- Talks about something that happened during the day

Cognitive

- Knows first and last names
- Is able to memorize address
- Can count to 10 or higher
- Knows at least four colors
- Begins to understand time, as in before and after
- Tells what happens next in a book

Movement/Physical Development

- Uses scissors
- Draws a person with three or more body parts
- Unbuttons some buttons
- Dresses and undresses without help
- Holds a crayon between thumb and finger
- Prints some capital letters
- Climbs and hops
- Stands on one foot
- Catches a bounced ball

Adapted from the Centers for Disease Control and Prevention. (2022). *Learn the signs. Act early*. https://www.cdc.gov/ncbddd/actearly/milestones/milestones-4yr.html

Health Promotion

Lucy takes Abigail to the pediatrician's office for her 4-year-old checkup. Abigail actually turned 4 about 3 months ago.

"I feel guilty for not getting Abigail in sooner," Lucy tells the medical assistant in the office.

"No need to worry," the assistant tells Lucy. "It's good that you are getting her in for her checkup. Three months is not all that late."

The assistant weighs Abigail and takes her vital signs in a small room in the front of the office. She weighs 40 lb (18.1 kg) and is 3.5 ft (42 in) tall. Abigail's vital signs are as follows:

- Pulse: 102 beats/min (bpm)
- Respiratory rate: 25 breaths/min
- Blood pressure: 92/60 mm Hg
- Temperature: 98.2°F (36.8°C)

"Let's check how well you can see," the assistant tells Abigail, holding up a picture chart. "First, though, can you name the pictures you see on the chart? That will make it easier for me to know which pictures you are talking about." Abigail dutifully names the pictures on the chart. The assistant then has Abigail stand on a line and goes to another line 20 ft away. "Now, cover your left eye and call out the name of each picture I point to." The assistant points to pictures on different lines of the chart, and Abigail calls out the names. The assistant repeats this procedure while having Abigail cover her right eye. Throughout the vision screening, Abigail has difficulty keeping one eye covered, Lucy notices. She keeps forgetting and takes her hand off of her eye. The assistant estimates that her vision is 20/30.

The assistant shows Lucy and Abigail to an exam room. "Kevin is running a little behind schedule," the assistant says, "but the wait shouldn't be too long." Kevin is the nurse practitioner Abigail is scheduled to see. While they are waiting, Lucy notices that there are stickers on the wall that are of different shapes and colors. She points them out and has Abigail practice naming the shapes and the colors. She is able to name red, green, blue, yellow, and black, but she cannot remember orange and purple. She gets all of the shapes correct. "Great job!" Lucy tells her daughter. At that moment, Kevin enters the room.

"Hi, Abigail!" Kevin says. "How are you today?" Abigail chatters for a moment in response. Kevin then turns to Lucy and says, "How are things going? Do you have any specific questions or concerns?"

"Actually, yes," Lucy says. "I'm a little concerned about Abigail's vision. Is 20/30 okay? Also, I noticed that Abigail did not seem to cooperate very well with keeping one eye covered during the screening. Could that have affected the result?"

"Although we check visual acuity with the picture chart at the 4-year-old checkup," Kevin says, "most children don't really understand how to follow the direction of keeping one eye covered until around the age of 5. I would not be concerned at this point. Children typically reach the visually acuity of 20/20 by the time they are 5 years old."

Kevin talks to Lucy about the measurements his assistant took at the beginning of the visit. He explains that Abigail's weight, 40 lb, puts her in about the 80th percentile for weight for all girls her age. Abigail's height, 3.5 ft, puts her in about the 90th percentile for height.

"Although these percentiles sound high," Kevin explains, "all they mean is that she is bigger than the average 4-year-old. Because her weight percentile is below her height percentile, I'm not concerned." He further explains that her body mass index (BMI) is 15.9, which is within the range of ideal weight. The range for ideal BMI is from the 5th to the 85th percentile, and Abigail is in the 69th percentile.

Kevin begins Abigail's physical exam. During the exam, he talks with both Abigail and Lucy.

"What do you like to do, Abigail?" he asks.

"I like to swing and ride my tricycle," Abigail tells Kevin.

"That's great!" he replies. "I'm so proud of you for being active and playing outside. That helps you stay healthy." He explains to Lucy how important activity is at this age and how it can prevent a sedentary lifestyle, which leads to obesity.

"What do you like to eat?" he asks Abigail.

"Pizza!" she shouts.

"Me, too," he says. "Do you know what fruits and vegetables are?"

"Yes."

"Can you name a fruit for me?"

"Apple," she says.

"That's right," he replies. "What about a vegetable?"

"Carrot," she says.

"We make sure that Abigail has at least one fruit or vegetable at every meal," Lucy says.

"It sounds like you are a good eater," Kevin tells Abigail. He explains to Lucy that most 4-year-olds eat three meals and two snacks per day and that it is important for caregivers to model healthy eating and offer healthy foods at each meal.

Kevin completes the physical exam and says, "Everything looks great, Abigail." He finishes up the appointment with some anticipatory guidance. "In general, a child should be in a forward-facing car seat until they outgrow the seat. After Abigail outgrows her front-facing car seat, she should be in a booster seat with a back until she is around 8 years old. But you should read the height and weight requirements for your specific car safety seat, because they can vary" (American Academy of Pediatrics [AAP], 2021).

"Sleep is another thing to consider," Kevin says. "It's so important for children. Not only does it help the child with cognitive development, adequate sleep can help improve physical and mental health as well as prevent obesity beginning as early as infancy" (Tsao et al., 2020). "Preschool children typically need 11 to 12 hours of sleep per day. Does Abigail still take naps?"

"No," Lucy says. "She's more interested in playing with her older sister, Isabelle."

"That's fine," Kevin says. "Many children stop napping around the age of 4. However, no napping means that it is imperative that Abigail get 11 to 12 hours of sleep at night."

Continuing with his teaching, Kevin talks to both Lucy and Abigail about safety, especially stranger safety (Patient Teaching 6.1). "Preschoolers like to explore and meet new people," he says. "Sometimes they wander off in stores or parks. The good news is that by the age of 4, children have the cognitive ability to memorize their address and phone number. So, I encourage you to work with Abigail to help her learn her address and phone number in case she ever gets separated from you."

Finally, Kevin explains to Lucy that with Abigail's increasing independence comes the need for new sets of rules (Patient Teaching 6.2). "Children tend to behave well when caregivers and other adults set rules and limits for them and follow them consistently," he says. "When children do not follow the rules, the consequences need to be logical and timely. Also, I recommend that you encourage some independence in Abigail by having her dress and undress herself. Give her a chore to do such as picking up her dirty clothes. Daily routines will help her know what to expect and perhaps divert behavioral meltdowns."

After all of his teaching is complete, Kevin discusses Abigail's 4-year-old immunizations (Patient Teaching 6.3). "Abigail has had all of these immunizations before," he explains. "Each shot that she is getting today is a booster to her earlier immunizations. Two of the immunizations are live virus vaccines, meaning that Abigail receives a weakened form of the virus for which her body will form antibodies. The two live virus vaccines are the measles, mumps, and rubella, known as the MMR, and the chickenpox, or varicella, vaccines. Most 4-year-olds do not have reactions to the immunizations. However, if Abigail has side effects from the live virus vaccines, they are most likely to occur

Patient Teaching 6.1

Stranger Safety

At 4 y, children are becoming more independent. Children at this age are also very trusting. Therefore, it is very important to talk to children about safety with strangers. Caregivers should talk to their children about how to be careful when around strangers. Tell your child the following:

- Do not go with anyone you do not know.
- No one should touch you in the bathing suit areas unless the person is a doctor or a nurse, and then only if I say it is okay.
- If someone tells you to keep a secret from me, that is wrong; please tell me.
- If you get separated from me, try to find a security guard or police officer.

Parents can help their children learn tools to use when they are lost and in the presence of strangers. At this age, children are able to memorize their address and phone number. Help your child learn this information so that if your child gets lost, someone will be able to help them. In addition, in crowded places, point out safe areas and people who can help, such as police officers and security guards.

Patient Teaching 6.2

Discipline

Setting rules and limits can go a long way toward curtailing unwanted behavior in your child. When establishing household rules, be sure that your child is able to understand the rules and follow them. Similarly, be sure your child is able to accomplish the task they are asked to do. Children develop at different rates. Often children are not misbehaving, they simply are not at the developmental stage to accomplish what is being asked of them. Some tips for discipline in the 4-year-old include the following:

- Routines:
  - Establishing daily routines helps a child know what to expect each day.
  - Simple routines such as brushing teeth and reading a story before bed provide comfort and can help divert temper tantrums.
- Limits:
  - Setting limits lets children know what is expected, such as requiring them to always wear a helmet when riding a bike.
  - Explain the consequences of breaking the rules.
- Independence:
  - It is important to encourage independence within the set limits.
  - Independence within limits helps encourage self-confidence.
- Responsibility:
  - Encouraging responsibility with chores around the house fosters independence and self-confidence.
- Time-out:
  - When your child is not listening and a consequence must be enforced, time-out is a preferred method of discipline.
  - The goal of time-out is to separate your child from the situation.
  - Children should be warned that they are getting a time-out.
  - Choose a time-out spot.
  - Choose a time. A general rule of thumb is 1 min/y of age of your child.
  - If your child whines and fusses, then the time-out starts over.

Adapted from American Academy of Pediatrics. (2018). *Disciplining your child.* https://www.healthychildren.org/English/family-life/family-dynamics/communication-discipline/Pages/Disciplining-Your-Child.aspx

Patient Teaching 6.3

Immunizations for 4-Year-Olds

Immunizations

The immunizations that your child will get at their 4-year-old checkup are as follows:

- Diphtheria, tetanus, acellular pertussis (DTaP)
  - The DTaP vaccine protects against the following:
    - Diphtheria, a serious infection of the throat that can block the airway
    - Tetanus, otherwise known as lockjaw, a nerve disease
    - Pertussis, otherwise known as whooping cough, a respiratory infection that can have serious complications
- Inactivated poliovirus (IPV)
  - The IPV vaccine protects against polio, which can cause paralysis and death.
- Measles, mumps, rubella (MMR)
  - The MMR vaccine protects against the following:
    - Measles, a serious and highly contagious respiratory infection that causes rash and fever
    - Mumps, a highly contagious virus that causes fever, headache, and swollen glands under the jaw
    - Rubella, also known as "German measles," a virus that causes a rash and swollen glands
- Chickenpox (varicella)
  - The varicella vaccine protects against chickenpox, which is a disease that causes a rash that itches, forms blisters, and causes fever.
  - Chickenpox can be life-threatening in babies and children with weakened immune systems.

Common Side Effects

After your child gets immunizations, they may have the following:

- A fever of up to around 102°F (38.89°C)
- Redness or a small amount of swelling at the injection site
- A mild rash 5–7 d after the MMR or varicella vaccine
- Fussier in the 24 h after immunizations
- More sleep in the 24 h after immunizations

When to Call the Healthcare Provider

- If your child has a fever and the temperature is 105°F (40.5°C) or higher
- If your child has a seizure
- If your child has uncontrollable crying for 3 h or longer

Adapted from the Centers for Disease Control and Prevention. (2019). *Diseases and the vaccines that prevent them.* https://www.cdc.gov/vaccines/parents/diseases/index.html

5 to 7 days after the shots, so be aware. The most common side effects of the MMR and the chickenpox vaccines are fever and localized rash."

Abigail sits on the table like a big girl and gets her immunizations. She sits still and barely lets out a whimper. Lucy is so proud of her. On the way out of the office, Abigail picks out a sucker and a sticker and tells her mother that she is excited to get home and play with her stuffed animals.

At Home

A few days after her checkup, Abigail is not acting like herself, Lucy notices. She is grumpy and tired. She feels warm to the touch, so Lucy takes her temperature. It is 102.3°F (39°C). Lucy is not too concerned. She remembers that Kevin told her

either the MMR or chickenpox vaccine could cause side effects 5 to 7 days later. She decides to keep an eye on Abigail over the next day or two to see what happens.

The next morning Abigail is worse. She wakes up, goes immediately to the couch, and lies back down. This is not like her at all. She usually bounces out of bed, eats breakfast, and is ready to play zoo with her stuffed animals. Abigail's dad, Jack, tries to entice her to eat breakfast, but she is just not interested. Abigail's temperature remains roughly the same, ranging from 101.8°F (38.8°C) to 102.3°F (39.06°C). Lucy gives Abigail some acetaminophen to help with the fever.

"Maybe we should call the pediatrician's office," Jack says.

"Not just yet," Lucy says, trying to stay calm. "I still think this is just a result of the immunizations."

Abigail stays on the couch and watches television most of the day. She cuddles with her blanket and her favorite stuffed tiger. Near bedtime, Abigail begins to complain that her legs hurt. Lucy gives her another dose of acetaminophen, rubs her legs to help her feel better, and lies down with Abigail until she falls asleep.

The next morning Abigail does not even want to get out of bed. She is now on day 3 of fever, and this morning her temperature is up to 102.9°F (39.4°C). Abigail is still complaining of her legs hurting. Lucy picks Abigail up to take her to the bathroom and notices small red spots on Abigail's arms (Fig. 6.1). She remembers that both the MMR and chickenpox vaccines can cause a rash, but these red spots concern Lucy. Lucy does not remember Isabelle having any trouble with her 4-year-old immunizations. She knows that every child can be different, but she also has a feeling that something is not right. She tells Jack that she is going to call the pediatrician's office.

That morning Lucy calls the pediatrician's office and talks to the nurse. "Abigail received her immunizations 1 week ago, but her symptoms seem to be getting worse, not better. She has had a fever for 3 days that doesn't seem to be responding well to acetaminophen. She's been very sleepy, just not acting like herself, and this morning woke up with small red spots on her arms."

Figure 6.1. Petechiae. Petechiae are pinpoint, flat red spots that indicate bleeding under the skin. Reprinted with permission from Weber, J. R., & Kelley, J. H. (2017). *Health assessment in nursing* (6th ed., unnumbered figure in Abnormal Findings 14-4 in Chapter 14). Wolters Kluwer.

The nurse takes in this information and tells Lucy, "These symptoms do seem unusual for an immunization reaction. Bring Abigail into the office for a sick visit. An appointment is available at 11:30 a.m. We'll see her then."

At the Pediatrician's Office

Both Lucy and Jack bring Abigail to the pediatrician's office. The assistant takes Abigail's vital signs and reports them as follows:

- Pulse: 120 bpm
- Respiratory rate: 28 breaths/min
- Blood pressure: 90/58 mm Hg
- Temperature: 102.4°F (39.1°C)

Her weight is still at 40 lb. After completing the vital signs and measurements, the assistant takes Abigail and her parents to a room.

A few minutes later the nurse practitioner, Kevin, comes in. Lucy is glad that they are able to see him again since he just saw Abigail 1 week ago. Lucy tells Kevin the history of Abigail's present illness.

"You were right to bring Abigail in," Kevin says. "Although the immunizations that she received could cause fever, they would not cause fever of this intensity and duration."

Kevin completes a thorough physical exam. After he is finished, he tells Lucy and Jack, "I cannot find any overt signs that indicate what could be causing Abigail's fever. Her ears are not infected, her lungs are clear, and her throat is not red or inflamed. Has she had any trouble urinating, complaints of burning, or foul-smelling urine?"

"No," Lucy says.

"I'm concerned because Abigail has mild **hepatosplenomegaly** and generalized **lymphadenopathy**," Kevin says, "meaning her liver, spleen, and lymph nodes are all enlarged. The red spots on her arms are called **petechiae**, which are caused by bleeding under the skin. All of Abigail's symptoms can be explained by a viral illness, but with the high fever, fatigue, and leg pain, the presentation is concerning. I'd like Abigail to have blood work done to help determine what is going on with her." Kevin explains that he is writing an order for a stat complete blood count (CBC) with differential and a comprehensive metabolic panel (CMP). He tells Abigail's parents that he will call them when he gets the results. Lucy and Jack take Abigail to the laboratory immediately to have blood drawn.

About an hour later, Lucy and Jack receive a call from Kevin. He tells them he has received the results of Abigail's blood work (Table 6.1) and asks them to come back to the office.

Back at the pediatrician's office, Kevin meets with Lucy and Jack and tells them that her blood work is concerning. "Her white blood cell (WBC) count is very high, higher than it should be for an infection. Her hemoglobin (Hgb) and hematocrit (Hct) levels are low, indicating that Abigail is anemic. Her platelet levels are slightly low, which could be the reason for the petechiae. The most concerning part of Abigail's blood work, however, is that she has 38% **lymphoblasts**. A lymphoblast is an immature WBC that does not work correctly." Kevin looks at Jack and Lucy with a somber expression and says, "The

Table 6.1 Abigail's Initial Laboratory Results

Laboratory Test	Abigail's Results	Normal Range for a 4-Year-Old Female
Complete blood count with differential		
WBC, /μL	42,000	5,000–15,500
RBC, $\times 10^6$/μL	4	4.2–5.4
Hgb, g/dL	10	12.5
Hct, %	31	37
Platelets, $\times 10^3$/μL	90	150–350
Neutrophils—bands, %	50	3–5
Neutrophils—segmented, %	30	54–62
Lymphoblasts, %	38	N/A
Comprehensive metabolic panel		
Albumin, g/dL	4.3	3.6–5.2
Alkaline phosphatase, U/L	220	100–320
ALT, U/L	16	10–25
AST, U/L	22	13–35
BUN, mg/dL	7	5–18
Calcium, mg/dL	9.2	8.8–10.8
Chloride, mEq/L	99	99–107
Creatinine, U/L	32	20–180
Glucose, mg/dL	75	60–100
Potassium, mEq/L	4.1	3.4–4.7
Sodium, mEq/L	150	135–147
Total bilirubin, mg/dL	0.2	<1.5
Total protein, g/dL	7.2	6–8

ALT, alanine aminotransferase; AST, aspartate aminotransferase; BUN, blood urea nitrogen; Hct, hematocrit; Hgb, hemoglobin; RBC, red blood cell; WBC, white blood cell.
Adapted from Kleinman, K., McDaniel, L., & Molloy, M. (Eds.). (2020). *The Harriet Lane handbook* (22nd ed.). Elsevier.

percentage of lymphoblasts in Abigail's blood along with the high WBC count and low Hgb, Hct, and platelet levels has me concerned that Abigail may have leukemia."

Jack and Lucy are absolutely stunned and cannot even speak. Lucy tears up but tries not to cry so as not to alarm Abigail.

"I'm going to have her admitted to the hospital with an oncology consult," Kevin continues. "The oncologists will want to conduct more tests for a definitive diagnosis. I know this is a terrible moment for you. I can assure you, though, that you will get the best care possible at the children's hospital. Go home, pack a bag for yourselves and Abigail, and go to the main welcome center at the hospital."

"How could this have happened?" cries Lucy. "Would her immunizations have caused this?" Suddenly, all Lucy can think about is that she did something to cause Abigail to develop this terrible illness.

Kevin looks at Jack and Lucy with compassion. "Abigail's immunizations in no way caused her to develop leukemia. We do not really know why children develop leukemia," he explains. "I can assure you that you have done nothing to cause this."

Jack and Lucy drive home and pack a bag for Abigail and Lucy. Jack will have to come home to stay with Isabelle. In the meantime, a neighbor is able to take care of Isabelle. Lucy is not sure what to tell Isabelle at this point, so she tells her that she and her daddy have to take Abigail to the hospital so the doctors can figure out what is making Abigail so sick and help her get better. Lucy and Jack kiss Isabelle goodbye and promise that daddy will be home to tuck her in tonight. They get in the car and drive to the hospital. Abigail is asleep in the backseat, clutching her stuffed tiger in her arms.

At the Hospital

Jack and Lucy do as Kevin instructed and stop at the main welcome desk of the hospital. The clerk looks up Abigail's name and finds her room number. The Hanson family is then escorted to a room in the hospital's oncology unit. Lucy is surprised; the unit almost looks like a hotel rather than a hospital.

The first person that Jack, Lucy, and Abigail meet is their nurse.

"Hi, I'm Norma," she says. "I'll be taking care of you all. I've been a nurse on the oncology unit for 20 years now. I like to work with children who are newly diagnosed because I feel it is my job to help families navigate through this difficult period." She takes Abigail's vital signs and weight. Abigail's weight is 39.8 lb (18 kg) on the hospital scale. Her vital signs are as follows:

- Pulse: 122 bpm
- Respiratory rate: 26 breaths/min
- Blood pressure: 91/56 mm Hg
- Temperature: 102.1°F (38.9°C)

Lucy watches Norma take Abigail's vital signs. She has been trying to stay strong but feeling extremely overwhelmed, Lucy breaks down and begins to cry. Jack sits next to Lucy and puts his arm around her.

The team of doctors comes in and Lucy brushes away her tears.

"Hi, I'm Dr. Redman, the attending physician," one says. She sits down in between the bed and the chair so that she can talk to Lucy, Jack, and Abigail at the same time. "We still need to do more blood work and some tests to be sure, but the initial blood work leads me to believe that Abigail has acute lymphoblastic leukemia (ALL)."

"When the percentage of lymphoblasts in a child's blood is greater than 20% and the WBC count is high, I suspect leukemia," Dr. Redman explains (National Comprehensive Cancer Network [NCCN], 2021).

"What are lymphoblasts?" Jack asks.

"Lymphoblasts are immature WBCs that do not function correctly, lowering the ability to fight infection, which is why Abigail has fever and lymphadenopathy," Dr. Redman says. "Furthermore, because the lymphoblasts are so proliferative, the bone marrow is not able to produce as many red blood cells (RBCs) and platelets. This explains why Abigail is anemic and has petechiae."

The entire time, Abigail listens to Dr. Redman and watches her mom and dad. Lucy can tell she is worried.

"What's wrong with me?" Abigail asks Dr. Redman.

"Well, sweetie, your body is making bad blood cells that are making you sick." She assures Abigail that she did nothing wrong to cause this to happen, explaining to Lucy and Jack that children at this age sometimes believe they caused their illness.

"Am I going to get better?" Abigail asks.

"I'm going to do my best to get the bad blood cells out of your body," Dr. Redman says.

"Can my tiger stay with me while I'm in the hospital?"

"Absolutely," Dr. Redman says. "He will help you feel safe while you are here."

Workup for Acute Lymphoblastic Leukemia

"In addition to some more blood work," Dr. Redman tells Lucy and Jack, "Abigail will need to have a bone marrow biopsy and a lumbar puncture. The bone marrow biopsy will confirm the diagnosis and the lumbar puncture will determine whether the leukemia has spread to the central nervous system."

Box 6.1 Orders for Abigail Hanson

- Admit to unit A6 West.
- Insert peripheral intravenous (IV) line.
- Dextrose 5% normal saline at 75 mL/h
- Nothing by mouth
- Acetaminophen 270 mg IV every 6 h as needed for fever
- Administer oxygen to keep saturation at 95% or higher.
- Complete blood count with differential
- Peripheral blood smear
- Blood type and screen
- Comprehensive metabolic panel
- Uric acid
- Prothrombin time
- Activated partial thromboplastin time
- Bone marrow biopsy
- Lumbar puncture
- Electrocardiogram
- Echocardiogram

"Will these procedures hurt?" Lucy asks.

"They will be uncomfortable," Dr. Redman says, "But we will give Abigail some medicine to relax her and make her sleepy so she will not feel the discomfort during the procedure. However, she may be sore afterward. Norma, your nurse, is excellent and should be able to answer any questions you have." Dr. Redman explains that she must leave the room now to enter orders into the computer (Box 6.1).

Norma comes into the room and explains the tests and procedures that Dr. Redman ordered for Abigail. "The ECG, or electrocardiogram, and the echocardiogram are ordered as baseline tests of heart function because some of the chemotherapeutic agents can affect cardiac function," Norma tells Lucy and Jack. Turning to Abigail, she says, "These tests are just pictures, and they won't hurt."

Next, Norma talks about the bone marrow biopsy (Fig. 6.2) and lumbar puncture (Fig. 6.3). She tells Jack and Lucy, "Before the procedures, a child life specialist will show Abigail how the procedures are done on a doll. The child life specialist will also let Abigail play with some of the equipment the doctors and nurses will use for the procedures to help ease her anxiety."

A few hours later, Norma comes into the room and tells Jack, Lucy, and Abigail that the bone marrow biopsy and lumbar puncture could not be scheduled until the next day. She explains that nothing will happen this evening or overnight, so Jack should go home to be with Isabelle and come back in the morning.

The following day Abigail goes for the bone marrow biopsy and lumbar puncture. When she comes back to the room, she has a small bandage on her posterior left hip over the iliac crest. Abigail starts to cry. "Does it hurt where your boo boo is?" Norma says. Abigail nods her head yes. Norma uses something she calls the FACES scale to determine how much pain Abigail is experiencing (How Much Does It Hurt? 6.1).

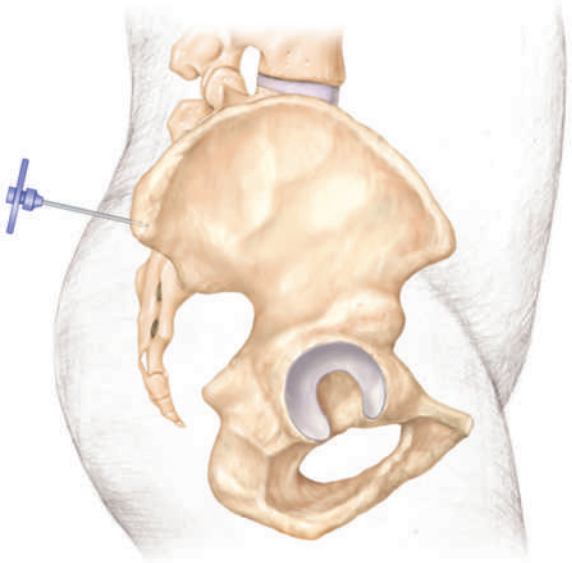


Figure 6.2. Bone marrow biopsy needle inserted in the right iliac crest. Reprinted with permission from Anatomical Chart Company.

Abigail points to the frowny face without tears, a number 8 on the scale. Norma checks the medication record and tells Lucy and Jack, "Abigail is due for some acetaminophen now." She administers the medicine and says, "If it does not relieve her pain, I will call Dr. Redman to get an order for a stronger pain medication."

Diagnosis

A while after Abigail returns to her room, Dr. Redman comes to discuss the procedure and blood work results with Jack and Lucy. Dr. Redman takes Jack and Lucy to a conference room down the hall. Norma accompanies them.

Figure 6.3. Positioning for a lumbar puncture. Reprinted with permission from Bowden, V., & Greenberg, C. S. (2013). *Children and their families* (3rd ed., Fig. 21-9B). Wolters Kluwer Health/Lippincott Williams & Wilkins.

How Much Does It Hurt? 6.1

Wong-Baker FACES Pain Rating Scale

Preschool children are in the preoperational stage of cognitive development and have developed symbolic representation. However, they are not yet able to understand the concepts of "greater" and "less." Therefore, a preschool child does not understand when asked to rate their pain on a scale of 1 to 10.

Image © 1983 Wong-Baker FACES Foundation. www.Wong-BakerFACES.org

The Wong-Baker FACES Pain Rating Scale shows a series of faces with different expressions. The faces range from a happy face at 0, or no pain, to a crying face at 10, or the very worst pain. These faces are the preschool child's symbolic representation of pain.

Used with permission. Originally published in *Whaley & Wong's Nursing care of infants and children.* © Elsevier Inc.

Dr. Redman sits down at the table with Jack and Lucy. She looks at them empathetically, and Lucy can tell from her expression that the news is not good. "The procedures and blood work confirm that Abigail does indeed have ALL." She explains to them that the repeat WBC is 43,000 and the peripheral blood smear showed lymphoblasts (Fig. 6.4). The bone marrow biopsy showed 35% lymphoblasts, which is diagnostic for ALL, she says.

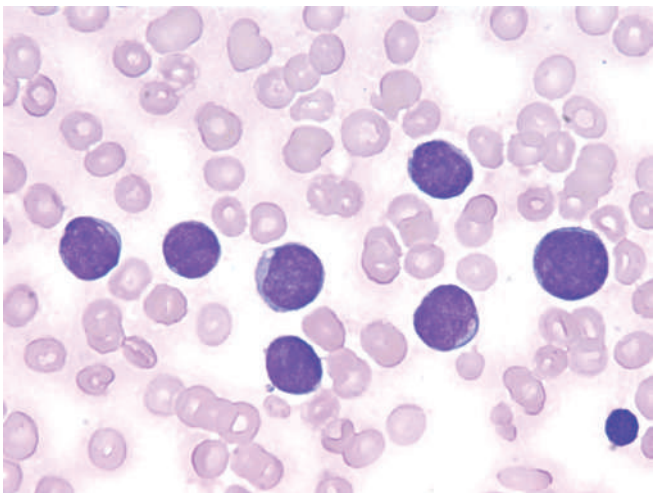


Figure 6.4. Peripheral blood smear. The dark purple cells without a nucleus are lymphoblasts. Reprinted with permission from Strayer, D. S., & Rubin, E. (2014). *Rubin's pathology* (7th ed., Fig. 26-56). Wolters Kluwer.

At this point Lucy feels like collapsing, but she stays strong and asks Dr. Redmond, "What happens now?"

Dr. Redmond continues with the remainder of the results. She tells Jack and Lucy that there is some positive news. Abigail's cerebral spinal fluid (CSF) is negative for leukemic cells. Abigail's age, WBC count, and negative CSF put her in the standard risk category, she explains. Children from 1 to 10 years old with a WBC count of less than 50,000 and negative central nervous system involvement have the highest cure rate, up to as high as 98% (National Cancer Institute [NCI], 2021).

Dr. Redman explains that while there is good news even in the face of this terrible diagnosis, it will still be a hard road for Abigail to get to remission. She finishes discussing the test results. The echocardiogram and ECG are normal. Abigail's bleeding times are normal, so she is not currently at risk for any serious bleed. Her uric acid level is a little high, indicating cell breakdown. Dr. Redman concludes the conversation by stating that the team would like to get chemotherapy started as soon as possible.

Norma takes Jack and Lucy back to Abigail's room. Norma asks them, "What questions do you have?"

Lucy feels overwhelmed, and Jack looks stunned. "What now?" Lucy asks.

"I know this is a lot of information, a lot to absorb," Norma says. "Please know that I am here to help you, and as you process things and questions come to mind, I'll be happy to answer them. I'll be off tomorrow, but for the rest of my shift today and when I come back the day after tomorrow, I'll be available to sit down with you and go over Abigail's treatment, as you feel ready."

Clinical Judgment: The Nurse's Point of View

Norma:

RECOGNIZE CUES: When a child, like Abigail, is diagnosed with cancer, the caregivers are usually so overwhelmed they cannot process much of the information they hear.

ANALYZE CUES: The family is hearing a lot of information, including new terms and medical language they are unfamiliar with, which produces anxiety. It's a lot to absorb. That's why I like to sit in on meetings with the family and the physician and listen closely to all that is said. I'm like another set of ears for the caregivers.

PRIORITIZE HYPOTHESES: Later, once the initial shock of the diagnosis is over and the caregivers are ready, I can go over the information again with them a little at a time.

GENERATE SOLUTIONS: I've learned over the years that providing information in small chunks allows the caregivers to think about the information and ask questions.

TAKE ACTION: Psychological support is extremely important at the time of diagnosis, and I try to make sure the family has the necessary tools, resources, and support during this time (Yamaji et al., 2022).

EVALUATE OUTCOMES: After each teaching session, I'll have Abigail's parents repeat the information so I'm sure that they understand what I've said.

Initiation of Treatment

The next morning a surgeon comes to Abigail's room to discuss the placement of a **central venous catheter (CVC)** (Fig. 6.5). "The CVC allows chemotherapy to be delivered safely," the surgeon explains to Lucy and Jack. "Also, all of Abigail's blood work will be drawn from the CVC, so she will no longer have to be stuck with a needle. Abigail is scheduled to have the CVC placed later this morning, so she will not be able to eat any breakfast."

Before Abigail leaves for surgery, the child life specialist, Meg, comes to show her a doll with a CVC so that Abigail will not be scared of the lines when she wakes up from surgery.

"That's brilliant," Lucy tells Jack. They watch as Abigail touches the lines, fascinated.

"It's like a straw coming out of her body," Abigail says.

"That's right," Meg tells her. "You will have special straws, too, so your body can drink in the medicine." Turning to Lucy and Jack, Meg says, "Some children even name their CVC. It helps them cope with their illness." Abigail decides to name her CVC "Sippy."

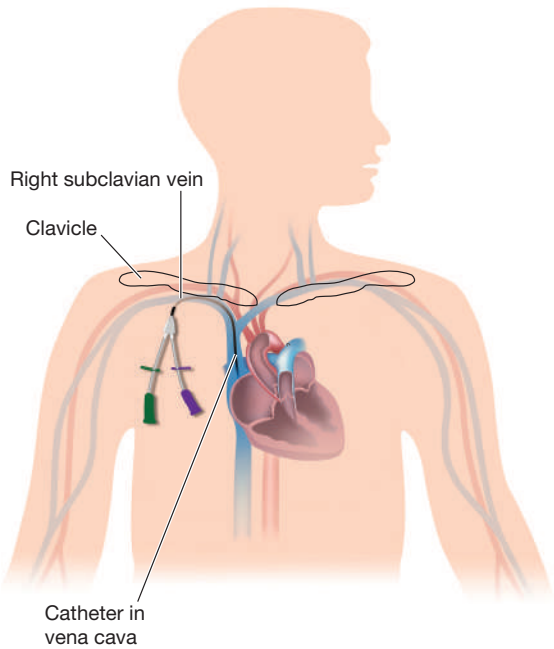


Figure 6.5. The insertion site for a central venous catheter.

The CVC placement (Fig. 6.5) goes smoothly. When Abigail is back in her room, Dr. Redman stops by.

"I'll be writing orders for the chemotherapy to be started tomorrow," she says. Lucy is glad because she knows Norma will be back tomorrow, and she feels comfortable asking her questions about Abigail's treatment.

"The first phase of chemotherapy is the induction phase," Dr. Redman explains. "This phase lasts 4 to 6 weeks. Abigail's response to this phase will be a good indication of her potential for cure. A child who enters complete remission after the induction phase is predicted to have a better chance of being cured" (NCI, 2021).

"You mean she'll have to be in the hospital for the next 4 to 6 weeks?" Lucy asks.

"Not the entire time, no," Dr. Redman clarifies. "If she does not have any complications and is stable, she will be discharged in a week to 10 days and the remainder of the treatments can be conducted in the outpatient setting with close follow-up."

"Then what?" Lucy asks, trying to not panic.

"After the induction phase is the consolidation phase, which lasts approximately 6 to 9 months," Dr. Redman says. "The last stage of treatment is the maintenance phase. This phase lasts up to 2 years."

"Two years!" Jack says, distraught at this news. "So, altogether, Abigail's treatment will last around 3 years?"

Dr. Redman nods. "I'm sorry. I know this is a lot to take in. Why don't we stop here for now? We can discuss the details about the consolidation and maintenance phases later, when you're ready."

At this moment, Lucy realizes the full impact of Abigail's leukemia and treatment. This will be a new way of life for their family.

"Aren't there some natural therapies for the treatment of leukemia," Lucy asks, trying to think of any alternative to the news she has just heard. "A friend who practices alternative medicine told me there might be some herbs that could help Abigail" (Box 6.2).

"Many people ask about complementary therapies for cancer treatment," Dr. Redman says. "I do know of some, but I do not recommend any of them during the induction phase. I would be open to discussing them during the consolidation phase, however."

The following morning, Lucy and Jack are glad to see Norma return. "We have many questions about Abigail's chemotherapy," Lucy tells her. "Our biggest concern is about the side effects. She's been through so much in the last few days—a lumbar puncture, a bone marrow biopsy, and a CVC placement. We just hate to see her go through more."

"I understand how overwhelming everything is right now," Norma says. "One thing I can do that might help is to tell you the names of the medicines before I give them so that you can write them down and remember them. That way you can learn what side effects are typically associated with each drug and have some idea of what to expect. The chemotherapy that is ordered for Abigail is strong, because Dr. Redman wants Abigail to be in full remission after the induction phase."

"Every child experiences different side effects of chemotherapy," Norma continues, "and those side effects can range from mild to severe" (Box 6.3). "However, you should be prepared and prepare Abigail for her to lose her hair—a condition called **alopecia**. In addition, Abigail will most likely experience nausea and vomiting. We will need to watch her for dehydration and electrolyte imbalances if she experiences severe vomiting" (Ruktrirong et al., 2021). "She may also develop **stomatitis**, or painful mouth sores that can affect eating. The most concerning side effect, though, is immunosuppression. The chemotherapy works on the immune system to suppress the cancer but in doing so also kills the working components of the bone marrow, WBCs, RBCs, and platelets. Suppression of the immune system

Box 6.2 Complementary Therapy: *Astragalus membranaceus*

In a study conducted by Jian-Xiang et al. (2022), the researchers were trying to determine if Chinese medicine is safer than traditional Western medicine. For both traditional Western medicine (49.1%) and Chinese medicine (43.48%), Jian-Xiang et al. (2022) found that the most reported adverse events were rash, pruritus, dizziness, and vomiting. The researchers found that it was difficult to determine which style of medicine is safer; however, herbs used in Chinese medicines often produce fewer side effects when used in combination. Dadgari et al. (2020) found that out of 150 mothers sampled in their study, 67.34% used complementary and alternative therapies to increase the chance of their child's recovery.

The most common herb used in pediatric patients diagnosed with leukemia is *A. membranaceus*. This herb increases the white blood cell (WBC) count. The pathophysiology of acute lymphoblastic leukemia involves an increased WBC count, and therefore physicians may be hesitant to have patients take these herbs, fearing they may worsen the leukemia. However, other researchers have determined that *A. membranaceus* increases the number of healthy WBCs and increases the breakdown of the tumor cells. Therefore, *A. membranaceus* should not exacerbate leukemia.

It is important to let parents know that they should partner with the healthcare team when considering complementary and alternative therapies while their child is undergoing treatment for cancer.

Box 6.3 Side Effects of Chemotherapy

Not all children on chemotherapy experience the same side effects. Similarly, side effects of chemotherapy may be experienced at different levels of severity among different children. The most common side effects are as follows:

- Nausea and vomiting
- Alopecia
- Stomatitis
- Fatigue
- Loss of appetite
- Immunosuppression
- Diarrhea
- Easy bruising

could cause Abigail to develop a serious infection, anemia, and problems clotting due to low platelets."

"As I do for all children on chemotherapy," Norma says, "I'll be carefully monitoring Abigail to detect any complications early. The effects of the chemotherapy, other than nausea and vomiting, may not appear for several days to weeks later. Also, Dr. Redman will not discharge Abigail until she is stable and you are comfortable with her care."

"I've heard that there are medications that can help with the side effects of chemotherapy," Lucy says. "Could you tell me what they are and whether Abigail will be allowed to have any?"

"Before each treatment with chemotherapy, I will give Abigail medication to help with nausea and vomiting," Norma replies. "She can continue to receive this medication every 8 hours. In addition, Abigail will need to do mouth care every 4 hours to prevent any sores that develop from becoming infected. This involves two medications, one that is swished around the mouth and spat out and one that is swished around the mouth and swallowed" (The Pharmacy 6.1).

"And we'll need your help, Abigail," Norma says after squatting to get on the child's eye level. "You have an important job to do. We'll give you a special sponge on a stick so you can rub the medicine around your mouth all by yourself. Do you think you can handle that?"

Abigail nods eagerly.

"I thought you could," Norma says. "And you know what else? Every time you do your mouth care on time, you will get a sticker. When you have 10 stickers, you may pick a prize out of the prize box in the playroom."

Abigail smiles for the first time all day.

The Pharmacy 6.1 Ondansetron, Dexamethasone, Nystatin, and Chlorhexidine Gluconate

Medication	Classification	Route	Action	Nursing Considerations
Ondansetron	• Antiemetic	• PO • IM • IV	• Selective 5-HT_3 receptor antagonist • Works in the chemoreceptor trigger zone	• Dosing depends on reason for use • For chemotherapy-induced nausea: 0.15 mg/kg/dose 30 min before treatment, and then every 8 h • Monitor for agitation, anxiety with oral use • Monitor for sedation and drowsiness with IV use
Dexamethasone	• Corticosteroid • Antiemetic • Anti-inflammatory	• PO • IM • IV	• Decreases inflammatory mediators • Long-acting corticosteroid • Suppresses normal immune response • Antiemetic activity is unknown	• For chemotherapy-induced nausea: 10–20 mg 15–30 min before treatment • Prophylaxis for nausea, vomiting 4 mg every 4–6 h
Nystatin	• Antifungal	• PO	• Binds to fungal cell membrane • Changes cell wall permeability	• 400,000–600,000 U four times/d • Swish and hold in the mouth for as long as possible before swallowing • May use a mouth sponge to paint the inside of the mouth
Chlorhexidine gluconate	• Antibacterial dental rinse • Prophylactic dental rinse	• PO	• Activity against gram-positive and gram-negative organisms • Bonds to bacterial cell wall • At high concentrations, causes cell death	• Used to prevent oral infections in immunocompromised patients • For immunocompromised patients, use 10–15 mL two to three times/d • May cause mouth and teeth discoloration

HT, hydroxytryptamine; IM, intramuscular; IV, intravenous; PO, oral.
Adapted from Taketomo, C. K. (2021). *Pediatric & neonatal dosage handbook* (28th ed.). Lexicomp.

Clinical Judgment: The Nurse's Point of View

Norma:

RECOGNIZE CUES: A diagnosis of cancer introduces a "new normal" into a family's life.

ANALYZE CUES: This new normal includes lengthy hospital stays, multiple outpatient visits, and often overwhelmingly stressful times when the child is very ill. I explain to Jack and Lucy that right now it may not seem possible to get some normalcy and routine back to their life, but that for Abigail's and Isabelle's sake they must try.

PRIORITIZE HYPOTHESES: Abigail's family most likely feels overwhelmed and will want to focus on every aspect of her medical care. Although I encourage caregivers to participate in their child's care, I also encourage them to remain in the protector role while collaborating in care and communicating openly with Abigail (Son et al., 2019).

GENERATE SOLUTIONS: I tell Jack and Lucy to remain Abigail's parents while learning how to care for her during her treatment. It is important that Abigail be treated like their 4-year-old daughter and not like a patient, especially once the family is discharged home. I encourage them to bring Abigail's sister, Isabelle, for a visit today. Sometimes siblings of children diagnosed with cancer make up what is happening in their heads because they cannot see their sick siblings. Sibling visits can help alleviate fears. I tell them that after Abigail's treatment begins, Isabelle may not be able to visit her if her immune system is suppressed. However, Abigail and Isabelle can communicate over the phone or through video calls.

Spotlight on Essential Nursing Competencies

Person-Centered Care

- Define Norma's patient.
- Discuss how Norma provided person-centered care.
- How does Norma's approach to care help Abigail and her family adjust to her diagnosis?

Interprofessional Collaboration

- Who are the members of Abigail's care team?
- What role does each member play?
- Why are these special roles important for Abigail?

Evidence-Based Practice (EBP)

- How did Norma incorporate EBP into the care of Abigail and her family?
- If Norma did not promote this evidence-based care, what could happen?

Psychosocial Implications

"Continuing to foster Abigail's development while she is in the hospital is also important," Norma says (Hospital Help 6.1). "Encourage her to continue her play as she would at home, to the extent possible. Play has been shown to help decrease pain and helps facilitate her growth and development" (Mohammadi et al., 2021). "When Abigail feels like it, and as long as her WBC count is okay, she can go to the playroom to play. When her WBC count is low, a child life specialist can come to Abigail's room, provide toys and books, and engage in play."

"Will Abigail be allowed to have her stuffed animals?" Jack asks. "Abigail likes to play zoo with them. She only has her tiger with her now, which is her favorite, but I think it would cheer her up if she had more of her animals here."

"Absolutely," Norma says. "Feel free to bring her stuffed animals from home. The goal is to keep things as normal as possible and encourage her to play as she would at home."

Hospital Help 6.1 Gaining Trust

Preschool children are active in imaginative play. This is the time of tea parties and superheroes. Preschool children are also very concrete thinkers, which, coupled with an active imagination, can make hospitalization a very scary time. The nurse should choose words carefully when discussing any tests or procedures with children. For example, telling a 4-year-old, "I am going to take your blood," might lead the child to think that the nurse is literally going to take all of the child's blood.

Gaining trust is important while a preschool child is in the hospital. Allowing the child to have a comfort item helps increase trust in the healthcare team and aids with cooperation from the child. It is important to let the child play with safe medical equipment. Any procedures can be explained using medical equipment and dolls. If the child has their own doll or stuffed animal, performing a "procedure" on the stuffed animal first, such as a dressing change, can help alleviate fear in the child.

Complications

One week later, Abigail has finished her first doses of chemotherapy in the induction phase. She is surrounded by her stuffed animals in her room, but her tiger always stays with her in her bed. It is now 2 days after her last dose of chemotherapy, and she is still having trouble with nausea and vomiting and unable to keep much food down. Later that evening Lucy notices that Abigail feels warm and appears flushed. Abigail's nurse today is Tom. He comes in to take her vital signs and reports them as follows:

- Pulse: 124 bpm
- Respiratory rate: 32 breaths/min
- Blood pressure: 94/56 mm Hg
- Temperature: 102.5°F (39.2°C)

Clinical Judgment: The Nurse's Point of View

Tom:

I have a new patient today, Abigail Hanson. I conduct a quick assessment of her before calling Dr. Redman. I want to make sure I have all of the information so I can recommend a plan of action.

RECOGNIZE CUES: When I changed her CVC dressing this morning, there was no redness or drainage at the site. Abigail's lungs are clear to auscultation, although she is tachypneic. Her skin is flushed and warm to the touch (Priority Care Concepts 6.1). Her mucous membranes are pink and moist. Her abdomen is soft and nontender. Her lower extremity pulses are weak and thready. Her capillary refill time in the upper extremities is less than 3 seconds, but in the lower extremities it is about 4 seconds.

ANALYZE CUES: I know I need to intervene quickly so that Abigail's status does not get worse (Pulcini et al., 2021).

PRIORITIZE HYPOTHESES: Based on my assessment of Abigail, I believe she has an infection and could possibly be septic.

GENERATE SOLUTIONS: I explain to Abigail's mother, Lucy, that I am going to call Dr. Redman to get some orders for blood work and antibiotics. I tell her that the blood work is to see if Abigail has an infection and the antibiotics are to treat any infection that may be there. She looks anxious, which is understandable.

TAKE ACTION: I call Dr. Redman to get these orders (Box 6.4). She gives me orders for a blood culture and sensitivity, a CBC with differential, and a CMP. She also orders a broad-spectrum antibiotic to be started after the blood cultures are drawn. I carefully read back the orders to make sure they are correct.

Priority Care Concepts 6.1

Preventing Septic Shock

When a child with neutropenia develops fever, it puts them at risk of sepsis and septic shock. The nurse is responsible for monitoring the child closely and noticing small changes in status. Timely intervention can prevent progression from infection to shock.

When assessing a child with neutropenia, look for the following changes:

- Flushed skin progressing to mottled and blue skin, indicative of poor capillary refill and poor perfusion
- Warm extremities progressing to cooler and very cool extremities
- Tachycardia progressing to decreased blood pressure
- Tachypnea progressing to shallow breathing
- A sense of not feeling well progressing to tiredness and then severe lethargy

Box 6.4 Using ISBARR

Introduction: "Hi, Dr. Redman. This is Tom on unit A6W."
Situation: "I am taking care of Abigail Hanson. She has developed a fever. Her temperature is 102.5°F (39.17°C)."
Background: "Abigail is a 4-year-old recently diagnosed with acute lymphoblastic leukemia. She finished her first round of treatment 2 d ago."
Assessment: "Abigail has a fever and is tachypneic and tachycardic. Her lungs are clear to auscultation bilaterally. Her abdomen is soft and nontender. Her skin is flushed and warm. Her lower extremity pulses are weak and thready, with a capillary refill time greater than 3 s. Her central venous catheter site is without redness or drainage. I believe that Abigail has an infection and is at risk for sepsis."
Recommendation: "I would like to draw blood for cultures, a complete blood count with differential, and a comprehensive metabolic panel. Could I also have an order to begin broad-spectrum intravenous antibiotics after the blood for cultures is drawn?"
Read Back: Tom waits for Dr. Redman's orders. He will repeat them back to her once she is finished.

Table 6.2 Abigail's CBC Results After the First Round of Treatment

WBC, /μL	1,200
RBC, $\times 10^6$/μL	4
Hgb, g/dL	9.8
Hct, %	30
Platelets, $\times 10^3$/μL	88
Neutrophils—bands, %	4
Neutrophils—segmented, %	20

Hct, hematocrit; Hgb, hemoglobin; RBC, red blood cell; WBC, white blood cell.

Tom returns to the room and explains the plan to Lucy. "I'd like to get the antibiotics started as soon as possible so that Abigail does not get sicker." Turning to Abigail, he says, "I'm going to give you some medicines now through your straw to help you feel better, okay?"

"His name is Sippy," Abigail says.

"Oh, okay," Tom says. "Sippy is going to help give you some medicine, then."

"Does my tiger need medicine too?"

"Yes, I think he needs medicine too," Tom replies. "I will make sure he gets some." Although weak, Abigail smiles at Tom.

About an hour later, Tom gets the results of Abigail's blood work and is looking over them intently (Table 6.2). Lucy asks him about the results. He tells her something about calculating Abigail's ANC based on her CBC (Box 6.5).

Box 6.5 Calculating Absolute Neutrophil Count

$$\text{ANC} = \frac{(\text{segs}\% + \text{bands}\%) \times \text{WBC}}{100}$$

$$\text{Abigail's ANC} = \frac{(20 + 4) \times 1{,}200}{100} = 288$$

ANC, absolute neutrophil count; bands, neutrophils—bands; segs, neutrophils—segmented; WBC, white blood cell.

"What does that mean?" Lucy asks.

"Sorry," Tom says. "Let me try to put that into English for you. ANC stands for **absolute neutrophil count**. Neutrophils are a type of white blood cell. The ANC should be 1,500 or more. Anything less than that is considered neutropenia, meaning not enough neutrophils. An ANC less than 500 poses a severe risk for bacteremia, or a bacterial infection of the blood" (NCI, 2021).

"So," Lucy says, her voice quavering a bit. "What is Abigail's?"

"It's 288," Tom says.

"What do we do, then?" Lucy says, fighting back tears.

"Abigail should have limited visitors," Tom says. "You and Jack can still be in the room, but Isabelle cannot come to visit. Also, Abigail is not able to have any fresh fruit, vegetables, or flowers in the room. I'll monitor Abigail closely and will get the antibiotics started as soon as they come from pharmacy."

Lucy begins to cry and asks Tom, "Is there anything else we can do?"

"There is a medication called granulocyte colony stimulating factor, or G-CSF, that stimulates the production of WBCs," Tom explains. "Once I get the antibiotics started, I will talk with Dr. Redman about ordering G-CSF" (The Pharmacy 6.2).

After 3 very intense days, Abigail's fever dissipates. Her WBC count comes up to 4,500, with an ANC of 2,200. Norma is back taking care of Abigail. She explains to Jack and Lucy that, because Abigail had such a rough time with the initial round of chemotherapy, Dr. Redman wants to keep Abigail in the hospital at least through the next round of chemotherapy to closely monitor her status.

At Discharge

Abigail tolerates the second treatment much better than the first, which is a big relief to Lucy. After Abigail has spent 3 weeks in the hospital, Dr. Redman is finally ready to discharge her home. Norma arrives and goes over discharge instructions with Lucy and Jack.

"You all have gotten used to the routine of the hospital, so returning home will be very disruptive," Norma says. "Abigail will need to protect her CVC. You should make sure the dressing is dry and intact and cover the dressing when Abigail takes a bath. Unfortunately, she will not be able to swim. One of the

The Pharmacy 6.2 Filgrastim

Classification	Route	Action	Nursing Considerations
Granulocyte colony stimulating factor	• IV • SC	• Stimulates the production, maturation, and activation of neutrophils • Increases neutrophil migration and cytotoxicity • Decreases neutropenia	• IV, SC: 5 mcg/d once daily, beginning at least 24 h after chemotherapy • Continue for 14 d or until ANC reaches 10,000 • Monitor CBC with differential, platelet count, and uric acid level • Monitor temperature • Monitor liver function due to increased serum alkaline phosphatase • Monitor for musculoskeletal pain

ANC, absolute neutrophil count; CBC, complete blood count; IV, intravenous; SC, subcutaneous.
Adapted from Taketomo, C. K. (2021). *Pediatric & neonatal dosage handbook* (28th ed.). Lexicomp.

Box 6.6 When to Call the Doctor

Parents of children receiving treatment for acute lymphoblastic leukemia should call the physician when any of the following occurs:

- The child has a temperature of 100.5°F (38.05°C) or greater.
- There is any redness, swelling, or drainage around the central venous catheter insertion site.
- The child becomes pale, listless, or lethargic.
- The child has episodes of vomiting that are not well controlled with medication.
- Any time there is a concern.

most important things to remember is when to call the doctor" (Box 6.6).

"Remember to treat Abigail like a normal child," Norma reminds them. "Let her play when she feels like it. Encourage interaction between Abigail and Isabelle. When Abigail is not feeling well, encourage Isabelle to read to her or watch a movie with her."

"Finally," Norma says, "I've arranged for a home health nurse to visit you tomorrow" (Analyze the Evidence 6.1). "Having a nurse visit helps ease fears and address any concerns once you're home. In fact, you may have multiple visits from the home health nurse, if you feel you need it. Do you have any questions?"

"No," Lucy says. "I think we're good."

Jack and Lucy have everything packed up. Abigail is excited that she gets to ride in a wheelchair to her car, her stuffed tiger in her lap. Lucy and Norma, who is pushing Abigail in the wheelchair, go out the main hospital entrance, where Jack is waiting in the car. Abigail gives Norma a hug, and Norma says, "I'll see you for your next treatment." Isabelle is in the backseat, anxious for Abigail to get in the car. Lucy buckles Abigail in her booster seat, and the Hanson family heads home.

Analyze the Evidence 6.1 Chemotherapy at Home

Caring for a child newly diagnosed with cancer is stressful for parents and any other caregivers of the child. Once a child is discharged home, the family faces many daily challenges. Often families find that although they became familiar with hospital routines, once they are home they are completely overwhelmed and may have a hard time remembering even the simplest of discharge instructions.

Kok et al. (2019) as well as De Zen et al. (2021) found that delivering chemotherapy at home eases the burden for the child and the family by increasing the quality of life for the entire family, allowing many routines to stay in place, and decreasing the burden of multiple trips to the hospital. In addition, having the nurse deliver chemotherapy in the home allows for additional teaching and for the child and family to ask questions. Neither study found safety concerns with home delivery of chemotherapy.

Think Critically

1. Norma does not discuss the need for O_2 with Abigail's parents. Why would Abigail need O_2?
2. In addition to antiemetics, what can you do to help Abigail cope with the myriad of side effects of chemotherapy?
3. Why does Norma create a sticker chart for Abigail to ensure that she does her mouth care?
4. What would be the course of action if Abigail continues to have trouble with vomiting and nutrition?
5. Besides nurses, physicians, and child life specialists, who else would be a member of Abigail's healthcare team?
6. What are ways in which you can encourage caregivers to be involved in their child's care?
7. If Abigail were older, such as 8 or 15 years old, how could you have involved her in her care?

References

American Academy of Pediatrics. (2021). *Car seats: Information for families*. https://www.healthychildren.org/English/safety-prevention/on-the-go/Pages/Car-Safety-Seats-Information-for-Families.aspx

Dadgari, A., Bagheri, I., Salmani, N., & Mirakhor, M. (2020). Mothers' attitudes toward the use of complementary and alternative medicine in children with cancer. *International Journal of Cancer Management, 13*(10), e104870. https://doi.org/10.5812/ijcm.104870

De Zen, L., Del Rizzo, I., Ronfani, L., Barbieri, F., Rabusin, M., Dall'Amico, R., Barbi, E, & Robazza, M. (2021). Safety and satisfaction of a home-delivered chemotherapy program for children with cancer. *Italian Journal of Pediatrics, 47*(1), 43. https://doi.org/10.1186/s13052-021-00993-x

Jian-Xiang, W., Zhi-Qiang, L., Guan-Zhong, F., & Yun-Zia, Z. (2022). Which is safer, Chinese medicine or western medicine? A comparative analysis based on Chinese spontaneous reporting database. *Chinese Journal of Integrative Medicine, 28*(2), 138–144. https://doi.org/10.1007/s11655-021-3340-7

Kleinman, K., McDaniel, L., & Molloy, M. (Eds.). (2020). *The Harriet Lane handbook* (22nd ed.). Elsevier.

Kok, N. T. M., Ligthart-Beukhof, A. C., & van de Wetering, M. D. (2019). Chemotherapy intravenously in children with cancer at home, the nurse practitioner makes it possible. *Supportive Care in Cancer, 27*(12), 4389–4391. https://doi.org/10.1007/s00520-019-05053-z

Mohammadi, A., Mehraban, A. H., Damavandi, S. A., Zarei, M. A., & Haghani, H. (2021). The effect of play-based occupational therapy on

symptoms and participation in daily life activities in children with cancer: A randomized controlled trial. *British Journal of Occupational Therapy, 84*(7), 400–409. https://doi.org/10.1177/0308022620987125

National Cancer Institute. (2021). *Childhood acute lymphoblastic leukemia treatment (PDQ)—Health Professional Version*. https://www.cancer.gov/types/leukemia/hp/child-all-treatment-pdq#_580_toc

National Comprehensive Cancer Network. (2021). *Guidelines for patients: Acute lymphoblastic leukemia*. https://www.nccn.org/patientresources/patient-resources/guidelines-for-patients/guidelines-for-patients-details?patientGuidelineId=48

Pulcini, C. D., Lentz, S., Saladino, R. A., Bounds, R., Herrington, R., Michaels, M. G., & Maurer, S. H. (2021). Emergency management of fever and neutropenia in children with cancer: A review. *The American Journal of Emergency Medicine, 50*, 693–698. https://doi.org/10.1016/j.ajem.2021.09.055

Ruktrirong, J., Traiveree, C., Monsereenusorn, C., Photia, A., Lertvivatpong, N., & Rujkijyanont, P. (2021). Single daily dosing versus divided dosing intravenous ondansetron to prevent chemotherapy-induced nausea and vomiting among children: A comparative randomized double-blind controlled trial. *Pediatric Blood and Cancer, 68*(6), e29002. https://doi.org/10.1002/pbc.29002

Son, H., Haase, J., & Docherty, S. L. (2019). Parent-child communication in a childhood cancer context: A literature review. *Pediatric Nursing, 45*(3), 129–141.

Tsao, H. S., Gjelsvik, A., Sojar, S. H., & Amanullah, S. (2020). Sounding the alarm on the importance of sleep: The positive impact of sufficient sleep on childhood flourishing. *Pediatrics, 146*(1), 49–50. https://doi.org/10.1542/peds.146.1MA1.49b

Yamaji, N., Nagamatsu, Y., Kobayashi, K., Hasegawa, D., Yuza, Y., & Ota, E. (2022). Information needs for children with leukemia and their parents' perspectives of information needs: A qualitative study. *BMC Pediatrics, 22*(1), 414. https://doi.org/10.1186/s12887-022-03478-w