

Environments, Patients, and Practice

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Preface

Medical speech-language pathology is practiced at the intersection of systems-based contexts and whole person-centered care. For clinicians entering medical environments, the learning curve can feel steep! This is rarely because the foundational principles of speech-language pathology are unfamiliar but rather because the contexts in which these principles are applied are complex, fast-paced, and interdisciplinary. This textbook was developed to support clinicians as they begin their experiences as a speech-language pathologist (SLP) in the medical environment. We will tell you a little bit more about who this text is for, who wrote it, and how it is organized.

Audience

This is a textbook written for graduate students and early-career SLPs who are interested in, or are preparing for, working in medical environments. It is designed to serve as a foundational text for a graduate course in medical speech-language pathology, rehabilitation methods, and clinical practicums. It also serves as an onboarding resource for clinical departments, a reference for clinicians transitioning into medical settings, and a teaching resource for academic faculty. Although not intended for clinicians with extensive experience in medical speech-language pathology, we believe clinicians at all stages of practice will find opportunities for reflection, growth, and learning within its pages.

Clinical Context

We use the term “medical environment” intentionally to encompass the full continuum of care, from acute care and inpatient rehabilitation to long-term care facilities. While hospital-based practice is often the most visible representation of medical speech-language pathology, the principles and challenges discussed in this book extend well beyond any single setting. The content is designed to be applicable across a wide range of settings and levels of care.

The Authors

This textbook reflects a collaborative effort that we are incredibly proud to share. It brings together the experiences of 33 contributing authors—from 11 different disciplines and 10 different institutions—who represent nearly 500 years of combined professional experience. These contributors provide a vast array of interdisciplinary care experience and include SLPs, occupational and physical therapists, pharmacists, and physicians. This diversity offers readers a wide range of professional perspectives and institutional practices that define modern medical speech-language pathology.

Finding the Right Balance

We have intentionally sought to provide a detailed description of the medical environment rather than specific disorders.

This is not a disorder-specific diagnostic or intervention manual. For that, the reader is referred to the multitude of exceptional resources already available. Instead, our goal is to reduce the learning curve by understanding systems, navigating complexity, and developing strategies that address the challenges inherent in medical settings.

General Structure

The textbook is organized into four logical progressions: It opens with an overview of the various medical environments related to medical SLP services and the vital role of communication infused across all settings (Chapter 1—The Landscape of Care in the Medical Environment, Chapter 2—Communication in the Medical Environment). The focus transitions then to *systems*—including a detailed look at body systems (Chapter 3—Body Systems and Medical Considerations), medications (Chapter 4—Pharmacology), respiratory systems (Chapter 5—The Respiratory System in Clinical Practice), nutritional systems (Chapter 6—Dysphagia and Nutrition), imaging systems (Chapter 7—Medical Imaging Modalities), neurologic systems (Chapter 8—Neurology and Neurologic Considerations), and pediatrics (Chapter 9—Pediatric Medical Speech-Language Pathology).

The third section focuses on factors around the patient experience, including decision-making and autonomy (Chapter 10—Patient Decision-Making and Autonomy), participation and safety (Chapter 11—Maximizing Participation and Patient Safety: An Interdisciplinary Approach), cultural humility (Chapter 12—Culturally Responsive Practice), and the invaluable first-hand experiences of patients

and their families (Chapter 13—The Lived Experience).

The textbook concludes with three chapters that enhance clinical toolkits and skills. This includes effective leadership (Chapter 14—Leading From Where You Are), clinical decision-making (Chapter 15—Thinking Like a Clinician), and strategies for well-being that are informed by ancient philosophical wisdom (Chapter 16—Flourishing in the Medical Environment).

Selected Terminology

Through the text, we use terminology commonly found in medical contexts, such as “impaired” or “atypical.” We recognize that such terms carry implicit judgment and are shaped by a host of cultural, physical, and physiologic factors. These terms are not intended to be denigrating nor to define normality but rather convey disruptions in expected functions within a medical framework. We acknowledge the complexity and potential limitations of this language and encourage readers to engage with it thoughtfully.

Additionally, we use the term “patient” to refer to the individuals receiving care in the medical environment. We do not view this term as dehumanizing or incompatible with person-centered care but rather as a descriptor commonly used within medical systems.

Institutional Variations

Medical environments vary widely across regions, institutions, and health systems. By including authors with diverse backgrounds and experiences, we aim to provide a broad,

applicable perspective. We also acknowledge that local policies and procedures may differ; the reader is always referred to their local institutional policies and procedures.

Redundancy

You will notice intentional overlap and redundancy across chapters. We see this as an authentic reflection of clinical practice and an effective pedagogical strategy to solidify learning rather than as a limitation. Medical care is inherently interdisciplinary, and patients' needs do not exist in neatly defined categories. For example, a patient with respiratory failure (Chap. 5) does not exist separately from their nutritional needs (Chap. 6) or their autonomy in decision-making (Chap. 10). Concepts recur because they matter across body systems, health care disciplines, and team decisions in all settings for nearly all patient populations.

How to Use This Book

For the Student

Know that every author in this textbook started out as a new grad—eager to learn and make an impact but very uncertain in our skill sets and frequently overwhelmed. Those are entirely normal feelings and part of taking on something that is challenging but extremely rewarding. We hope this textbook lessens the learning curve and increases your familiarity with the medical environment. We also hope that you will return frequently to this textbook and that each time you return to the textbook, you take something new or different away from your reading and reflection of the content.

Often when content is presented prior to a clinical experience, the content serves as a foundational starting point. But it is on returning to the text after a period of clinical experiences that new ideas take shape and connections are made between the text content and your clinical experience. The line “you never step in the same river twice” holds so true to your clinical resources as well. Each time you return to the embedded and online resources, you come back as a different person and a different clinician, bringing additional experiences, insights, and knowledge. Subsequently, the resource resonates differently each time you return to it. We hope that holds true for your engagement with this textbook as well and that you return to it often.

For the Educator

While “educator” often implies a formal role or title, such as clinical educator or professor, we all are educators. This text, along with its accompanying slides and activities, provides a strong foundation for academic coursework in a semester or seminar format. It also serves as a framework for structured discussions at clinical staff meetings or topic discussions as part of “lunch and learns” or other semi-structured continuing education opportunity within a clinical setting. The text has a sequential order; however, the order of chapters can certainly be revised to be specific to your intended course design, schedule, or learning outcomes. Additionally, there is value in each chapter as a “just-in-time” resource—providing a readily accessible set of ideas that may serve an immediate purpose in the event of a specific type of case or clinical scenario or as material for adjacent clinical or course content. The additional online

resources provide novel content and expand on ideas presented within the text.

Companion Website

This text includes access to a PluralPlus companion website. For instructors, the site includes PowerPoint slides, a test bank, and activities, including additional case studies. For students, the site includes videos, flashcards of key terms, study quizzes, clinical resources, and links to related resources. See the inside front cover for instructions on how to access the website.

Our Goal

Ultimately, this textbook is intended to serve as a resource to help you better understand the systems in which we practice. Our sincere hope is that it is helpful as you navigate how to approach patients, families, and team members with curiosity, humility, and purpose. We hope it serves as a steady companion as you learn to navigate the challenges, and endless rewards, of medical speech-language pathology.

Disruptions of the Cardiovascular System

Cardiovascular disorders range from acute to chronic and are common indications for hospitalization. **Myocardial infarct** (i.e., a “heart attack”; *myo* = muscle; *cardiac* = heart; *infarct* = tissue death due to disruption of blood supply) is the disruption of blood flow to the heart resulting in temporary or permanent cardiac damage. ST-elevated myocardial infarction (STEMI) or non-ST-elevated myocardial infarction (non-STEMI) are specific types of myocardial infarctions that relate to the ST waves measured on an electrocardiogram (ECG). If, for example, a patient’s chart notes an “NSTEMI,” it means they have had a heart attack.

Cardiac arrest is another disruption of the cardiovascular system but is not synonymous with myocardial infarct. Instead, cardiac arrest is the abrupt loss of cardiac function, with associated unresponsiveness, impaired or absent respiration, and inadequate or absent perfusion. Immediate action is required, optimally with life-saving resuscitation, which may include compressions, ventilation, defibrillation, and critical medications. These events within the hospital are typically called “code blue” and trigger a **code blue team** activation.

Deep vein thrombosis (DVT) is a venous clot, commonly in the leg (Figure 3–4). Complications include limb ischemia and pulmonary embolism (PE), where the clot travels into the pulmonary system. Risk for DVT can be managed with medication or, more commonly, with **sequential compression devices** (SCDs), which apply intermittent compression to promote circulation in patients with limited mobility (Figure 3–5).

Stroke reflects disruption of blood supply to the brain that may be due to a wide range of cardiovascular factors, including

blocked arteries, high BP, or aberrant blood constituency regarding atypical clotting processes. This is discussed in greater detail in Chapter 8, Neurology and Neurologic Considerations.

Respiratory/Pulmonary System

Overview

The primary function of the pulmonary system is to exchange carbon dioxide for oxygen. Oxygen-rich air is inhaled through the oral and nasal cavities into the trachea and lungs. The right lung is divided into three lobes, and the left has two lobes (to account for the space occupied by the heart). Within the deep portions of the lungs, carbon dioxide is removed, and oxygenation of blood occurs within the elastic alveoli. A connection of capillaries link to larger vessels to carry oxygenated blood throughout the body via the cardiovascular system, and waste carbon dioxide is expelled via exhalation (Figure 3–6). Refer to Chapter 5, The Respiratory System in Clinical Practice, for more detail.

Assessment of Respiratory Function

Hypoxemia (*hypo* = reduced/low; *-ox* = oxygen; *-emia* = related to blood) refers to reduced oxygen levels in the *blood*. **Hypoxia** refers to low levels of oxygen within *tissues/organs*. Causes include acute or chronic respiratory diseases, such as chronic obstructive pulmonary disease (COPD) and pneumonia, as well as airway obstructions, medication effects, and other systemic factors. Oxygenation can be assessed through several measures, discussed below.

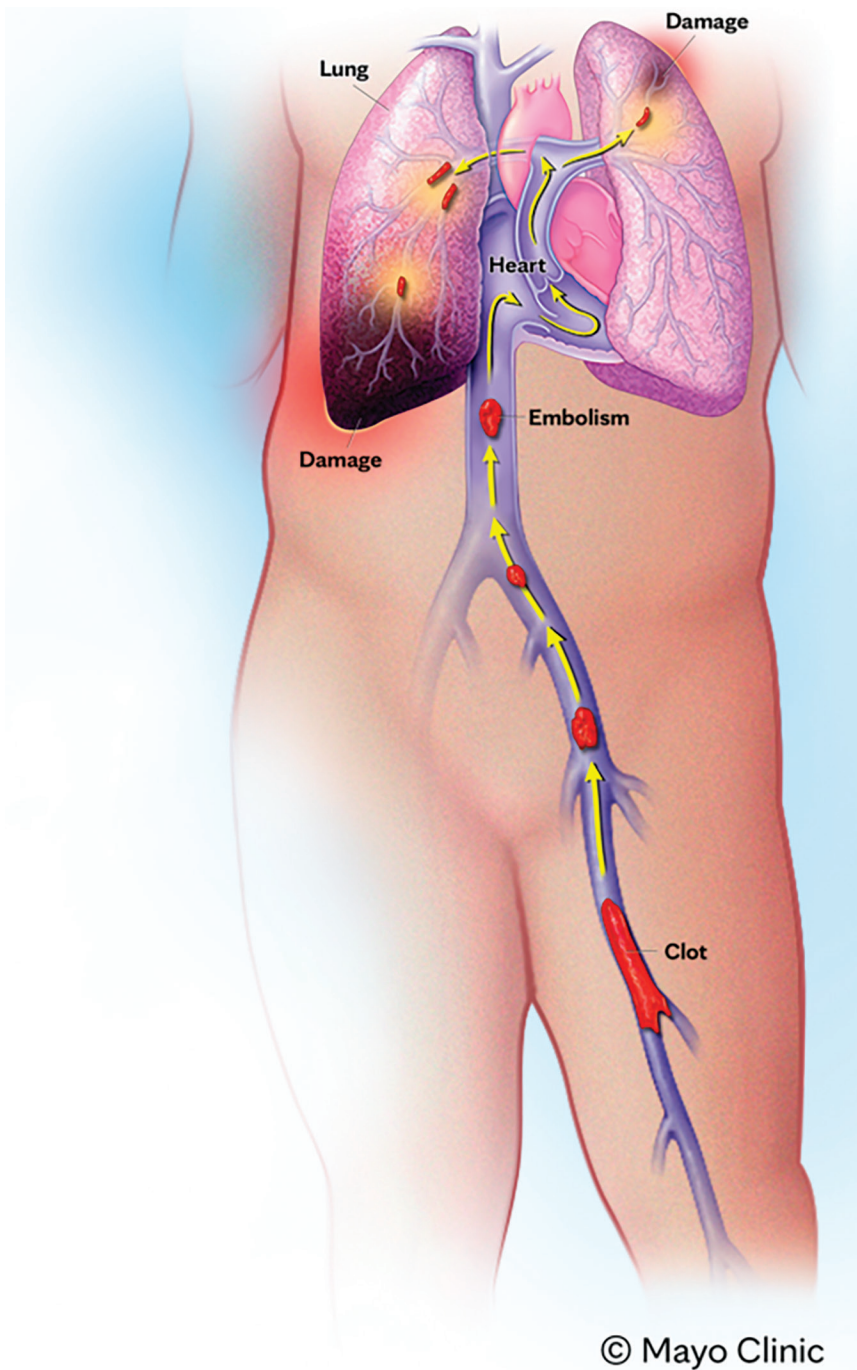


Figure 3–4. Deep Vein Thrombosis and Pulmonary Embolism. From: Mayo Clinic Press. Mayo Clinic Health Letter December 2023. Rochester, MN: Mayo Clinic, December 2023; used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.



Figure 3–5. Sequential compression devices. Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.

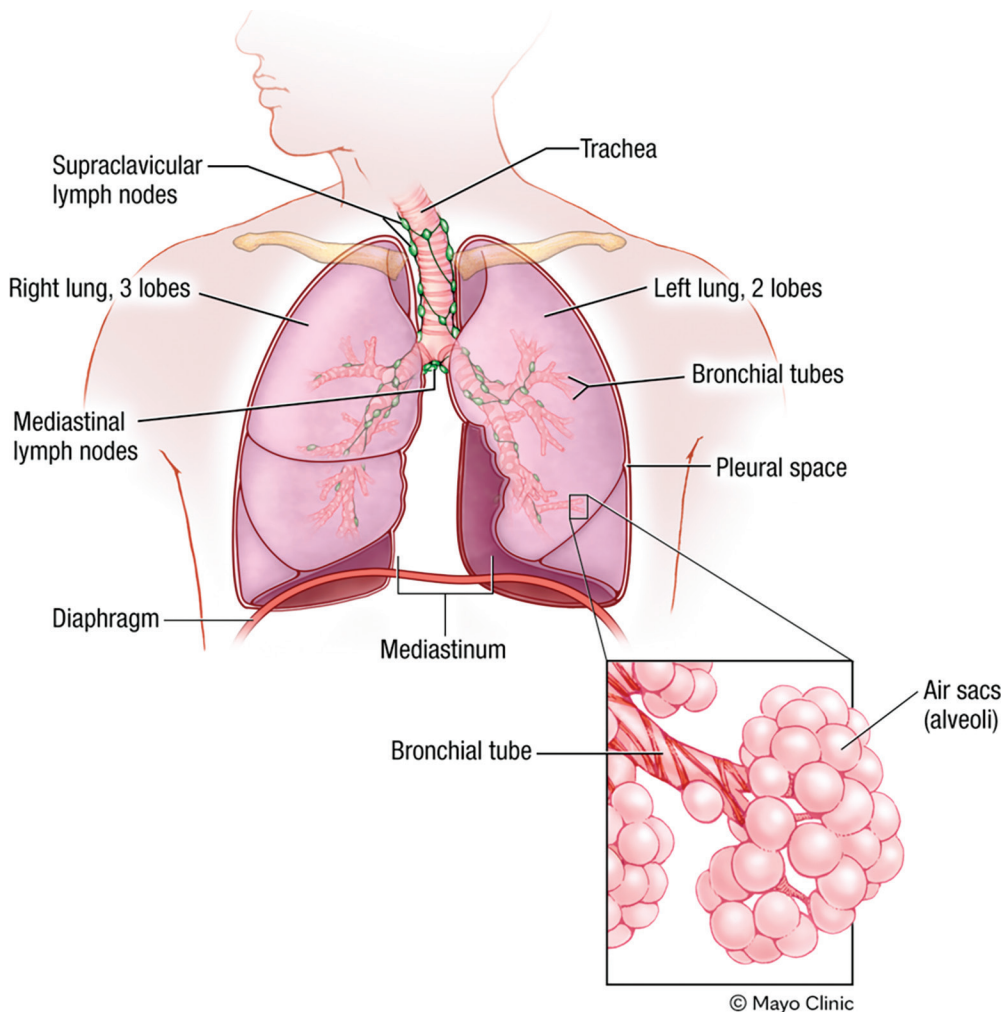


Figure 3–6. Respiratory System. From: Mayo Clinic Patient Education. Small Cell Lung Cancer. (MC7786–02). Rochester, MN: Mayo Clinic, 2024, p. 3. Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.

Monitoring Systems

Respiratory impairments can present quantitatively via a change in levels of oxygenation as measured through pulse oximetry and arterial blood gases.

Oxygen saturation (SpO_2) is a measurement of oxygenation of blood via percentage of oxygenated and unoxygenated hemoglobin present. This is commonly measured noninvasively via an infrared monitor placed on the finger, forehead, ear, or toe and referred to as pulse oximetry (or “pulse ox”) (Figure 3–7). Typical targeted ranges are equal to or greater than 92% SpO_2 .

Partial pressure of oxygen (PO_2) reflects the amount of oxygen dissolved in blood plasma. It is measured via an arterial blood gas (ABG) test, which requires an invasive arterial blood draw. It is reported in millimeters of mercury (mmHG). Typical PO_2 levels are between 80 and 100 mmHg.

Respiratory rate is the number of respiratory cycles, or breaths, per minute. Typical range is 12 to 20 breaths per minute, where a

lower rate can indicate slowed or depressed breathing and an elevated rate can indicate rapid or labored breathing (Figures 3–8 and 3–9).

Lung Sounds

Respiratory assessment typically includes charting the quality of lung sounds via **auscultation**, or audible assessment of quality and characteristics of the breath sounds, typically via stethoscope (Weinberger et al., 2023). Common terms used to indicate potential abnormal respiration include:

- *crackles* (or *rales*): “the ‘opening’ sounds of small airways and alveoli” heard during inspiration (Weinberger et al., 2023, p. 30)
- *wheezes*: “airflow through narrowed airways” (Weinberger et al., 2023, p. 30)
- *rhonchi*: category of general aberrant respiratory noise, typically attributed to secretions



Figure 3–7. Pulse oximetry, pictured on the end of the patient’s finger. Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.

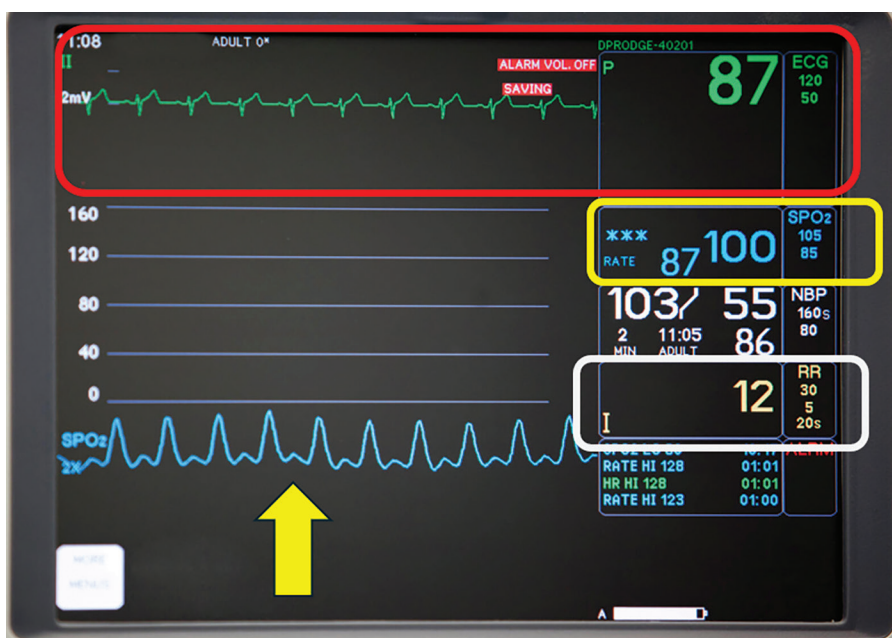


Figure 3–8. Patient Monitoring System—In the telemetry monitor above, the heartrate is highlighted with a red box, oxygen saturation levels (SpO₂) in a yellow box, and respiratory rate in a white box. The patient has a typical HR at 87, demonstrating good O₂ sats at 100 (note the “rate” in the yellow box is in reference to a strong, concordant heartrate). Pt’s respiratory rate is 12, within typical parameters. The yellow arrow points to the blue heartrate waveform being produced by the O₂ pulse oximetry monitor. While the heartrate in the red box is more reliable and collected through chest pads, the similar reading indicates a strong pulse oximetry signal. Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.



Figure 3–9. Patient vital sign monitoring device. Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.

Bronchoscopy

Bronchoscopy (Figure 3–10) is the evaluation of the airway and lungs performed by trained physicians, commonly a pulmonologist (lung specialist) or intensivist (critical care specialist), using direct digital visualization via an endoscope (a flexible camera). This procedure can be done at the bedside in intensive care units and may be diagnostic

and/or interventional. The procedure allows for full color visual inspection, lesion biopsy, foreign body visualization and removal, brushings (cellular samples gathered from the mucosal lining), and tissue sampling.

Interventions

Common interventions include supplemental oxygen (e.g., via nasal cannula as in

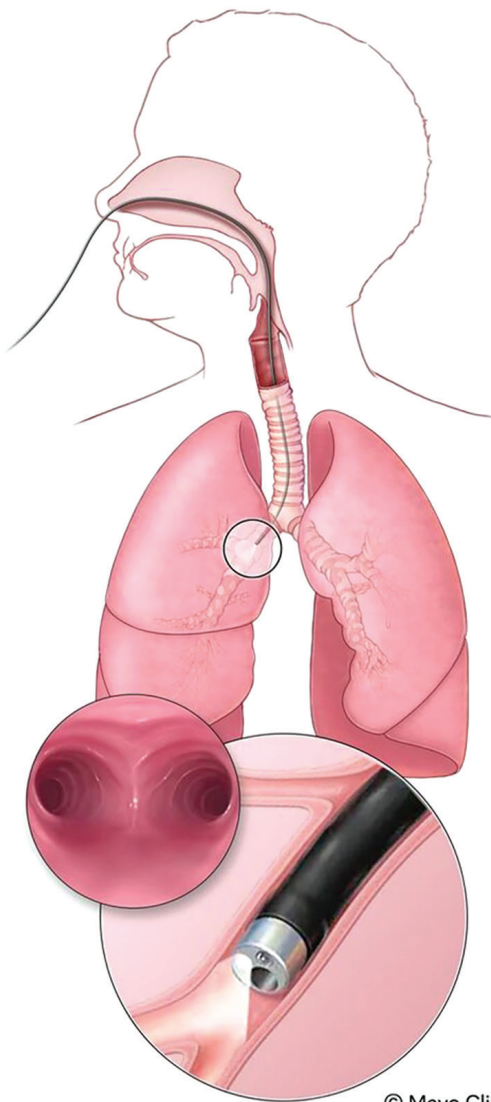


Figure 3–10. Bronchoscopy. From: Mayo Clinic Press. Mayo Clinic Health Letter February 2023 (MC2019-0223). Rochester, MN: Mayo Clinic, February 2023; used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.

A Complete Lack of Expertise Relating to Swallowing in My First Week

During my first week working in an acute care hospital, I (Sather) shadowed a registered nurse to better understand her role and how it overlapped with mine. She was highly skilled, compassionate, and had worked on the neuroscience inpatient unit for several years. As we walked toward her patient's room, she said: "So this guy in 4127 is in his late 50s, he had a left MCA, very aphasic and has a Corpak running at 60." I was still learning the layout of the hospital and trying to figure out where room 4127 even was. I repeated her words in my head: "left MCA . . . did she mean CVA? Corpak at 60? 60 what? And what was it?" I had not yet connected that she was referring to the middle cerebral artery and to his tube-feeding. Once we entered the room, I noticed the yellow tube coming out of the patient's nose and asked what it was. She kindly explained it was a Corpak—the hospital's reference term for a nasogastric feeding tube—delivering formula at 60 cc/hr. Although I had learned about feeding tubes in graduate school, I had never seen one in person nor heard that brand name before. She did not look at me like I was clueless; she looked at me like a teacher. She calmly explained what she meant and helped me make sense of what I was seeing. This small encounter showed me how much cognitive effort is required when you are new: interpreting terminology, decoding environmental cues, and filling in the blanks from limited prior experiences. (It also showed me how skilled mentors support new learners.) Even in such a relatively simple interaction, I lacked the mental and experiential frameworks to make it feel automatic. That is what it means to be a novice.

for expertise, they are most effective when paired with intentionality (Persky & Robinson, 2017). Mentorship, structured feedback, and deliberate practice are the catalysts that accelerate this progression.

Evolving From Novice to Expert

Fortunately, developing expertise is not solely dependent on time and repeated exposure. A growing body of literature supports the role of explicit instruction, structured frameworks, coaching, feedback, and deliberate practice to advance expertise

(Macnamara et al., 2016). The "theory of 10,000 hours"—that one simply accrues expertise after that much exposure—is generally considered a misnomer (Goleman, 2013). Instead, expertise emerges not only from expanding knowledge but also from restructuring it and developing more organized, accessible, and meaningful representations of what we know (Schmidt & Rikers, 2007). This is an empowering concept for novice learners: By engaging with structured strategies, one can actively shorten the learning curve and foster the development of clinical wisdom.

Developing Expertise

Schmidt and Mamede (2015) outline a three-stage process for developing expertise in the practice of medicine:

1. *Causal understanding:* The learner first grasps the underlying pathophysiological principles. For example, an SLP may understand the risk of aspiration based on knowledge of pulmonary and airway functions.
2. *Encapsulation:* Clinical patterns become mentally consolidated into simplified diagnostic labels. For example, a patient with a 3-day history of productive cough, hypoxia, tachypnea, and right lower lobe infiltrate might be recognized as having pneumonia. For the SLP, a patient with new onset of non-hesitant but empty speech with neologisms and jargon would be recognized as someone exhibiting fluent, Wernicke's-like aphasia due to probable inferior MCA stroke.
3. *Illness scripts:* With further experience, learners develop detailed mental models that include etiology, pathophysiology, clinical features, epidemiology, and typical presentations (Schmidt & Rikers, 2007; Xu et al., 2021). Illness scripts are discussed later in the chapter.

This model provides a helpful road map for understanding how novice clinicians evolve toward expertise—not only by doing more or passing time but also by engaging with information differently.

Strategies for Clinical Decision-Making

Although experience certainly supports the development of clinical expertise, there are structured strategies and tools that, when intentionally applied, accelerate clinical reasoning. Rather than passively waiting for years of exposure to accumulate, clinicians at any stage can engage with concrete tools that promote both efficiency and accuracy in clinical reasoning.

Structured Frameworks for Clinical Reasoning

Structured frameworks refer to organized processes, forms, or models that help clinicians identify, organize, and interpret infor-

mation in a systematic way. These frameworks serve as an external scaffold for the high cognitive demands of medical SLP practice. Whereas expert clinicians may rely on intuitive, pattern-based thinking, clinicians transitioning into new roles or specialties benefit from using explicit structures to scaffold their reasoning—ultimately helping them transition toward expertise.

One such structured framework is the SNAPPS (Summarize, Narrow, Analyze, Probe, Plan, Select) framework; it is learner-led and often used in medical school training. It supports clinical data organization, causal reasoning, and efficient case presentation across medical settings (Pascoe et al., 2015; Pierce et al., 2020) and is recognized as a valuable tool for developing effective clinical reasoning (Teixeira Ferraz

Grünewald et al., 2023). Preservice medical students who use SNAPPS have shown enhanced clinical reasoning and communication (Jain et al., 2019). For medical SLPs, SNAPPS not only can be used for differential diagnosis but also is appropriate for making judgments about rehabilitation potential (prognosis) and disposition planning. An application of the SNAPPS framework relevant to medical SLPs is displayed in Table 15–1.

Intentional Reflections

Reflection is a cornerstone of clinical learning. Intentional, guided reflection

helps learners make sense of past experiences and apply insights to improve future clinical reasoning (Sauerwein et al., 2024). Deliberate prompts can deepen this process, making abstract reasoning more concrete and actionable. Without these moments of sensemaking, important learning can easily be lost. Consider a new clinician working with a patient with aphasia who becomes increasingly frustrated during a naming task. Without reflection, the clinician might conclude simply that the patient “shuts down easily” or “isn’t trying” and might carry that assumption into future sessions. What goes unexamined is the clinician’s own role: Perhaps the task was too

TABLE 15–1. SNAPPS Format	
Summarize	Clinician: This is a late-70s-year-old male with a history of alcohol use disorder, admitted with multiple falls, confusion, and a head bleed of some kind. We’ve got orders to see him for evaluation of cognitive functioning. Supervisor/Peer: Good start—make sure you know more about his bleed. For example, is it a hemorrhagic stroke? Or a subdural hematoma? And would it matter if this was a chronic versus acute bleed? How does that relate to his onset of symptoms? Are there concerns he was falling at home? What is his home situation—living alone, with family, et cetera? Suggestions: Being concise in your summaries is helpful to filter out the noise and helps make sense of the situation amid a wide range of variables. The supervisor in this case made scaffolding comments and questions to develop a heuristic of pertinent details and provide opportunities for higher-level cause-effect thinking.
Narrow the differential	Clinician: He could be confused because he fell and has a traumatic brain injury/traumatic bleed. He could also be confused from long-term, excessive alcohol use or may still be intoxicated. Supervisor/Peer: Those are all potential reasons—think too about what his premorbid (prior to hospitalization) status was. Suggestions: Given the relative limited experience of newer clinicians, a solid peer or supervisor will challenge you to think more broadly than just what your experiences to date have been (and thus counter the <i>availability</i> bias). In this case, the patient might have had cognitive decline prior to his admission, and his current cognitive profile may be very similar to his baseline status. Conversely, despite his extensive chronic alcohol use, he may have been functioning very effectively in work, community, and family life.

TABLE 15–1. *continued*

Analyze the differential	Clinician: I don't think it's due to the head bleed because the neurosurgeon reports this is a small, chronic bleed and not at all something that will be surgically managed. It is not large enough to account for the symptoms. So I'm wondering if this relates to the cumulative results of multiple falls or to his alcohol use? Supervisor/Peer: Good thinking. You're putting pieces that you are aware of together, and you're also acknowledging that there's room for unknowns and uncertainty. Suggestions: In this case, the supervisor/colleague reinforces the analytical process, the absence of overconfidence and the comfort with uncertainty.
Probe the preceptor	Clinician: I'm not overly familiar with chronic alcohol abuse. The nurse mentioned "DTs," "CIWA scores," and Wernicke-Korsakoff syndrome. I've never heard of those. (Note: DTs means delirium tremens; CIWA means Clinical Institute Withdrawal Assessment for Alcohol; Wernicke-Korsakoff syndrome is an alcohol-related neurological disorder caused by severe thiamine deficiency.) Supervisor: This happens a fair amount. Alcohol intoxication is frequent among trauma patients. I encourage you to look up the terms, and then we can talk a bit about what you've read and how it relates to this patient. Suggestions: The supervisor/colleague may tailor their responses depending on the context, learner, and urgency. For example, the supervisor may provide direct information to the clinician regarding what the CIWA scores entail, especially if that information is needed quickly. Otherwise, it may be appropriate to encourage self-directed learning or connection with a provider who can support their learning in this topic area (e.g., alcohol counselor, trauma team member, emergency department faculty).
Plan management	Clinician: Based on what I know, and what I'm uncertain about, it seems reasonable that we should wait a couple days and see if his symptoms get worse, better, or stay the same. He is communicating his wants and needs with the care team. I can reach out to family to ask about his prior level of functioning. Supervisor: This makes good sense. I would also hold off on doing any kind of lengthy assessment at this point. He's going to be here for a few more days. Suggestions: Reinforce linking plan to current symptoms, disposition plan, and institutional safety protocols.
Self-selected directed learning	Clinician: I need to look up more information differentiating concepts of Wernicke-Korsakoff versus acute intoxication and the effects of alcohol withdrawal on cognition. Supervisor: Great. Also consider reviewing an article such as this one by Wang et al. (2023) on the role of alcohol use disorder on short- and long-term cognitive function. Suggestions: At this point the supervisor should support the clinician in a tangible component of self-directed learning—guiding the clinician to a relevant, self-chosen topic and also providing a structure for tangible outcomes (such as a brief lunch-and-learn to the rest of the SLP staff; a one-page summary, etc.).

linguistically demanding, the instructions were unclear, or the clinician missed early signs of fatigue or communication breakdown. When reflection is skipped, these incomplete explanations harden into habits that shape subsequent clinical interactions and decisions.

A brief, structured 3-minute reflection can interrupt this pattern: What exactly happened during the task? When did the breakdown begin? What was I doing at that moment? What alternative explanations make sense given everything else I know about the patient? What could I adjust next time? This short pause can help reframe the encounter, reveal overlooked cues, and generate more responsive strategies for the next session.

Awareness of our own tendencies (emotional, interprofessional) and of our potential biases can strengthen clinical reasoning, especially in complex or ambiguous situations. Cultivating reflection and humility may be just as essential to thinking like a clinician as is developing diagnostic skills.

Structured Reflections

Structured reflections involve prompting learners to generate possible diagnoses or treatment plans—sometimes independently, sometimes with varying degrees of support—and then reflect on their rationale. This might include evaluating a patient's speech-language results and considering the potential communication disorders. Learners may be asked to create differential diagnoses based on case vignettes and justify which assessment findings support or refute each possibility. Exercises often incorporate illness scripts, encouraging learners to compare the hallmark features of similar conditions; for example, differentiating apraxia of speech from dysarthria. Reflection prompts

might also ask learners to review their initial intervention plan, identify potential reasoning errors, or consider alternative strategies, such as modifying cueing techniques based on a patient's response or medical comorbidities. Although valuable, these strategies may be more cognitively demanding for novice clinicians with less developed knowledge structures (Xu et al., 2021). Whereas structured reflections guide learners through analyzing cases systematically, self-explanation provides a complementary strategy that encourages learners to articulate their reasoning in real time and to actively link case features to their prior knowledge.

Self-Explanation

Self-explanation is one type of deliberate reflection tool more useful in the early stages of clinical training (Xu et al., 2021). It encourages learners to link features of a clinical case with existing knowledge or with new information they actively seek out from other sources. This strategy can be supported with justification prompts that ask learners to articulate principles that support their clinical reasoning and mental model revision prompts that guide them in identifying gaps or inconsistencies in their current understanding (Chamberland et al., 2015). Example prompts include:

- Justification prompts: What principle is being applied here? Do you agree with the present interpretation? Why or why not? Explain. What pathophysiological mechanisms could support the current presentation?
- Mental model revision prompts: How does the current interpretation compare with what you already know? What does not align with

what you already know? How does this current case help you gain more insight into how to approach this clinical scenario? What new information does this case provide to you?

Such practices align with Rencic's (2011) encouragement for deliberate practice—including frequent, honest feedback on performance; maximal learning on each case interaction; reflection for improvement; and frequent use of structured mental practice. Although reflection and self-explanation strengthen reasoning skills, they can be cognitively demanding, particularly when learners must integrate multiple clinical variables. To support efficient decision-making and reduce cognitive load, clinicians often rely on organizational scaffolds, which condense and structure critical knowledge for rapid retrieval during patient encounters.

Organizational Scaffolds

Storing and retrieving relevant information encapsulating the wide range of medical conditions and diseases encountered in the medical setting creates an immense cognitive burden on new and novice clinicians. The volume and complexity of this knowledge can be daunting for those building new mental libraries. Organizational scaffolds help manage cognitive load by offering condensed, structured ways to access and apply clinical knowledge. Some happen intrinsically, such as illness scripts (see below). Because deep, analytical thinking is time-consuming, is cognitively taxing, and requires significant energy (Kahneman, 2011), the initial phase of a new clinical position can be especially exhausting due to cognitive fatigue. To support clinical rea-

soning, especially in high-frequency, lower-stakes situations, clinicians often benefit from external tools that reduce cognitive demands. Commonly used supports include illness scripts, heuristics, and checklists.

Illness Scripts

Illness scripts are mental templates or “cue cards” that synthesize key features of a clinical condition, including etiology, pathophysiology, signs and symptoms, and typical presentations (Xu et al., 2021). Expert clinicians have these illness frameworks readily accessible, often implicitly. These illness scripts contain important distinguishing features of various illnesses and clinical presentations (Rencic, 2011). As clinical scenarios present, an expert clinician typically subconsciously flips through their mental cognitive notebooks until they align an illness script with the current clinical scenario in a form of pattern recognition. This rapid, intuitive matching process supports efficiency in diagnosis and planning. In contrast, novice clinicians typically have fewer and less complete illness scripts, making it harder to apply knowledge efficiently.

Shea and Chan (2024) propose an illness script framework containing elements of the *mechanism*, *epidemiology*, *time course*, and *clinical presentation*. Tables 15–2 and 15–3 provide examples applied to medical speech-language pathology encounters.

As novice clinicians gain experience, they build a growing library of illness scripts. Over time, these scripts become more detailed and readily retrievable during clinical reasoning scenarios. For example, when evaluating a patient with confusion, the clinician may mentally scroll through a set of illness scripts related to potential causes—such as delirium, metabolic disturbance, or neurodegenerative disease. Similarly, a