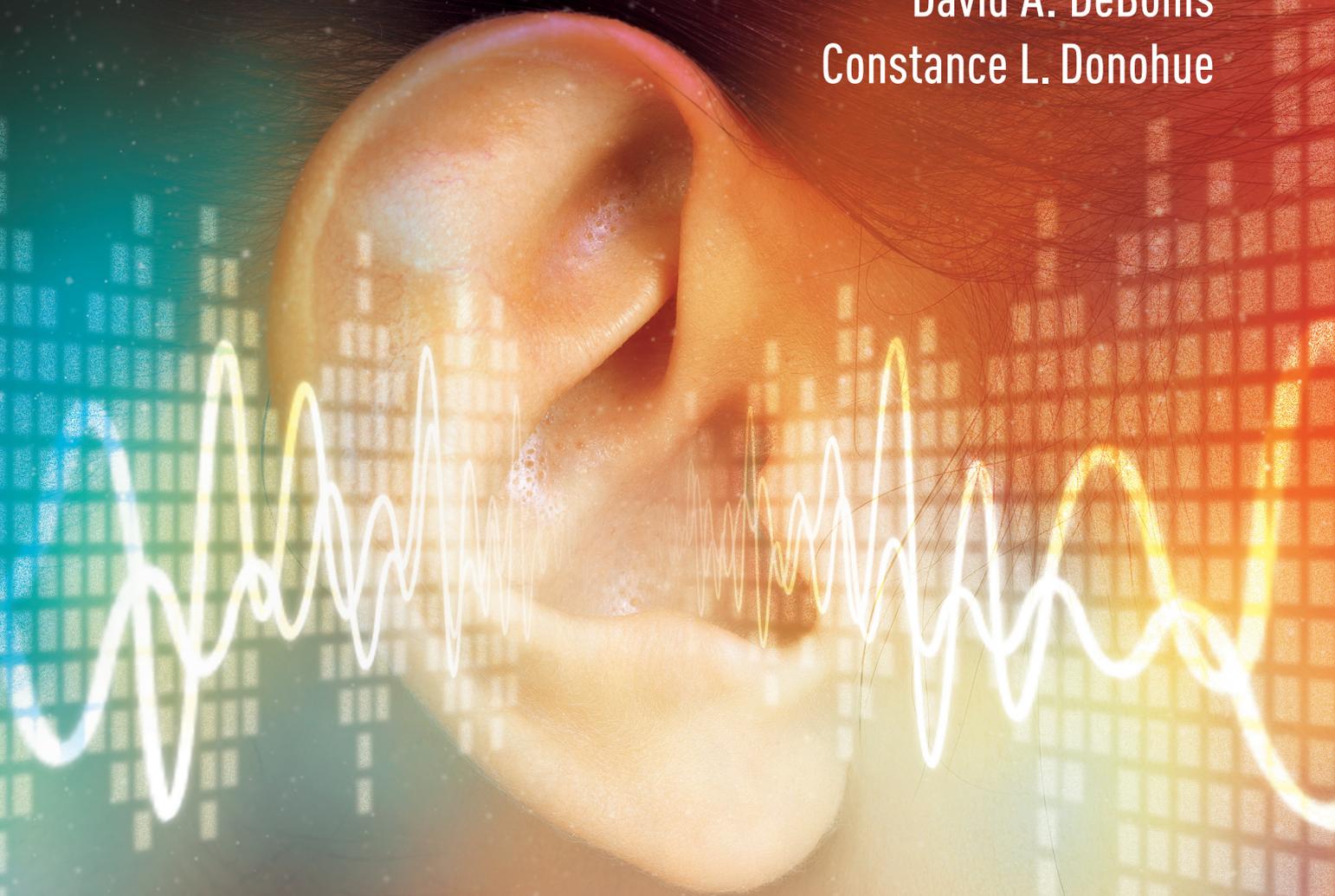


THIRD EDITION

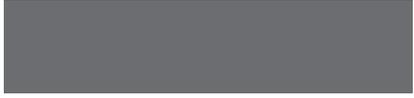
# Survey of Audiology

Fundamentals for Audiologists  
and Health Professionals

David A. DeBonis  
Constance L. Donohue



SLACK Incorporated

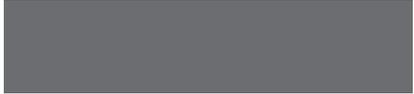


THIRD EDITION

**Survey of**  
**Audiology**

Fundamentals for Audiologists  
and Health Professionals





THIRD EDITION

# Survey of Audiology

Fundamentals for Audiologists  
and Health Professionals

**DAVID A. DEBONIS, PhD, CCC-A**

*The College of Saint Rose*

*Albany, New York*

*Sunnyview Rehabilitation Hospital*

*Schenectady, New York*

**CONSTANCE L. DONOHUE, AuD, CCC-A**

*The College of Saint Rose*

*Albany, New York*

**SLACK**  
INCORPORATED



SLACK Incorporated  
6900 Grove Road  
Thorofare, NJ 08086 USA  
856-848-1000 Fax: 856-848-6091  
www.Healio.com/books  
© 2020 by SLACK Incorporated

Senior Vice President: Stephanie Arasim Portnoy  
Vice President, Editorial: Jennifer Kilpatrick  
Acquisitions Editor: Brien Cummings  
Managing Editor: Allegra Tiver  
Creative Director: Thomas Cavallaro  
Cover Artist: Justin Dalton  
Project Editor: Dani Malady

*Survey of Audiology: Fundamentals for Audiologists and Health Professionals, Third Edition Instructor's Manual* is also available from SLACK Incorporated. Don't miss this important companion to *Survey of Audiology: Fundamentals for Audiologists and Health Professionals, Third Edition*. To obtain the *Instructor's Manual*, please visit <http://www.efacultyounge.com>

Dr. David A. DeBonis and Dr. Constance L. Donohue have no financial or proprietary interest in the materials presented herein.

All rights reserved. No part of this book may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission from the publisher, except for brief quotations embodied in critical articles and reviews.

The procedures and practices described in this publication should be implemented in a manner consistent with the professional standards set for the circumstances that apply in each specific situation. Every effort has been made to confirm the accuracy of the information presented and to correctly relate generally accepted practices. The authors, editors, and publisher cannot accept responsibility for errors or exclusions or for the outcome of the material presented herein. There is no expressed or implied warranty of this book or information imparted by it. Care has been taken to ensure that drug selection and dosages are in accordance with currently accepted/recommended practice. Off-label uses of drugs may be discussed. Due to continuing research, changes in government policy and regulations, and various effects of drug reactions and interactions, it is recommended that the reader carefully review all materials and literature provided for each drug, especially those that are new or not frequently used. Some drugs or devices in this publication have clearance for use in a restricted research setting by the Food and Drug Administration or FDA. Each professional should determine the FDA status of any drug or device prior to use in their practice.

Any review or mention of specific companies or products is not intended as an endorsement by the author or publisher.

SLACK Incorporated uses a review process to evaluate submitted material. Prior to publication, educators or clinicians provide important feedback on the content that we publish. We welcome feedback on this work.

#### Library of Congress Cataloging-in-Publication Data

Names: DeBonis, David A., author. | Donohue, Constance L., author.  
Title: Survey of audiology : fundamentals for audiologists and health professionals / David A. DeBonis, Constance L. Donohue.  
Description: Third edition. | Thorofare, NJ : SLACK Incorporated, 2019. | Includes bibliographical references and index.  
Identifiers: LCCN 2019017091 (print) | LCCN 2019018222 (ebook) | ISBN 9781630915049 (epub) | ISBN 9781630915056 (web) | ISBN 9781630915032 (pbk. : alk. paper)  
Subjects: | MESH: Correction of Hearing Impairment | Hearing Disorders--diagnosis  
Classification: LCC RF290 (ebook) | LCC RF290 (print) | NLM WV 270 | DDC 617.8--dc23  
LC record available at <https://lcn.loc.gov/2019017091>

For permission to reprint material in another publication, contact SLACK Incorporated. Authorization to photocopy items for internal, personal, or academic use is granted by SLACK Incorporated provided that the appropriate fee is paid directly to Copyright Clearance Center. Prior to photocopying items, please contact the Copyright Clearance Center at 222 Rosewood Drive, Danvers, MA 01923 USA; phone: 978-750-8400; website: [www.copyright.com](http://www.copyright.com); email: [info@copyright.com](mailto:info@copyright.com)

## DEDICATION

This book is dedicated to our students and clients,  
with gratitude for their insights and accomplishments.



# CONTENTS

<i>Dedication</i> .....	<i>v</i>
<i>Acknowledgments</i> .....	<i>xi</i>
<i>About the Authors</i> .....	<i>xiii</i>
<i>Preface</i> .....	<i>xv</i>
<i>Introduction</i> .....	<i>xvii</i>
<b>Chapter 1</b>	<b>Audiology as a Scientific, Collaborative, and Humanistic Discipline</b> ..... <b>1</b>
	The Profession of Audiology..... 3
	Audiology as a Humanistic Discipline..... 5
	Recommendations for the Future..... 10
	Questions for Discussion..... 10
<b>Chapter 2</b>	<b>Acoustics of Sound and Preliminary Clinical Application</b> ..... <b>13</b>
	Acoustics Standards..... 13
	What Is Sound?..... 14
	Units of Measure..... 23
	Application of Acoustic Concepts to Reading Audiograms and to Understanding the Listening Environment..... 23
	Fundamental Pathways of Sound..... 26
	Environmental Acoustics..... 36
	Questions for Discussion..... 39
<b>Chapter 3</b>	<b>Anatomy and Physiology of the Auditory System</b> ..... <b>41</b>
	Anatomy and Physiology of the Peripheral Auditory System..... 41
	Anatomy and Physiology of the Central Auditory System..... 51
	Questions for Discussion..... 54
<b>Chapter 4</b>	<b>Pure Tone Testing</b> ..... <b>55</b>
	Relationship Between Pure Tones and Perception of Speech Sounds..... 55
	The Audiometer..... 59
	Calibration..... 60
	Pure Tone Testing..... 62
	Masking..... 69
	Potential Pitfalls in Pure Tone Testing..... 75
	Questions for Discussion..... 77
	Appendix A: How to Mask During Pure Tone Testing..... 79
<b>Chapter 5</b>	<b>Speech Audiometry</b> ..... <b>85</b>
	Contributions of Speech Audiometry..... 85
	Speech Audiometry Tests..... 86
	Masking During Speech Audiometry..... 99
	Other Issues in Speech Audiometry..... 100
	Questions for Discussion..... 102
	Appendix A: Selected Tests of the Minimal Auditory Capabilities Battery..... 106
	Appendix B: How to Mask During Speech Audiometry..... 107

<b>Chapter 6</b>	<b>Physiological Assessment of the Auditory System</b> . . . . .	<b>111</b>
	Acoustic Admittance Testing . . . . .	112
	Tympanometry . . . . .	113
	Eustachian Tube Testing . . . . .	121
	Acoustic Reflex Thresholds . . . . .	121
	Otoacoustic Emissions . . . . .	126
	Auditory Evoked Potentials . . . . .	134
	Questions for Discussion . . . . .	149
	Appendix A: Answers to Tympanogram Cases 1 to 4 . . . . .	151
<b>Chapter 7</b>	<b>Disorders of the Auditory System</b> . . . . .	<b>153</b>
	Selected Conditions That May Affect the Outer Ear . . . . .	154
	Selected Conditions That May Affect the Middle Ear . . . . .	157
	Selected Conditions That May Affect the Inner Ear . . . . .	164
	Selected Conditions That May Affect the Central Auditory System . . . . .	177
	Balance Disorders: Assessment and Management . . . . .	181
	Questions for Discussion . . . . .	192
<b>Chapter 8</b>	<b>Diagnostic Audiology With Children: Behavioral Methods</b> . . . . .	<b>195</b>
	Auditory Development and Pediatric Audiology . . . . .	195
	Components of Auditory System Development . . . . .	198
	General Principles of Pediatric Audiological Assessment . . . . .	207
	Client-Specific Protocols for Audiological Assessment of Young Children . . . . .	226
	Questions for Discussion . . . . .	233
	Appendix A: Suggestions for Parents of Children With Middle Ear Problems . . . . .	235
<b>Chapter 9</b>	<b>Assessment and Management of Special Populations</b> . . . . .	<b>237</b>
	Older Adults . . . . .	238
	Individuals Who Are Deaf . . . . .	241
	Adults With Developmental Disabilities . . . . .	246
	People With Neurogenic Disorders . . . . .	249
	Individuals With Nonorganic Hearing Loss . . . . .	253
	Multicultural Issues . . . . .	257
	Questions for Discussion . . . . .	260
	Appendix A: Considerations for Hearing Assessment and Case Management of Individuals Who Have Developmental Disabilities . . . . .	261
	Appendix B: Communication Strategies for Use in Individuals With Developmental Disabilities . . . . .	261
<b>Chapter 10</b>	<b>(Central) Auditory Processing Disorders in School-Age Children</b> . . . . .	<b>263</b>
	Evidence Reviews and Clinical Practice . . . . .	263
	(Central) Auditory Processing Disorders . . . . .	265
	Nature and Development of Tests of (Central) Auditory Processing . . . . .	265
	Maturation and Plasticity of the (Central) Auditory Processing System . . . . .	266
	Traditional View of (Central) Auditory Processing Disorder . . . . .	266
	Nontraditional View of (Central) Auditory Processing Disorder . . . . .	268
	New Directions Regarding Auditory Processing . . . . .	271
	Helping Children Who Have (or Are Suspected of Having) an Auditory Processing Disorder . . . . .	272

Final Remarks . . . . . 274

Questions for Discussion . . . . . 274

Appendix A: Sample Case History Form for Auditory Processing Evaluation . . . . . 276

**Chapter 11 Screening . . . . . 277**

    Definitions and Models . . . . . 278

    Decisions About the Screening Protocol . . . . . 280

    General Screening Components . . . . . 285

    Screening Protocols Across the Life Span . . . . . 286

    Recent Trends in Hearing Screenings . . . . . 300

    Questions for Discussion . . . . . 301

    Appendix A: Sample Content to Include in Forms for Reporting Hearing Screening Results . . . . . 303

    Appendix B: Hearing Screening (Adults) . . . . . 305

    Appendix C: Hearing Handicap Inventory for the Elderly . . . . . 306

**Chapter 12 Helping Individuals With Hearing Loss . . . . . 307**

    Model of Aural Rehabilitation . . . . . 308

    Hearing Aid Amplification . . . . . 309

    Treatment Planning . . . . . 312

    Hearing Aid Selection and Fitting Process . . . . . 312

    Verification . . . . . 328

    Validation . . . . . 330

    Assistive Devices . . . . . 331

    Adult Aural Rehabilitation . . . . . 335

    Implantable Hearing Aids . . . . . 339

    Hearing Aids and Aural Rehabilitation in the Pediatric Population . . . . . 341

    Cochlear Implants . . . . . 345

    Tinnitus . . . . . 356

    Prevention . . . . . 361

    Counseling . . . . . 363

    A Further Look at Diagnosis Through Aural Rehabilitation: Five Sample Cases . . . . . 365

    Questions for Discussion . . . . . 367

    Appendix A: Classroom and Educational Strategies for Consideration for Children With Hearing Loss . . . . . 371

*Glossary* . . . . . 373

*Survey of Audiology: Fundamentals for Audiologists and Health Professionals, Third Edition Instructor’s Manual* is also available from SLACK Incorporated. Don’t miss this important companion to *Survey of Audiology: Fundamentals for Audiologists and Health Professionals, Third Edition*. To obtain the *Instructor’s Manual*, please visit <http://www.efacultyounge.com>



## ACKNOWLEDGMENTS

We would like to thank numerous individuals for their support in developing this third edition of our text. As always, we thank our families, friends, and colleagues who continually support us in this endeavor. We also want to thank the audiologists who served as peer reviewers for this newest edition. We appreciate the positive and constructive feedback that they provided to us. A special thanks to the team at SLACK Incorporated, including Allegra Tiver, Dani Malady, and Nathan Quinn. We have appreciated the positive and collaborative approach they have taken with us and with this project. A very special thank you is also given to Brien Cummings, our Acquisitions Editor, who reached out to invite us to pursue this third edition of our text and worked with us to make this a manageable project. We will always be grateful for the opportunity to update our book and to continue to have it available for interested students and professionals.

Finally, we want to thank our clients for providing us with a rich variety of clinical experiences and interactions, which led us to a deeper understanding of the dynamic connections between the science and humanism of our profession. Similarly, our students, through their questions, comments, and insights, have reinforced the need to address audiology in the larger context of the field of communication disorders and to put this information on paper. We thank them for this.



## ABOUT THE AUTHORS

*David A. DeBonis, PhD, CCC-A* is a professor of Communication Sciences and Disorders at The College of Saint Rose in Albany, NY and a member of the audiology staff at Sunnyview Rehabilitation Hospital in Schenectady, New York. He has a master's degree in audiology from The Pennsylvania State University in University Park, PA and a PhD degree in educational psychology from the State University of New York at Albany. David has over 30 years of clinical experience and 25 years of college teaching experience. He has co-authored and authored articles in several journals, including the *American Journal of Audiology* and the *International Journal of Audiology*. In 2014, he was awarded the Thomas Manion Outstanding Faculty Award at The College of Saint Rose.

*Constance L. Donohue, AuD, CCC-A* is an audiologist and an adjunct faculty member at The College of Saint Rose in Albany, NY. Her experience includes nearly 20 years of teaching in the Communication Sciences and Disorders Program at the college. Connie received a master's degree in audiology and hearing impairment from Northwestern University in Evanston, IL and a Doctor of Audiology degree from A. T. Still University of Health Sciences, Arizona School of Health Sciences in Mesa in 2013. Since 1998, Connie has worked in state government, including 15 years at the New York State Department of Health, where she helped establish and implement statewide newborn hearing screening. She currently serves as director of the Bureau of Early Intervention and oversees the Early Hearing Detection and Intervention Program.



## PREFACE

As audiologists, we have had the wonderful good fortune of working in challenging and stimulating settings in which we have met a wide range of clients with various audiometric and personal profiles. We have interacted with clients from newborn babies to those who had celebrated their 100th birthdays; from clients whose hearing losses were a mild inconvenience to those whose hearing losses altered their lives forever; from clients who enjoyed the support and guidance of family and friends to those who had to deal with their hearing loss alone.

These invaluable human interactions created in us a sense of what the practice of audiology is and what it is not. It is not just about ears or hearing. It is about people, and it is about communication. It is also about people's temperaments, their outlooks, and their beliefs; it is about their families and support systems.

After years of day-to-day clinical work, we both were given the opportunity to teach audiology to undergraduate and graduate students. As is often the case, we learned a lot through teaching. One thing that we learned was that few audiology textbooks adequately addressed the more humanistic domains of audiological care. Students would often ask why a certain topic discussed in class was not included in their textbooks. Also, we learned that students were relying heavily on our notes but were reading the textbook only infrequently. They also were not using it as a reference in later classes. From our teaching, we also learned that students often felt that the issues addressed in their textbooks were, in large part, not directly relevant to them or the work they would be doing.

Based on these rich clinical and teaching experiences, we decided to write an audiology textbook that would accomplish several things. First, it would maintain the scientific rigor that many of the books on the market already had. Second, it would include ongoing discussion of the complex humanistic themes that are critical to providing audiological care in the real world. In fact, this text unambiguously defines audiology as a scientific and humanistic discipline. Third, it would specifically address the relevance of audiology concepts and practices not only to audiologists, but also to speech-language pathologists and individuals in other health professions. Finally, it would be written in a way that was consistent with our teaching style: in understandable language and with extensive use of examples and cases. In this *Third Edition*, we have sought to maintain these elements and update certain topics that had undergone change.

Of course, we hope that this book will be well received by students and will make their experiences in audiology classes more rewarding. However, our hope for this text extends beyond that. We also hope it will foster greater understanding among future audiologists that the humanistic themes that undoubtedly emerge in the real-world practice of audiology must be considered an important part of our work and that attending to these human factors is critical to our success as professionals working with individuals who have hearing loss.

We welcome feedback from our readers regarding this text. Feel free to contact us at [debonisd@mail.strose.edu](mailto:debonisd@mail.strose.edu) or [condonohue@gmail.com](mailto:condonohue@gmail.com).

### *New to This Edition*

The *Third Edition* of this text contains more detailed information regarding the profession of audiology, including credentials that are available and the lack of awareness by the public of the role of the audiologist. Regarding diagnostic information, this edition includes more specific normative data found in the literature to enhance the reader's ability to engage in test interpretation and clinical decision making. Updated information is also included about new auditory evoked response techniques. Information regarding auditory processing disorder is quite different from the previous edition; it covers not only approaches supported by the American Speech-Language-Hearing Association (ASHA) and the American Academy of Audiology, but also contrasting views of the disorder.

A number of topics that were either added or enhanced reflect the attention they have received in the literature and in audiology practice. For example, this edition addresses misophonia, a sound sensitivity disorder, as well as the role of new information about genetics in audiology practice. This includes information about genetic testing, genetic counseling, and research using biotechnology to address hearing loss. Tinnitus is also addressed in more detail, specifically the similarities between it and chronic pain. New views of noise are discussed and include its potential effect not only on hearing, but also on areas beyond the ear. The role of hearing loss, cognitive decline, and mental health are also addressed, as the relationships that exist among these is now well documented.

A detailed chapter on helping individuals with hearing loss has been updated and expanded, consistent with the technological advances that have been made with hearing aids and the many options for clients to connect their hearing aids wirelessly with other devices. Readers are provided with some detailed information regarding the ways in which hearing aids can be adjusted to meet the clients' specific needs. Also raised is the unfortunate lack of affordability of hearing aids and efforts being made to address this.

## Supplements

To help you get the most out of *Survey of Audiology*, we have provided useful supplements for instructors and students:

- **Instructor's Manual, PowerPoint Slides, and Test Bank:** A teacher's tool, this manual provides a wealth of ideas and activities designed to help instructors teach the course. Each chapter includes content summaries and outlines, key terms, discussion questions, topic launchers, suggested readings, and a variety of test questions, including multiple choice items, fill-in-the-blank items, true-or-false items, and essay questions. A new feature of the updated *Instructor's Manual* is the addition of PowerPoint slides for each chapter. These slides can be used and/or adapted by instructors.

# INTRODUCTION

The *Third Edition* of this text is written for students of audiology, speech-language pathology, and other health professions who are interested in gaining some foundational knowledge about audiology.

The book will likely be used in different ways by different groups. Students studying to be audiologists, for example, will likely benefit not only from the more basic topics covered, but also from information that goes beyond this and provides a deeper and broader understanding of the content. For example, whereas some readers will seek out information about conventional hearing testing procedures and how they inform us about hearing and communication, audiology students may also be interested in testing that goes beyond the standard testing. Using chapter headings and subheadings should be helpful in making decisions about what level of detail is most appropriate.

In thinking about how best to use this book, students are encouraged to think beyond a single audiology course. For example, many sections of this text will be appropriate for an introductory audiology course. However, for some topics, the coverage in this text will be more than what would typically be included in an initial course. As students progress through their training programs, some of these advanced sections will become more relevant and valuable. For this reason, students are encouraged to view this book as a reference that has value now and in the future.

Finally, in order to get the most out of this book, students should make use of learning objectives that open each chapter, discussion questions that end each chapter, and bolded key words throughout the text that are defined in the glossary. Students should also make use of the numerous audiograms, figures, tables, and case studies that are provided to summarize important information and to help students make application of the text material to clinical cases.



# 1

## Audiology as a Scientific, Collaborative, and Humanistic Discipline

### AFTER COMPLETING THIS CHAPTER, YOU SHOULD BE ABLE TO:

1. Define *audiology*, and support the statement that it is a scientific and humanistic discipline.
2. Define and differentiate between speech-language *pathologist* and *audiologist*.
3. Describe the purpose and requirements for Board Certification in Audiology.
4. Describe the purpose of, and major themes included in, codes of ethics applicable to audiology.
5. Support the argument that scientific knowledge alone does not adequately prepare audiologists to meet client needs.
6. Describe consultative and collaborative models of interaction that foster humanism in clinical practice.
7. Understand the components of an educational program designed to facilitate the human dimensions of clinical care.
8. Identify three organizations for hearing and speech clinicians.

**Audiology**, as a scientific discipline, is the study of hearing and hearing disorders. **Audiologists** are individuals who provide both assessment and intervention services to individuals who have challenges in the area of either hearing, balance or associated disorders (ASHA, 2018). The national organization that certifies audiologists and **speech-language pathologists** in the United States is the American Speech-Language-Hearing Association (ASHA, 2018).

Not only is the **scope of practice** in audiology broad, the particular knowledge base that could theoretically be required for a given audiologist in a clinical audiology setting is also vast. Consider that the clinical audiologist working in a medical facility is required to carry out:

- Comprehensive audiological evaluations
- **Auditory brainstem testing** for both site of lesion and hearing estimation purposes
- Intraoperative monitoring
- **Otoacoustic emission** testing

- **Electronystagmography**
- **Vestibular** rehabilitation
- **Cochlear implant** programming
- Hearing aid dispensing using state-of-the-art programmable and digital products
- Dispensing of **assistive listening devices**

This combination of responsibilities represents a range of technical and decision-making skills that speaks to the ever-growing complexity of the field of audiology and to the need for audiologists to have a firm foundation of scientific knowledge to competently collect and interpret the data generated from these activities.

Because most audiologists, regardless of their type of practice, find themselves in settings in which their knowledge base must be expansive and in which learning is an ongoing process (in order to remain current with technological advances), the profession of audiology is currently undergoing a dramatic reconfiguration of its

training programs, moving to the clinical doctorate as the entry-level degree. Also, state licensure boards in many states across the country have passed continuing education requirements for audiologists as a way of ensuring that this process of ongoing education takes place.

Further examination of the *Scope of Practice in Audiology* (ASHA, 2018) reveals that scientific knowledge alone does not adequately prepare the audiologist. While a science, audiology is also a humanistic discipline, and because of this, audiologists must acquire knowledge that goes beyond that involved in the collection and interpretation of scientific data. Audiologists provide their services using the latest technologies and strategies, combined with interpersonal skills to guide clients and their communication partners toward their goals. Importantly, services are provided to all, regardless of age, race, socioeconomic status, gender, religious affiliation, ethnicity, or sexual orientation. Further, the audiologist recognizes and responds to the emotions, thoughts, feelings, and behaviors that may result from the challenges client face.

This challenge that audiology services be provided to diverse individuals and that such services address the psychosocial aspects of hearing loss requires audiologists to assess and use the human elements of their interactions with clients to do their work competently and ethically. In order to work effectively with a diversity of individuals, audiologists must have a broad understanding and comfort with the range of characteristics that make up human beings. People differ not only in their age, ability, and cultural background, but also in temperament, motivation, ability to change, family dynamic, and reaction to hearing loss. Integrating these factors into our scientific knowledge effectively requires not only specialized awareness and understanding of people, but also an increased understanding of ourselves.

Although audiology is both a scientific and a humanistic endeavor, the humanistic aspect of our field has received less attention and perhaps some resistance by professionals in our field. This is not unlike the struggle in the field of medical education. According to Novak, Epstein, and Paulsen (1999), “as medical knowledge and effective remedies have multiplied, the science of curing has overshadowed the art of healing” (p. 516). The authors add that restoring the balance between technology and healing requires such things as ongoing communication, words of reassurance, and affirmation, and that when these things are provided to patients, “the greatest satisfaction of clinical care” can result (p. 517).

Peters and colleagues (2000) investigated the long-term effects of an innovative, problem-solving, and humanistic-based curriculum on medical students in preclinical training programs at Harvard Medical School. The program was designed specifically to promote knowledge of basic sciences combined with competency in integrating psychosocial and humanistic elements of patient care. Measured during medical school, during residency, and in private practice,

students exposed to the innovative curriculum continued to function differently than a similar group who received the traditional curriculum, even 10 years later. Specifically, the experimental group members were much more likely to choose low-technology, socially oriented careers (e.g., psychiatry, primary care) in which human interactions would be the focus. These students also viewed ongoing medical education as a means to solve patient problems. Students in the traditional curriculum were more likely to choose positions with less direct patient contact and viewed lifelong learning as a way to build a larger scientific knowledge base.

Despite research, widespread dissatisfaction among consumers of health care, and repeated recognition that “there is more to medical practice than hard science” (Maheux, 1990, p. 41), few clients believe that the day-to-day practice of medicine has been moved toward a more humanistic approach. Novak and colleagues (1999) identify three possible reasons. One is that it is easier to teach facts and protocols than to facilitate problem solving using the numerous and complex variables of real human interaction. Also, many of the calls for curricular change have been addressed in a very peripheral fashion, relegating “soft” courses to low-priority status. Finally, much of a medical student’s clinical exposure is with physicians who, in an effort to be “efficient,” rarely move beyond the technical aspects of cases and therefore do not model these humanistic dimensions.

The parallels between the struggles in the field of medical education and the current status of audiology should be noted and are an opportunity for us to learn. Audiology, like the medical field, is experiencing an explosion of technology that demands our time and cognitive energy in order for us to remain current and provide our clients with the most up-to-date service possible. Much of the continuing education coursework that is currently available to professionals is designed to meet this need to maintain an ever-broadening scientific base of knowledge. For training programs, this technology explosion means that decisions will have to be made regarding how much of each of these areas can reasonably be covered in the classroom. Just as has occurred in the medical field, this decision-making process may lead to cursory coverage of the soft areas involving interpersonal aspects of client care.

Also, as noted previously, failure to maintain some reasonable balance between the science and humanity of our field can result in dissatisfaction for our clients and for ourselves as clinicians. Many, like Robinson (1991), believe that audiology is clearly moving toward technical management and away from human management. This is indeed unfortunate because “as audiologists we come into our own when we begin to face the challenge of caring for our patients and their families through an ongoing interpersonal dialogue, the kind of dialogue that can only emerge within a positive, well-developed relationship with our patients” (Clark, 1994, p. 2).

## THE PROFESSION OF AUDIOLOGY

### *What Is an Audiologist?*

According to ASHA (2018), an audiologist is a professional who works to promote healthy hearing, communication competency, and quality of life across the life span. This is achieved by working to prevent hearing loss whenever possible, by screening individuals for hearing loss, and by assessing and treating individuals for disorders of hearing and balance. As needed, audiologists provide hearing aid and cochlear implant services, including equipment dispensing, follow-up services, and counseling.

The important work of the audiologist is performed for all clients, regardless of their race, age, gender, religion, ethnicity, or sexual orientation. The practice of audiology is guided by scope of practice documents offered by both ASHA (2018) and the American Academy of Audiology ([AAA], 2004).

### *Education, Training, and Credentials*

At one time, the educational requirements to become an audiologist were met with a bachelor's degree. This changed to a master's degree and remained in place for many years until the decision was made in the late 1980s that audiology would be a doctorate-level profession. In order for this to occur, programs offering master's degrees in audiology had to transition to the new doctoral programs, which began to appear in the mid-1990s. These programs are typically 3 to 4 years in length and require more intensive study so that audiologists are better prepared to meet the challenges of an expanding scope of practice.

The specific degree that students now earn is a professional doctorate in audiology, designated as AuD, which became the entry-level degree for the practice of audiology in 2007. Seventy universities in the United States offer this degree, and masters level programs have been discontinued. The AuD degree is different from the traditional PhD, which prepares individuals to pursue the important work of conducting research in audiology.

In March of 2016, new educational standards were approved by the Accreditation Commission for Audiology Education (ACAE) Board of Directors with an increased focus on topics that include counseling, business and management, genetics, infectious disease, and pharmacology. The mission of the ACAE is to establish, maintain, and apply standards for audiology education in order to ensure that audiologists can meet the changing demands of clinical practice. More specifically, the ACAE accreditation of audiology programs indicates to the public that individuals who have earned the AuD degree are prepared to meet the needs of individuals who have hearing and balance disorders (ACAE, n.d.).

In addition to their educational training, in most states, audiologists are also required to be licensed or registered to practice. In order to maintain this credential, they are also often required to document the continuing education work they have done. Some states also require separate registration to dispense hearing aids. These requirements are in place to ensure that an individual practicing as an audiologist has the necessary education and training to serve the public. Other countries often have different requirements.

An additional credential available to audiologists is Board Certification in Audiology, which is awarded by the American Board of Audiology (n.d.). This credential is not required, but those who wish to earn it do so to demonstrate to the public that they have attained a level of knowledge and skill that exceeds the minimum requirements of the state license. Requirements for this credential include:

- An AuD degree
- State license or registration
- National exam in audiology score of 600 or greater
- Mentioned professional practice of 2000 hours beyond those required for your degree
- Adherence to standards of best practice and ethical behavior
- 60 hours of continuing education units, including some from intermediate and advance level courses (i.e., tier 1 courses)

Finally, the employment outlook for audiologists appears to be very good. Windmill and Freeman (2013), using a model that has been used by the U.S. Department of Health and Human services to estimate the number of doctors that will be needed in the future, predict that over the next 30 years, the need for audiology-related services will increase. Unfortunately, when the researchers examined the rate at which audiologists are leaving the field and the rate at which individuals enter the field, concerns are raised regarding whether the number of audiologists will be sufficient for the demand.

### *The American Speech-Hearing Association, the American Academy of Audiology, and the Academy of Doctors of Audiology*

Two very important organizations that must be highlighted in this discussion of the profession of audiology are ASHA and AAA. ASHA has been involved in creating standards for educational training programs in speech-language pathology and audiology and for clinical practice for over 50 years. Although ASHA remains a powerful force in the profession, many audiologists now view AAA as their professional organization—one that is uniquely able to provide them with the support and professional identity they

TABLE 1-1

HEARING AND SPEECH PROFESSIONAL ORGANIZATIONS	
WEBSITE (UNIFORM) GROUP RESOURCE LOCATOR	DESCRIPTION/MISSION
ASHA www.asha.org	ASHA is the professional, scientific, and credentialing association for more than 123,000 members and affiliates who are audiologists; speech-language pathologists; and speech, language, and hearing scientists.
AAA www.audiology.org	With more than 10,000 members, AAA is the world's largest professional organization of, by, and for audiologists.
American Auditory Society www.amauditorysoc.org	The primary aims of the society are to gain knowledge and understanding of the ear; increase hearing and balance; disorders of the ear, hearing, and balance and preventions of these disorders; and habilitation and rehabilitation of individuals with hearing and balance dysfunction.
Educational Audiology Association (EAA) www.edaud.org	EAA is an international organization of audiologists and related professionals who deliver a full spectrum of hearing services to all children, particularly those in educational settings. The mission of EAA is to act as the primary resource and active advocate for its members through its publications and products, continuing educational activities, networking opportunities, and other professional endeavors.
ADA www.audiologist.org	ADA, founded in 1976 as the Academy of Dispensing Audiologists, provides valuable resources to the private practitioner in audiology and to other audiology professionals who have responsibility for the concerns of quality patient care and business operation.

need. Founded in 1988, AAA has 12,000 active members, making it the largest professional audiology organization in the world. Another professional organization for audiologists is the Academy of Doctors of Audiology (ADA). This group was called the Academy of Dispensing Audiologists from 1977 to 2006; members voted to change to the current name in 2006.

National, state, and local speech-hearing associations are an important source of information about the past, present, and future direction of the profession of audiology. These organizations also afford professionals and students an opportunity to network and learn from one another. Table 1-1 contains the names, websites, and descriptions of several organizations relevant to hearing and speech professionals and those interested in learning more about the professions of audiology and speech-language pathology.

## Work of Audiologists

Audiology is a dynamic and rewarding profession, and the work done by audiologists impacts individual lives in positive and important ways. As students studying audiology, perhaps for the first time, consider the following scenarios and imagine that you are the audiologist portrayed:

- A 3-month-old child is referred to you due to concerns that a hearing loss might exist. The parents are filled with anxiety about the possible hearing loss. After performing your testing, you report to the parents that the child's hearing is within normal limits.
- Three months after having identified a 4-year-old child with a moderate hearing loss and fitting him with two hearing aids, you receive a call from his speech-language pathologist reporting substantial gains in the child's vocabulary and articulation skills.
- A 6-year-old child with almost no usable hearing in either ear has had a surgical procedure (cochlear implantation) to improve her access to speech. You activate the device and call her name. For the first time, she turns her head toward the speech signal. Her parents are overjoyed.
- An older adult resident of a nursing home appears confused and unresponsive. Your testing reveals wax blockage in each ear. You refer him to a physician who removes the wax. The resident is now able to engage with others.
- You are a research audiologist working on a treatment for cochlear hearing loss and you discover a substance that is effective in certain animals. You apply for funding to study if it would work in human adults.

## Public Awareness of the Audiology Profession

Despite the very thorough training and important role that audiologists have in addressing issues related to hearing and hearing loss, the general public remains largely unaware of our profession (Myers and Carroll, 2017). Myers and Carroll (2017) note that although the public readily associates visual difficulties with optometrists and ophthalmologists, they do not make the same immediate association between hearing loss/balance issues and audiologists. They suggest that it is important for audiologists to reach out to inform a broad array of nonphysician professionals about the role that they play, including optometrists, physical and occupational therapist, home care providers, and diabetes educators. All of these professionals regularly work with individuals who, for various reasons, may be at risk for hearing loss. The authors also suggest that audiologists work toward greater participation in activities such as World Health Day (sponsored by the World Health Organization) and Better Hearing Month (sponsored by AAA). Finally, they encourage the continued promotion of public examples of the importance of protecting hearing and addressing hearing loss when it occurs. They cite examples such as the use of hearing aids by Presidents Ronald Reagan and Bill Clinton and the use of ear protector headphones on the infant son of New Orleans Saints' quarterback Drew Brees at Super Bowl XLIV.

## Codes of Ethics

One of the functions of professional associations is to develop standards for professional practice. The expectation is that the community of professionals will adhere to these professional standards, which take the form of a **code of ethics**. If a professional violates the code of ethics, there are consequences that can range from time-limited sanctions to loss of credentials.

Codes of ethics list principles and rules that members of a professional organization agree to uphold. They provide a common benchmark or expectation for professional behavior in important areas, including treatment of patients, competence, relationships with other professionals, confidentiality, and avoiding conflicts of interest. Without a code of ethics, there is no common understanding of what is expected of professionals. While codes of ethics are important in business to set the “tone at the top,” they are critical in the health care arena, where competent and compassionate patient care and safety are paramount. These standards help us think through dilemmas that can arise from time to time in professional practice. For example, questions that arise in the practice of audiology might include whether discounts can be accepted for products or if it is okay to accept gifts from manufacturers.

## What Are the Similarities and Differences Among the ASHA, AAA, and ADA Codes of Ethics?

Codes of ethics in health care have common elements, including providing the best possible care to persons served professionally, achieving and maintaining high standards of competence, maintaining confidentiality, providing adequate supervision, maintaining appropriate documentation, and not discriminating on any basis in the delivery of professional services. These principles are found in the codes of ethics of AAA, ASHA, and ADA. All three codes of ethics strive toward high standards of integrity and ethics in carrying out professional responsibilities. They are each generally structured in the same way—principles of ethics that Sproat (2006) describes as “aspirational in nature” followed by rules of ethics that define specific expectations of professional conduct by the group's members.

A review of the codes of ethics for three of the major professional organizations to which an audiologist may belong reveals themes common to ethical codes for health care providers. These include providing competent, quality care to those served (AAA, ASHA, and ADA) or studied (AAA and ASHA) by their members. To further illustrate these themes and similarities across codes of ethics for audiologists, Table 1-2 contains a crosswalk of selected ethics rules from the AAA, ASHA, and ADA code of ethics documents, and notes the locations of the rules in each of the codes of ethics.

In addition to the references in Table 1-2, ASHA has developed companion documents to further explain policies on specific areas, such as the standards for audiology assistants. It is also important to check the laws and regulations in the state in which you live and work to find out whether assistants are allowable and whether their services are reimbursed by public or private insurance. There are also issues in ethics documents to consult when questions about whether an activity you are considering or are being asked to engage in is consistent with professional ethical principles.

## AUDIOLOGY AS A HUMANISTIC DISCIPLINE

In order to avoid the imbalance that has hindered the medical field in becoming a true helping profession, audiology must be viewed as a humanistic discipline. To define **humanism** in audiology, we paraphrase Branch and colleagues (2001) and define it as the audiologist's “attitudes and actions that demonstrate interest in and respect for the patient and that address the patient's concerns and values” (p. 1967). Table 1-3 summarizes the broad categories that might be included in educating students and professionals in the humanistic aspects of audiology.

TABLE 1-2

LOCATION OF SELECTED ETHICAL RULES IN THE AAA, ASHA, AND ADA CODES OF ETHICS			
TOPIC	AAA	ASHA	ADA
Delegation of duties to unqualified personnel	Rule 2d	Rules I.E. and I.F.	Rule II.4.
Provision of supervision	Rule 2d	Rules I.E., I.G., II.A, II.E, II.F, IV.L., and IV.R.	Rule II.4.
No discrimination	Rule 1b	Rules I.C. (patients) and IV.L. (students, other professionals)	Rule I.6.
Confidentiality	Rule 3a	Rules I.O. and I.P.	Rule I.5.
Record keeping and documentation	Rule 5e	Rule I.Q.	Implied in Rule I.5., but requirement to maintain documentation is not explicitly stated
Billing/fraud	Rule 4b	Rules I.Q., III.D., IV.E.	Rule III.4. (disclosure of fees)
Conflicts of interest, acceptance of gifts, economic benefit	Rule 4c (addresses conflicts of interest but not economic benefit per se)	Rules III.B. and III.D. (address conflicts of interest and economic benefit)	Rules II.5. and II.7. address related issues and economic benefit
Continuing education	Rule 2f	Rule II.D.	Rule II.3.
Relationships with colleagues	Rules 7a and 7b	Rules IV.A., IV.L., and IV.M.	Rules V.1. and V.5.
Communication with the public	Rules 6a and 6b	Rules I.D., III.A., III.C., III.F., III.G., and IV.C.	Rules IV.1., IV.2., and IV.3.
Conducting research	Rules 5b, 5c, and 5d	Rules I.I., I.J., I.O., I.P., II.C., II.E., III.C., and IV.R.	Not stated
Uphold the code of ethics and report violations	Rules 8a and 8c	Rules IV.M., IV.N., and IV.Q.	Rules VI.1., VI.2., and II.6.a.

ADA, n.d.; AAA, 2018; ASHA, 2016.

## Listening

A few of these broad themes should be highlighted. Note that, through both verbal and nonverbal means, the clinician collects information about factual matters as well as about the client's emotional state. The audiologist listens actively when clients share information about their emotional response, understanding that listening can be part of the healing process for the client. In addition, the audiologist attempts to evoke such information because, ultimately, this insight will assist in the process of diagnosis and rehabilitation. A humanistic audiologist recognizes his or her role not only provides content counseling in the form of factual information, but he or she also must engage with the client and the client's family in support counseling as the clients adjust to the life changes resulting from their communication disorder.

In addition, the audiologist uses his or her observational skills to uncover information that the client might not readily discuss and to probe for greater understanding. The audiologist also observes family interactions and understands that the family, as well as the other important people in the client's life, will play an important role in any effort to reduce the degree of communication deficit.

## Clients as Individuals

Humanistic care that is provided to the client must be done in the context of the client's values, beliefs, history, needs, abilities, culture, and social network. This recognition that humanistic care is contextualized is critical to providing service that addresses the individual needs of clients, rather than forcing prescribed procedures and protocols on clients. Only when humanistic audiology is practiced can

TABLE 1-3

<b>CONTENT OF EDUCATIONAL PROGRAM TO FACILITATE THE HUMAN DIMENSIONS OF CLINICAL CARE</b>	
<b>SOCIAL AMENITIES</b>	Greeting the patient Introducing team members Asking clients for permission, when appropriate
<b>VERBAL COMMUNICATION SKILLS</b>	Gathering information using open-ended and closed questions, active listening, and obtaining psychosocial information Eliciting, clarifying, and attending to patients' emotions, beliefs, concerns, and expectations Providing client education and facilitating behavioral change Monitoring tone and pace of voice
<b>NONVERBAL COMMUNICATION SKILLS</b>	Position, including maintaining appropriate eye contact, placing oneself at the same level as the client, including client in clinical discussions Monitoring facial expressions
<b>OBSERVATIONAL SKILLS</b>	Client's verbal and nonverbal communications and communication styles Client's unspoken reactions to difficult information Client's family and social interactions Client's communication and decision-making skills
<b>HUMANISTIC CARE</b>	Attending to the patient with respect as a unique individual Providing care in the context of the client's values, history, needs, beliefs, abilities, culture, and social network Providing care in the context of what is meaningful for the client Providing humane care at the time of transitions, such as loss of functional status Being honest and genuine in portraying oneself to the client Respecting client confidentiality Collaborating with clients, family members, and other professionals as a means of meeting the clients' needs effectively Making use of various nonpaternalistic models of clinician–client interactions for purposes of fostering the client's independence and self-regulation
<b>SELF-AWARENESS</b>	Being aware of the emotions that are evoked in the context of a client interaction Being aware of the communication skills that one has used Being aware of one's values, beliefs, history, needs, and culture Being aware of how these aspects of self-awareness affect one's interaction with and care of the client Being aware of the "ego" that can be involved in assuming the role of the "expert" Using this information to improve one's care of the client and achieve mutual benefit

Adapted from Branch, W., Kern, D., Haidet, P., Weissmann, P., Gracey, C. F., Mitchell, G., & Inui, T. (2001). The patient–physician relationship. Teaching the human dimension of care in clinical settings. *Journal of the American Medical Association*, 286(9), 1067-1074. Copyright 2001, American Medical Association. All rights reserved.

information about the particular client be integrated into the diagnostic and rehabilitation process.

Consider a 6-year-old child who, due to medical problems, has a history of traumatizing experiences when brought for medical treatment. Certainly, this history

should be considered carefully when making decisions about the type of testing that will be used and the sequence in which those tests will be performed. Although most 6 year olds may be able to participate in the audiological assessment in a certain standard manner, a humanistic

approach requires that every effort be made to be flexible in approach in order to meet the needs of individuals.

Next, consider an adult who is severely physically impaired, having limited use of his upper extremities. An audiologist who assumes, because of the presenting physical characteristics, that the client will not be able to participate actively in the diagnostic assessment is not providing humanistic care. It is only in viewing this client as a unique person that the audiologist learns that physical limitations do not automatically imply cognitive deficits.

## Transitions

Another very important consideration of humanistic care has to do with the audiologist's handling of transitions, such as the loss of functional status. For audiologists, especially those with experience in the field, loss of hearing is a common occurrence and one that typically can be managed successfully. However, humanistic care requires us to make every effort to understand hearing loss from a client's perspective. Individuals who have hearing loss often react to their loss in ways that may seem disproportionate to us. Empathy and insight reveal that when a client learns that he or she has a hearing loss, concerns about future "losses" or sadness about previous "losses" may be generated. One illustrative example is a male older adult who, upon learning that he had a considerable hearing loss in each ear, began to grieve for the loss of his wife, who had died 3 years earlier.

## Self-Awareness

Self-awareness on the part of the audiologist is another requirement of a humanistic education. This refers primarily to clinicians developing an understanding of their own values, beliefs, history, and needs and how these can influence emotional responses evoked in their interactions with clients. Just as it is critical in a humanistic approach to audiology to acknowledge that we are providing services to individuals, it is equally important to acknowledge that we, as care providers, are individuals with our own unique traits. Only through this self-understanding are we able to use our own uniqueness for the benefit of the client-clinician relationship.

Consider an audiologist whose client is a 1-year-old deaf male, both of whose parents are individuals who have normal hearing. Upon making the diagnosis, the audiologist provides a range of options to the family, covering a continuum from auditory/oral to Total Communication to manual approaches. The parents, who have a history of deafness in the family, indicate that they have chosen to pursue the use of sign language and immersion into the deaf culture at this time. Other parents in a similar situation might opt for high-powered hearing aids and consideration of cochlear implantation. All of these parties—the audiologist and the parents—are influenced by their own

personal backgrounds and beliefs during the decision-making process. The self-aware clinician is comfortable with and respects the choices made by parents regarding their child's communication.

## Roles of an Audiologist

The previously mentioned case and the issue of self-awareness raise the very important related issue in humanistic care involving role identification on the part of the audiologist. Some audiologists derive personal gratification from being an expert and often adopt a paternalistic style with their clients, in which they diagnose the problem and then determine the solution. Ylvisaker and Feeney (1998), in their discussion of various models of client-clinician relationships, refer to this model as the *surgeon-patient model* or the *medical model*. Another paternalistic model is the teacher-student model, in which the clinician identifies deficiencies in the client's knowledge or skills and then attempts to remediate these deficiencies. Neither of these two paternalistic models is consistent with a humanistic approach to client care.

Audiologists and other clinicians who adopt a humanistic approach to their work are likely to be guided well by one of the following two nonpaternalistic models. In the consultant-client model, the audiologist views him- or herself not as one who determines goals, but as one who assists clients in achieving their own self-determined goals. Similarly, the counselor-client model involves empowering the client to move beyond personal obstacles in the pursuit of personal goals. Each of these two models calls for audiologists to be honest in how they portray themselves to clients and to recognize that consultants can only facilitate independence and self-regulation when clients assume responsibility for their own management.

## Collaboration

A logical outgrowth of audiologists assuming roles that are not authoritative is that their work becomes collaborative. As audiologists become familiar with techniques to collaborate with their clients in a supportive and empowering manner, they also develop the ability and appreciate the value of collaborating with other professionals, family members, and significant others in the client's life. This approach has far-reaching benefits for professionals, clients, and their families. For example, when a child is newly identified with hearing loss, the number and complexity of issues to be addressed can be daunting. Once the work is shared among the child's caregivers, health care providers, and parents, the process becomes manageable and parents find themselves with the necessary tools and support to make informed decisions about their child's care. Taking this a step further, parents and clients ultimately develop the inner resources and practical information to manage challenges that inevitably arise both in the short and long term.

Advocates of collaboration are many and, in the work of the speech-language pathologist, collaboration has become the norm. Speech-language pathologists routinely work with reading specialists, preschool teachers, elementary education teachers, and special education teachers on a range of skills, including preliteracy skills, social skills, and behavior management. These services are now routinely offered in various “push-in,” inclusive delivery models. In medical settings, speech-language pathologists are often part of a multidisciplinary team that includes an occupational therapist, physical therapist, psychologist, social worker, and physician.

Collaboration between a speech-language pathologist and an audiologist is a special partnership that should be highlighted for students in training because of the obvious and important links between the two disciplines. Audiologists who foster this collaboration understand that speech-language pathologists can provide a wealth of information about clients that can be used to make the diagnostic process much more efficient and reliable. In addition, healthy collaboration between speech-language pathologists and audiologists requires that reports be written so that meaningful interpretation of the data can occur.

For example, a speech-language pathologist is working with a client with a hearing impairment on speech intelligibility due to articulation errors. An audiologist providing the speech-language pathologist with information that specifically addresses what speech sounds the client does and does not have auditory access to will directly affect the pathologist’s work and is evidence of the power of collaboration.

Furthermore, Ylvisaker and Feeney (1998) have long advocated the use of collaboration in both the diagnostic and the helping phases of their work with individuals who have traumatic brain injury. The authors note that collaboration is valuable in diagnostics because it increases the number and types of observations that can be made. Also, including a variety of individuals in the diagnostic process increases the likelihood that these same people will be engaged in the intervention stage. Further, when important people in the life of the client are included, they are able to maximize the value of natural opportunities that may arise for the client to practice new skills.

For instance, a female older adult was in the process of obtaining new hearing aids. Her daughter had accompanied her for all of the audiology visits and was an integral part of the assessment and fitting process. One day, the client and her daughter stopped in to a busy restaurant. When asked where they would like to sit, the client responded that they had no preference. The daughter then asked her mother, “Mom, do you remember what we discussed the other day at the audiologist’s?” The client, remembering the discussion regarding the negative effects of background noise, then requested a seat in the quieter section of the room. As Ylvisaker and Feeney (1998) point out, helping individuals with disabilities often requires some change in everyday

routines. This includes change on the client’s part, as well as on the part of other people involved in those routines.

When humanistic audiology is at its finest, our efforts to collaborate may reach what Ylvisaker and Feeney (1998) call a “new level” in which professionals “embrace a vision of themselves not as experts who have a profoundly important contribution to make, but as experts who work in collaboration, who learn through collaboration, and who empower others through collaboration” (p. 247).

To balance this discussion, students of audiology and seasoned clinicians must also be aware of certain realities involved in providing audiological/hearing health care in the 21st century. For example, increased medical care costs combined with shrinking reimbursement from public and private sources have forced clinicians to add clients to their caseloads to maintain revenue. The practice of audiology has not escaped the growing trend to “do more with less,” and this trend makes efforts to provide humanistic care more challenging. It also makes it necessary for professionals to be aware of sources of funding and the workings of third-party reimbursement. Although assisting clients with these matters can be part of humanistic care, audiologists may become overwhelmed with these issues, which can interfere with providing direct audiological services. Another reality is that, despite progress toward making audiology an autonomous profession, in some settings, the audiologist’s role is more consistent with that of a technician than a professional.

Broadening this theme of audiology as a humanistic discipline, in 2011 AAA published a document created by the academy’s Presidential Task Force, entitled “Report of the Global and Humanitarian Efforts” that describes the academy’s efforts to channel compassion to the less fortunate in the following ways:

- Sharing knowledge of how to access services for those who lack this knowledge
- Offering services to those without insurance, with limited financial means, or where services do not exist
- Supporting efforts to assist families who are challenged by hunger and lack of medical care
- Providing hearing screenings to underserved populations
- Working with hearing aid manufacturers and philanthropic organizations to make hearing aids more available

Considering these ideas, students of audiology require exposure to both the technical and humanistic aspects of this discipline. We hope that this philosophy of practicing audiology is evident throughout this introductory textbook for students of speech-language pathology, audiology, and related fields. For example, in the chapters on acoustics of sound and disorders of the auditory system, we present the required technical material, which is then applied directly to clinical practice. This establishes the important connections for the student that learning audiological concepts is