Association for Education and Rehabilitation of the Blind and Visually Impaired

Orientation and Mobility Division IX

Scope of Practice in Orientation and Mobility

Justin T. Kaiser, Jennifer L. Cmar, Sandra Rosen, Dawn Anderson

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Executive Summary

Orientation and mobility (O&M) includes the concepts, skills, and techniques that individuals with visual impairments use to travel through the environment. O&M specialists are knowledgeable and skilled professionals who teach individuals with visual impairments to travel as independently as possible in familiar and unfamiliar settings. The purpose of this document is to define the scope of practice in O&M, specify settings for O&M service provision, describe O&M specialists' roles and responsibilities, promote collaboration with O&M specialists, and outline O&M specialists' education and certification requirements.

Who do O&M specialists serve?

O&M specialists serve the diverse population of individuals with visual impairments, including:

- individuals who are totally blind and those who have low vision
- people of all ages, from birth to old age
- people with adventitious (acquired) or congenital visual impairments
- individuals who have electronic retinal prostheses
- individuals with any disabilities in addition to visual impairment
- individuals with cerebral/cortical visual impairment
- individuals from culturally and linguistically diverse backgrounds
- individuals across the continuum of functional, developmental, and intellectual ability

Why is O&M important?

O&M skills give individuals the freedom to participate in all facets of society. Thus, O&M is designated as a related service in the Individuals with Disabilities Education Act (IDEA, 2004) and a service under the Rehabilitation Act of 1973. O&M instruction promotes movement, and facilitates the development of concepts, skills, and knowledge required for individuals to achieve their present and future employment and life goals.

How are O&M services provided?

O&M service delivery models include center-based, itinerant, and consultation. O&M services are available through different education and rehabilitation providers. O&M instruction occurs in natural environments, the real-world settings in which individuals live, learn, work, play, interact, and travel. Instructional settings include indoor and outdoor school, home, and community environments.

What do O&M specialists do?

Roles and responsibilities of O&M specialists include:

- **Assessment:** conducting initial and ongoing comprehensive assessments (including functional low vision and environmental assessments) of travel skills and needs; must be

conducted by qualified O&M specialists, and updated with changes in vision, transitions in environment, and as dictated by individual needs

- **Planning and instruction:** designing and adapting lessons, selecting training environments, providing one-on-one instruction based on individuals' current and future needs, and integrating content from other areas of the Expanded Core Curriculum
- **Collaboration:** referral to other education, healthcare, and rehabilitation professionals, and collaborating with various individuals during screening, assessment, referral, program planning, consultation, and service provision
- **Advocacy and community education:** advocating with and on behalf of individuals with visual impairments for accessible travel environments and equal access to information, and provision of in-service (staff) training or public education
- **Service to the profession:** engaging in intern supervision, mentorship, leadership, and research

Which domains are included in O&M assessment and instruction?

Domains of O&M assessment and instruction include:

- **Concept development:** environmental, body, spatial, directional, and related concepts
- **Sensory awareness and development:** learning through auditory, tactile, haptic, olfactory, proprioceptive, and vestibular input
- **Sensorimotor development and facilitation:** coordinated movement through sensory and motor systems
- **Orientation:** establishing and maintaining awareness of one's position in space
- **Mobility:** using a long cane, human guide, dog guide, and transportation systems, and techniques for indoor and outdoor environments, and street crossings
- **Assistive technology:** various high-tech and low-tech devices to enhance orientation, mobility, and independence
- **Environmental access:** accessing environmental information in non-visual formats
- **Social:** soliciting assistance, interacting with the public, and personal safety
- **Psychosocial:** adjustment to visual impairment, readiness for instruction

What does O&M professional preparation and certification involve?

In the U.S., university programs are the primary training model for O&M specialists. The two recognized professional O&M certification bodies are:

- the Academy for Certification of Vision Rehabilitation and Education Professionals, which provides the Certified Orientation and Mobility Specialist (COMS) credential
- the National Blindness Professional Certification Board, which provides the National Orientation and Mobility Certification (NOMC) credential

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Introduction

Orientation and mobility (O&M) is a set of concepts, skills, and techniques for safe, efficient travel (i.e., purposeful, directed movement) by individuals with visual impairments[1] in all environments and under all conditions (Jacobson, 2013). *Orientation* is the awareness of one's position in space, and *mobility* is how one moves through that space (Wiener, Welsh, & Blasch, 2010). Individuals with visual impairments use O&M skills and techniques to travel safely and independently through the environment. O&M instruction focuses on the development of sensory perception and interpretation of visual, auditory, tactile, olfactory, kinesthetic, vestibular, and proprioceptive information. Independent travel often involves the use of orientation and mobility devices and tools (e.g., long canes, dog guides, and adaptive mobility devices) and orientation technology (e.g., global positioning systems [GPS] and mobile apps).

O&M specialists[2] are professionals who have specialized knowledge and skills related to teaching individuals with visual impairments to travel in their natural environments. O&M specialists introduce travel skills in increasingly complex environments to prepare people to travel as independently as possible in various familiar and unfamiliar settings, including home, school, day program, workplace, and community. O&M services involve ongoing comprehensive assessments which lead to an individualized curriculum and instruction based on the person's current and future needs, strengths, limitations, and preferences. The practice of O&M is dynamic in response to new technologies, ongoing research, and best practices.

This scope of practice paper includes descriptions of (a) the population served by O&M specialists; (b) the importance of O&M for individuals with visual impairments; (c) service delivery models and settings for O&M instruction; (d) roles and responsibilities of O&M specialists; (e) domains of O&M assessment and instruction for individuals across the entire lifespan, birth through old age; and (f) education and certification requirements for O&M professionals.

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[1] In this document, the phrase "individuals with visual impairments" (or "individuals") refers to students, clients, and consumers who are blind or have low vision who may be served by O&M specialists.

[2] "O&M specialist" is used throughout this document to refer to professionals who provide O&M services; however, these professionals may use other titles such as O&M instructor.

Statement of Purpose

The purpose of this document is to:

1. define the scope of practice in O&M;
2. specify the settings in which O&M services are provided;
3. inform consumers, families, educators, health care providers, adult service providers, administrators, support staff/caregivers, community members, policymakers, and other professionals about the roles and responsibilities of O&M specialists;
4. promote collaboration between O&M specialists and other professional service providers; and
5. outline O&M specialists' education and certification requirements.

Who O&M Specialists Serve

O&M specialists provide services to the diverse population of individuals with visual impairments, which may include:

- individuals who are totally blind and those who have low vision
- people of all ages, including infants and their families, preschool and school-age children, transition-age youth, working-age adults, and older adults
- people with adventitious or congenital visual impairments
- individuals who have electronic retinal prostheses
- individuals with any disabilities in addition to visual impairment, including those who are deaf-blind or who have Autism Spectrum Disorder
- individuals with cerebral/cortical visual impairment (CVI)
- individuals from culturally and linguistically diverse backgrounds
- individuals across the continuum of functional, developmental, and intellectual ability

O&M specialists adapt instruction to the specific characteristics, needs, and abilities of the individual. Children with visual impairments need to learn basic travel skills and environmental awareness so they can actively explore environments as their travel skills progress to more advanced levels. O&M specialists also work with the families of individuals with visual impairments and other key personnel (e.g., caregivers, support staff, job coaches, and employers) to answer questions and provide support in addition to the direct instruction with the individual. Many individuals who have visual impairments and additional physical, intellectual, or sensory disabilities require O&M instruction. Instructional strategies and O&M techniques may need to be adapted to the specific physical, motor, or cognitive abilities of the individual, and are often best learned within familiar, daily routines with the support of familiar caregivers and support staff.

Why O&M is Important

O&M skills give individuals the freedom to participate in all facets of society. O&M instruction promotes movement, which is vital for concept development, exploration, and environmental awareness in young children. Beginning at an early age and continuing throughout adulthood, O&M instruction facilitates the development of concepts, skills, and knowledge required for individuals to achieve their present and future employment and life goals. O&M instruction is provided in a multitude of community settings (beyond the classroom, school campus, or rehabilitation center) to truly prepare these individuals to travel as efficiently and independently as possible. Individuals who are confident in their travel skills are empowered to pursue social, vocational, and recreational endeavors.

In the United States (U.S.), O&M is designated as a service under federal law for children and adults with visual impairments, including those with additional disabilities. O&M is listed as a related service in the Individuals with Disabilities Education Act (IDEA, 2004). IDEA mandates that O&M services be provided in order to prepare children to travel in school, home, and community environments. O&M is also included in the Rehabilitation Act of 1973, as amended by the Workforce Innovation and Opportunity Act (WIOA, 2016). WIOA requires provision of pre-employment transition services to transition-age youth with disabilities, which could include O&M services for youth with visual impairments.

O&M is particularly important because the employment rates of individuals with visual impairments in the U.S. and in other countries (e.g., United Kingdom, New Zealand) are far lower than those of the general population (Erickson, Lee, & von Schrader, 2018; Slade, Edwards, & White, 2017; Statistics New Zealand, 2014). Although many factors likely contribute to these divergent employment rates, researchers have identified difficulty finding and accessing transportation as a prominent barrier to employment for people with visual impairments (Crudden & McBroom, 1999). Moreover, researchers have documented a link between employment outcomes and O&M, particularly independent community travel (Cmar, 2015; McDonnall, 2011) and self-efficacy in planning and using transportation (Cmar, McDonnall, & Crudden, 2018).

O&M instruction is also important for addressing personal and environmental factors that contribute to falls among older adults. Older adults with visual impairments are at a greater risk for falls, leading to increased disability, longer hospital stays, increased rehabilitation time, and a higher risk of dependency and death (World Health Organization, 2007). The fear of falling leads to activity limitations, reduced independence, and decreased societal engagement (World Health Organization). O&M specialists address environmental barriers and teach individuals alternative techniques for navigating various environments to increase their skills and confidence.

How O&M Services are Provided

O&M is a diverse profession that occurs in various education and rehabilitation models and instructional settings.

Service Delivery Models

O&M specialists use various service delivery models (e.g., center-based, itinerant, and consultation) to provide instruction. Infants and their families generally receive O&M services within their home. Examples of center-based O&M services can be found at specialized schools for children who are blind, some government agencies, some private rehabilitation centers, community organizations, and in the U.S., the Department of Veterans Affairs Blind Rehabilitation Centers. Center-based models often involve a residential component, but some offer day programs as well. Instructional settings for center-based services typically include the school, medical (e.g., inpatient and outpatient), or agency facilities, and areas in the surrounding community. Center-based O&M specialists usually provide instruction in environments that are selected for having ideal characteristics for O&M instruction. Individuals who learn O&M in a center-based model must transfer their skills and knowledge to their home environments after finishing their training or with itinerant instruction during this transition.

Itinerant O&M specialists provide services to individuals in their home communities. The itinerant service delivery model is used for infants, preschoolers, children, and adults who attend local public or private preschools, schools, rehabilitation agencies, and for adults with intellectual or developmental disabilities. Rather than using pre-established training areas, itinerant O&M specialists may provide home or community-based instruction in and around the individuals' local environments. Some of the desired environmental characteristics for O&M lessons for more advanced or specific skills (e.g., bus transportation, complex intersections) may not be available near individuals' homes or schools; therefore, completion of some aspects of training may require transportation to farther locations.

O&M specialists may work for different types of organizations including early intervention agencies, preschools, public schools, specialized schools for children who are blind, private and state rehabilitation centers, state agencies, community organizations, and hospitals; they may also work as independent contractors or freelance workers. They work autonomously and/or as part of a team of professionals. O&M specialists generally provide direct instruction, but they may also provide assessment and consultation services. Regardless of where they work, O&M specialists primarily instruct one individual at a time. One-on-one instruction is necessary for providing optimal, individualized instruction and monitoring safe travel in diverse environments. For adults with intellectual disabilities, one-on-one instruction with a familiar caregiver or support staff present during lessons is most helpful for carryover of O&M skills.

Settings

O&M instruction occurs in environments that are appropriate for the individualized needs and goals of children and adults with visual impairments.

Natural environments

Natural environments are the real-world settings in which individuals live, learn, work, play, interact, and travel. Service provision in natural environments is a vital element of O&M instruction. Natural environments are ideal settings for developing functional mobility skills and techniques, developing problem solving skills, promoting skill generalization, and providing exposure to unique environmental characteristics and diverse spatial layouts. Natural environments also provide opportunities for individuals to practice navigating real-world social environments. To best prepare individuals for authentic travel situations, O&M instruction may take place at any time of day and in all types of weather conditions. The variety and authenticity of learning opportunities available in natural environments cannot be adequately replicated in contrived or controlled settings.

School, home, and community

O&M instruction occurs indoors and outdoors in school, home, and community settings. School settings may include preschools, elementary schools, middle schools, high schools, vocational schools, colleges, and universities. Within these school settings, individuals may receive instruction in a multitude of areas, including but not limited to classrooms, hallways, cafeterias, playgrounds, courtyards, and restrooms. Instruction in home environments may be provided in indoor and outdoor locations, such as houses, apartment complexes, yards, driveways, and neighborhoods, and in common areas such as clubhouses and community parks.

O&M instruction takes place in a vast array of urban, suburban, and rural community settings, including downtown areas and business districts. These settings may include workplaces, day program facilities, hospitals, prisons, and correctional facilities. O&M instruction often occurs in commercial areas such as grocery stores, department stores, convenience stores, indoor and outdoor shopping malls, banks, office buildings, medical buildings, airports, trains, buses, bus stops, and transit stations. Instructional settings could also include gyms, sports facilities, parks, trails, concert halls, public libraries, theaters, and other areas in which recreation and leisure activities take place. O&M instruction takes place at intersections, sidewalks, parking lots, driveways, escalators, elevators, revolving doors, and anywhere else that is appropriate for the individual.

What O&M Specialists Do

Assessment

Qualified O&M specialists conduct initial and ongoing comprehensive assessments of individuals' travel skills and needs. New O&M assessments need to be conducted with changes in vision, transitions in environment, and as the needs of the individual dictate. The assessment process includes interviews with individuals and other people who interact with them (e.g., family members, teachers, caregivers, support staff); review of medical records (including medications); evaluation of travel skills using formal and informal tools; evaluation of auditory perception and other sensory systems; and evaluation of current and future travel needs. Assessment results are used to determine eligibility for O&M services and to guide subsequent O&M goals. When appropriate, O&M specialists may recommend assessments by other professionals (e.g., audiologists, counselors, physical therapists).

Functional low vision mobility assessment

O&M specialists conduct functional low vision mobility assessments for individuals who have some functional vision. The purpose of this assessment is to evaluate how an individual uses his or her vision in a variety of travel situations, including familiar and unfamiliar environments, different times of day, and varying lighting conditions. To gain the most comprehensive picture of one's visual functioning, components of a functional low vision mobility assessment include review of records (e.g., eye reports, functional vision and CVI assessment reports), interviews with the individual and others who interact with them, and observations of the individual performing specific tasks in natural settings. Areas of assessment include visual field, visual acuity, depth perception, visual efficiency (e.g., scanning), color perception, contrast sensitivity, glare, and light sensitivity, as is relevant to functional mobility performance. O&M specialists use assessment results to make recommendations and plan individualized instruction.

Environmental assessment

O&M specialists conduct environmental assessments to evaluate areas where people with visual impairments currently travel or may travel in the future. Environmental assessments focus on aspects of an environment that could support or hinder independent travel such as signage, sound, texture, and organization; and safety features and hazards. A key element of this assessment involves observations of an individual performing tasks in the environment; however, O&M specialists may also use checklists, interviews, and questionnaires to gain a more thorough understanding of the individual's functioning. For individuals with low vision, environmental assessments may also include visual attributes such as lighting, glare, color, and contrast. Based on the assessment results, the O&M specialist recommends modifications to the environment (e.g., home, workplace, day program) that could reduce the risk of falls, and promote safety and independent functioning.

Planning and Instruction

Through lesson planning and instruction, O&M specialists design and adapt lessons considering individual skill levels, instructional environments that support learning, instructor feedback, and support for the learner. They preview and select training environments based on individuals' immediate and future needs, while considering their cognitive, physical, and psychosocial functioning (Wall Emerson & Corn, 2006). When planning lessons, O&M specialists individualize the structure and pace of instruction and incorporate relevant aspects of different learning theories (e.g., behavioral theory, cognitive learning theory, social cognitive theory, and discovery learning theory). O&M specialists establish a rapport with individuals that fosters a positive learning environment. They provide opportunities for independence, problem solving, and self-advocacy throughout O&M instruction so individuals learn to do things for themselves and do not become overly reliant on others. O&M specialists provide opportunities for individuals with multiple disabilities to participate in movement and O&M techniques, which could include use of partial participation. They work with support staff and caregivers to promote independence for individuals with multiple disabilities to the greatest extent possible.

O&M is a critical component of the Expanded Core Curriculum (ECC) for students with visual impairments, which addresses the concepts and skills that require systematic, sequential instruction to account for the information that many children with visual impairments do not learn incidentally through visual observation and experience (Hatlen, 1996). O&M instruction often includes content in the ECC areas of self-determination, social interaction skills, independent living, sensory efficiency, career education, recreation and leisure, compensatory skills, and assistive technology.

Collaboration

Individuals with visual impairments often receive services from multiple professionals in the medical, education, and rehabilitation fields. O&M specialists understand how, when, and why to refer to other education, healthcare, and rehabilitation professionals. These professions often have overlap in their scope of practice, allowing for a common understanding through which collaboration can begin.

O&M specialists collaborate with a variety of individuals who have a shared role in promoting optimal educational and rehabilitation outcomes for individuals with visual impairments, including but not limited to:

- Individuals with visual impairments and their families, significant others, and caregivers
- Early intervention providers, daycare providers, and preschool teachers
- Teachers of students with visual impairments, teachers of the deaf/hard of hearing, and teachers of students who are deaf-blind
- General education teachers, special education teachers, and paraprofessionals
- Vision rehabilitation therapists, low vision therapists, and assistive technology specialists

- Interpreters, interveners, and support service providers
- Physical therapists and occupational therapists
- Audiologists and speech-language pathologists
- Optometrists, ophthalmologists, and clinical low vision specialists
- Physicians and other healthcare practitioners
- Administrators
- Legislators
- Traffic engineers
- Rehabilitation counselors
- Employers
- Supported employment providers and job coaches
- Day habilitation providers and residential services providers
- Adaptive driving instructors
- Social workers, mental health professionals, and counselors

Collaboration may occur at any point in the education and rehabilitation processes, such as screening, assessment, referral, program planning, consultation, and service provision. O&M specialists are key members of educational and rehabilitation service teams for individuals with visual impairments. Accordingly, O&M specialists have an integral role in developing and implementing service plans, including Individualized Family Service Plans, Individualized Education Programs, Section 504 plans, and Individualized Service Plans. O&M specialists collaborate with and seek input from other team members, including families/caregivers and individuals (as appropriate), throughout the assessment and program planning processes.

Advocacy and Community Education

O&M specialists advocate with and on behalf of individuals with visual impairments to promote equal access to information and accessible travel environments. Opportunities for advocacy or outreach could include providing in-service trainings or public education initiatives within one's community at the local, state, and even national levels. For example, staff training for adult care professionals may cover human guide techniques, low vision simulations, and recommendations for environmental adaptations. An O&M specialist might provide a similar training in a student's classroom for his or her classmates or teachers. O&M specialists are aware of environmental accessibility standards and guidelines that affect individuals with visual impairments, and they may advocate for modifications to travel environments and public transportation systems that will promote accessibility.

Service to the Profession

O&M specialists often have additional service and research roles and responsibilities. Service to the profession may include supervising interns, mentoring new O&M specialists, and taking on leadership roles in schools, agencies, or professional organizations (e.g., Association for

Education and Rehabilitation of the Blind and Visually Impaired, Academy for Certification of Vision Rehabilitation and Education Professionals, National Blindness Professional Certification Board, and Council for Exceptional Children). O&M specialists also conduct and participate in research to strengthen O&M teaching and learning, establish evidence-based practices, and inform public policy.

Domains of O&M Assessment and Instruction

O&M specialists conduct assessments and provide instruction in multiple domains, including concept development, sensory awareness and development, sensorimotor development and facilitation, orientation, mobility, assistive technology, environmental access, social, and psychosocial.

Concept Development

Sighted children acquire much of their conceptual knowledge through incidental learning, or visual observation, of the world around them. O&M lessons for young children and individuals with brain injury may focus on development of environmental, body, spatial, directional, and related concepts. To facilitate concept development through senses other than vision, children with congenital visual impairments need direct instruction, opportunities for guided exploration, and a multitude of hands-on experiences. People with adventitious visual impairments have prior visual experiences that may help them understand many O&M concepts and environmental features.

Sensory Awareness and Development

Perceptual learning is necessary for all individuals to learn about the world around them. Much of that learning occurs at an early age through viewing people, objects, and other aspects of the environment. For individuals with visual impairments, this learning must focus on input from other sensory and perceptual systems including auditory, tactile, haptic, olfactory, proprioceptive, and vestibular.

The auditory system is used to access information about people, objects, and the environment from beyond arm's reach, but does not fully replace visual perception. Auditory information is used for localization, identification, and discrimination of specific sounds as well as alignment during travel. Auditory spatial perception is how individuals may use sound to estimate distance and direction in the environment (Voss, 2016). O&M specialists focus on guiding individuals' discovery of reflected sound and its usefulness in understanding the world (e.g., clicking or tapping a cane to learn about the qualities of a given space).

Infants and young children with visual impairments often rely on their tactile sense to assist in exploring their environment. Since tactile stimuli must be in close range to be contacted, exposure to novel textures may be limited especially without mobility. Individuals of all ages can use tactile information to identify landmarks for orientation purposes and avoid obstacles as they move through the environment.

Proprioception and vestibular awareness contribute to balance in children and adults. Proprioceptive and vestibular functioning are important building blocks in efficient movement. Proprioception also forms the foundation for good posture, gait patterns, and coordination.

The majority of individuals that O&M professionals serve have some functional vision. For individuals with low vision, visual efficiency training may improve functional use of remaining vision. Skills such as attending, shifting gaze, pursuit, tracking, tracing, scanning, and focusing may improve with instruction and practice.

Sensorimotor Development and Facilitation

Sensorimotor functioning is the coordinated, interrelated functioning of the body's sensory systems (e.g., vision, hearing, proprioception) and motor (movement) systems to perform activities in daily life. A strong foundation of efficient sensorimotor skills forms the basis for the development of posture, balance, and orientation, and is integral to a child's development of concepts about the world and to his or her ability to learn in school.

Vision is a critical component in the early process of the neurological development of sensorimotor skills. Children who are born without functional vision often fail to develop efficient sensorimotor skills, including upright posture, gait, and mature coordination. This lack of development, in turn, can interfere with the efficient performance of many daily activities.
O&M instruction assists children with visual impairments in developing sensorimotor skills that are critical to their physical development, ability to navigate various environments, and successful functioning at home, in school, and in the community. For individuals with visual impairments of any age, when sensorimotor skills are impaired due to physical or health issues, O&M specialists work in collaboration with occupational therapists, physical therapists, and other appropriate professionals.

Orientation

Orientation is how individuals establish and maintain an awareness of their physical location through sensory input and environmental feedback. O&M specialists use environmental features such as landmarks and information points to help travelers with visual impairments determine where they are in the environment. Sensory information from the environment, such as auditory, visual, or tactile input, can also serve as landmarks or information points. Spatial orientation refers to how someone understands the relative position and relationship of objects in space, both

to one another and to himself or herself. Since people with visual impairments do not have continuous visual feedback of objects' positioning in space, they must learn to establish and maintain a dynamic mental understanding of the environment to be efficient and independent travelers.

Individuals with visual impairments learn to problem solve to establish orientation and to re-establish their orientation in case they become lost or confused in different situations. O&M specialists vary the amount of input they provide depending on the individual's skill level to facilitate problem solving while promoting confidence and independence. One common performance assessment is a drop-off lesson where an O&M specialist purposefully disorients an individual in a familiar or unfamiliar environment to assess how he or she orients (or reorients) to the environment.

Mobility

O&M specialists provide instruction in the use of various mobility tools and techniques, and on selecting appropriate mobility systems for one's needs and skills.

Long cane

The specialized knowledge of the long cane and its techniques is unique to the profession of O&M. With appropriate O&M instruction, the long cane can provide individuals with visual impairments with information about objects, surface changes, and surface integrity in the immediate environment (Blasch, LaGrow, & De l'Aune, 1996). The long cane also serves as a means of identification of its user as a person with a visual impairment. Long canes come in a variety of materials, lengths, and colors, and they have different features (e.g., folding, telescoping) and types of tips. O&M specialists prescribe or recommend an appropriate long cane for individuals while accounting for factors such as height, gait, walking speed, proprioceptive and tactile sensitivity, travel environments, and personal preferences. O&M specialists may also recommend adaptive mobility devices for the specific needs of very young children or individuals with additional disabilities, as an alternative to the long cane or to facilitate transition to a long cane.

O&M specialists teach techniques for using the long cane in a multitude of travel situations and environments. The methods used to maneuver the long cane in a specific situation depend on factors such as the type of ground surface being traversed, the individual's functional vision and need to locate landmarks, and the presence of stairs, obstacles, or narrow openings in the travel path. Long cane techniques include diagonal, two-point touch, constant contact, touch and drag, touch and slide, and three-point touch technique (Fazzi & Barlow, 2017; Jacobson, 2013). Long cane instruction also includes techniques for traversing congested areas, and navigating doors, curbs, stairs, elevators, and escalators. O&M specialists teach individuals with low vision how to maximize use of functional vision while using the long cane. Instruction may also include

adapted cane techniques for people who use other mobility devices (e.g., support canes, walkers, and wheelchairs). Through careful monitoring of individual progress, O&M specialists structure lessons in a manner that promotes overlearning of cane techniques and facilitates skill generalization across environments and situations.

Human guide

O&M specialists teach techniques for traveling with a human guide (i.e., walking with another person who serves as a guide through an area) in various travel situations and environments. Human guide instruction includes strategies for effectively accepting and refusing guided assistance. O&M specialists provide instruction on effective guiding strategies to family members and other people who interact with individuals with visual impairments. Instruction may also include modified human guide techniques, such as those appropriate for young children, people with multiple disabilities, and people who use mobility devices (e.g., support canes, walkers, crutches, and wheelchairs).

Dog guides

The concepts and skills learned through O&M instruction provide a foundation for preparing individuals for travel with a dog guide. O&M specialists share information about dog guides and dog guide schools with interested individuals. This information may include differences in travel techniques used by dog guide and cane users. O&M specialists may be asked to conduct evaluations of individuals who apply to dog guide schools. O&M specialists work with existing dog guide handlers who request assistance with orientation. The O&M specialist's role is to assist the handler. If problems arise with the dog guide, O&M specialists advise handlers to seek assistance from their dog guide school.

Transportation systems

Many individuals with visual impairments use public transportation to travel to and from school, work, and other settings, within their communities and beyond. O&M specialists structure public transportation instruction according to each individual's assessed characteristics and needs. O&M specialists are knowledgeable of various modes of public transportation and may provide instruction on any of the following transportation options: buses, rail systems (e.g., light rail, heavy rail, subway, trolley), taxis, paratransit services, ride-sharing services, airplanes, and hired drivers. O&M instruction includes specialized strategies for all aspects of transportation use, including identifying an appropriate mode of transportation for an intended trip, trip planning, locating and navigating transit stops and stations, vehicle familiarization, non-visual strategies for using different types of transportation, completing public transportation transfers, problem solving, and the use of technology. For individuals with low vision who meet their state vision requirement for a driver's license, O&M specialists provide instruction as necessary.

Indoor techniques

Indoor O&M instruction ideally begins with the introduction of foundational travel skills in quiet, controlled indoor areas with few distractions. Instruction focuses on skills needed to navigate rooms, hallways, stairs, elevators, and other elements typically found within buildings. Indoor instruction includes long cane or adaptive mobility device techniques, trailing, self-protective techniques, self-familiarization, search patterns, locating dropped objects, contacting and exploring objects, negotiating obstacles, and non-visual strategies for establishing line of travel.

O&M specialists introduce tactile, auditory, and proprioceptive alignment strategies during indoor travel and later apply them to outdoor environments. Part of this instruction includes teaching individuals to recognize when they are straying from their intended line of travel (i.e., veering), and strategies for recovery from veering using information from the environment. Orientation skills, such as use of indoor numbering systems, cardinal directions, and landmarks and clues, are often introduced during indoor instruction. Advanced lessons take place in indoor areas with large crowds, wide-open spaces, and complex features to focus on skills such as problem solving, self-advocacy, and soliciting assistance.

Outdoor techniques

Initial outdoor travel lessons facilitate refinement of previously learned cane or adaptive mobility device techniques and introduction of new skills and techniques. Ideally, this instruction begins in a quiet, residential area and then gradually progresses to complex outdoor areas with more traffic, such as semi-business and business areas. Outdoor instruction includes techniques for sidewalk travel, detecting curbs and blended curbs, negotiating different types of blocks and multi-block areas, sidewalk recovery, cardinal directions, outdoor numbering systems, and using landmarks and clues. Instruction in rural communities may include techniques for traveling in areas without sidewalks or paved travel paths.

Street crossing techniques

The ability to cross streets is critical for pedestrian travel, and individuals with visual impairments use specialized strategies to complete this task. O&M specialists have expertise in non-visual street crossing strategies appropriate for different types of intersections, including but not limited to those with 2-way stop signs, 4-way stop signs, traffic signals (including Accessible Pedestrian Signals), channelized turn lanes, and medians; roundabouts; and crossings with no traffic control. O&M specialists understand the implications of changing technologies, including modern intersection design and quiet vehicles, on street crossing techniques used by individuals with visual impairments.

O&M specialists provide instruction on all aspects of street crossings, such as intersection identification, crosswalk identification, intersection analysis, risk assessment, alignment

techniques, determination of the best time to cross, initiation of the crossing, maintaining alignment during the crossing, recovery from veering, and resuming travel after completion of the crossing. They emphasize the use of tactile, auditory, and even visual information (as appropriate) during street crossing instruction. O&M specialists also stress the importance of analyzing risks present in street crossing situations and advise individuals on alternatives to crossing when the level of risk is unacceptable.

Assistive Technology

Technology has immense potential to enhance orientation, mobility, and independence among individuals with visual impairments. Thus, O&M specialists provide instruction on the use of high-tech and low-tech devices, as appropriate for each individual's needs. These devices include but are not limited to long canes; adaptive mobility devices; auditory, electronic, and tactile maps; tactile graphics and models; compasses; optical or electronic low vision devices (e.g., monoculars); electronic travel aids; sensory substitution devices; and electronic orientation aids. Electronic orientation aids include accessible wayfinding technologies such as standalone GPS devices designed for pedestrians with visual impairments and wayfinding applications for mobile devices. Some O&M specialists also provide rehabilitation services to individuals who use other sensory substitution devices or assistive technologies, including those who have electronic retinal prostheses, in interpreting visual environmental information and using this information for travel in conjunction with a long cane or other mobility device.

Despite its vast capabilities, technology is not a replacement for the underlying concepts, skills, and techniques of O&M. Before recommending training with a new device, O&M specialists assess individuals' prerequisite skills and readiness for adding technology to their repertoire of tools and techniques. O&M specialists inform individuals of strengths and limitations of technological devices to promote realistic expectations of the capabilities of technology, and they caution individuals against over-reliance on technology to the exclusion of other skills. O&M specialists remain abreast of technological advances in order to advise and instruct individuals on the most appropriate, current device(s) for their needs.

Environmental Access

Many individuals with visual impairments cannot use visual information (e.g., print signs); thus, they need access to environmental information in a format (e.g., braille or synthesized speech) that they can perceive using senses other than vision. To promote environmental access, O&M specialists provide instruction on various methods for accessing tactile and auditory environmental information such as tactile maps, tactile graphics, braille signage, Accessible Pedestrian Signals, and tactile warnings. O&M specialists may also incorporate GPS and other technologies (e.g., low vision devices, talking signs, and environmental beacons) into their instruction to supplement other information sources. Instruction could also include strategies for

self-advocacy regarding changes to the environment to enhance accessibility, such as the addition of an Accessible Pedestrian Signal.

Social

When designing instruction, O&M specialists consider the potential influence of the social environment, including social interactions, family dynamics, and culture, on learning and adjustment. Social interactions include the daily interactions with and attitudes of others, including family members and members of the public. O&M specialists facilitate development of efficient strategies for soliciting assistance and interacting with a variety of personnel, such as store clerks, transit operators, and pedestrians. Part of this instruction for all children and adults includes personal safety, preparation for dealing with reactions of the public, and development of appropriate responses.

Psychosocial

O&M specialists are aware of psychosocial variables that may influence individuals' adjustment to visual impairment, readiness for O&M instruction, and progression through O&M instruction. Among these variables are the age at which visual impairment occurs, the level of visual impairment, family and social supports, and interactions with others. O&M specialists understand the continual adjustment and readjustment that some individuals with visual impairments undergo, and the resulting impact on their self-esteem (Tuttle & Tuttle, 2004). They design instruction with regard to the psychosocial impact of congenital visual impairment, adventitious visual impairment, and vision loss due to sudden trauma, while accounting for individual differences.

O&M specialists are also aware of unique psychosocial issues affecting people with low vision. For instance, some individuals with low vision do not use a mobility device (such as a long cane) in all travel situations. Without the presence of the long cane, individuals' visual impairment may not be noticeable to the public; thus, these individuals may struggle in some social situations, such as when they need to ask for assistance. O&M specialists facilitate structured opportunities during which individuals with low vision can practice social interactions and develop effective strategies for these types of situations (Welsh, 2010).

Professional Preparation and Certification

In the U.S., university programs are the primary training model for O&M specialists. Programs use either a traditional on-campus model or a distance education model where classes may be primarily online with minimal face-to-face courses. University programs in O&M are primarily offered at the graduate level for a master's degree or certification only, but a few bachelor's degree programs are offered at the undergraduate level. Coursework typically includes all the content knowledge needed to complete an internship and pass a nationally standardized and validated certification test. An essential part of O&M coursework includes opportunities for college or university O&M students to demonstrate skills under blindfold and low vision simulation and to teach other O&M students to perform techniques in a variety of natural environments. An internship supervised by an O&M specialist is typically required where the O&M intern must demonstrate competency in a number of required content areas and for providing direct instruction to individuals with visual impairments. Some O&M specialists hold multiple certifications. For instance, those who primarily work with children may be dually-certified as both a teacher of students with visual impairments and an O&M specialist.

There are two professional certification bodies for O&M. The Academy for Certification of Vision Rehabilitation and Education Professionals provides the credential titled Certified Orientation and Mobility Specialist (COMS). This certification requires the completion of a college or university O&M program, an internship, and passing a certification exam. The National Blindness Professional Certification Board provides the credential titled National Orientation and Mobility Certification (NOMC). This certification requires either the completion of an approved university program with an internship practicum or completion of a supervised cane travel apprenticeship with an internship. A certification exam is also required for the NOMC credential. The COMS and NOMC credentials both require continuing education for recertification. Both the Academy for Certification of Vision Rehabilitation and Education Professionals (2013) and the National Blindness Professional Certification Board (2006) provide a Code of Ethics to guide the practices of O&M professionals.

References

Academy for Certification of Vision Rehabilitation and Education Professionals. (2013). Certified Orientation and Mobility Specialist (COMS) Handbook, Section 5, Code of Ethics for Orientation and Mobility Specialists. Retrieved from https://www.acvrep.org/certifications/coms-code

Blasch, B. B., LaGrow, S. J., & De l'Aune, W. R. (1996). Three aspects of coverage provided by the long cane: Object, surface, and foot-placement preview. *Journal of Visual Impairment & Blindness*, *90*, 295-301.

Cmar, J. L. (2015). Orientation and mobility skills and outcome expectations as predictors of employment for young adults with visual impairments. *Journal of Visual Impairment & Blindness, 109*(2), 95-106.

Cmar, J. L., McDonnall, M. C., & Crudden, A. (2018). Transportation self-efficacy and employment among individuals with visual impairments. *Journal of Vocational Rehabilitation, 48*(2), 257-268.

Crudden, A., & McBroom, L. W. (1999). Barriers to employment: A survey of employed persons who are visually impaired. *Journal of Visual Impairment & Blindness, 93*(6), 341-350.

Erickson, W., Lee, C., & von Schrader, S. (2018). *2016 Disability Status Report: United States*. Ithaca, NY: Cornell University Yang-Tan Institute on Employment and Disability.

Fazzi, D. & Barlow, J. (2017). *Orientation and mobility techniques: A guide for the practitioner.* (2nd ed.). New York, NY: AFB Press.

Hatlen, P. (1996). The core curriculum for blind and visually impaired students, including those with additional disabilities. *RE:view, 28*(1), 25-32.

Individuals With Disabilities Education Act of 2004, 20 U.S.C. § 140.

Jacobson, W. H. (2013). *The art and science of teaching orientation and mobility to persons with visual impairments* (2nd ed.). New York, NY: AFB Press.

McDonnall, M. C. (2011). Predictors of employment for youths with visual impairments: Findings from the second National Longitudinal Transition Study. *Journal of Visual Impairment & Blindness, 105*(8), 453-466.

National Blindness Professional Certification Board. (2006). Code of Professional Ethics for NOMC Certification. Retrieved from https://www.nbpcb.org/pages/codeofethics.php

Rehabilitation Act of 1973, Pub .L. 93-112, 87 Stat. 355, H.R. 8070, enacted September 26, 1973.

Slade, J., Edwards, E., & White, W. (2017). *Employment status and sight loss.* Royal National Institute of Blind People. Retrieved from http://www.rnib.org.uk/professionals/knowledge-and-research-hub/research-reports/employment-research

Statistics New Zealand. (2014). *Disability and the labour market: Findings from the 2013 Disability Survey.* Wellington, New Zealand: Author. Available from www.stats.govt.nz

Tuttle, D. W., & Tuttle, N. R. (2004). *Self-esteem and adjusting with blindness: The process of responding to life's demands*. Springfield, IL: Charles C Thomas Publisher, LTD.

U. S. Department of Education. (2004). *Building the Legacy: IDEA 2004.* Retrieved from http://idea.ed.gov/explore/view/p/,root,regs,300,A,300.34,.html

Voss, P. (2016). Auditory spatial perception without vision. *Frontiers in Psychology, 7*, 1-7. doi:10.3389/fpsyg.2016.01960

Wall Emerson, R., & Corn, A. L. (2006). Orientation and mobility instructional content for children and youths: A Delphi study. *Journal of Visual Impairment & Blindness*, *100*, 331-342.

Welsh, R. L. (2010). Improving psychosocial functioning for orientation and mobility. In W. R. Wiener, R. L. Welsh, & B. B. Blasch (Eds.) *Foundations of orientation and mobility: Vol. 2*. (3rd ed., pp. 138-159). New York, NY: AFB Press.

Workforce Innovation and Opportunity Act of 2014, 81 Fed. Reg. 55630 (August 19, 2016) (to be codified at 34 C.F.R. pts. 361, 363, 397).

World Health Organization (2007). *WHO global report on fall prevention in older age.* Geneva: Ageing and Life Course, Family and Community Health, World Health Organization. Available from: http://www.who.int/ageing/projects/falls_prevention_older_age/en/