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Assisting Occupational Therapists in North Dakota: An Agricultural Resource Guide

Teresa Bunn
University of North Dakota

Caitlin Layden
University of North Dakota

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Assisting Occupational Therapists in North Dakota; An Agricultural Resource Guide

By

Teresa Bunn, MOTS

Caitlin Layden, MOTS

Advisor: Lavonne Fox, Ph.D., OTR/L,

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This Scholarly Project Paper, submitted by Teresa Bunn and Caitlin Layden in partial fulfillment of the requirement for the Degree of Master of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

Dr. LaVonne Fox

Signature of Faculty Advisor

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Date

PERMISSION

Title: Assisting Occupational Therapists in North Dakota; An Agricultural Resource
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Teresa Bunn, 4-8-14

Caitlin Layden, 4-8-14

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- Teresa Bunn

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- Caitlin Layden

ABSTRACT

Within the state of North Dakota, agriculture and farming are of the most essential and influential factors within the state's economy (Rathge et. al 2012). Rural communities are among the medically under-served areas within the United States; establishing the dire need of healthcare services (Hagglund et al., 1998; Schweitzer et al., 2011). A study conducted by Meyer and Fetsch (2006) deduced the four prominent disabilities affecting farmer's engagement in occupations as arthritis, spinal cord injury, amputation, and back injuries. Farmers, and their family members, are also at higher risk for work related stressors which may result in severely disabling conditions; which overall establishes an even greater need to provide services to this population (Schweitzer et al., 2011). In addition, Willkomm (2001) reviewed the difficulties farmers with disabilities encounter and the increased risks for secondary injury.

A literature review was conducted to identify areas of need for farmers; the performance skills and client factors potentially impacted by injury, and best practice assessments and interventions. Based on the results of the literature, a concise manual entitled *An Agricultural Resource Guide for Occupational Therapists* was developed. This resource guide is designed for occupational therapists to utilize when working with this population. It contains a review of assessments and intervention strategies to utilize with farmers within his or her context based on the Ecological Model and encompassing the Occupational Therapy Practice Framework. An Ecological Model perspective is utilized to consider the farmer and tasks within the natural work and home environment. Components from the Occupational Therapy Practice Framework were

utilized throughout the manual to provide organization of multiple client factors and performance skills required by farmers to complete tasks.

North Dakota is a state dominated by agriculture; as such, it is essential to understand the population's physical, mental, social, cultural, and temporal constraints. The is purpose of this project was to ensure that the needs of the farmer and family are being met and allow the farmer to remain active within the profession for as long as he/she so chooses.

Chapter 1

Introduction

Rural communities are among the medically under-served areas within the United States; establishing the dire need for occupational therapy (OT) services (Hagglund et al., 1998; Schweitzer, Deboy, Jones, & Field, 2011). There are a limited number of professionals equipped with the ability to meet the needs of farmers with disabilities (Willkomm, 2001). Ultimately, these factors prevent an individual from engaging in the therapy process, and inhibit a patient's potential abilities for progress and outcome (Dew et al., 2012). The goal for rural service implementation should gear towards a client centered, person centered, and accessible services for rural populations (Dew et al., 2012).

A study conducted by Meyer and Fetsch (2006) deduced the four prominent disabilities affecting farmer's engagement in occupations as arthritis, spinal cord injury, amputation, and back injuries. Farmers, and their family members, are also at high risk for work-related stressors potentially resulting in disabling conditions; overall establishing the need to provide services in rural areas (Schweitzer et al., 2011). Willkomm (2001) reviewed the difficulties farmers with disabilities encounter, and the increased risks for secondary injury. With the aforementioned factors contributing to service delivery of rural populations, preparing an intervention protocol/technique may pose to be a challenge for healthcare providers with little to no experience working with farmers.

Successfully grasping and understanding the culture and issues this population experiences is an essential factor for healthcare providers (Smallfield & Anderson, 2008; Polain, Berry, & Hoskin, 2011). The barriers for OTs to practice in rural areas could include:

1. Treating a wide range of clients with varied ages, diagnoses, and comorbidities,
2. Having the skill-set and keeping current in knowledge pertaining to differing diagnoses and conditions treated.
3. The distance and time required for traveling to serve the rural populations.
4. The ability to keep and recruit new practitioners into rural areas (Smallfield & Anderson, 2008).

Willkomm (2001) discussed healthcare workers negative perceptions of farmers with disabilities' capabilities to continue working in physically demanding tasks. Healthcare professionals need to act as advocates for farmers to receive the education and services necessary to succeed in desired occupations and roles. Barriers, such as those listed prior can cause a multitude of factors that influence the delivery and quality of healthcare to rural populations. Through identification of barriers and limiting factors, providers can devise a battery of resources and intervention techniques to promote increased health possibilities within the farming population.

To identify the needed resources and treatment concepts, an extensive literature review was completed analyzing numerous agricultural, OT based, psychological, and physical disorder journals. The review of literature identified the gaps in relevant assessments and interventions that can be used with this population. There is limited research on farmer-OT interactions and evidence-based practice available for service delivery in rural settings.

Based on the literature review, *An Agricultural Resource Guide for Occupational Therapists* was developed. The purpose of this guide is to serve as a resource tool for occupational therapists working within the rural realm of North Dakota. North Dakota is a state dominated by agriculture, as such; it is pertinent for therapists working rurally to have an understanding of farmers' physical, mental, social, and time-frame constraints. *An Agricultural Resource Guide for Occupational Therapists* is a compilation of various assessments and intervention strategies for occupational therapists to utilize when working with farmers.

Occupational therapists working with rural populations should be knowledgeable and current with issues affecting farmers in order to provide quality, client-centered care. The resource guide will serve as a concise, effective, and efficient resource of intervention techniques and assessments to be utilized by occupational therapists. It is the hope of the developers that this manual will provide the profession with a knowledge base to increase competency and care with farmers. The goal for rural service implementation should gear towards a client centered, person centered, and accessible services for rural populations (Dew et al., 2012).

Key Terms and Concepts

- **Farming:** cultivating, operating, or managing a farm for profit. A farm can include raising livestock, beef, dairy, poultry, fish, fruit, produce, orchards, providing range and pasturage, growing and harvesting forages, crops, grains, and ag-horticultural products. It includes farm market gardens, subscription farms, greenhouse, herbs, organic farms, value-added production, agro-tourism, and other forms of agriculture” (Wilhite, 2003, p. 3).

- Farmworkers, Farm, and Ranch: “Inspect, maintain, and repair equipment, machinery, buildings, pens, yards, and fences. Feed and water livestock, monitor food/water supplies, drive trucks, tractors, and other equipment to distribute feed to animals. Other aspects include inspecting, maintaining, and repairing equipment, machinery, buildings, pens, yards, and fences. Finally work also entails herding livestock to pastures for grazing or to scales, trucks, or other enclosures” (O*NET, 2010).
- Ecology of Human Performance: An overarching model that observes the interaction of the person, context, tasks, and the performance capacity. This model identifies a person’s desires and needs in occupational performance in cohesion with the work environment. A collaborative approach is utilized between the therapist and client throughout the therapeutic process. The interaction of the person, context, and tasks has an influential impact on the performance capacity of farmers. The ultimate goal utilizing this model is to extend the range of tasks for individuals (Turpin & Iwama, 2011).
- Client Factors: “Specific abilities, characteristics, or beliefs that reside within the client and may affect performance in areas of occupation” (American Occupational Therapy Association, 2008, p. 630).
- Performance Skills: “Abilities clients demonstrate in the actions they perform; these include motor and praxis skills, sensory-perceptual skills, emotional regulation skills, cognitive skills, and communication and social skills” (American Occupational Therapy Association, 2008, p. 639).

- Performance Patterns: “Habits, routines, roles, and rituals used in the process of engaging in occupations or activities” (American Occupational Therapy Association, 2008, p. 641).

The remainder of the scholarly project will progress as follows; chapter II contains the extensive literature review pertaining to the farming population, and an introduction to the product. Chapter III presents the methodology and activities used to develop the project in its entirety. Chapter IV presents the product, *An Agricultural Resource Guide for Occupational Therapists*, developed for assisting occupational therapists working with farmers. Finally, chapter V provides an overall summary of the project; it condenses the purpose of the project, key information found throughout this process, and recommendations for the utilization of the guide created. Final components addressed in chapter V are the strengths, limitations of the product, and recommendations for future development and research in this area of practice.

Chapter II

Literature Review

Introduction

North Dakota is dominated by agriculture with farming as one of the most substantial factors within the state's economy (Rathge et. al 2012). For purposes of this scholarly project, the term farming is referring to farming and/or ranching as demonstrated in the following definition:

“Farming is broadly defined as cultivating, operating, or managing a farm for profit. A farm can include raising stock for food or fiber, dairy, poultry, fish, fruit, produce, orchards, providing range and pasturage, growing and harvesting forages, crops, and grains, and ag-horticultural products. It includes farm market gardens, subscription farms, greenhouse, herbs, organic farms, value-added production, agro-tourism, and other forms of agriculture”

(Wilhite, 2003, p. 3).

Agriculture provides employment for 1 out of 12 North Dakota residents (Growing north dakota, 2013). North Dakota is 68,976 square miles, averaging 9.3 persons per square mile (A look at north dakota agriculture, 2013). In addition farms and ranches encompass over 39 million acres, almost 90% of the state of North Dakota (A look at north dakota agriculture, 2013). Nationwide, approximately 288,000 individuals working in agricultural acquire a disability inhibiting his or her abilities to engage in activity demands (Willkomm, 2001).

A study conducted by Meyer and Fetsch (2006) found that the top four disabilities that affect farmer's client factors to engage in work were arthritis, amputations, spinal cord injuries, and back injuries. Farmers and their family members were also found to be at an increased risk for work-related stressors; thus, potentially resulting in severely

disabling conditions both physically and mentally. Medically, rural communities are among the most prevalently under-served areas within the United States and are often places in great need of healthcare services (Hagglund, Clay, & Acuff, 1998; Schweitzer, Deboy, Jones, & Field, 2011). Because of the limited services, the necessity to provide therapies and other healthcare services to this population is vital (Schweitzer, Deboy, Jones, & Field, 2011). The majority of healthcare professionals work in more urbanized areas (The Agape Link, 2010). Individuals living rurally are required to travel to urban areas in order to access services. Healthcare professionals are often not prepared to meet the needs of this profession due to limited understanding of the farming culture, demands, and essential performance skills required (Polain, Berry, & Hoskin, 2011).

During the evaluation process and development of interventions, occupational therapists (OTs) need to be aware and competent in environmental, physical, and mental health aspects of farming. The purpose of this scholarly project is to assess essential performance skills, patterns, client factors, and activity demands, with contextual elements and ergonomically attributing factors of farming to develop a holistic agricultural resource guide.

Demographics

With 9.7 individuals per square mile, North Dakota nationally ranks forty-ninth in population density (School of Medicine and Health Sciences, 2013). According to the School of Medicine and Health Sciences (2013), just over half, 52%, of North Dakota's population resides within rural areas. With the pervasiveness of the agricultural industry, about half the state's agricultural population is comprised of males (School of Medicine and Health Sciences, 2013). The number of those living/working on farms is

approximately 24% statewide (North Dakota Legendary, 2010). Within the United States, approximately 1% claim farming as his or her main occupation (EPA, 2013). In 2011, the number of farms in America totaled 2.2 million (EPA, 2013).

In North Dakota, there is a wide variety and combination of farms. Some individuals predominantly raise crops, others livestock, while many are a combination of the two. The top five agricultural products for the state are wheat, cattle/calves, soybeans, corn, and sugar beets; accounting for 25% of the state's economy (North Dakota Economy, 2013; North Dakota Legendary, 2010). Beef cattle rate as one of the state's top products; second is the production of bovine milk and dairy. Other livestock production includes swine and sheep. Just behind Kansas, North Dakota is ranked second in farm products. North Dakota grows more durum wheat than any other state, along with being the leader in barley, sunflower, and flaxseed production. Other agricultural production products include: canola seed, honey, navy beans, oats, pinto beans, rye, soybeans, sugar beets, corn, and hay (North Dakota Economy, 2013).

The age of farm operators/workers has increased from age 54 to age 57 (EPA, 2013). The number of individuals age 65 or older are considered the principle operators of the farm; overall increasing since 1965 (EPA, 2013). Aging simultaneously increases the risk of manifesting chronic diagnoses due to varying activity demands. For instance, an individual developing osteoarthritis (OA) or back complications due to improper positions and ergonomic aspects will increase over time.

Only a quarter of North Dakota's population has experience in a farming context; most of the hospitals per capita are within more densely populated areas of the state (Bismarck, Minot, Williston, Fargo or Grand Forks) (The Agape Link, 2010). These

areas have the means, resources, and man-power to maintain and staff hospitals. As a result of the scarcity of healthcare facilities statewide, travel time to access services for individuals may range from a half hour to several depending on variables of road conditions, location of the farmsteads, or other multifactorial elements (Smallfield & Anderson, 2008).

Demographics assist in establishing the background and lives of farmers and ranchers. Initially as a healthcare provider, the environment and context should be encompassed from a holistic view. Through gaining knowledge of demographics, continued comprehension of the culture of farming populations can assist healthcare workers to build understanding and rapport with clientele.

Culture

Due to varying levels and intricacy of the farm life, the culture and lifestyle of farming may be a difficult culture to comprehend. The term farmer is multifaceted, with a broad occupation composition.

“A **farmer** is defined as a person who is:

1. Actively engaging in farming (or who desires to become actively engaged in farming i.e. beginning farmer, eligible for socially disadvantaged programs, part of a vocational plan or training) and;
2. Deriving taxable income from such activity (or planning to derive taxable income from such activity).
3. Or an individual who is retired from farming”

(Wilhite, 2003, p. 3).

Client factors vary from different farmers, types of tasks, and environments. Client factors are defined as one’s specific abilities, characteristics or beliefs an individual holds that may affect performance in meaningful occupations (American Occupational Therapy Association, 2008). Examples of one’s client factors include values, beliefs, mental and sensory functions, movement-related functions, physical functions and structures

(American Occupational Therapy Association, 2008). Analyzing the client factors of farmworkers, farm, and ranch include:

“Inspecting, maintaining, and repairing equipment, machinery, buildings, pens, yards, and fences, feeding and watering livestock, monitoring food and water supplies, driving trucks, tractors, and other equipment to distribute feed to animals, and herding livestock to pastures for grazing or to scales, trucks, or other enclosures” (O*NET, 2010).

Grieshop, Stiles, and Villanueva (1996) analyzed and compared different cultures within the context of agriculture. The purpose of their study was to identify how individuals perceive the acquisitions of injuries and accidents in agriculture as well as to develop injury control scales with a population of farmers and farm workers. Through developing these scales, the authors were able to gain a greater understanding of the locus of injury control (LIC) and the impact of culture relative to one’s belief of accidents. Overall, the authors concluded that workers based the cause of injury on both internal and external factors. There was a greater emphasis on external contributions (factors out of his or her control such as faith, God, or weather), while individuals still acknowledged internal affects, simultaneously. This differed from the farm owners, which were controlled internally, believing that safety outcomes were dependent on choices made and strategies utilized by him or herself (Grieshop, Stiles, & Villanueva, 1996). These beliefs often lead to farmers disregarding aches, pains, or mental health, because it is more important to finish the work than take time off to seek medical assistance (Grieshop, Stiles, & Villanueva, 1996).

For farmers the person, work environment, and family life are interactive. Stave, Törner, and Eklöf, (2007) discussed how essential and influential the family unit is culturally through analyzing a farmers’ self-identity and regards for interdependence.

Farming is family driven; with tight knit communities enabling rural farming areas to run smoothly. Generally, farmers are known to be independent, stoic, and uphold traditional family roles. Farmers' work excessive hours and often, family members are an integral part of the operation (Stave, Törner, & Eklöf, 2007). While this level of interdependence and strong family supports deems a positive factor, it can also present numerous demands.

Demands on Family

The familial cultural idea is to pass the farm down to the next generation continuing the legacy, tradition, and maintenance of the farmstead. As a result, there tends to be a greater population of male farmers in comparison to women. Although, men on the farm predominantly become the main caretakers, farming stressors stem throughout, having a cascading effect amongst family dynamics and productivity. Family members are as susceptible as the main operator for contracting injury as well as having mental and emotional hindrances while working on the farm (Fraser et al., 2005).

Farms are family operated and responsibilities 'blur' as family members take on multiple roles to manage the farm efficiently (Fraser et al., 2005). Farmers come into more frequent contact with and live in closer proximity to family members. For instance, farmers may live with/by parents and in-laws, causing role conflict and business discrepancies (Fraser et al., 2005). Fraser et. al (2005), report daughter-in-laws of the family, often wives of farmers, perceive the highest stress due to feelings of neglect, little value on the farm, and negative interactions with in-laws on farm and household maintenance issues. If conflict arises within the family, such as any tension or sibling rivalry in regards to farm operations, all areas of production and operation may be

compromised. Obstacles identified by farmers and their families were seen as personal, social, and cultural that altered and constrained them from consistently acting safely (Fraser et al., 2005).

If farmers are unable to work or choose not to hire workers to assist with operating one's farm, children may become a form of assistance. However due to the size, limited strength, and inexperience of children, it can become a dangerous work environment (Fraser et al., 2005). In fact, the majority of farm related injuries within the population of children is due to farm machinery (Lubicky & Feinberg, 2010). Despite the numerous risk factors for children working alongside the primary farmer, there are positives aspects. Positive aspects include a close relation with family, community trust, varying and practical skill sets, self-efficacy, and a strong work ethic all contributing to the mental and physical development of children (Fraser et al., 2005).

Farmer's are exposed to risks resulting, at times, in a disabling injury or illness. When farmers do become disabled, labor may fall on the family members to assist the farmer with engaging in tasks and/or keeping the farm operating. This may entail caregivers working alongside with modified equipment, properly placing the farmer within the equipment, and/or lifting the farmer in and out of machinery to complete farming tasks (Willkomm, 2001).

Understanding familial expectations and backgrounds enriches individual's cultural diversity and assists with the comfort level of patients during interaction and treatment. Individuals are at greater ease and trusting of practitioners if the therapist has a knowledge base into the differential aspects of patient culture. With this concept in mind, understanding further demands placed on individuals rurally will optimize therapy.

Demands of Farming

In the North Dakota, the population's occupations are their lifestyles. Farm injuries account for 160,000 of work-related injuries annually, making farming one of the most dangerous occupations (Lundvall & Olson, 2001). Farm work is a dangerous occupation, but the occupation is being done by older populations engaging in physically demanding tasks (individuals 50 years or older) (Heaton et al., 2012). As farmers age, a decrease in injury has been observed due to disengaging in less hazardous tasks; the younger the farmer, the greater the risk of acute injury (Heaton et al., 2012). However, as individuals age, increased mobility issues, for example arthritis and/or contraction of chronic injury during work, is more prevalent. Analyzing activity demands required of individuals, in the aforementioned production areas is essential to identifying the challenging tasks and developing appropriate interventions. Activity demands are those specific aspects of a task that influence the type and amount of effort required to engage in an activity (American Occupational Therapy Association, 2008).

Farming Tasks

There are specific performance skills and patterns required for activity demands in farming. Performance Skills include concepts of motor and praxis skills, sensory-perceptual skills, emotional regulation skills, cognitive skills, communication and social skills (American Occupational Therapy Association, 2008). An understanding of the performance skills required for a farmer to engage in activity demands, the length of time required to begin/complete work, as well as the physical nature and environmental context are just a glimpse into the uniqueness of this diverse culture.

According to the *Occupational Therapy Practice Framework: Domain and*

Practice, (2008), performance patterns refer to the habits, routines, roles, and rituals used for the engagement of occupations. Habits are those activities that are automatic in nature. Routines are a specific sequence in which occupations are commenced. Roles, or a set of behaviors, are societally driven and personal (American Occupational Therapy Association, 2008). It is relevant to keep in mind performance patterns when analyzing the familial influences on farming as well as other roles in which farmers engage.

The tasks completed on farms changes daily depending on the time of year. The land being prepped through fertilization and tillage, crops being planted or harvested, livestock production consisting of breeding, birthing, and feeding, as well as attendance and maintenance of equipment. All of these activity demands require different performance skills, muscle groups, cognition, varying strength to manipulate objects, and time to complete chores and duties. With each task, the complexity can vary thus increasing the likelihood of injury. For instance farmers working with livestock or handling animals have been associated with more severe injuries as compared to those without livestock (Heaton et al., 2012). It has even been noted that raising livestock gives rise to greater complications and unpredictability, inevitably requiring multiple skill sets and an extensive time frame to properly care for and treat domestic animals (Raine, 1999). Arable farmers, those raising grains, have even noted the difficulties that come with raising livestock of any kind. Some farmers note the arable aspect of farming is easier and much more predictable while others comment, “livestock’s more stressful because it’s more complicated” (Raine, 1999, pg. 262). The time, physical demands, and unpredictability of animals all factor into the risks associated with owning, raising, working, and selling livestock. Other tasks that have been associated with irreversible

injuries (such as arthritis or amputations) include farm maintenance/machinery repair, fieldwork, crop production, and transportation (Heaton et al., 2012). Often, in order to complete maintenance on farm equipment, such as fixing a belt on a haybine or prolonged, contorted-work positions, cause significant discomfort and chronic issues over time.

Willkomm (2001) acknowledged that farming is a hazardous profession. The belief system of individuals involved in this area of work is that farm hazards and injury are a part of the trade; an inevitable uncertainty. By understanding risk factors, therapists can address activity analysis through home assessments, ergonomics, safety techniques, and varying performance patterns or skills to assist with intervention planning and treatment.

Risk Factors

Stave, Törner, and Eklöf, (2007) conducted a study to understand the farmers and their families' perceptions of health and safety. From a familial-ecological perspective, one can gain an understanding of risks and prevention perceptions. There were several main themes identified. First was the nature of risks; participants had a great deal of knowledge pertaining to the nature of risks taking into consideration both context and circumstances. In addition respondents identified that the amount of danger depended on what type of job was being completed and the type of equipment being used.

The following is just a glimpse at the array of risks and dangers that can take place in agriculture production: the operation of powerful and complex machines, toxic chemicals, and the uncertainty of weather and ungrounded electricity. Time is distinguished by tasks accomplished as weather permits during each season as opposed to

timed schedules. During the planting season, there is a limited span of time to plant crops due to factors of long lasting snow, spring rains, which cause difficulty with moving machinery in and off of the field. There is also a required growing period for each specific crop before it can be harvested; which must be done before frost sets in or before conditions are no longer ideal to get the maximum price for the crop. Time constraints, such as harvesting crops during adequate weather, pose to be a great cause of human error. An example of human error is tractor rollovers; accounting for 1,412 deaths of farmers from 1992 to 2005 (Myers & Hendricks, 2009).

Farmers identified that they would “cut corners” on safety aspects when time, finances, fatigue, and breakdown of machinery occurred, often resulting in accidents and injury (Stave, Törner, & Eklöf, 2007). Becoming too comfortable with tasks, machinery, and establishing routines can cause complacency; this often leads to injury due to farmers disregarding previous safety features (Stave, Törner, & Eklöf, 2007). Not only does this apply to machinery, but also to the chemicals used. Families were concerned about the long and short-term effects of exposure to chemicals used by farmers (Seiz & Downey, 2001). Short-term effects of exposure may present dizziness, nausea, headaches, and loss of consciousness (Farmworker Justice, 2005). Long term effects involve cancer, neurological disorders, breathing disorders, and hormonal/reproductive health problems, and exposure may even end in death (Farmworker Justice, 2005). Hearing problems are another risk factor often not considered. Farmers work around loud, heavy machinery daily, and most do not take the time to use ear-plugs or other safety devices to protect their hearing (Farmworker Justice, 2005).

There are a variety of environmental factors that comprise work tasks. Waters, Genaidy, Barriera, and Makola (2008), discussed the use of heavy equipment vehicles, such as tractors and combines/harvesters, and the physical exposure individuals receive while operating these types of equipment. Risk factors for musculoskeletal disorders as a result of running heavy equipment in correlation with musculoskeletal disorders of the neck and lower back were identified (Waters, Genaidy, Barriera, & Makola, 2008). Individuals may be exposed to numerous factors for potential musculoskeletal disorders within the lower back and neck such as static and non-ergonomic safe work postures of the trunk and neck involving twisting, stooping, and deep side bending (Waters, Genaidy, Barriera, & Makola, 2008).

Working on heavy equipment also subjects individuals to whole-body vibrations (shock/jarring/jolting), physical activity demands (walking, pulling, and lifting), extreme climate conditions, and psychosocial factors potentially contributing to further mobility issues and musculoskeletal disorders (Waters, Genaidy, Barriera, & Makola, 2008). Prolonged exposure to heavy vibration can cause further discomfort or pain for individuals with hip osteoarthritis or a hip replacement (Heaton et al., 2012). Farmers who suffer from mobility problems are twice as likely to experience further injury due to farm work compared to farmers who do not have prior musculoskeletal disorders, arthritis, or joint issues (Heaton et al., 2012; Waters, Genaidy, Barriera, & Makola, 2008). Acknowledging that farmers spend prolonged hours on heavy equipment, ergonomic factors need to be considered to decrease the amount of vibration/physical work demands applied on the body. By assisting with these factors, this lowers the risk of developing mobility problems or secondary injury. In order to have individuals

implement and be conscientious of proper positioning and work modifications, behavioral change and thinking of work may be implemented (Stave, Törner, & Eklöf, 2007).

The isolation that accompanies farming, especially for smaller, family run farms, is also a major risk factor. Farmers that are isolated may dwell on stressors, often increasing anxiety and worry (Raine, 1999). Isolation increases stress; Individuals are also at an increased risk of not receiving help in sufficient time if an accident or trauma occurs. It is essential that healthcare providers become awareness of risk factors as they may give rise to further injuries and/or psychological dysfunction.

Psychosocial Dysfunction

Psychosocial disorders affect all populations and demographics. Economic issues, environmental changes, family dynamics, financial issues, and production costs are all stressors (Fraser et al., 2005). Such stressors may result in depression, suicidal ideation, anxiety, or other psychiatric morbidities effecting farmers (Fraser et al., 2005).

The American Psychiatric Association (2013) depicts major depression as having a depressed mood/loss of interest or pleasure in daily activities for more than two weeks. Mood constitutes a change in a person's baseline. Areas that are impaired include social, occupational, and educational roles with a multitude of symptoms displayed by individuals. Symptoms include: depressed mood or irritability most of the day or everyday as indicated by the individual or through observation by others. Decreased interest or pleasure in activities, weight fluctuations, irregular sleep patterns, change in activity level, feelings of worthlessness or guilt, limited concentration, or thoughts of suicide are all potential effects on individuals (American Psychiatric Association, 2013).

Another disorder, often seen in the farming population, is Generalized Anxiety Disorder (GAD). Generalized Anxiety Disorder encompasses excessive anxiety and worry, occurring more often than not over a six month time-span; concerning a variety of activities (American Psychiatric Association, 2013). Symptoms include difficulty controlling worry, restlessness, feeling on edge, fatigue, difficulty concentrating, irritability, muscle tension, and sleep issues (American Psychiatric Association, 2013).

Polain, Berry, & Hoskin, (2011) deduced that due to the stigma associated with mental health disorders and the need to maintain a “stoic” persona to head a farm/ranch; seeking assistance and disclosing mental health issues becomes a dilemma. When farmers do access healthcare, they often do not believe the healthcare provider understands the culture of farming, rural issues, or any issues related to agriculture in order to provide appropriate treatment (Polain, Berry, & Hoskin, 2011). This also makes it increasingly difficult for farmers to seek help for health issues with the ideation of unqualified and/or non-understanding specialists. Awareness of demands, diversity within the realm of farming, and cultural differences of agricultural lifestyles provides a perspective for healthcare professionals working within rural communities.

Mental health is often a neglected area for a farmer; an area for healthcare workers to be more cognizant when assessing individuals (Schweitzer, Deboy, Jones, & Field, 2011; Shanteau, 2001). The mentality of farmers, as noted above, makes providing the necessary services to this population difficult (Fraser et al., 2005). Stave, Törner, and Eklöf, (2007), identified in their study on farmer perceptions of stressors that the exponential amount of hours farmers engage in task completion can have negative impacts on one’s physical, emotional, psychological health and overall sense of well-

being. The amount of time spent engaging in and completing tasks is not the only risk or cause of psychosocial stressors or disorders in farmers.

Risks and Causal Factors

Many psychosocial risks and causal factors come into play when considering mental health aspects for farmers. Sanne, Myketu, Moen, Dahl, and Tell (2003) conducted a study to determine and distinguish if farmers experience greater levels of anxiety and depression as compared to non-farmers and, if so, to determine the varying factors causing it. Overall, factors analyzed were work-related factors, wages, physical demands, psychological factors, demographics, lifestyle, and income to determine levels of anxiety and depression. The authors found that male farmers tended to have higher levels of anxiety as compared to female farmers and non-farmers. It was also found that both genders of farmers experienced higher levels of depression and depressive symptoms as compared to non-farmers. Of all groups tested, male farmers that raised livestock had the highest levels of depression. Male farmers reported working more extensive hours, accumulating lower income, engaging in heavier manual labor, and having educational in comparison with non-farmers (Sanne, Myketu, Moen, Dahl, & Tell, 2003).

Raine (1999) conducted a qualitative study that focused on farmer's perception of stress in farming, causal factors, and the personal effects on the individual. Farming is based on interaction of an individual within the environment; the inconsistencies of the environment and the inability to match the activity demands placed on farmers increases stress (Raine, 1999). Participants in the study noted in comparison to past and present agricultural production, farming has become increasingly more difficult and stressful.

Contributing factors of stress were the increase in paperwork, cost of production/expenses (seed, chemicals, equipment, livestock), fluctuating crops prices, consumer perceptions of farming, and government regulations (Raine, 1999). Time and the economy, as well as policies and perceived attitudes of government agencies, erodes confidence in information provided by these groups to farmers (Raine, 1999).

One major implication to the farming industry is the influence of economic pressures and how this can play out in different ways for each particular farmer. Behavioral changes can affect certain aspects when analyzing the role of economic circumstances. Hall (2007) conducted a study that found farmers in difficult financial circumstances had more risk-related pressures. In response to risk-related situations, farmers chose to ignore or minimize health and safety. The more fiscal farmers focused on economic thinking with the rationale that risk-taking was necessary to make gains within their businesses; business growth equates with survival (Hall, 2007).

The important concepts for healthcare professionals are the factors causing anxiety, stress, depression, and even suicide rate to escalate in this population. There are many stress factors that are unique to farming. Freeman, Schwab and Jiang (2008) found that financial components such as loss of crop due to weather, machinery breakdown, and financial loss resulting in foreclosure produce high stress for the farming population. Other factors include farmers that primarily raise livestock report having higher stress levels; as well as women reported having a higher number of stressors than men when on the farm (Raine, 1999; Fraser et al., 2005).

Research has focused on the stress and risks of farming in correlation with suicide rates. The suicide rate of agricultural workers is between two to three times greater than

the national average (Helwig, 2013). According to the national average, non-farming individuals make roughly five suicide attempts before completion as compared to the farmer's three attempts. Non-farming female's average twenty-five attempts to completion compared to farm women's three (Helwig, 2013). A multitude of farming factors include financial stress, physical, mental, and economic strains, and time constraints placed during seasonal work.

These prior unique, multifactorial risk factors can increase farmer's rate of anxiety, depression, and even suicide. (Freeman, Schwab & Jiang, 2008; Grisso, et.al., 2008; Malmberg, Hawton & Simkin, 1997). Farmers are not only more reluctant to seek medical assistance for psychosocial issues but also more prone to forgo treatment for physical issues as well (Beeson, 2007; Grisso, et al., 2008; Malmberg, Simkin, & Hawton, 1997). It is not uncommon to have psychosocial issues connected with the physical disorders and injuries farmers may contract in the agricultural business.

Disorders and Injury

Peterson, Ramm, and Ruzicka, (2003) found that the most common rural physical diagnoses are cerebral vascular accident, total hip replacement, and total knee replacements. Meyer and Fetsch (2006) found that the top three disabilities resulting from farming tasks include arthritis, spinal cord injuries (SCI), and amputations. Back injuries are among the top reasons for disability on the job (National Institute of Neurological Disorders and Stroke, 2013). Each of these will be discussed in more detail within the following sections.

Arthritis

Arthritis is an inflammation of the joints of the body with symptoms of pain,

stiffness, swelling, or redness (Mayo Clinic Staff, 2013). There are two forms of arthritis that affect the body; osteoarthritis (OA) and rheumatoid arthritis (RA). Osteoarthritis is defined as wear and tear to joints' cartilage over time resulting in bone on bone articulation restricting and causing painful movements (Mayo Clinic Staff, 2013; Heaton et al., 2012). Rheumatoid arthritis is caused by the body's immune system attacking the joint capsule creating inflammation and edema; over time, potentially progressing to cartilage and bone destruction within the effected joint (Mayo Clinic Staff, 2013).

Kirkhorn, Greenlee, and Resser (2003) discussed the frequency of arthritis diagnoses in regards to farmers and farm workers. The authors discussed the importance of increasing knowledge of risk factors, promoting healthy lifestyles to decrease obesity, and the need to adequately evaluate and treat the effects of arthritis to assist rural agricultural workers. As stated prior, farmers with mobility issues are twice as susceptible to sustaining an injury compared to farmers without mobility issues (Heaton et al., 2012). The importance of providing access of healthcare and treatment for the rural population for prevention, care, and treatment of arthritis can be vital in reducing incidence and prevalence of the disease (Kirkhorn, Greenlee, & Resser, 2003).

Kirkhorn, Greenlee, and Resser, (2003), discussed recommendations to analyze engineering strategies and ways to ergonomically reduce the physical forces that increase individuals developing arthritis. Dis-ergonomically sound work positions, heavy lifting, repetitive bending, forceful work, and kneeling are all common risk factors associated with the development of arthritis, specifically OA, in farmers (Heaton et al., 2012). Modifying work positions may assist with the ability to decrease the incidence of arthritis among farmers, something assessments and/or home/work modification could adjust and

address. Modification of work positions could also assist in decreasing the incidence of SCI within the farming population.

Spinal Cord Injuries

The second most disabling conditions are spinal cord/back injuries (Meyer & Fetsch, 2006). Spinal cord injuries occur when any part of the spinal cord is damaged resulting in permanent damage (Mayo Clinic Staff, 2013). There are two types of SCI, complete and incomplete, that could result in tetraplegia or paraplegia. Complete injuries occur when all sensory and motor functions are lost below the injury site; whereas, incomplete injuries have some sensory and motor function below the injury site (Mayo Clinic Staff, 2013).

Reed and Kidd (2009) discuss the interaction of the farmer in the environment leading to factors that play a significant role in obtaining a SCI. These include type of equipment, flooring, ladders, and poor building repairs. The most common types of accidents resulting in an SCI include falls, tractors, turnovers, falls, pulling out stumps or other stuck machinery, and inattention to the environment. Interactions with the environment leading to SCI include uneven terrain, falling from heights, ATV and other equipment use, injuries resulting from livestock (being crushed or kicked), or rushing through farm-work due to weather time-constraints (Reed & Kidd 2009).

Contracting an SCI is debilitating to farmers and affects his or her overall wellbeing. Challenges include loss of movement, blood pressure issues, blood clots, dysesthesias, bladder/bowel control or infection, increased pain due to nerve damage, and difficulty breathing (Mayo Clinic Staff, 2013; National Ag Safety Data Base, 2002). All of these factors impede the farmers' ability to return home and farming (Mayo Clinic

Staff, 2013; National Ag Safety Data Base, 2002). Understanding the challenges farmers face when reintegrating back to the farm and home after a SCI can assist in proper activity analysis and treatment planning. Another common challenge that can be related are back injuries.

Back Injuries

Back injuries can be acute or chronic. Acute being caused by trauma to the lower back, sudden impact, or other stress on the spinal cord, bones, and surrounding tissues lasting from days to weeks. Chronic injuries are pain that persists more than three months and is progressive (National Institute of Neurological Disorders and Stroke, 2013). Over-exerting oneself while lifting, pushing, or pulling objects and using improper body ergonomics were found to be the most frequent causes of back injury within the population of farming (Shelley & Dennis, 1993). Back injuries are preventable if proper ergonomics and body mechanics are used and time is taken to complete tasks.

The more physically fit the individual, the less likely the individual will suffer back injuries. However, as with arthritis, work modification and use of assistive devices can lessen the likelihood of injury or secondary injury (Shelley & Dennis, 1993). Sitting or standing in a slouched position, then attempting to lift a heavy object can lead to back and leg problems (Shelley & Dennis, 1993). There are times when improper mechanics, hast, or malfunctions with machinery can present more devastating consequences, such as amputations.

Amputations

Farm accidents are twice as likely to end in amputations compared to other industries, with amputations accounting for 11% of all agricultural related injuries

(Jepsen, McGuire, & Poland, 2011; Dedeaux, 2013). Farming tasks account for limb loss at a rate of 2.5 times greater than other industries (Bedard, 2012). Hazards of farm machinery affect the whole family (Heckathorne & Waldera, 2011). Farmers are not the only persons on the farm affected; accidents involving children living on the farm are mostly caused by farm machinery (Lubicky & Feinverg, 2009).

The causes of amputations on farms are due to four things: entanglement, entrapment, crushing, and infection (Jepsen, McGuire, & Poland, 2011; Dedeaux, 2013). Power take off (PTO) shafts, belts, and balers (any moving parts on machinery) are often causes of entanglement and subsequent loss of limbs (Dedeaux, 2013). Combine heads and augers often trap and pull on loose clothing, causing entrapment of limbs (Dedeaux, 2013). Crushing occurs when heavy equipment slams against limbs; the damage here is mostly internal, causing damage to infrastructure that will result in an amputation (Dedeaux, 2013). Infection occurs after injury, mostly due to unclean wounds, that may end in infection if not taken care of properly (Dedeaux, 2013). Complacency with equipment can lead to these types of injuries because farmers may take shortcuts to save on time (Dedeaux, 2013).

Upper extremity amputations are more complex to treat due to extent of recovery, time needed for training of the prosthesis, and a higher risk of secondary injury (Jepsen, McGuire, & Poland, 2011; Dedeaux, 2013). Upper extremity amputations can include finger amputations (full, partial, or tip), hand amputations (full or partial), and either above or below the elbow (Jepsen, McGuire, & Poland, 2011; Dedeaux, 2013). The further up the extremity the amputation, the longer and more difficult the recovery (Jepsen, McGuire, & Poland, 2011; Dedeaux, 2013). It is difficult to distinguish the exact

number of individuals who suffer from amputation within the state of North Dakota, as the state does not participate in Survey of Occupational Injuries and Illnesses (SOII). Between 2004 and 2008, the incidence rate of amputations filed per 100,000 workers ranged from approximately 11 to 17 nationally (Briggs et. al., 2008).

Upper extremity amputations are at higher risk of secondary injury due to overuse of the unaffected extremity, decreased sensation, circulation, padding and scar tissue around the injury site, decreasing the ability to tolerate daily bumps and bruises, and more susceptibility to frostbite (Jepsen, McGuire, & Poland, 2011). In order to protect the injured area and be able to complete tasks, prosthetics are often used for cosmetics or for functional work. However, farmers indicate that prosthetics are not always suitable for needs. Problems identified by farmers using prosthetics often resulted from insufficient training in use of prosthetics in farm tasks, which prothetist's think may contribute to further issues with the prosthetic (Waldera, Heckathorne, Parker, & Fatone, 2013; Bedard, 2012). Farmers are also use prosthetics in ways not intended by manufacturers or prothetist's (Waldera, Heckathorne, Parker, & Fatone, 2013). In several interviews, Waldera, Heckathorne, Parker, and Fatone, (2013), found the resounding statement of farmers using the hook as hammers or to pry things, uses not intended by the manufacturer. Because of the improper use of these devices and the frequency of breakdown, farmers often want or desire simpler devices. These prosthetics are expensive, not durable enough for physical tasks of farming, not suitable for the extreme weather changes, or transferable to different types of farming (Bedard, 2012). Farmers believed that simpler devices would be more durable and expressed high tech devices may be too complicated, expensive, and frail (Waldera, Heckathorne, Parker, & Fatone,

2013). Durability of the prosthetic is one of the most important factors for continued use by farmers (Heckathorne & Waldera, 2011). Farmers need devices that are low in cost, able to withstand the unpredictable environments and durable and stable enough to complete farming tasks (Waldera, Heckathorne, Parker, & Fatone, 2013).

The challenges of adaptive equipment and intervention for each diagnosis are often unique. Function and dysfunction for an individual can occur on many levels. As presented, an individual may experience difficulties within psychosocial aspects, physical components, and possibly cognitive components. The other significant are for consideration that spans both the psychosocial and physical aspects is cognition. Understanding the cognitive issues that may arise with individuals is vital for holistic assessment and treatment of farmers.

Cognition Dysfunction

Cognition is essential to the engagement in everyday performance capabilities of individuals. Cognition refers to the processing of information initiated and completed within the brain (American Occupational Therapy Association, 2008). Performance skills within the cognitive realm include judgment, sequencing tasks, problem solving capabilities, attention, addressing multiple tasks, attention span, memory, executive functioning (American Occupational Therapy Association, 2008). According to Gordon et al. (2013) cognitive functioning can be assessed through participation of a task within the context that occupation performance occurs. When there has been a loss of function in mental performance skills a cognitive dysfunction has occurred. Cognitive dysfunction may occur across the lifespan; it can be acute or chronic, stagnant or progressive, with varying levels of impairment for individuals (Gordon et. al, 2013). The primary disorders

addressed by occupational therapists noted by Gordon et al. (2013) were cerebral vascular accidents, traumatic brain injuries, and dementias.

There have been a various studies correlating with differing factors affecting cognition. Dartigues et al. (1992) determined the factors of intellectually stimulating occupations (i.e. teachers, professionals) as well as higher education levels may contribute to minimizing cognitive impairments or delay impairments later in life. The study utilized the Mini Mental State Examination (MMSE) to deduce global cognition. It was found that the highest numbers of individuals to score below a 24 were farm managers and farm workers. According to Fischhof, Weber, Moslinger-Gehmayr, and Neusser (2001) a score of 24-30 is considered normal, 18-23 is defined as mild cognitive decline, and 0-17 is defined as severe cognitive decline. Dartigues et al. (1992) determined that an additional factor may be farmers exposure to herbicides and pesticides (neurotoxins) resulting in neurologic diseases, at a higher risk for developing brain diseases, and subjective memory impairments.

Tyas, Manfreda, Strain, and Montgomery (2001), analyzed differing contributing factors for individuals contracting dementia. The authors found that when analyzing occupational exposures, defoliants and fumigants were significant in developing Alzheimer's disease. Exposures to these variables were more prevalent in individuals who reported being farmers. Overall, both studies concluded that it is essential to keep in mind components of occupations as a potential for decreased cognitive function (Dartigues et al., 1992; Tyas, Manfreda, Strain, & Montgomery, 2001).

Traumatic brain injuries (TBI) also have the capability to decrease cognitive functioning. According to Gabella, Hoffman, Marine, and Stallones (1997), the incidence

of fatality from TBI's increased exponentially as rurality increased. The contributing factors for contracting brain injuries consisted of falls, motor vehicle accidents, suicide rate and assaults. The limited healthcare access in rural areas is also a potential hazard. Individuals that acquire TBI's as well as cerebral vascular accidents (CVA) may be at a higher risk for life altering affects or fatality due to decreased healthcare accessibility.

There are a significant number of factors that limited healthcare service and delivery for the farmer. Factors stem from both the farmer's perspective as well as healthcare providers. Understanding the issues and barriers of healthcare in rural areas can assist in bridging the gap of services and access to those services.

Rural Healthcare Dilemmas

There are many barriers that exist in regards to rural practice from both a client's and practitioners' viewpoint (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).

From the client's viewpoint the barriers could include:

1. Geographical access to therapy (or isolation within rural areas)
2. Financial costs of transportation
3. Cost of psychological/physical disability services
4. Appointments, scheduling constraints, office hours
5. Limited caregiver/family education in natural context
6. Limited worksite accommodations
7. Economic and financial constraints
8. Limited services in rural areas (School of Medicine and Health Sciences, 2013).

Social and leisure components are also reduced due to the previous noted factors, affecting satisfaction with therapy and the effectiveness of therapy (Dew, et al., 2012; Polain, Berry, & Hoskin, 2011).

Appointments for farmers may be difficult due to cost, taking time out of the workday, or availability of services. Due to these contributing factors the likelihood of agricultural workers taking time for health, whether it is their own or their families, decreases. Obtaining health insurance through farming is more expensive than through other means; example a spouse of the farmer was able to obtain insurance through his or her occupation (Prince & Westneat, 2001). Farmers are required to purchase insurance individually, resulting in higher premiums and out-of-pocket expenses (School of Medicine and Health Sciences, 2013). Individuals in rural areas of North Dakota are less likely to have health insurance as compared to higher populated areas; 15% within the state of North Dakota delayed seeking services due to higher costs of care (School of Medicine and Health Sciences, 2013). In North Dakota, 49% of farmers spend more than 10% of their income on health care (School of Medicine and Health Sciences, 2013).

Individuals with disabilities living in rural areas also lack accessibility and efficiency of services. Willkomm (2001) discussed the difficulties farmers face with disability and the potential for secondary injury. There are a minimal number of professionals equip with the ability to assist the needs of individuals with disabilities. Willkomm (2001) deduced that there is a negative perception of healthcare providers for individuals with disabilities to continue working in physically demanding work tasks. Such as with SCI the lack of transportation to healthcare services, physical inaccessibility (both to public and private buildings), and health care delivery barriers can contribute to the development of secondary conditions (Hagglund, Clay, & Acuff, 1998). Lack of education often contributes to further injury; skilled caregivers may lack the necessary information required to provide services for individuals in rural settings. Unfortunately,

this knowledge deficit often leads to inadequate provider mediated assistance for individuals with SCI who are returning home (Hagglund, Clay, & Acuff, 1998). Provider service deficits include: identification of services, education, and adaptive technology needed for these patients. Environmental contexts may also be of concern; many rural farmsteads are old houses that are small, narrow, inaccessible, and difficult to modify due to the layout of the house and finances (Hagglund, Clay, & Acuff, 1998). These circumstances also affect the use of varying buildings on the farm, such as grain bins or silos.

Other contributing barriers for farmers include safety information that is seen as lacking objectivity, credibility, scientific rigor, and distrust of safety information issued by professionals with no farming experience; and finally, attitudes and beliefs of farmers risk taking persona (Stave, Torner, & Eklof, 2007). This ultimately affects an individual from engaging in the therapy process and inhibiting a patient's potential progress and outcome (Dew et al., 2012). Rural services need to be more client centered, person centered, and accessible (Dew et al., 2012). The barriers for practitioners to practice in rural areas may include:

1. Treating a wide range of clients of varying ages, diagnoses, comorbidities, the need for up-to-date knowledge (Peterson, Ramm, & Ruzicka, 2003).
2. Having the skill-set for different diagnoses and conditions treated (Peterson, Ramm, & Ruzicka, 2003).
3. Dealing with the distance and time needed to travel to places to serve the rural populations. Traveling was required for 54.5 % of the facilities. There were only approximately 11% of facilities that did not require travel to provide services. Days of travel ranged from two days a week to five or more for many practitioners. Occupational therapists felt the amount of time traveling decreased the quality of care due to the limited amount of time spent working with the client (Peterson, Ramm, & Ruzicka, 2003).
4. The ability to keep and recruit new practitioners into rural areas (Smallfield & Anderson, 2008; Peterson, Ramm, & Ruzicka, 2003).

5. Referrals were given to physical therapists instead of OT due to the lack of knowledge of rural healthcare workers about the role (Peterson, Ramm, & Ruzicka, 2003).

All areas of the healthcare profession have depleted numbers in rural settings (School of Medicine and Health Sciences, 2013). Mental health is a largely underserved and unaddressed aspect in rural areas (School of Medicine and Health Science, 2013).

Physicians may underestimate the health risks associated with agricultural exposures (Prince & Westneat, 2001). There is minimal education and training for healthcare providers working with rural, farming populations (Smallfield & Anderson, 2008; Polain, Berry, & Hoskin, 2011). When considering healthcare delivery for individuals with SCI, several barriers exist including insufficient number of physicians, hospitals, and skilled caregivers within rural areas (Hagglund et al., 1998).

Healthcare professionals need to act as advocates for farmers in order for this population to receive the education and services necessary to succeed. Assessing the needs of clients who are employed in farming may prove difficult because of limited interaction, experience, and information with this population. Barriers and multifactorial influences affect the delivery and quality of healthcare to rural populations. Through identification of these elements, providers can be better enabled to access needed resources and treatment concepts to promote rural health. The process begins with appropriate assessments.

Agricultural Relevant Assessments

Assessments within this section were identified as relevant to use within the environment and profession of farming from an agricultural standpoint. These assessments focus on the environment, tools and machinery used. Based on the results

recommendations can be made for adaptations or assistive technologies. This section showcases four agricultural assessments utilized by healthcare workers within this occupation. By analyzing assessments already in the agricultural area, OTs can determine different aspects to further analyze, assess, and assist individuals. This enables occupational therapists to find gaps in the current use of assessments and determine more holistic approaches to provide assessments and interventions for individuals.

Agricultural Worksite Assessments

Evaluating worksites provides valuable information about the farmer's ability to complete farming tasks, barriers faced, and possible alternatives to completing work tasks/activities (Farmworker Justice, 2005). Without knowing the layout and context of the farmer's environment, difficulty would arise to accurately treat symptoms and adapt work positions/equipment. Going to the farm to gain understanding of client factors affecting performance within tasks and discussing with the farmer possible modifications enhances rapport building (Farmworker Justice, 2005).

Safe Tractor Assessment Rating System (STARS)

Day, et al., (2005), analyzed the STARS, which was designed to analyze the overall safety features and to motivate improved design in tractors. The checklist analyzes aspects such as rollovers, run overs, user protection, information and controls, and pedestrian protection. The authors concluded that, with the input from other farmers, STARS might serve as a useful tool for objective assessments of safety features for new and used tractors. In addition this assessment provides reference to injury patterns, fatalities, current standards, and tractor safety research. This assessment would be easily

accessible to farmers, manufactures, and dealers online and would also be used as a beneficial teaching tool for safety training (Day, et al., 2005).

Assistive Technology Assessment

As farmers return to work environments, assistive devices may not be best suited for the labor-intensive work of farming. There are few assessments that can evaluate the safety and effectiveness of assistive devices when used by farmers. Farmers are creative in nature, often adapting or modifying assistive devices in ways not intended to be used by manufactures, making their own assistive devices to work where other assistive devices would not (Field & Mathew, 2010; Waldera, Heckathorne, Parker, & Fatone, 2013). Field and Mathew (2010) determined the need within the population to produce an evaluation of assistive devices to estimate the safety of homemade assistive devices and to prevent possible secondary injuries sustained when using makeshift devices. The assessment has a combination of observation, assessment of the assistive device, interview of the user, and use of one's own clinical judgment (Field & Mathew, 2010).

Worksheets within the assessment include client and disability information, assistive technology information, quick reference sheet, assessment questions, problems observed, possible solutions, and results and recommendations (Field & Mathew, 2010). The assessment should be considered a guideline for professionals to use, as there is no pass/fail score. Not all assistive technologies or features may be involved, and there are no engineering details of the devices (Field & Mathew, 2010). It does estimate risk for secondary injury when implementing assistive devices for farmers (Field & Mathew, 2010).

Oklahoma AgrAbility Site Visit

The Oklahoma AgrAbility site presents various assessment and assessment strategies that can be effective for OT's and can be generalized to farms in other areas of the country due to the ability to relate items across farming contexts. Evaluators assess the physical layout, record barriers, safety hazards, identify farming tasks, maintenance, management activities, barriers, tools used, and number of workers on the farm (Wilhite, 2013). Farming occurs within the context of the occupation, within the yards and fields. Site visits are used to assess different environmental factors, equipment used, client factors, and performance abilities.

These agricultural assessments predominantly provide an evaluation of the environment. The use of OT can serve this population and provide a more holistic means of evaluation by analyzing the person, environment, and tasks in unison to further assist the farmer and family.

The Role of Occupational Therapy

As farmers are a prevalent population of North Dakota, the probability of OTs working with farmers or individuals associated with farming is probable. Therapists acknowledged that rural settings had varying contexts that posed as challenges while working in rural settings (Peterson, Ramm, & Ruzicka, 2003). Throughout the literature, there has been little written by therapists in rural settings.

The role of OT within this population is beneficial. Occupational therapy works to promote, establish, and restore function in occupations for the person by analyzing the individual and the performance of tasks within the environment. To provide skilled services, occupational therapists must encompass client factors, performance skills and

patterns, while keeping in mind the context in which the occupation is carried out. These factors can be discovered through interviews (formal or informal), observation within the natural environment, assessments (formal or informal), as well as being aware of the facilitators and barriers in which occupation takes place. Occupational therapists are required to have extensive knowledge and understanding of the population being served in order to provide competent, ethical, and effective care.

Occupational therapists have the avenues for change necessary for farmers to succeed within their environment. Education of colleagues, along with advocating for referral, can assist rural healthcare workers in understanding what the profession of OT has to offer for patients. It is important to increase awareness among healthcare professionals about agricultural health and safety hazards as an integral step towards improving the health of the farming population.

Defining different competencies and relevant job functions for working with agricultural populations ensures healthcare professionals' roles are being fulfilled to address patients holistically (Lundvell & Olson, 2001). As OTs focus on the holistic view of the individual, understanding relevant job functions are important. There were four categories that emerged within defining competencies for agricultural nurses: political competencies, business acumen, program leadership, and management capabilities (Lundvell & Olson, 2001). Within these competencies, five themes emerged as important for those working with the agricultural population including interpersonal communication, knowledge of injury prevention principles and measures, ability to recognize hazards that may create unsafe working and living environment, written communication skills, and a strong sense of self (Lundvell & Olson, 2001).

Besides the themes and competencies, there were five top job functions (out of 39 identified by the survey) for working as an effective agricultural nurse: 1) Serve as a liaison between the agricultural, health, and medical, and the nonfarm communities, 2) promote agricultural health and safety issues through the media, 3) conduct follow up assessment of injury, illness, or disease occurring as a result of an agricultural exposure, 4) implement educational courses to various groups, and 5) function as a resource for information to victims of agricultural injury and illness and their families (Lundvell & Olson, 2001). These concepts are applicable across the board of healthcare workers, especially OT. These concepts should be inherent for OTs to uphold and implement when working in rural settings. Considering the competencies and themes noted above will assist OTs in better addressing the needs of farmers. It also assists in defining the role OT in rural settings. The competencies, themes, and job function can assist OTs in selecting and using assessment tools relating to agricultural needs.

Occupational Therapy Assessments

Understanding the socioeconomic influence, client factors, work ethics, perceptions, performance patterns/skills, and other environmental effects are essential to be able to relate to and work with the farming population. Time is required for farmers to reintegrate back into the community and work environment. Without proper services in place, individuals with disabilities have difficulty returning to their daily lives prior to injury. There are several circumstances to take into consideration when completing an activity analysis in the farm work environment; occupational safety needs to be the first factor to identify when adapting or changing work styles. Day, et al., (2005), conducted a study that analyzed occupational safety in farming; predominantly, it was found that the

aim of safety has been on locating hazards, providing information, identifying equipment needs, and different methods to reduce farming hazards.

Utilizing the *Occupational Therapy Practice Framework: Domain and Process* for preparing evaluations, occupational profiles, treatment sessions, home exercise programs, or home/work modifications can be an important client-centered tool when working with the population of farmers. From the agricultural view of assessments, which focuses mainly on the environment, adding a therapeutic perspective holistically assesses the individual and with consideration of environmental components. Agricultural assessments view farmers' worksites, tasks, and barriers in performance based on disability; occupational assessments view the person as an occupational being with different routines, roles, and performance components within their chosen environment.

Occupational therapy can address varying performance skills and client factors through the use of assessments. There are different areas within assessments OTs can utilize in order to holistically view individuals. Assessments can be of performance in areas of occupation, social participation, quality of life, performance skills, performance patterns, client factors, and performance within context and environment. Several items that make the profession of OT unique include the ability to analyze tasks and activities, and the interaction of the person within the environment. Addressing different areas of occupation demonstrate true understanding of the farmer as an occupational being. Occupational therapy can add a unique view for the farmer returning to his desired occupation through use of the uncommon knowledge; for example, use of activity analysis to assess the farmer within his natural setting.

Assessments of task performance in an individual's natural context enables OTs

to observe and comprehend tasks that are successful, tasks that facilitate engagement, and which tasks elicit difficulties and/or barriers. Occupational therapy assessments can allow therapists to probe in order to understand all components of the task. The occupation of farming has a high incidence of social and physical isolation. Emphasizing the importance of addressing physical and social aspects for maintenance of relationships along with integrating needed psychosocial/psychological aspects is what is missing in rural healthcare services. Farmers and therapists can collaborate to focus specifically on deficits and barriers in the environment that limit engagement in occupations. This collaboration can result in solutions, adaptations, and further recommendation opportunities. As farmers live in the environment in which they work, understanding and assessing the interaction of the person, task, environment/context, and occupational performance adds levels of understanding needed in order to engage successfully in tasks.

Advocating for utilization of the profession in rural settings is crucial to assist patients. Lundvell and Olson (2001), reiterate the importance of utilizing one's therapeutic use of self to provide treatment to patients, and the importance of a framework for the creation an assessment and intervention strategy to work with farmers and other agricultural workers.

Conclusion

After analysis of the literature, it was found that there are many contributing factors and risks associated with the profession of farming. There are indications within the literature for a strong demand for healthcare workers to address underserved rural areas. In addition, workers that do work in these areas are in need of resources and comprehensive means to enable effective and efficient evaluation and treatment planning.

The creation of a guide for OTs working in rural areas serves as a beneficial tool in assisting with treatment planning and challenges or obstacles that may arise while working. Through an extensive literature review an introduction to the rural farming culture is presented. *An Agricultural Resource Guide for Occupational Therapists*, was designed with information pertaining to North Dakota. The guide is organized in six sections:

1. Welcome/introduction
2. Environment/Context
3. Person
4. Task
5. Human Performance
6. References

Each section has subsections that further define the variety of resources ranging from rural information, definitions of farming tasks, types of farmers and farming machinery, and discussion of the uniqueness of each context in facilitating occupational engagement. Assessments and intervention strategies have also been compiled into the guide to be utilized by OTs in rural settings. It has been designed using the Ecological Model. Utilizing an overarching Ecological Model can establish a client-centered means with which to analyze individuals within the environment where occupations are performed. The main four constructs important to the ecological perspective that are relevant to this population of farming are person, environment/context, task, and occupational performance. The Occupational Therapy Practice Framework provided the organization of multiple client factors and performance skills required by farmers for completing occupational tasks. The product is presented in completion in chapter four.

Chapter III

Methodology

The two creators of *An Agricultural Resource Guide for Occupational Therapists* are invested to aid the needs of farmers, as both individuals grew up in rural, agricultural communities. The two individuals have close involvement with both farming and occupational therapy, as thus, sought to link the two realms in order to provide the need of healthcare services in rural North Dakota. The purpose this resource guide is to assist practitioners working with the population of farming. To begin this process, the authors found it essential to determine gaps and identify needs of the population through the utilization of a literature review.

The review of the literature was conducted to:

1. assess the areas of need;
2. identify barriers faced by both healthcare providers and farmers;
3. distinguish specific issues for farmers and rural areas, and;
4. determine the performance skills and client factors required of farmers.

This review of literature utilized various data-bases. Data-bases included:

PubMed, ODIN, Google Scholar, EBSCO, CINAHL, SCOPUS, PsycINFO, OT Search, and The American Occupational Therapy Association website. Additional recourses were obtained through Google searches tailoring search items to the following terms. There were a multitude of keywords used to obtain information. The authors initially began with the terms ‘farmers’, ‘farming’, ‘rural’ and ‘issues’; additional keywords stemmed from there. Identification of phrases, ‘physical impairments’, ‘psychology’,

'psychosocial', 'cognitive', 'family', 'culture', 'farming risks', 'healthcare barriers', and 'farming tasks' were incorporated into the search.

Each article obtained was read, assessed, and critically appraised for the level of evidence and relevancy for creating the literature review and composing the agricultural resource guide. Coinciding articles were then assembled together to prepare the best layout for the product. As this resource tool is for individuals working with the farming population, categories consisted of defining farming tasks, cultural aspects, as well as prevalent psychological, physical, and cognitive disorders. In addition the impact of injury, risks, and barriers on the farmer and family were classified. Simultaneously, other supplemental documents containing information of demographics, beneficial information on farming/farmers, and rural agriculture were reviewed to solidify the need for this scholarly project.

Through the use of this information, several themes were identified. Overall, there was a lack of current evidence-based literature of occupational therapists addressing farmers with physical, psychosocial, or cognitive issues. Limited skill-set, comfort, and confidence of occupational therapists posed to be an issue when working with the array of different diagnoses and conditions seen in rural settings (Smallfield & Anderson, 2008). Minimal information was found on occupational therapists within rural communities acknowledging or addressing mental health disorders or establishing any provisions of services for this population (Schweitzer, Deboy, Jones, & Field, 2011; Shanteau, 2001). There is a general lack of education and understanding of cultural factors, rural issues, and needs noted within the literature. Finally, farmers found it difficult to access services due to extended waiting times, expensive services, services

unclear on how to access, and farmers' reluctance to disclose issues or seek assistance (Polain, Berry, & Hoskin, 2011). Ultimately, through review of the literature, there are minimal services available and numerous barriers to provide healthcare from both the practitioner and farmers' perspectives.

After review of all information obtained, acquisition of valuable information to address the gaps in the literature commenced. Occupational therapy assessments and intervention strategies were identified using the aforementioned various search engines and availability of resources from the University of North Dakota Occupational Therapy Department. A review of literature on assessments currently being used in agriculture was completed to find gaps in addressing the needs of farmers within his/her natural context.

The use of an Ecological Model perspective and the Occupational Therapy Practice Framework were supported when considering the themes identified prior. These two concepts were determined by the developers as the best modes to guide the design of the product. The Ecological Model was chosen as farmers' tasks are required to occur within the natural context and home environment. The Occupational Therapy Practice Framework provided the organization of multiple client factors and performance skills required by farmers for completing occupational tasks. After incorporating all of this information, a final overarching resource guide consisting of assessments and intervention strategies for working rurally was developed called *An Agricultural Resource Guide for Occupational Therapists*.

Chapter IV

Product/Results

The purpose of this scholarly project was to design a resource for occupational therapist to use when working with farmers. As discussed prior, resources are limited and exposure of occupational therapist to the culture of farming is decreasing. To achieve this outcome a guide was designed using information gleaned from evidenced based literature.

An Agricultural Resource Guide for Occupational Therapists was designed with information pertaining to North Dakota. The guide is organized in six sections: welcome/introduction; environment/context; person; task; human performance and references.

Each section has subsections that further define the variety of resources ranging from rural information, definitions of farming tasks, types of farmers and farming machinery, and discussion of the uniqueness of each context in facilitating occupational engagement. Assessments and intervention strategies have also been compiled into the guide to be utilized by OTs in rural settings.

The Guide has been designed using the Ecological Model. Utilizing an overarching Ecological Model can establish a client-centered means with which to analyze individuals within the environment where occupations are performed. The main

four constructs important to the ecological perspective that are relevant to this population of farming are person, environment/context, task, and occupational performance. The Occupational Therapy Practice Framework provided the organization of multiple client factors and performance skills required by farmers for completing occupational tasks. The product is presented in completion in the section following.

An Agricultural Resource Guide for Occupational Therapists

2014

**University of North Dakota
Department of Occupational Therapy**

Teresa Bunn, MOTS
Caitlin Layden, MOTS
&
Dr. LaVonne Fox



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Layden, 2013

Welcome

Due to the authors' passion about services for farmers and agricultural workers within rural areas, and because of their close involvement with both farming and occupational therapy, an overarching guide was created. Both creators share the origin of this passion to farming and its relation to the profession of Occupational Therapy.

Caitlin Layden

Growing up on a ranch has taught me the value of hard work, dedication, and self-preservation. I enjoyed every minute of my time living in a rural area. My experiences and knowledge gained from my family have shaped me into the person I am today. The culture, lifestyle, and context have instilled in me a perception on values, morals, and all around way of living. Growing up in a rural community, one sees the trials and tribulations associated with an agricultural lifestyle. Individuals are at a high risk for injury both physically and mentally. I have been witness to this in my family as well as others. As a result of these multifactorial concepts, I am passionate about this population and I am determined to utilize the knowledge and skilled services I have obtained through occupational therapy to assist with the health and wellness of this underserved population.

Teresa Bunn

Growing up on a dairy farm has taught me the importance of hard work and determination, traits that I witnessed in both my grandfather and father. I know all too well what it is like living on a farm, relying on crops and cattle to keep the family going. Chores included bedding down the cows in the dead of winter after going to school all day, or getting up at 5 a.m. because my grandfather could not come over to milk due to a blizzard. Farming is a 'live and breathe the work' occupation; family vacations, holidays, graduations, school events, birthdays, and other occasions were always planned around planting, harvest, or in my case around milking. When the opportunity presented itself to create a manual that combined aspects from my life, occupational therapy and farming, I was only too happy to find a partner that shared some of my ideas.

Purpose

The purpose of this guide is to serve as a resource guide for occupational therapist (OT) practitioners working within the rural realm of North Dakota. Minimal research is completed on the farming population and interactions with OT resulting in limited resources, knowledge, and evidence-based effective practice. Following an extensive literature review, this guide has been compiled to include assessments and intervention strategies for OTs to utilize when working with farmers in rural settings. North Dakota is a state dominated by agriculture; therefore, it is essential for OT providers to understand the physical, mental, social, and time constraints of farmers to enable and equip one to provide quality, client-centered care. Farmers are a prevalent population in North Dakota; the probability of farmers, or individuals associated with the farming industry, receiving or needing to receive OT services is inevitable. This guide will serve as a concise, effective, and efficient resource of intervention techniques and assessments for the use of healthcare providers in rural North Dakota.

Model of Practice: Ecological Model of Occupational Therapy

Using an overarching Ecological Model concept requires OTs to consider the environment as extensively as considerations of the person. This model identifies a person's desires and needs in occupational performance in cohesion with the work environment. A collaborative approach is utilized between the therapist and client throughout the therapeutic process. The interaction of the person, context, and tasks has an influential impact on the performance capacity of farmers (Turpin & Iwama, 2011). To acknowledge and retain the theme of these models, the five following concepts should be considered:

1. Environment or Context:

Turpin and Iwama (2011) define the environment as physical, temporal, social, and cultural elements that have the capacity to shape task performance. The environment can serve as either a facilitator or barrier in occupational performance. All aspects of the context are relevant when assessing farmers as each variable interacts and affects participation and performance in occupations. There are four aspects to consider when assessing an individual's context. These are physical, cultural, social, and temporal aspects of the environment (Turpin & Iwama, 2011).

Physical- The physical context is defined as large elements such as terrain or building structures as well as small objects, for example tools. The physical environment is the most tangible aspect of environment (Brown, 2009).

Social- The social aspect of the environment is composed of multifactorial layers. One layer consists of an individual's interpersonal relationships (friends and family). The next area is made of social groups (i.e. work groups). The final layer of the social environment is large political and economic systems (Brown, 2009).

Cultural- This aspect is based on shared experiences that determine one's values, beliefs, and customs. This type of environment consists of national identity, ethnicity, nationality, and religious components (Brown, 2009).

Temporal- This area is made of time-orientated factors of the individual and the task (Brown, 2009).

2. Person:

An individual is comprised of factors and skills within sensorimotor (physical), cognitive, and psychosocial domains. Individuals are capable of attaching meaning to tasks within specific contexts. By assessing the uniqueness of each individual farmer, perceptual meanings attached to tasks, and contextual variables, the influential interactions on occupational performance can be identified. Utilizing this concept, therapists should assess farmer's needs, desires, prioritize tasks, determine client factors, performance skills and patterns necessary for occupational performance in varying contexts (Turpin & Iwama, 2011).

3. Task:

Tasks are defined as sets of behaviors, unlimited in number, necessary to accomplish a goal and assist in the building of occupations and roles. Farmers identify which tasks are important and the meaning attached to each task. Varying contextual factors (temporal, cultural, physical, and social) influence task performance and perceptual satisfaction within performance achievement. Tasks within varying environments are analyzed in order to understand the client factors, performance skills, and performance patterns necessary to occupationally perform (Turpin & Iwama, 2011).

4. Occupational Performance:

Performance is defined as the association of the person, environment and occupational factors. Performance is dependent on the congruence, fit, and balance of the context, person, and task. Performance within varying contexts expands as persons acquire new skills, as physical barriers are removed/modified, when social supports are implemented, or when time is accommodative (Turpin & Iwama, 2011).

5. Intervention Strategies: These five approaches guide the OT and client to choose which strategy or strategies work best for each area of need.

a. *Establish/restore:* The goal of these intervention strategies is to develop and improve skills and capabilities for the farmer to engage in the necessary tasks needed on the farm (Brown, 2009).

b. *Adapt/modify:* If a skill cannot be newly established or completely restored, the focus of these intervention strategies is to work at changing environmental variables and task demands to promote an increase in performance range. The use of home, farmyard, or equipment modification checklists assist in adapting the environmental factors to create optimal fit (Brown, 2009).

c. *Alter:* This intervention strategy is aimed at altering the actual context in which tasks occur (Brown, 2009). The question here is; are there any contexts that can be altered to increase independence?

d. *Prevent:* This intervention strategy looks at changing the person, environment, or task variables to prevent negative outcomes (Brown, 2009).

e. *Create:* This intervention strategy focuses on creating circumstances that support optimal performance for all persons and populations (Brown, 2009). Could something be created within the environment, task and/or contexts that allow for optimal performance of the whole family not just the individual with a disability?

Individuals and his or her interactions through occupational performance are ever changing across different contexts (physical, temporal, cultural, and social). When utilizing this model, it is found to be more effective to change the environment or person-environment fit. The application of this process is to:

1. First identify and prioritize what the person wants or desires to perform. Acknowledge the desired occupational performance task through collaboration with the client (Brown, 2009).

2. Complete an assessment of barriers and facilitators within the person, environment, and task dynamic to determine deficits in performance. According to Brown (2009) occupational therapists should utilize assessments that evaluate and analyze the environment where occupations or tasks occur.

3. Finally, an essential assessment strategy, through the focus of this model, is to observe the performance by skilled observation within the pertinent context (Brown, 2009).

Organization of Manual

The manual is organized into 5 sections:

- Environment or Context
- Person
- Task
- Occupational Performance
- Resources

The environment/context, person, and task sections contain the following aspects

Assessment information

Assess individuals in a holistic manner utilizing components of collaboration with patients, activity, analysis, assessments, and interventions. Assessments are essential for determining client factors, performance, skills and patterns, and environmental influences on occupational engagement.

Remember when conducting assessments to do the following:

- Through use of an ecological model, prioritize the wants and/or needs of the farmer. This is vital in providing client-centered intervention. Once problems are identified, the clinician can use clinical judgments, resources, skilled services, and intervention objectives to best serve the client's needs and desires within his or her natural environment.
- After discovering task priorities, a task analysis is completed to understand the demands of the context, individual, and the interaction of both in task performance. Task analysis aids in comprehending requirements of each task and interactive nature of the person (farmer) and environment/context while performing tasks. Observation of tasks supplements interviews to gain the farmer's perceptions of functional performance while engaged in tasks in his or her natural context.
- Assess the performance skills and client factors (physical, psychosocial, and cognitive aspects of an individual) to assist in the return to farming. Assessment of performance in areas of occupation enables OTs to observe and understand what tasks are successful for the individual, factors facilitating engagement in tasks, and which aspects elicit difficulties and/or barriers in occupational performance. When OTs work in congruence with patients to address deficits and barriers limiting engagement in the occupation of farming; solutions, adaptations, and further recommendations can be made. Understanding the interaction of the person and environment in correlation with occupation extends the level of perception for what areas can be addressed for client success.
- When looking for assessments for use with farmers, consider assessments that are: easy to understand, short in duration, and conveniently carried out within the context of the farming. Also, look for assessments that analyze tasks, work positions, endurance, and other client factors or performance skills/patterns essential for carrying out work tasks. Considering the viewpoint of the client simultaneously with observation for assessing how the client views his or her success in performance and task engagement is also useful when thinking of assessments. Personal variables contributing to the success or failure of tasks can be identified through assessment of person, context, and performance of tasks. Assessing and evaluating the context in which the client is required to complete tasks allows the therapists to determine environmental features and develop intervention plans with the individual.

Interventions

Farmers' work entails a wide environmental component; the ecological model best suits the needs of this population. The Ecology Model of Human Performance identifies that individuals are both unique and complex; as is the case with the farming population. Viewing the context in which farmers engage can assist with not only understanding work composition, but also assist to gain farmer's perception and meaning of work tasks. The profession of OT can provide evidence-based interventions, technologies, and assistive devices/techniques to address the specific needs of individual farmers. This can be accomplished through implementing interventions to establish/restore, create, alter, adapt/modify, and prevent aspects within the work context.

The goal of each intervention is to find congruence among the person, context, tasks, and initiation of human performance. With this in mind, intervention strategies at the end of this guide focus on the interaction of the person with the environment, task, and performance in each area. Farmers often live or spend large amounts of time within the work environment, and farming tasks often cannot be moved from the environment. Focus on adapting, altering, or changing the existing environment to promote success is crucial. Assessments in this guide are meant to be completed within the natural environment of the farmer for optimal observation and analysis of task performance. Increasing independence is an essential motivator for involvement and change within therapy. Empowering the farmer to be an active and involved participant of treatment is an avenue for change; it is important for OT's to provide individualized treatment (Meyer & Fetsch, 2006).

Addressing the needs of farmers occurs through worksite modifications, ergonomics education, rehabilitation services, and if needed, community referral sources. Occupational therapists can provide assistance through interventions by implementing farm/ranch modifications, establishing structures and routines for managing chores, operating the farm independently, as well as addressing safety with maintaining and operating machinery (Meyer & Fetsch, 2006). Tables (located on pg. 60-61) based on the Ecological Model were developed to consider modifications, family aspects, and other client factors that may affect farmers' performance in meaningful tasks.

Willkomm (2001) observed an increase regarding independence at home, in the community, and in the work environment after providing educational materials. Educational and preventative measures serve as a strategy to reduce the risks of injury and illness as well as secondary injury. Meyer & Fetsch (2006) found a positive correlation with the implementation of therapy services, as opposed to no therapy services. Providing information, education, and services to promote productivity and finance management after disability result in the opportunity of returning to desired agricultural professions (Meyer & Fetsch, 2006).

Understanding and Removing Barriers

In order to make a bridge between the farmer and services, the OT must understand the potential barriers, and consider farmer's, therapist's, healthcare professionals' varying viewpoints. This allows the OT to anticipate and problem solve to enable the positive treatment experiences and outcome results for client. As OTs receive technical and professional training in urban centers, understanding the therapeutic relationship and subsequent treatment sessions from a farmer's viewpoint may be difficult. Provided below is a list of possible implications or barriers for farmers and OT's alike to consider.

Barriers: From a Farmer's Viewpoint

- Farmers are reluctant to seek any medical assistance because they view it as unnecessary; with an ideation that the issue will eventually subside (Griehop, Stiles, & Villanueva, 1996).
- Farmers often do not trust instructions from professionals that have no farming experience (Stave, Torner, & Eklof, 2007).
- Farmers often do not access programs put in place within their communities (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Varying perceptions on the effectiveness of participating in therapy (Wilkomm, 2001).
- Limited access to therapy services (School of Medicine and Health Sciences, 2013).
- The isolation of farmers within rural environments (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Getting to and from therapy often requires traveling far distances thus increasing financial costs (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Insurance costs (Prince & Westneat, 2001).
- Cost of psychological services (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Office hours of clinicians may not coincide with hours of farmers; therefore, making access to services increasingly difficult (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Education of caregivers at home in providing care and assisting in implementation of home exercise programs (Smallfield & Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Decreased family/social time due to therapy (Smallfield and Anderson, 2008; Hagglund, Clay, & Acuff, 1998).
- Stigma related to mental health diagnoses limiting or inhibiting farmers from seeking services (Schweitzer, Deboy, Jones, & Field, 2011; Shanteau, 2001).
- Farmers have found it difficult to access services due to extended waiting times, expensive services, services confusing to access, and the reluctance to disclose issues or seek assistance (Polain, Betty, & Hoskin, 2011).

Barriers: From a healthcare Professional Viewpoint


- Healthcare providers often do not understand the culture of farming, rural issues, or problems related to agriculture in order to provide appropriate treatment (Polain, Betty, & Hoskin, 2011).
- Only a quarter of North Dakota's population has experience on farms; most of the hospitals per capita are in denser populated areas of the state (Fargo, Grand Forks, Bismarck, Minot, and Williston) because these areas have the necessary resources to maintain a well-stocked hospital.
- There is a lack of communication between rural hospitals and urban hospitals (Friesen, Krassikouva-Enns, Ringaert, & Isfeld, 2010).
- Professionals acknowledged a limited, required skill-set, comfort and confidence when working with varying diagnoses and conditions treated (Smallfield & Anderson, 2008).
- The distance and time needed for travel to serve the rural populations effectively (Smallfield & Anderson, 2008).
- Traveling distances to access healthcare services for individuals within rural communities is anywhere between a half hour to several hours depending on the location of the farm or rural area (Smallfield & Anderson, 2008).
- The ability to keep and recruit new practitioners into rural areas (Smallfield & Anderson, 2008).
- The understanding of the culture, work environment, and required work skills is relatively unknown among the rest of the state's population, including healthcare workers.

The job of the occupational therapist is to minimize or eliminate as many of the barriers presented as possible for both the client and the clinician.

- Increased communication between service providers and health-care workers as well as improved understanding of rural culture is desired by the farming population (Stave, Torner, & Eklof, 2007).
- Rehabilitation professionals can facilitate communication by participating in advocacy efforts, collaborating with state surveillance systems, developing innovative outreach models, and participating in research to identify and remove barriers to community and reintegration (Hagglund, Clay, & Acuff, 1998).
- Eliminating or reducing the impact of these barriers will assist in developing a treatment plan. Considering the barriers presented for both healthcare providers and farmers will assist in bridging the gap found in the literature and in providing services to rural areas.

Environment or Context

Cultural, personal, physical, social, temporal and virtual elements that have the capacity to shape task performance (American Occupational Therapy Association, 2008).



Introduction to Farming Culture

“Farming is broadly defined as cultivating, operating, or managing a farm for profit. A farm can include raising stock for food or fiber, dairy, poultry, fish, fruit, produce, orchards, providing range and pasturage, growing and harvesting forages, crops, and grains, and ag-horticultural products” (Wilhite, (2003, p. 3). The definition indicates personal farming as a complex process requiring many different variables, skill sets, and capabilities to successfully perform within domains of varying environments.

The number of farms in America totals 2.2 million (EPA, 2013). Individuals outside of the agricultural industry often not understand the culture of farming; aspects such as equipment used, work ethic, terminology, and how time perceptions vary. Farmers gain profit through crop production, livestock, renting land, or Conservative Reserve Program (CRP) (North Dakota Legendary, 2010; North Dakota Economy, 2013). There are different types of farmers within the United States including dairy, diversified livestock (such as beef cattle, pigs, or sheep), mixed farms (including livestock, dairy, and crops), and arable (growing crops such as corn, soybeans, hay, and wheat) (North Dakota Legendary, 2010; North Dakota Economy, 2013).

Farming is considered one of the most dangerous occupations (Lundvall & Olson, 2001; Waldera Heckathorne, Parker, & Fatone, 2013). Meyer and Fetsch (2006) found that even after injury or disability, 88% of those farmers continued to engage farm activities at full or part-time intensity. This includes operating of field working on machinery, working on farm office tasks, repairing and maintaining machinery, and up keeping and maintaining general aspects of the farm.

North Dakota Farmer: Relevant Demographics

“North Dakota ranks 49th in population density when compared nationally, with 9.7 people per square mile” (School of Medicine and Health Sciences, 2013).

According to *The Second Biennial Report: Health Issues for the State of North Dakota* (2013), 52% of North Dakota’s population is within rural areas. Roughly half the state’s population is male, possibly due to the prevalence of the agricultural industry (School of Medicine and Health Sciences, 2013).

The State of North Dakota has an approximation of 32,000 farms/ranches within the state (North Dakota Legendary, 2010). The number of those living or working on farms is around 24% (North Dakota Legendary, 2010).

The age of farm operators/workers has increased from age 54 to 57 (EPA, 2013). The number of individuals age 65 or older are considered the principle operators of the farm; overall increasing since 1965 (EPA, 2013). The aging of this population increases the risk for secondary along with primary diagnoses, such as an individual developing arthritis or chronic back complications due to improper positions and ergonomics (Heaton et al., 2012).

Farming is among one of the most profitable economic ventures in the State of North Dakota. Within the State of North Dakota, the production of wheat, beef production, sugar beets, corn, grains, and soybeans are among the most prominent; comprising 25% of the state’s economy. North Dakota is ranked second in farm production (EPA, 2013; North Dakota Economy, 2013).



Farming Terminology

The environment of farming, as with all professions, has unique and specific language and terminology. To successfully work within this population, it's important to understand the terminology and concepts used by farmers. The use of jargon, words, or phrases specific to professions, can lead to misunderstanding, miscommunication, and frustration between both parties without clarification.

Provided below is a short list of definitions of equipment and tasks that are relevant to North Dakota farmers. This list is not comprehensive; however, it is a general introduction to terminology commonly used. This list was developed based from terms used within literature, and from experience of the creators of this guide. Information was obtained through the subjective experience of the two authors, farming family members of the authors, and information adapted from the *Encyclopedia Britannica*. It is organized into three primary areas: crop management, livestock management and overall farm management. Pictures have been provided when appropriate.

Crop Management

Combine

A complex farm machine that both cuts and threshes grain. Combines were not generally adopted until the 1930s, when tractor-drawn models became available. Originally designed to harvest wheat, but now used to harvest a variety of crops.



(Bartholomay, 2013)

Heads of Combines

Flex head-cutting soybeans, edible beans, chickpeas, and other grains. Follows the contour of the ground.

Corn head-used for combining corn.

All crop head-cuts row crop off at the ground (such as corn, soybeans, and sunflowers, chickpeas).

Sunflower head-combines sunflowers.

Pick up head- picks up the swath (crop cut down first) from the ground in order to combine the grain.

Straight head- used for cutting small grains specifically.



(Bartholomay, 2013)

Swather

Modified version of a combine and is self-propelled. Cuts grain into swaths which then allows plants to dry for combing. This is used as an alternative to combining if the farmer does not have a straight head for the combine. Swathers can also be used to cut grass or alfalfa to make hay.



(Ookaboo ,2009)

Skidster (or Loader)

Industrial use, construction, farm use to load materials (such as bales on a trailer), feed animals, or move snow. Different attaches can be added to the front of the loader.



(Bunn, 2013)

Tractor

A high-power, low-speed traction vehicle and power unit mechanically similar to an automobile or truck but designed for use off road. Tractors have a power-takeoff (PTO) accessory that is used to operate machinery and implements.



(Bunn, 2013)

Baler

Used to compress hay or straw into tightly packed square or round bales together with wire, twine, or net wrap.



(Ookaboo ,2009)

Baling

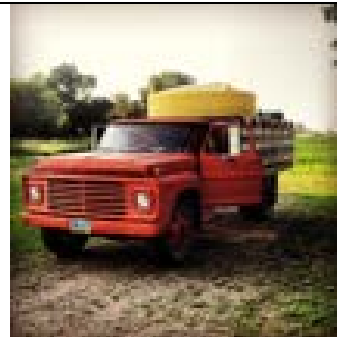
Baling, depending on the type of bale, is completed several times during the summer season. Hay can be either made from grass or alfafa. Grass hay can come from pasture land, ditches, and Conservation Reserve Program (CRP).



(Bartholomay, 2013)

Transporting Crops:

The use of grain trucks or semi's to move grain from off the field to either grain bin, storage, or elevator.



(Bartholomay, 2013)

Hopper
On a combine, holds the grain until the combine is able to come to a truck to dump.



(Ookaboo ,2009)

Grain elevator
Storage building for grain. Usually is a tall frame, metal, or concrete structure with a compartmented interior. Storage facilities on a farm are usually called granaries, crib, or a bin.



(Bunn, 2013)

Chisel Plowing
Equipped with narrow, double-ended shovels, mounted on shanks used to break up soil.



(Ookaboo ,2009)

Harrowing
Drag on the plow. Some use it now to incorporate chemical, some drag wheat fields at an angle to disperse chaffs.



(Ookaboo ,2009)

No-till drill or Till-less Agriculture

A cultivation technique where soil is disturbed only along the slit or in the hole where seeds are planted. Large quantities of selective herbicides are used with this method to kill weeds and remains of previous crops. This method reduces rate of soil erosion, equipment, fuel, and fertilizer needs, and time required for tending crops. Crops suited to the technique include corn and soybean.



(USDA, n.d.)

Disking

Use of round, convex blades to chop crop remains and blend/mix it in with the soil.



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Silage

Plants such as corn, legumes (alfalfa or oats), and grasses that have been chopped and stored. Corn silage is the most commonly used silage.








(Bartholomay, 2013)

Planting Crops



This includes buying and lifting the seed bags (average weight of seeds bags are around 45-50 pounds) and placing the seeds into the planter. Usually occurs in the spring (for exception of winter wheat which is planted from September to October). Planting season requires extensive time sitting in the tractor.







(Bartholomay, 2013)

<p style="text-align: center;"><u>Harvest</u></p> <p>The cutting of the planted crops, occurring from July to November depending on weather conditions and length of time required for varying crops to grow.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Pasture</u></p> <p>An area that can be used for grazing livestock or for different purposes, such as a wildlife preserve, or grass hay.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Acre</u></p> <p>An area of land that is equal to 4,840 square yards.</p>	
<p style="text-align: center;"><u>Quarter</u></p> <p>¼ of a section (160 acres) of land.</p>	
<p style="text-align: center;"><u>Section</u></p> <p>320 acres of land.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Bushel</u></p> <p>A unit of measurement of dry volume; a measurement of weight.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Auger:</u></p> <p>Conveys grain from a truck to the grain bin. It can also be used to transport the grain from the bin to the truck in order to transport stored grain. These vary in length according to the size of the bin. Can be PTO or electrical in nature.</p>	 <p style="text-align: center;">(Bunn, 2013)</p>

Livestock Management

<p style="text-align: center;"><u>Feeding Animals</u></p> <p>Can be done by hand, skidster, or tractor depending on the size of the herd. Hay, silage, or ground feed are used.</p>	 <p style="text-align: center;">(Bunn, 2013)</p>
<p style="text-align: center;"><u>Livestock</u></p> <p>Farm animals, with the exception of poultry, including cattle, sheep, pigs, horses, donkeys, and mules.</p>	
<p style="text-align: center;"><u>Cattle</u></p> <p>Make up the largest livestock group worldwide. Among those prominent in beef production are Hereford, Shorthorn, and Angus. The chief dairy cattle breeds are Holstein-Friesian, Brown Swiss, Ayrshire, Jersey, and Guernsey. Cattle feed primarily on pasture, hay, and other supplemented feed products.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Sheep</u></p> <p>Among the first animals to be domesticated. Sheep graze for food, eating both short, fine grasses and coarse, brushy weeds.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Pigs</u></p> <p>Are raised most often for meat products. Corn is usually the basic feed for pigs, although wheat, sorghum, oats, and barley are often included in their diet.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Horses/Donkeys</u></p> <p>Are bred for riding, show, and racing. Horses are used for farm work or for riding, the latter especially on large cattle ranches. Horses and donkeys feed on grass and other pasture growths, and their diets are usually supplemented with hays, grain (primarily oats), and other nutritive feeds.</p>	 <p style="text-align: center;">(Bunn, 2013)</p>

<p style="text-align: center;"><u>Poultry</u></p> <p>This is the raising of birds for meat, eggs, and feathers. Primary varieties of poultry include chickens, turkeys, ducks, and geese.</p>	 <p style="text-align: center;">(Bartholomay, 2013)</p>
<p style="text-align: center;"><u>Calving</u></p> <p>This is the time of year when cattle begin the process of having and raising young. Usually completed in the late winter early spring; weather conditions make calving more difficult.</p>	 <p style="text-align: center;">(Bunn, 2013)</p>
<p style="text-align: center;"><u>Herding Animals</u></p> <p>Animals are often herded to move to different pastures depending on the season. Animals can be herded on horseback, with four wheelers, trucks, or other off-roading vehicles. Herds of animals can include any of the livestock previously mentioned.</p>	
<p style="text-align: center;"><u>Transport Animals</u></p> <p>Using horse or cattle trailers to transport animals.</p>	
<p style="text-align: center;"><u>Artificial Insemination</u></p> <p>A cow is impregnated with the use of a bull's sperm only. It is done manually by the farmer or through use of a veterinarian. This option is used to synchronize calving times.</p>	
<p style="text-align: center;"><u>Branding</u></p> <p>After the brand of the farmer is registered, hot iron is shaped into the desired brand in order to deter theft of the herd and prove ownership.</p>	 <p style="text-align: center;">The copyright holder of this work, hereby grant the permission to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License (Wikimedia Commons, 2012).</p>
<p style="text-align: center;"><u>Vaccination</u></p> <p>A variety of shots used to defend cattle against vaccination and maintain health of the herd.</p>	 <p style="text-align: center;">(Bunn, 2013)</p>

Overall Farm Management

Farm Errands

Running farm errands can be done by the farmer or by the family members. Errands may include picking up parts for machinery, picking up seed for planting, picking up chemicals, or feed for animals on the farm.

Financial Planning

At the beginning of every year, an operating loan (or line of credit) may be taken out at a bank in order to cover spring costs. After harvest, this loan is paid off from income off the crops. Items purchased in the spring may include seed, fertilizer, chemicals, land rent, fuel, and feed.

Management

Maintaining day-to-day operations of the farm. This will depend on the time of year, type of livestock, amount of land farmed, number of hired help, and type of crop planted.



Environment & Context

Meyer and Fetsch (2006) identified that home modifications and assistive devices were the top reasons for farmers remaining/living on the farm after disability. The therapist can create solutions to prevent further complications due to the variables of the environment. Provided below are excerpts of assessments used to identify needs of farmers.

Ergonomic/Work Place Evaluation

Work place assessments are critical for reducing the advancement of diseases (such as arthritis), prevention of secondary injury, and other hazards within the context of the farm. Ask questions to understand the context more adequately. The more information that is discovered the more effective the evaluation. Farmyards, terrain, driveways/approaches, entryways, lighting, floors, physical layout of the work environment, and how work tasks are completed are to promote independence and engagement in occupation. In addition, incorporate and keep in mind all components of the environment (temporal, cultural, and social) in addition to the physical attributes. The following three assessments are examples of ergonomic based evaluations that that may assist with identification of environmental needs.

Ergonomic Checklist for Agriculture:

This is an example of a checklist that analyzes varying areas within the agricultural realm. Areas addressed are storage and handling of materials, workstations, tools, and machine safety. The checklist analyzes agricultural vehicles, physical environment, control of hazardous chemicals, and protection equipment. Other areas include welfare facilities, work organizations and schedules, as well as family and community cooperation. When using this evaluation tool, one must observe the situation and determine what areas are valid in the assessment process (Hunsrud & Holubok, 2012). This resource can be obtained through the guide *A Lifetime of Work: A guide to Health and Wellness on the Farm* developed by Andrea Hensrud and Gregory Holubok Jr. located at the Harley French Library.

Work Sites: Modifying your farm or ranch:

This consists of analyzing farmyards, access, entries and exits, lighting, noise, environmental control, floors and surfaces, arrangement of workspaces, and materials handling (Hensrud & Holubok, 2012). This resource can be obtained through the guide *A Lifetime of Work: A guide to Health and Wellness on the Farm* developed by Andrea Hensrud and Gregory Holubok Jr. located at the Harley French Library.

Extension Responds: Stress and Safety:

This is an example of a quick reference addressing aspects to consider when farmers are preparing for spring planting. This quick sheet looks into the lighting and marking for roadway travel, shields, guards, hydraulic systems, mechanical locks, wheels and tires, chemical application equipment, and small environmental changes (Purschwitz, n.d.). This resource can be obtained through the University of Wisconsin-Extension services on the Agriculture and Natural Resources website. The quick reference can be obtained at http://www.uwex.edu/ces/ag/issues/stress-safety/preparing_machinery.pdf.

Home Evaluation

Home evaluations are completed in order to reduce injuries and other hazards within the home. Modifications can be simple or complex in nature. For example, the addition of grab bars within the bathroom or railings on stairs are simple additions. Widening doorways or removing structural barriers are more complex.

Modifying your Home Assessment

This is an example of a resource that identifies benefits to assessing one's home, a checklist for assessing one's home, as well as modifications for the home setting. This resource tool analyzes all aspects of the home as well as utility, general applications, and home safety (Hensrud & Holubok, 2012). This resource can be obtained through the guide *A Lifetime of Work: A guide to Health and Wellness on the Farm* developed by Andrea Hensrud and Gregory Holubok Jr. located at the Harley French Library.

Home Safety Self-Assessment Tool (HSSAT)

The HSSAT is a way to assist with creating a safer home environment for individuals. It is comprised of three sections: a home safety assessment checklist, a list of home modifications, and services that are available locally (Aging and Technology Resource, 2013). Information on this assessment can be found on the *Aging and Technology Research website*. This assessment tool can be obtained at <http://agingresearch.buffalo.edu/hssat>.

Life Stressor and Social Resources Inventory- Adult Form

This assessment analyzes and assists practitioners in identifying the relationship of life stressors and social resources; evaluating the impact of these factors on health and well-being. It can be accomplished in any setting. The average time for administration is 45 minutes for self – administration while the interview format of the assessment is 45-90 minutes, including 20 minutes for scoring. This assessment is suited for individuals with psychiatric, medical, or behavioral issues (Asher, 2007, p. 721). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; further information and pricing can be obtained from <http://www4.parinc.com/Products/Product.aspx?ProductID=LISRES> (PARI, 2012).

Social Climate Scale: Family Environment Scale, 3rd Edition

The Family Environment Scale analyzes the social-environmental characteristics of families. It contrasts perceptions of family members to assess family strengths, problems, and identify important issues for treatment of the whole family unit. This assessment can be done in any setting. The average time for administration is 15-20 minutes. This assessment is best suited for any diverse family situation (Asher, 2007, p. 729). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained by visiting the website http://www.chce.research.va.gov/measures_fes.asp and contacting Rudolf Moos, Ph.D. for instruction/manuals of this assessment (U.S. Department of Veterans Affairs, 2009).

Person

An individual is comprised of factors and skills within sensorimotor, cognitive, and psychosocial domains and are capable of attaching meaningfulness to tasks within specific context. Included in this are the performance patterns that have developed based on client factors, performance skills, and context and environment (American Occupational Therapy Association, 2008).

Culture of Farming

This speech written by Paul Harvey in 1978 shows the culture, resiliency, and dedication to the occupation of farming. It is a trademark of the culture of farmers and an overview of the work completed on a daily basis.

This introduces what it means to be a farmer, the meaning of family dynamics, and the community in which the farmer resides.

“And on the 8th day, God looked down on his planned paradise and said, "I need a caretaker." So God made a farmer. God said, "I need somebody willing to get up before dawn, milk cows, work all day in the fields, milk cows again, eat supper and then go to town and stay past midnight at a meeting of the school board." So God made a farmer. "I need somebody with arms strong enough to rustle a calf and yet gentle enough to deliver his own grandchild. Somebody to call hogs, tame cantankerous machinery, come home hungry, have to wait lunch until his wife's done feeding visiting ladies and tell the ladies to be sure and come back real soon -- and mean it." So God made a farmer. God said, "I need somebody willing to sit up all night with a newborn colt. And watch it die. Then dry his eyes and say, 'Maybe next year.' I need somebody who can shape an ax handle from a persimmon sprout, shoe a horse with a hunk of car tire, who can make harness out of haywire, feed sacks and shoe scraps. And who, planting time and harvest season, will finish his forty-hour week by Tuesday noon, then, pain'n from 'tractor back,' put in another seventy-two hours." So God made a farmer. God had to have somebody willing to ride the ruts at double speed to get the hay in ahead of the rain clouds and yet stop in mid-field and race to help when he sees the first smoke from a neighbor's place. So God made a farmer. God said, "I need somebody strong enough to clear trees and heave bails, yet gentle enough to tame lambs and wean pigs and tend the pink-combed pullets, who will stop his mower for an hour to splint the broken leg of a meadow lark. It had to be somebody who'd plow deep and straight and not cut corners. Somebody to seed, weed, feed, breed and rake and disc and plow and plant and tie the fleece and strain the milk and replenish the self-feeder and finish a hard week's work with a five-mile drive to church. "Somebody who'd bale a family together with the soft strong bonds of sharing, who would laugh and then sigh, and then reply, with smiling eyes, when his son says he wants to spend his life 'doing what dad does.'" So God made a farmer.” -Paul Harvey (Franke-Ruta, 2013).

This speech can be accessed through a public domain at

[http://www.theatlantic.com/politics/archive/2013/02/paul-harveys-1978-so-god-made-a-farmer-speech/272816/.](http://www.theatlantic.com/politics/archive/2013/02/paul-harveys-1978-so-god-made-a-farmer-speech/272816/)



Cultural Tendencies

“A farmer is defined as a person who is:

1. Actively engaging in farming (or who desires to become actively engaged in farming i.e. beginning farmer, eligible for socially disadvantaged programs, part of a vocational plan or training) and;
2. Deriving taxable income from such activity (or planning to derive taxable income from such activity).
3. Or an individual who is retired from farming” (Wilhite, 2003, p.3).

- Farmers never really retire; instead, they assist with less strenuous activities, such as transporting crops or tractor work. If farmers continue farming past ‘the retirement age’, it is often due to their own motivation and determination to continue farming (Meyer & Fetsch, 2006).
- Farmers are resourceful, creative, and problem-solves when encountering obstacles. Such as when farmers are fitted with assistive devices; in order to continue farming, a farmer often will adapt the assistive devices or prosthetic without consulting a healthcare provider (Waldera, Heckathorne, Parker, & Fatone, 2013)
- Workers based the cause of injury more directly on external factors that were out of their control such as faith, God, or weather (Grieshop, Stiles, & Villanueva, 1996).
- Other characteristics of farmers include being stoic, independent, and upholding traditional family roles (Polain, Berry, & Hoskin, 2011).
- Individualism is a way life with loyalty to family and the farming enterprise of the utmost importance (Polain, Berry, & Hoskin, 2011).
- Farmers may alter or constrain their perception of safety depending on personal, cultural, or social factors that limit acting in a safe manner consistently (Stave, Torner, & Eklof, 2007).
- Farmers may distrust safety instructions because the instructions are made from professionals with no farming experience (Stave, Torner, & Eklof, 2007).
- Weather contributes to stress, and affects the amount of time farmers have to complete work.



Family

Farming is a family affair; it is within the culture of farming to pass down family farms from one generation to the next. Family members assist the farmer in completing farming tasks, errands, and running/repairing equipment. Roles may ‘blur’ as family members take on multiple tasks to ensure the operation of the farm to run (Fraser et al., 2005). All persons of the farm are culturally expected to contribute to the success of the farming enterprise (Fraser et al., 2005). Wives often take on employment outside of the farm for a guaranteed income, health insurance, and other benefits that farmers often do not possess (Fraser et al., 2005). There are physical and mental health tolls that affect the family members. Farming often entails extensive hours consisting of strenuous, physical, and manual labor. Farmers today do not rely on family as much as previous generations due to the increase in technology. This leads to more opportunities to be physically isolated from others, even family. Family support and ties lessened the mental impact caused by isolation (Polain, Berry, & Hoskin, 2011).

Assessment Focus

When assessing the person, it is important to evaluate all aspects of the diagnosis with regards to the environment/context and tasks. This section includes common diagnoses within the farming population, general screenings and assessments with which to assess the psychosocial, physical, and cognitive factors of the client. This section is organized as follows:

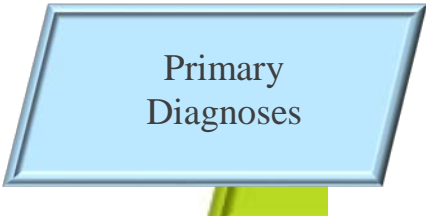
1. Psychosocial Factors
 - Mental Demands
 - Primary Diagnoses
 - Screenings and assessments
2. Physical Factors
 - Physical Demands
 - Primary Diagnoses
 - Screenings and assessments
3. Cognitive
 - Cognitive Demands
 - Primary Diagnoses
 - Screenings and assessments

1. Psychosocial Factors

From the literature review, the authors deduced mental health as an underserved area within the profession of farming. Often, farmers see having a mental health disorder as a weakness; therefore will not go in to receive mental health services let alone disclose they are suffering from a mental health issue. The income from farming is not guaranteed from year to year, as it is with most professions. Weather is a huge contributing stress factor for each part of the farming process as it is inconsistent and unpredictable. Stress, isolation, family stressors, lack of help, economic issues, finances, and health are also factors that combine to make mental health issues (Fetsch, 2012). Other signs of stress include variation from routines, increase in illness or disability, appearance of the person and farmstead, number of accidents increases, and care for livestock decreases (Fetsch, 2012). If stress is not addressed it may manifest into a chronic disorder and affect individuals in somatic complaints. The quality of life and satisfaction with task performance decreases, as symptoms of anxiety, depression, and anger increase (Fetsch, 2012).

Price and sales change in regards to input (cost of planting and obtaining fertilizer or spraying needs) and output (actual price received for crop at the end of harvest) imposing stress and perseveration of finances on the minds of farmers throughout the year. Prices fluctuate depending on demand, global economies, local economies, and weather patterns throughout the nation (for example droughts in one area of the country often means higher prices for the failed crop)(Fraser et al., 2005).

Economic issues, environmental changes, commodity markets, cost of upkeep on machinery, and production costs are all stressors that can contribute to depression, suicidal ideation, or other psychiatric illnesses that effect farmers (Fraser et al., 2005). Farming has also become more increasingly difficult due to increased amount of paperwork, decreased prices of crops, increased financial cost to run farms, increased government regulations, and the perception of outsiders of farmers (Raine, 1999). Suicidal ideation and suicide have higher rates among farmers than the general population (Fetsch, 2012). This could be from access to more lethal means of suicide, overwhelming demands of family and farm, difficult finances, transition to 'retirement', or shortage of healthcare professionals in the farming community (Fetsch, 2012).



Primary Diagnoses

Depression, suicide, suicidal ideation, anxiety, and general mental health issues are disorders that have been found to affect the farming population more so than the general public (Fraser et al., 2005). Alcoholism is a common coping mechanism within rural areas (The Better Health Channel, 2014). Because of all the risk factors listed above, understanding the disorders can aid in providing interventions. The following diagnoses are those seen most commonly within the farming population. Provided are descriptions of each diagnosis, possible causes, and implications of each diagnosis for the farmer.

- **Alcoholism**

This is often seen as ‘self-medicating’ from a farmer’s viewpoint. As mental health is an area lacking support, turning to alcohol is an easier coping mechanism than facing the possible stigma related to being diagnosed with a mental health disorder. Drinking is an ineffective coping strategy farmers may use when stressors become overwhelming. The effects of long-term stress, may lead farmers to begin consuming more alcohol than is healthy. Possible stressors may stem from extreme weather changes, changes in the markets, finances, and isolation. There is also a link between alcoholism and major depression and anxiety disorders. Men, especially older men, in rural areas drink more than those in urban settings (The Better Health Channel, 2014).

- **Major Depression**

The *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition, depicts major depression as having a depressed mood/loss of interest or pleasure in daily activities for more than two weeks (American Psychiatric Association, 2013). Mood constitutes a change in a person's baseline. Areas that are impaired include social, occupational, educational with a multitude of symptoms displayed by individuals. Symptoms include depressed mood or irritability most of the day and nearly every day as indicated by the individual or through observation by others. Farmers may inaccurately describe depression as stress; therefore disregard the effects of depressive symptoms on productivity, relationships, and overall well-being. Farmers appear to seek help from family members rather than healthcare professionals. This could be due to fear of stigma, lack of confidentiality within rural communities, or unwillingness to admit there is an issue. According to a power point by Fetsch (2012), North Dakota farmers had depression levels near twice that of other rural populations in the past. The implications of this statistic are important for healthcare providers to consider when implementing services.

- **Generalized Anxiety Disorder**

Another disorder seen in the farming population is Generalized Anxiety Disorder (GAD). Generalized Anxiety Disorder encompasses excessive anxiety and worry, occurring more often than not over a six month time-span; concerning a variety of activities. Sanne et al. (2003) conducted a study to determine and distinguish if farmers experience greater levels of anxiety and depression and, if so, to determine the varying factors. Overall factors analyzed were work-related factors such as wages, physical demands, and psychological factors; demographics, lifestyle, and income to determine levels of anxiety and depression. The authors found that male farmers tended to have higher levels of anxiety as compared to non-farmers and female farmers. It was also found that both genders of farmers experienced higher levels of depression and depressive symptoms as compared to non-farmers. Of all groups tested, male farmers that raised livestock had the highest levels of depression overall. Male farmers reported working more extensive hours and accumulating lower income in unison with heavier manual labor and limited educational level in comparison with non-farmers. A notable feature of being affected by stress is loss of the spirit and sense of humor (Fetsch, 2012).

Screenings & Assessments

The purpose of these screenings and evaluations is to analyze behaviors, thought processes, and other mental health factors relevant to this population. These assessments enable therapist to interact and work with individuals who have difficulties in these specific areas to tailor treatment, environment, and changes necessary to facilitate increased quality of life. Below are examples of OT evaluations that would work well with the cultural and personal values of the farmer.

Beck Depression Inventory, 2nd Edition (BDI-II)

The use of this assessment is to measure the severity of depression in the adult and adolescent population. This assessment can be done in any quiet environment. The average time for administration is 5-10 minutes. This assessment is best suited for the varying ages of 13-80 that have clinical or nonclinical populations suspected with depression (Asher, 2007, p.575). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; more information on obtaining and purchasing this assessment can be found at http://academicdepartments.musc.edu/family_medicine/rcmar/beck.htm.

Caregiver Strain Index

The use of this assessment is to understand the perception of caregiver's strains, feelings, and possible overload when caring for others. This assessment can be completed within the home environment. The average time of administration was not specified. This assessment is best suited for any caregiver situation that may benefit from assessment (Asher, 2007, p. 578). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from www.hartfordign.org with e-mail notification of usage to hartford.ign@nyu.edu. This material can be used for not-for-profit educational purposes only, and by citing *The Hartford Institute for Geriatric Nursing, Division of Nursing, New York University* as a source.

General Self-Efficacy Scale

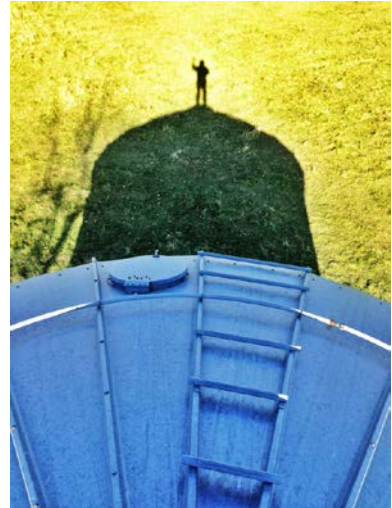
The use of this assessment is to evaluate an individual's perceived personal competency, or self-efficacy/beliefs, in relation to the ability to deal with a variety of stressful situations. It also assesses an individual's ability to cope with daily issues and adapt to stressful life events. The average time of administration was not specified. This assessment is best suited for individuals 12 and older that may be dealing with stressful situations (Asher, 2007, p. 593). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from <https://www.nationalserviceresources.gov/videos/peer-mentoring-recruiting-training-and-ensuring-longevity>, with further instruction on usage and citation of this scale.

Internal/External Scale

This assessment analyzes an individual's perception and belief of internal versus external controls over the consequences of one's personal actions. The average time of administration was not specified. This assessment is best suited for older adolescents and adults (Asher, 2007, p. 596). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; more information can be found at <http://www.parqol.com/page.cfm?id=150> (PARQol, 2014).

2. Physical Factors

Farming is a physically demanding occupation. Bilateral strength, endurance, fine motor coordination, eye-hand coordination, balance, and range of motion in all planes of motion are necessary for everyday work as a farmer. Peterson, Ramm and Ruzicka, (2003) found that the most common diagnoses addressed by OT's in rural areas were as followed: cerebral vascular accident, total hip replacement, and total knee replacements. Meyer and Fetsch (2006) found that the top four disabilities that farmers experience are arthritis, amputations, spinal cord injuries (SCI), and Back injuries.



Primary Diagnoses

As mentioned prior the top four physical disorders suffered by farmers are arthritis, amputations, spinal cord injuries, and back injuries. It is important to understand what the top diagnoses are for farmers and the implications for practice due to the prevalence of each diagnosis. The following diagnoses are those seen most commonly within the farming population. Provided are descriptions of each diagnosis, possible causes, and implications of each diagnosis for the farmer.

- **Arthritis**

Farmers are at an increased risk for developing osteoarthritis of the hip and knee as compared to workers of other industries due to the awkward work positions, heavy lifting, repetitive motions, prolonged kneeling, and forceful work tasks farmers complete daily (Heaton et al., 2012). It is important to understand what causes arthritis within farmers in order to adapt, change, or remove items within the work environment causing increased stress on the body. Modifying work positions may aid in decreasing the prevalence of arthritis among farmers; something home and work modifications, assessments, and interventions would address. There is a high prevalence of farmers treated for arthritis, about 53% of patients seen by physicians suffered from arthritis (Prince & Westneat, 2001).

- **Amputations**

For farmers with amputations, use of prosthetics aids in completion of work tasks. The simpler the prosthetic, the better it will work for the farmer. Farmer's think that, "simpler devices are more durable" or that "high tech devices are too complicated; complicated parts can fail or get clogged with dirt" (Waldera, Heckathorne, Parker, & Fatone, 2013, p. 210). Farmers need devices that are low in cost, able to withstand the unpredictable environment, and durable and stable enough to complete farming tasks ((Waldera, Heckathorne, Parker, & Fatone, 2013).

Farmers are at increased risk for secondary complications from prosthetic due to overuse of the uninvolved limb, prosthetic becoming entangled within farm equipment, and further injuries to the residual limb (Waldera, Heckathorne, Parker, & Fatone, 2013). Power take off (PTO) shafts are a high risk for amputations, especially if there is not a guard in place, because of fast moving, rotating parts that can easily catch loose fitting clothing. Older equipment often does not have safety guards in place. In fact, a machinery dealer cannot sell a PTO without a shaft due to safety reasons. Obtaining these safety guards may be an extra step farmer's disregard as they may deem other tasks as more important to do. Asking questions about PTO aspects on machinery would assist in decreasing risk of injury and addressing all safety aspects of the task and context.

An example of a prosthetic suitable for farmers needs is a Hosmer Work Hook. A Hosmer Work Hook has many different attachments that would be ideal for farmers working as it is durable, simple, and easy to use/switch attachments. The options for attachments include a nail holder, round opening (in order to hang onto round objects, such as a shovel handle), serrated split pale hook, knife holder, and chisel holder (Hosmer Termian Devices, 2014).

Spinal Cord Injuries

Spinal cord injuries are the second disabling condition found among farmers (Meyer & Fetsch, 2006). It has been estimated that between 4,500 and 6,000 person directly involved in farming and/or ranching have a SCI (Hagglund, Clay, & Acuff, 1998). Injuries of this nature are the second most disabling condition found among farmers (Meyer & Fetsch, 2006). Understanding the challenges farmers face when reintegrating back to the farm and home after a SCI can assist in proper treatment planning and activity analysis. Some of these challenges include loss of movement, blood pressure issues and clotting potential, sensation discrepancies, bladder/bowel control or infection, increased pain due to nerve damage, and difficulty breathing, all of which can impede the farmers' ability to return home and to farming (Mayo Clinic Staff, 2013; National Ag Safety Data Base, 2002).

Sustaining an SCI is debilitating to farmers and their overall wellbeing because of the client factors and performance patterns/skills affected. The interaction of the farmer and the environment lead to factors that played a significant role in obtaining a SCI. These include type of equipment, flooring, ladders, and poor building repairs (Reed & Kidd, 2009). The most common types of accidents resulting in an SCI include falls, tractors (turn overs, falls, pulling out stumps or other stuck machinery), and inattention (Reed & Kidd, 2009). Interactions with the environment leading to SCI include uneven terrain, falling from heights, all terrain vehicles (ATV) and other equipment use, injuries resulting from livestock (being crushed or kicked) or rushing through farm-work due to weather time-constraints (Reed & Kidd 2009).

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estimated that between 4,500 and 6,000 person directly involved in farming and/or ranching

Back Injuries

Back injuries are among the top reasons for disability on the job, being second most commonly complained neurological ailment within the United States; headaches being the first (National Institute of Neurological Disorders and Stroke, 2013). These injuries can be acute or chronic; acute being caused by trauma to the lower back or arthritis, sudden jolts, or other stress on the spinal bones and tissues that will last from days to weeks while chronic injuries is pain that persists more than three months that is progressive (National Institute of Neurological Disorders and Stroke, 2013). Often over-exerting oneself while lifting, pushing, or pulling objects and using improper body ergonomics are the most frequent causes of back injury within the population of farming (Shelley & Dennis, 1993). Back injuries are preventable if proper ergonomics and body mechanics are used and farmers

do not rush to complete tasks, and their overall wellbeing because of the client factors an

nce patterns/skills affected. The interaction of the farmer and the environment will lead to facto

However, like with arthritis, work modification and use of assistive devices can lessen the likelihood of injury or secondary injury, sitting or standing in a slouched position then attempting to lift a heavy object can lead to back, even leg, problems (Shelley & Dennis, 1993). Lifting objects carefully, using leg muscles instead of the upper body to lift, push, pull, or reposition objects, providing adequate support for the lower back, maintaining an upright posture while walking, wearing supportive shoes, stepping down backwards on ladders, and carrying heavy items close to the body not far away are tips that can be used by patients and clinicians alike (Shelley & Dennis, 1993).

Screenings & Assessments

The profession of occupational therapy has much to offer the realm of farming. Thinking of the whole person, not just parts or components, aids in promoting change and increased success with treatment. Physical assessments adequately determine individual's ability to participate in tasks. Through assessment the risks of developing an injury or reinjures will ultimately diminish. Utilizing activity analysis, identifying performance, skills, patterns, client factors, and all entities that comprise work functions, OT's can more adequately determine the physical demands placed on the farming population. Below are listed some examples of screens or assessments that can be completed with this population due to relative ease of administration and time required for the test.

Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH)

The QuickDASH is a 30 item self-reported, outcome measure for individuals suffering from single or multiple musculoskeletal upper-limb disorders (Fan, Smith, & Silverstein, 2011). This assessment is available for free download on the world wide web by entering QuickDASH into the search engine. The website <http://dash.iwh.on.ca/quickdash> is useful for obtaining this assessment.

Safe Tractor Assessment Rating System (STARS)

The STARS is designed to analyze the overall safety features of tractors and to motivate improved design in tractors. The checklist analyzed aspects such as rollovers, run overs, user protection, information and controls, and pedestrian protection (Day et al., 2005). This item can be available at <http://trove.nla.gov.au/work/7374356?selectedversion=NBD26326899>

Range of Motion (ROM)

General ROM assessments are useful to use when completing task analysis of farmers prioritized tasks. This will allow for opportunities to alter and modify existing contextual factors to enhance ROM capabilities.

Manual Muscle Testing

Because contextual and personal factors of farmers require intense physical labor, testing the strength of affected muscles can better tailor interventions.

Provocative or Special Testing

Provocative or other special tests can be useful in certain physical disorders. This can be used to assess the shoulder, elbow, wrist, and hand. Examples may include the Empty Can Test (involvement in the supraspinatus muscle), Cozen's Test (indicator of lateral epicondylitis), or Finkelstein Test (indicator of deQuervain's disease). These and numerous other tests can be obtained in the *Special Test for Orthopedic Examination 3rd Edition* (Konin, Wiksten, Isear, & Brader, 2006).

Arthritis Hand Function Test (AHFT)

This assessment measures pure and applied strength and dexterity in order to assess the effectiveness of treatment interventions on hand function. This assessment also allows the therapist to document client progress. It can be used to measure pre and post outcomes. The only requirement for setting and completion is the provision of a table to write on. The average time of administration is 20 minutes. This assessment is best suited for adults over age 20 with rheumatoid or osteoarthritis (Asher, 2007, p. 285). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained by contacting Catherine Backman and Hazel Mackie at School of Rehabilitation Sciences, University of British Columbia, T325-2211 Wesbrook Mall, Vancouver, British Columbia V6T2B5, Canada (Poole, 2011).

Epic Lift Capacity Test

This assessment determines the maximum lifting and lowering capacities of an individual. It also looks at client's safety in performing lifting tasks that are done 8-10 times in a day. This assessment is completed in settings where an individual is able to stand in a prescribed position, with equipment set in three vertical ranges. The time required to administer the assessment is 35 minutes. This assessment is best suited for individuals that are required to be medically stable and between the ages of 18-60 and between the height of 58" and 77" tall (Asher, 2007, p.148). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from http://epicrehab.com/products/index.php?main_page=product_info&cPath=9&products_id=65 (EpicRehab LLC., 2014).. This assessment does require a certification.

ErgoScience Physical Work Performance Evaluation


This assessment measures the functional capacity of an individual's ability to perform a variety of work-related physical activities. It is also used to determine the ability to match job requirements or to self-limit behaviors during tasks. The assessment should be completed in settings where the activity should take place with the required equipment. The average time for administration is 3-4 hours with 15 minutes needed for scoring. This assessment is best suited for all adults (Asher, 2007, p. 150). This assessment does require a certification. Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from http://www.ergoscience.com/service_details.php?serviceID=001 (ErgoScience, 2014).

Valpar Component Work Sample Series

This assessment is used to generate information pertaining to upper extremity and visual coordination functions. The required setting for this assessment was not specified. The average time for administration is 20-90 minutes. This assessment is best suited for individuals with or without disabilities (Asher, 2007, p. 163). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; more information and where it can be obtained from http://www.valparint.com/work_sam.htm (Valpar International Corporation, 2014).

3. Cognitive Factors

Cognition is essential to the engagement in everyday performance capabilities of individuals. Cognition refers to the processing of information initiated and completed within the brain. Performance skills include Judgment, sequencing tasks, problem solving capabilities, attention, addressing multiple tasks, attention span, memory, and executive functioning (American Occupational Therapy Association, 2008). According to American Occupational Therapy Association (2006), cognitive functioning can be assessed through participation of a task within the context that occupation performance occurs. When there has been a loss of function in mental performance skills a cognitive dysfunction has occurred. Cognitive dysfunction may occur across the lifespan; it can be acute or chronic, stagnant or progressive, with varying levels of impairment for individuals (Gordon et. al, 2013). The primary disorders addressed by occupational therapists noted by Gordon et al. (2013) were cerebral vascular accidents, traumatic brain injuries (TBI), and dementias.



Primary Diagnoses

- **Cerebral Vascular Accidents**

Strokes are related to a multiple number of risk factors, such as age, family history, ethnicity, or medical history that could be preventable (NHS, 2012). There are two types of strokes, ischemic and hemorrhagic; an ischemic stroke is the most common caused by a blood clot blocking blood flow to the brain (NHS, 2012). Hemorrhagic strokes are about 5% of cases and occur when a blood vessel bursts within the brain and causes a brain bleed; often, this type of stroke is due to high blood pressure.

After stroke, tiredness/fatigue, pain, sequencing, communication, and general mobility around the farm environment may be difficult for farmers (Jepsen, McGuire, & Poland, 2011). Especially if farmers plan to return to the work environment, addressing the above client factors will assist in maintaining the safety. After suffering a stroke, individuals may experience psychological stress in the form of anger, depression, anxiety, or frustration (NHS, 2012).

- **Traumatic Brain Injuries**

Traumatic Brain Injuries (TBI) happen to 1.5 million Americans each year, with roughly 5.3 million Americans living with the after effects of TBI (Farm Again, 2013). Traumatic brain injuries occur more so in men than in women and in individuals between the ages of 15 to 24 and over the age of 75; vehicle crashes, falls, or violence are among the leading causes of TBI (Farm Again, 2013). These can be either closed or open head injuries; closed injuries occur when the force of the impact causes the brain to bounce off the skull while open injuries occur when something penetrates the skull and the limitations are based off the area affected (Farm Again, 2013). This is an often misunderstood disorder as symptoms and subsequent limitations may not be apparent until later on; for example, if an individual suffers a closed head injury and chooses not to receive services, memory, problem solving, or other cognitive functions could be affected without anyone knowing.

- **Dementias**

Dementia is an overarching term for a decrease in cognitive and mental abilities that can be mild or severe in nature. Alzheimer's disease is the most common form of dementia, accounting for 60-80% of cases while vascular dementia (occurring after a stroke) is the second most common form of dementia (Alzheimer's Association, 2014). The cause of dementia is due to damage to brain cells; depending on which cells are affected will depend on what cognitive functions are interrupted (Alzheimer's Association, 2014). Dementia can be caused by factors that are reversible, such as vitamin deficiencies, medications, or thyroid problems (Alzheimer's Association, 2014). Common symptoms of dementia include difficulty with memory, communication, attention span, visual perception, or reasoning (Alzheimer's Association, 2014).

Screenings & Assessments

Cognitive assessments address the areas of attention, memory, judgment, insight, and executive functioning of individuals. These tests can be utilized across a wide variety of clients to ensure safety, security, and assist with preventative measures and modifications as needed to accommodate farmers and their families.

Canadian Occupational Performance Measure (COPM)

This assessment addresses self-care, productivity, and leisure. It also assists in detecting changes in client's self-perception of occupational performance over time. This assessment can be used as a measure for pre and post outcomes. This assessment can be completed in whatever setting or context needed. The required time for administration is 30-40 minutes. The assessment is best suited for clients with a variety of disabling conditions (Asher, 2007, p. 33). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained in full form from <http://www.caot.ca/copm/index.htm> (Law et al., 2005).

Behavioral assessment of Dysexecutive Syndrome

This assessment analyzes executive function skills, including areas of planning/organizing, problem solving, and decision-making. The assessment is able to challenge real life activities and time frames. It is also used to evaluate an individual's awareness of behavior issues caused by executive dysfunction in daily life situations. The assessment is best completed at a table. The required time for administration is one and a half hours. This assessment is best suited for individuals whom have acquired a brain injury or disease or mental health conditions (Asher, 2007, p.499). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from <http://www.pearsonclinical.com/education/products/100000427/behavioural-assessment-of-the-dysexecutive-syndrome-bads.html> (Wilson et al., 2014).

Cognitive Linguistic Quick Test

This assessment is a quick screening instrument that provides information pertaining to cognitive-linguistic function, attention, memory, language, executive functioning, and visual spatial skills. This assessment is best completed in a seated position. The average time for administration is 15-30 minutes. This assessment is best suited for individual's with acquired neurological dysfunctions including: stroke, traumatic brain injury, or dementia (Asher, 2007, p.513). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from <http://www.pearsonclinical.com/language/products/100000459/cognitive-linguistic-quick-test-clqt.html> (Helm-Estabrooks, 2001).

Cognitive Performance Test

This assessment evaluates activities of daily living and independent activities of daily living skills that require working memory and executive functional skills. The assessment is best completed in a standardized setup and position described for each task. The required time for assessment is 15 minutes to several hours depending on task. This assessment is best suited for individuals with Alzheimer's disease and/or other dementias and psychiatric diagnoses (Asher, 2007, p. 515). Information on this assessment can be found within the book *Occupational therapy assessment tools: An annotated index (3rd ed.)*; it can be obtained from <http://www.maddak.com/cpt-cognitive-performance-test-p-27823.html> (Maddak Ableware, 2014).

Task

Sets of behaviors, unlimited in number, necessary to accomplish a goal and assist in building occupations and roles. The term task is used in this model to facilitate interdisciplinary collaboration (American Occupational Therapy Association, 2008).

Farming Tasks

As mentioned previously, farming is one of the most dangerous occupations that an individual can be employed in, with farm injuries accounting for 160,000 of work that is done on and off the farm (Lundvall & Olson, 2001; Willkomm, 2001). Farming tasks that have been associated with more long-term injuries (such as arthritis or amputations) include farm maintenance/machinery repair, fieldwork, crop production, and transportation (Heaton et al., 2012). Tasks also change depending on the time of year. Whatever tasks are completed within the work environment and assessing the accompanying physical, mental, and familial demands can assist practitioners and patient's alike in creating an effective intervention session in order to further understand farmers. Terminology provided within the environment/context section coincides with farming tasks.

Within the Ecological Model, defining which tasks are important and meaningful assist in developing a treatment plan. The OT and the farmer can collaborate to identify which tasks are important and the meaning attached to each. All parties involved within the farming assessment, need to understand the risks involved and provide enough information for the patient to make an informed decision.

Occupational Therapy Task Checklist

Just as farmers have tasks that are important to them, there are tasks therapists should consider when working with farmers. Here is a list of varying tasks required by farmers for practitioners to gain insight in to several of the numerous activities involved within the persons context.

In each aspect of the Ecological Model, there are interventions that can be accomplished with little to no resources at the therapists' disposal. Following this task section are interventions based off the Ecological Model and each aspect of the person (environment/context, psychosocial, physical, cognitive, and task). Note that the interventions are only meant to generate ideas for treatment, not a sole option for the therapist to utilize.

- Assist livestock with giving birth and tending to newborns
- Breed and raise livestock of all variations
- Maintain and clean building and yards; remove manure, sanitize equipment (for dairy farming)
- Utilize vaccinations, medications, and address sickness with livestock
- Tend to crops through utilization of fertilizers, herbicides, and pesticides
- Determine what type of crops or livestock are most marketable and will reap profit
- Evaluate the product market to determine when to buy/sell crops and livestock
- Plant, till, cultivate, spray, and harvest fields (crop production duties)
- Utilize pasture conservation measures to ensure livestock are obtaining adequate health and nutrition
- Set up irrigation systems for fields to water farmlands
- Make or buy feed for livestock (such as haying, or buying supplements)
- Select and purchase supplies and equipment needed for the farm in correlation with budgeting (purchasing of machine parts, seed, and fertilizer)
- Set up and operate farm machinery
- Manage and maintain day-to-day farm operations and facilities
- Hire, train, and directs employee in addition with maintain employee records, insurance, and tax components.

(Career Planner, 2013)

Interventions

Examples of Interventions for Environment/Context

- Collaborate with the local 4-H, FFA, AgCountry, or Farm Services agencies to create a safety fair for the whole family to attend.
- Educate farmers on simple changes that can be made both individually and within the environment. For example, a change may be providing benches across the farmyard to decrease endurance demands.
- Complete multiple farm visits to ensure recommendations were completed and/or there are no further revisions required for the disorder.
- Provide resources to establish safety skills that were not previously implemented within the farm setting. This could include providing fact sheets or checklists by equipment that farmers would look at before using or completing maintenance on machinery.
- Rural farmsteads are old houses that often are small, narrow, inaccessible, and difficult to modify due to the layout of the house (Hagglund, Clay, & Acuff, 1998). Environmental and home modifications are necessary to ensure success of farmers within their home and work environment. Utilizing home or farmstead checklists (as mentioned on page 28 and 29 of this guide) to complete modifications are useful.

Examples of Interventions for Physical Disorders

- Complete work adaptations. This may include decreasing vibration on tractors and providing comfortable surfaces for farmers to sit, kneel, or work on in order to decrease stress placed on muscles/joints.
- Add ramps to get into tractors, combines, or other equipment on the farm to create accessibility to machinery easier.
- Add a 'suicide' knob to adapt steering wheels for easier turning capabilities for those with weakened or difficult grip patterns. This knob looks like a doorknob and is placed on the wheel to decrease the required grip strength of the user.
- Add rearview mirrors to open cab tractors for adapting and altering the machinery to facilitate performance.
- Address personal variables and client factors while creating opportunities to empower the farmer to engage in a wider range of tasks within the context of farming. These vary from farm to farmer.
- Work hardening routines would be useful for establishing/restoring function with this population. Farmers are doers; they are not one to idly sit by. It is important to keep in mind when working with this population that will work through injury as long as they can get the job done. Work hardening programs can assess specific tasks in which farmers prioritize as important and difficult to complete due to acquiring an injury.
- Utilize assistive devices to adapt, alter, or prevent the environment; such as built up handles on levers within the farm environment.
- Use existing tools, equipment, and devices to create an in home exercise program such as organizing tools or workshops.
- Adapt wheelchairs utilizing proper cushions for those with SCI.
- Establish stretching programs to reduce risks of musculoskeletal disorders for both on and off the field.
- Educate on the importance of position changes in relation to long periods of time spent inside tractor or combine cabs.
- Educate on proper ergonomics to prevent injury within the work environment.
- The Rural Institute on Disabilities has developed an interdisciplinary outreach health promotion workshop that provided individualized health assessments, education, peer support, counseling, and follow-up services (Hagglund, Clay, & Acuff., 1998). Researching a workshop that is in an acceptable range from the farmers' community can assist in the intervention process.

Examples of Interventions for Physical Continued

- Telehealth is a two-way interactive television that allows for specialty healthcare consultation (including limited physical examination, counseling, and provider-to-provider or provider-to-patient education) in areas that are difficult to address. This medium can help overcome the physical barriers (transportation) that prevent transfer of information between patients and healthcare providers (Hagglund, Clay, & Acuff, 1998).
- Area health education centers (AHEC) aim to help rural hospitals survive and to increase the number of family and specialty practitioners serving rural communities (Hagglund, Clay, & Acuff, 1998). Researching within the farmers' community will assist in continuation of follow up appointments and home exercise programs.
- Office of Rural Health Policy (ORHP) have many projects aimed at increasing the welfare of people with disabilities such as providing access to healthcare through telehealth and AHEC, improving dissemination through rural information center health services, and improving rural health care policy through the National Advisory Committee on Rural Health (Hagglund, Clay, & Acuff, 1998).
- The AgrAbility project is designed to facilitate post injury return to careers in agriculture (Hagglund, Clay, & Acuff, 1998). Though there is not a program established within the state of North Dakota, the website and other state's agencies can assist in assessment and intervention strategies.
- To improve community reintegration among people with SCI in rural areas, collaborate with independent living centers (ILC), researching where the closest one may be in relation to the farm being served (Hagglund, Clay, & Acuff, 1998).
- The ILC's often have partnerships with rehabilitation facilities and can be a natural resource to facilitate transition from acute rehabilitation centers to community living. Independent Living Centers are geographically better located than rehabilitation facilities (Hagglund, Clay, & Acuff, 1998).
- Provide tips that can be used by both patients and clinicians include: lifting objects carefully, using leg muscles instead of the upper body to lift, push, pull, or reposition objects, and providing adequate support for the lower back (Shelley & Dennis, 1993). Additional suggestions by Shelley and Dennis (1993) include: maintaining an upright posture while walking, wearing supportive shoes, stepping down backwards on ladders, and carrying heavy items proximally to the body. These are ways individuals can be conscientious of body mechanics and in taking the time to ensure safety with tasks.

Examples of Interventions for Cognition

- Add environmental cues and memory aids to adapt living and working environments. Collaboration with the farmer in areas where cues would be most useful and assist in putting them up.
- Utilize simple adaptation ideas to address cognition, memory, spatial skills, motor planning, physical, and emotional following a brain injury. This could include the use of clipboards, calendars, and reminders for memory and cognition or increasing responsibility to promote increased esteem and self-worth on the farm (Farm Again, 2013).
- Complete observations on the farmer in order to create, adapt, and alter work tasks to accommodate for the cognitive disorder or dysfunction to reduce the risk of secondary injury. Remember to discuss any changes or adaptation made to the task with the farmer to ensure follow through and understanding.
- Adapt or alter tasks and/or the environment to meet the safety needs of individuals. This should be done after completing a workplace or ergonomic assessment of the environment.
- Have structured and organized home and work environments that allow for routine and predictability to assist the individual following cerebral vascular accidents, traumatic brain injuries, and/or the acquisition of dementias. Work with the farmer and the family to ensure all aspects of the person and environment are considered.
- Modify equipment to tailor to the specific needs of the individual after completing an occupational profile. Examples of modifications to equipment could include building up tool handles, adding a step or ramp to work areas, or installing openers to machine sheds.
- Educate families, caregivers, and farm-hands on the diagnoses components, symptoms, outcomes, and assist measures for the individual returning to the farm following a cognitive issue.

Examples of Interventions for Tasks

- Education on how to manage farms could also be useful when considering the psychosocial or cognitive aspect of farming. With ever changing economics, prices, and commodities, being able to successfully manage a farm can either enhance or inhibit the outcomes of harvest. This would create opportunities for farmers to be more adaptable within the context of their occupation.
- Utilizing the Ecological Model perspective to devise multiple intervention techniques to find the correct fit of the individual within the environment to extend the range of tasks. Utilize the concepts of adapt, alter, prevent, create, establish in collaboration with the clients to enable that individual to function successfully in his or her natural context.
- Consider client factors, performance skills, and performance patterns in each environment the farmer works. Activity analysis within the environment will help aid intervention. Therapist may utilize the chart provided (establish/restore, alter, adapt, prevent, and create) to guide intervention in differing contexts.
- Educate the family and farmer of risk factors.
- Education on the importance of safety as it relates to the specific task/ machinery being used by the farmer is crucial.
- Increase awareness of individuals in their environment (observation of risks, safety issues, and precautions).
- Remind individuals prior to initiation of tasks to accentuate the importance of taking time and being conscientious during task performance. An example may be to put up a sign on a table saw reminding to keep the safety guard on and to take time when completing tasks that involve this device.
- Educate the importance of keeping the environment where tasks are performed organized and cleaned to prevent tripping hazards and injury (example workwhops).

Occupational Performance

Examining the relationship between the context, person and task interacting (American Occupational Therapy Association, 2008).

Case Study

In order to tie together the information provided in the sections prior (environment, person, and task), a case study and subsequent worksheets were created to assist in holistically treating farmers within the desired contexts. Table 1 outlines and provides varying intervention suggestions for performance areas that could be utilized with the client. Table 2 looks at breaking down the components of the person to identify strengths and problem areas. The following tables are resources for the practitioner to utilize.

Harlin is a 64 year old 'retired' farmer with a history of bilateral knee replacements and has chronic arthritis within both of his shoulders. He works alongside his son and nephews at the family farmstead. They farm/rent a total of 2,340 acres, raising corn, soybeans, wheat, hay, and a small herd of 45 livestock. Though he is retired, he remains an active member of the daily maintenance of the farm. He presented to therapy due to the increasing difficulties he has been having completing daily work and personal tasks. One problem area includes difficulty getting into and out of the grain trucks in order to haul grain to the elevators. Another issue defined by the individual is a decrease upper body strength making it increasingly difficult to complete daily maintenance on equipment. The therapist went to his work environment to better assess the difficulties he has within work and personal environments.

Tasks	Performance	Establish/Restore	Alter	Adapt	Prevent	Create
Ergonomics Inability to get up into grain trucks to haul grain into the elevator and to get into tractors	Harlin wants to be able to contribute to work and be useful on the farm by hauling or transferring items	Improving strength and endurance for daily maintenance of equipment through transferring tasks	Increase fit by having Harlin a pickup with a trailer on the back to haul grains instead of tall grain trucks	Utilizing a step up ladder to be able to get into the tall grain trucks	To prevent risk of falling during transfers in/out of the truck, have Harlin run errands/obtain parts using a car or pickup	Have a set place to park all the trucks that are by a platform and railing to assist the user in getting down
Assistive Technology Due to limited upper body strength, he is unable to turn wrenches to maintain the tractor.	Harlin wants to be able to complete daily maintenance on the farm to feel as though he is contributing to the farm	Create a daily strengthening program that will not aggravate his arthritis but that will maintain and possibly increase his strength.	Alter the tasks by matching his ability to work on less strenuous repair activities (hammering versus cranking with a wrench)	Built up handles on tools. Utilizing vice script tool to decrease needed grip strength and reduce fatigue.	Education on proper body mechanics during maintenance activities to aid in the prevention of further injury/chronic pain	Educate all workers on the farm of ways to work easier and modify the tools accordingly
Family Often feels as though he is in the way as oppose to assisting	Work with the family to come up with a list of modified work tasks he could complete	Not applicable	Altering working on machinery to handing parts to family members during maintenance tasks	Modifying work time to incorporate breaks during tasks	Education with family and Harlin on safety, energy conservation, and ergonomics	Not Applicable
Tractor Principles Inability to turn around to see where the rake is behind the tractor when raking hay.	Harlin wants to be able to run the tractor used to rake and bale hay.	Not Applicable	Have Harlin swath instead of rack so his gaze could remain forward and to the sides	Rearview mirrors, seat cushion, and a suicide knob will be added to the tractor.	Family will be working in the same field, baling, the promote safety.	Modify all tractors to have mirrors, seat cushions, and easier to use knobs/steering wheel
Work Recommendations	Extend the range of tasks through an array of varying means	Establish new work tasks with less strain for Harlin to learn and complete.	Having Harlin work on small tasks in the house	Adapting the shop with railing and benches	Education on safety measures in the shop environment	Assessing ergonomics of farm for entire
Farmyard Recommendations Due to limited endurance and pain from the knee replacements, it is difficult for him to walk long distances.	Harlin wants to remain mobile on the farmstead	Utilization of hot and ice packs to relieve pain in unison with strengthening and stretching exercises.	Have the Ranger within easy access	Walk short distances with the utilization of a cane	Have Harlin carry a cell phone with him in case of emergencies or if he needed assistance getting across the yard.	Provide opportunities to sit throughout the farm (i.e. benches) and multiples sets of keys across the farm for the ranger

Table 1

Data Summary Worksheet

Personal Variables	Activities of Daily Living	Work/Productive Activity	Social Participation/Leisure
Sensorimotor	Harlin becomes more fatigued in the evenings following work, resulting in decreased engagement in ADL tasks at night.	Harlin has difficulty with walking distances on the farm due to his chronic knee pain (history of bilateral knee replacements).	Harlin is not able to attend local bands and dances as his knees causes pain and fatigue.
Cognitive	Harlin is cognitively capable of performing all activities of daily living tasks independently.	Harlin does not have difficulty initially attending to a task; fatigue and limited endurance result in diminished judgment and processing	Harlin is aware, pleasant, personable during leisure and social activities.
Psychosocial	Harlin is frustrated with his fatigue in the evening and his gingerly pace getting ready for bed at night.	Harlin presents with low self-esteem as has not been able to contribute to the farm as much as in previous years.	Harlin reports feeling “down” about not getting out in the community as often due to his knee pain.

Table 2

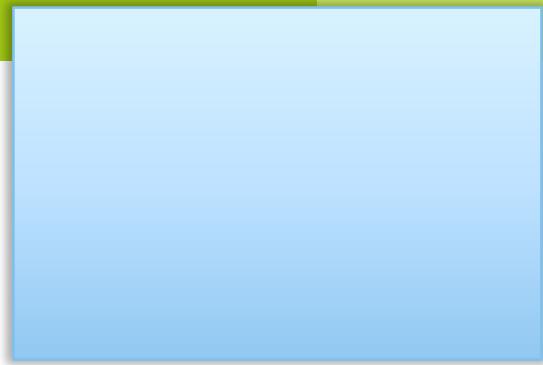
<i>Tasks</i>	<i>Performance</i>	<i>Establish/Restore</i>	<i>Alter</i>	<i>Adapt</i>	<i>Prevent</i>	<i>Create</i>
Ergonomics						
Assistive Technology						
Family						
Tractor Principles						
Workshop Recommendations						
Farmyard Recommendations						

Table Reference 1

Personal Variables	Activities of Daily Living	Work/Productive Activity	Social Participation/Leisure
Sensorimotor			
Cognitive			

Table Reference 2

Resources



Resources for Patients looking to return to Farming

Resources are a vital part to returning to farming or retiring from farming. Both require different sets of information in order to make the patient as successful as possible within their home environments.

The Toolbox: Agricultural Tools, Equipment, Machinery & Buildings for Farmers and Ranchers with Physical Disabilities

<http://www.agrability.org/Toolbox/index.cfm>

<http://www.agrability.org/Documents/Assessments/SecInjryAssmtTool.pdf>

- A resource containing assistive technology solutions for farmers, ranchers, and other agricultural workers with disabilities.
- The Toolbox contains products, design and ideas, and techniques and suggestions.

National AgrAbility Project:

<http://www.agrability.org/>

- This is a great resource for therapists and farmers alike; this website has a variety of tools in order to assist the farmer back to his/her occupation of farming. Within this website, there is a section with a variety of adaptive devices to assist farmers with disabilities to return to the occupation they love.

Center for Independent Living

<http://www.april-rural.org/>

- This is a great resource for individuals living within rural communities who have disabilities and are in need of services/to establish services

The Cooperative Extension Service

- Provides credible information for rural communities and assists in training and providing additional resources to local extension staff about disability awareness and educational activities.

Mental Health Resources:

<http://www.agbehavioralhealth.com/>

- This is a site allowing farmers to relate to the content. Therapists can utilize this as a resource to assist farmers to see that they may not be the only farmer suffering from mental or psychosocial strain.

Amputees Resources

- <http://www.amputee-coalition.org/>
- http://hosmer.com/products/hooks/pdfs/PR108-Hooks_Brochure.pdf
- This gives a variety of options for farmers with amputations to assist in returning to work
- www.nupoc.northwestern.edu/nupocresearch/other/prosthetics_agworkers
- This is a online survey that farmers with amputations may participate in in order to make the production of prosthetics more user friendly and accessible for farmers. Therapists may encourage their clients to take this survey for future users/amputees.

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Chapter V

Conclusion

The purpose of this project was to create a resource guide to assist occupational therapists working in rural areas and addressing needs of farmers. As farming is a prominent profession within the state of North Dakota, health care professionals need to be informed of rural problems and barriers of clients receiving services. A literature review was conducted to identify areas of need for farmers; the performance skills and client factors potentially impacted by injury, and best practice assessments and interventions.

Based on the results of the literature *An Agricultural Resource Guide for Occupational Therapists* was developed. This resource guide was based on the concepts of the Ecological Model and encompassing the Occupational Therapy Practice Framework. An Ecological Model perspective was utilized to consider the farmer and tasks in which he or she engages in the natural work and home contexts. Components from the Occupational Therapy Practice Framework were utilized throughout the manual to provide organization of client factors and performance skills needed by farmers to successfully engage in occupational performance.

The resource guide provides a comprehensive overview of farming, demographics, family dynamics, and barriers associated with providing and seeking services from practitioner and farmer viewpoints. Final attributes of the resource guide

provide varying assessments, intervention strategies, and where to access this information to address farmers' engagement in task performance within his or her natural context. Integration of all components into one condensed document provides a simplistic and efficient way to assist in providing quality care to farmers within the state and region.

Limitations

The limitations of the product include focusing on only the State of North Dakota, not including all of the farming terminology used within the industry, and not including or researching all of the diagnosis affecting farmers. It will also be a limitation when distributing the guide to practicing OT's, hospitals, or agricultural facilities as there is a chance some facilities may be missed.

Limitations of the literature include a lack of OT literature pertaining to working rurally and with the farming population. There was a limited amount of information found in regards to OT interventions and assessments. Throughout the literature review process and creation of the resource guide, a lack of awareness on healthcare providers' end in regards to the impact of culture, occupation, and interaction of person within the environment surfaced.

Recommendations

There are several recommendations for the use of this product as well as future work to increase usability and generalization of *An Agricultural Resource Guide for Occupational Therapists*.

1. Distributing this resource to occupation therapy practices within the state. The resource guide may best be accessed through emailing this resource guide to the hospitals within North Dakota with close attention to distributing to the small

- clinics in rural settings. Several hard copies could be printed and mailed to small clinics.
2. Integrating and expanding the recourse guide to enable generalization and applicability to other states or forms of farming. The material within the manual briefly denotes aspects of the intricate profession of farming; however, there are a multitude of varying farmers, ranchers, or other agricultural aspects that were not discussed within this project.
 3. Conducting a needs assessment for instituting an AgrAbility program within the state of North Dakota. The need for this program may be assessed by distributing surveys to rural and urban providers alike, measuring the usefulness of the information gathered.

Conclusion

An Agricultural Resource Guide for Occupational Therapists should be used as a general outline and guide when working with farmers. This resource is meant to assist in understanding the intricate culture and profession of farming. As each farmers' values and cultures differ, therapists working with this population should add in clinical reasoning and skilled-practice concepts in cohesion with this resource. Finally, importance lies in seeking opportunities to enhance the scope of practice through evidence-based research within the rural farming population.

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