

Effectiveness of Disseminating the Migrant  
Clinician's Reference Manual Online

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By

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**SUNY IT**

**DEPARTMENT OF INFORMATION DESIGN AND TECHNOLOGY  
CERTIFICATE OF APPROVAL**

Approved and recommended for acceptance as a thesis in partial fulfillment of the requirements for the degree of Master of Science in Information Design and Technology

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## Abstract

Migrant and seasonal farmworkers are a socially disadvantaged population, working in the Nation's most dangerous industry. Due to social isolation, cultural and linguistic barriers, coupled with a hazardous work environment, this population is thought to be at increased risk for work-related health problems. The primary sources of healthcare for farmworkers are federally funded migrant health programs located in highly agricultural areas throughout the United States. However, studies show that healthcare providers are ill-equipped to properly diagnosis and treat this patient population.

A clinic resource was developed to meet the needs of those serving farmworkers in the Northeast. This case study evaluates the effectiveness of disseminating this resource on the World Wide Web. The migrant health center environment and prior Internet usage were of particular interest.

Application of the Sense Making theory suggests critical gaps exist in the health literacy of migrant and seasonal farmworkers, wherein the migrant health reference manual serves as a bridge between provider and patient. Findings further suggest that the manual has a positive impact on patient care by addressing six focus areas of the Health People 2010 Health Literacy Initiative (USDHHS, 2000, p29):

- 1) *Access to Quality Health Services*
- 2) *Arthritis, Osteoporosis, and Chronic Back Conditions*
- 3) *Environmental Health*
- 4) *Health Communication*
- 5) *Occupational Safety and Health*
- 6) *Public Health Infrastructure*

## **List of Abbreviations and Symbols Used**

MCN	Migrant Clinicians Network
MHP	Migrant Health Program
NEC	Northeast Center for Agricultural Health
NIOSH	National Institute for Occupational Safety and Health
PDF	Portal Document Format
WWW	World Wide Web
NAWS	National Agricultural Workers Survey

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Like most nontraditional students, family life and work tend to overshadow personal goals, like finishing coursework. The SUNY IT faculty, especially, Dr Russell Kahn understands this. Whether it was good times, like the birth of my first child, or illness, Dr Kahn never passed judgment. Instead he provided unassuming encouragement.

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A tremendous amount of support has come from my husband. He has been there through the good, the bad, and the ugly. He is truly an amazing friend, husband, and father.

Without the assistance of my study participants and my network of support, I could have never finished what seemed like an insurmountable task, writing this thesis. For this, I thank you from the bottom of my heart.

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## Section 1: Entry Vignette

This is Dr. Melissa Jones' first season working with the local migrant health program. Ms. Jones is responsible for providing primary medical care to migrant and seasonal farmworkers. As her first week comes to an end she reflects back on her week:

“Working on the mobile unit has its challenges. With a line of people waiting, I'm forced to be efficient. I want to provide the best care possible, but I also want to help as many people as I can.”

A line at the mobile medical unit is common. During the harvest, this is the primary source of care for the men, women, and children that harvest wild blueberries in Washington County, Maine. Given that farmworkers are paid piece rate and take few breaks, the health program provides care in the evening. This ensures that the farmworkers do not have to choose between their health and their livelihood.

Providing care, mainly in the evening after the farmworkers have worked an 8-14 hour day, limits the number of patients who can come. However, the migrant health program does everything possible to maximize the farmworkers' access to care. This includes traveling to the location of the farmworkers, which eliminates transportation challenges.

Dr Jones recalls, “At about 3:30 p.m. each day, we left the Rakers' Center to make the trek through the blueberry barrens to the camps. I knew this was part of the process, but I had no idea what to expect. I anticipated back roads, but not a network of dirt roads that go on for miles. I soon understood why the mobile unit couldn't be any larger.”

The mobile unit is a customized RV (Figure 1). It contains two examination rooms and supplies, leaving little room for all but essential materials.

Figure 1 - The Mobile Medical Unit



In addition to traveling to the camps, the health program hires culturally aware staff. Dr. Jones spent two years in Mexico and is fluent in Spanish. Nevertheless, she is not a native speaker, nor has she raked blueberries. As a result, there are words and phrases that she is unfamiliar with.

She remembered, “A patient presented with a puncture wound. He explained that the “rekar” caused the injury. It took a few minutes before I was eventually able to understand what he was referring to. While raking, he accidentally stuck his leg with the rake.”

Subtle language differences, or in this case being unfamiliar with the work environment and relevant terminology are common obstacles for medical professionals. Moreover, many physicians have little or no occupational medicine training. Dr. Jones explains how this limitation has impacted her:

During my first week on the job, I must have treated three or four patients with a lump on their wrist. The farmworkers explained that this happened every year. I knew this had to be from raking, but didn’t know enough about the raking process to understand the direct cause, nor was I confident on how to treat these patients. I prescribed rest and ibuprofen. The ibuprofen was appreciated, but the farmworkers found my suggestion of rest unrealistic.

Rest is often prescribed for treatment of muscle injuries. Unfortunately, this is not a viable option for the overwhelming majority of migrant and seasonal farmworkers. Typically, farmworkers are unpaid when they are absent from work. For this reason, it was determined that clinicians need, at their disposal, a resource that provides insight into both the work process, and linguistic nuances. Furthermore, this resource must be easy to use and fit seamlessly into the work environment.

## **Section 2: Introduction**

This case study assesses the impact of a clinical resource created for migrant and seasonal healthcare providers. To accomplish this, the author uses a mixed methods approach to assess existing quantitative and qualitative data gathered by NEC researchers in the development of the resource; while utilizing qualitative research methods to evaluate responses from those who had used the resource, including physicians, nurses, program developers, and outreach workers employed within the migrant healthcare system. The users' perspective allowed for a practical application of Sense-Making Theory; in the migrant health setting, the manual addressed the need of the providers to communicate with and effectively treat their patient population.

This report examines the need for such a resource and describes the context in which the resource was developed, both in print and online. The case study considers the overall user satisfaction with this manual, and looks at the necessity of print and web formats for this resource. Furthermore, recommendations for future revisions are discussed along with the implications of this manual on the health literacy of migrant and seasonal farmworkers, namely communication between patients and their healthcare providers.

## **Literature Review**

An extensive review of numerous scholarly articles pertinent to the case study was conducted. Areas of interest were: general agricultural injury statistics, a demographic profile of migrant and seasonal farmworkers, a description of the work environment including injury and illness hazards, barriers to providing medical care to this population, as well as issues related to language and health literacy.

### *General Agricultural Injury Statistics*

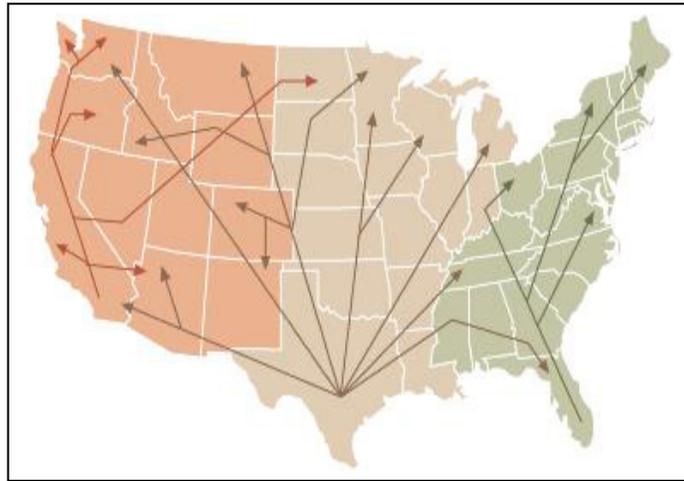
With an unintentional death rate of 22.7 per 100,000 workers per year, agriculture is recognized as one of our nation's most dangerous industries (National Institute for Occupational Safety and Health [NIOSH], 2004, p 195). Working primarily in production agriculture are an estimated 2.5 million migrant and seasonal farmworkers (United States Commission of Agricultural Workers, 1993, p 1).

### *Demographic Profile of Migrant and Seasonal Farmworkers*

Migrant, seasonal and immigrant agricultural workers ("farmworkers") are recognized as being among the most disadvantaged of all agricultural workers (Cieselski et al 1992; Ciesielski, Hall, and Sweeney, 1991; MMWR 1992; USDOL 2005; Ciesielski, Seed, Ortiz, and Metts, 1991; Slesinger and Cautley 1981, White-Means 1992, Littlefield and Stout 1987, Arcury and Quandt 2007). These workers are hired on a temporary basis, without many of the benefits that domestic workers enjoy. Farmworkers are employed in field or orchard crop harvests throughout the United States. Individuals may travel to several states and/or crop harvests within the same calendar year.

Those workers traveling from crop to crop generally follow one of three “migrant streams,” pictured below. The Eastern Stream begins in Florida, and workers will travel north to states like North Carolina, Pennsylvania, Maryland, New York, Massachusetts, and Maine. The Mid-Western Stream begins in Southern Texas and from there workers may travel to any one of the Midwestern states, from Nebraska and Iowa to as far north as Wisconsin and Michigan. Finally, the Western Stream begins in Southern California, and workers may travel North through California to Washington and Oregon, or Northeast to Colorado and North Dakota (US Department of Housing and Urban Development, 2008).

Figure 2 - Migrant Streams



According to the National Agricultural Workers Survey, a nationwide random survey conducted by the United States Department of Labor, the hired farm workforce was predominantly foreign-born. Seventy-five percent of farmworkers were born in Mexico, two percent in Central American countries, and one percent of the crop workers were born in other countries (United States Department of Labor, 2005).

Mexican-born crop workers were from almost every state of their native country. Forty-six percent were from the states of west central Mexico: Guanajuato, Jalisco, and Michoacan. Nineteen percent of Mexican farmworkers were from the southern part of Mexico, comprised of the states of Guerrero, Oaxaca, Chiapas, Puebla, Morelos and Veracruz (United States Department of Labor, 2005).

Of all respondents, 53% reported not being authorized to work in the United States. Crop workers are young: the average age in 2001-2002 was 33, and half were younger than 31. Among all crop workers, 79 percent were male, 58 percent were married, and 51 percent were parents, who reported an average of two children. While working, the majority of farmworkers live away from all nuclear family members, and are often unaccompanied by spouses or children. Most often, farmworkers send a majority of their earnings to those family members remaining in the home state or country (United States Department of Labor, 2005).

The majority (81%) of all crop workers reported that Spanish was their native language. Forty-four percent reported that they could not speak English “at all”; 53 percent said that they could not read English “at all.” On average, the highest grade completed was seventh grade. Of the U.S.-born crop workers, 56 percent had completed the 12<sup>th</sup> grade; of the foreign-born crop workers, only six percent had completed the 12<sup>th</sup> grade. Twenty percent of all crop workers reported that they had taken at least one kind of adult education class in the United States in their lifetime (United States Department of Labor, 2005).

#### *Work Environment Including Injury and Illness Hazards*

The workers’ pay is typically based upon production, otherwise known as piece rate. In other words, farmworkers are paid for the number of bins, boxes, or buckets they fill.

This type of system inherently encourages workers to skip breaks, and to overlook safety precautions that slow down production (Flocks et al., 2001).

The nature of the work requires farmworkers to hold awkward postures for extended periods of time. In addition, lifting and carrying heavy loads is common, and work tasks are repetitive. These factors are thought to contribute to high rates of musculoskeletal injuries (Earle-Richardson et al., 2003).

The physical work environment varies. Morning temperatures are cool, and fields are often damp with dew. While the air is comfortable for work, the slippery ground contributes to workers' slips and falls. On the other hand, afternoon temperatures reach stifling levels, which can contribute to heat related illnesses (Hansen & Donohoe, 2003). When compared to other industries, farmworkers are four times more likely to experience heat-related illnesses (National Rural Health Care Association, 1986).

Migrant and seasonal farmworkers are also exposed to chemicals in the form of fertilizers and pesticides. Some farmworkers are involved in applying chemicals, while others are exposed by working in an environment where chemicals are used. Exposure to pesticides can also continue after work by what is described as take home pesticide exposure (Hoppin, Adgate, Eberhart, Nishioka, and Ryan, 2006). Clothing, shoes, and tools brought into the home or living barracks may contain pesticide residue. This residue can cause further exposure and contaminate other surfaces, which affect not only the worker themselves but may also expose family members (McCauley et al., 2001). Further exacerbating the problem is the close proximity of living barracks to the fields where drift may cause additional exposure (Quandt, et al., 2004). According to the U.S.

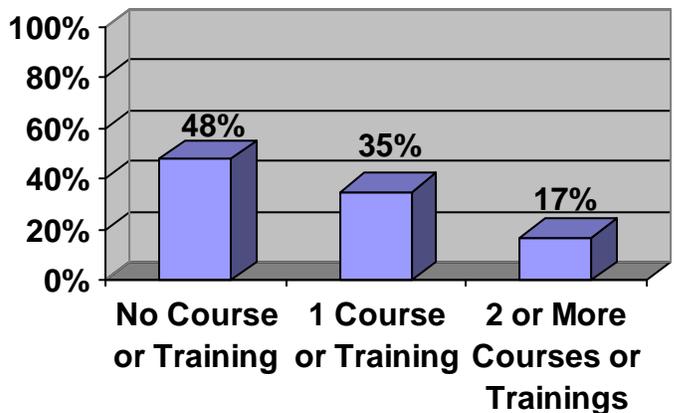
Environmental Protection Agency, between 10,000 and 20,000 farmworkers experience occupational pesticide poisonings each year (US EPA, 1993).

*Barriers to Providing Medical Care*

Results from the Northeast Center for Agricultural Health (NEC) surveillance project from 2000-2003 found that 15% of all medical visits to participating migrant health programs were occupational in nature. However, it is apparent that many healthcare providers are ill equipped to deal with these issues. For instance, although there are many pathways to exposure and poisonings each year, migrant health care providers report feeling unprepared to accurately diagnosis and treat pesticide poisonings (Quackenbush, Hackley, Dixon, 2006). A survey conducted by the Migrant Clinician’s Network (MCN) reported 48% of the clinicians surveyed had no occupational health training (Table 1) (Liebman and Harper, 2001).

Table 1 - Results from the Migrant Clinician's Survey

**Clinicians with Environmental or Occupational Health Training**



Health providers are further challenged by the lack of realistic treatment options for the migrant and seasonal farmworker population. In 2001-2002, 53% of farmworkers were unauthorized to work in the U.S. (United States Department of Labor, 2005). In a recent study on mental health, legality was one of five discrete domains of stressors for farmworkers (Hiott, Grzywacz, Davis, Quandt, and Arcury, 2008). Because farmworkers most go to great lengths and take tremendous risks to gain employment in the United States they would not risk deportation or loss of income. Because of this, requesting time off or light duty are not viable options. Furthermore, due to economic constraints, expensive or ongoing treatments including physical therapy are impracticable.

Language is an additional barrier for clinicians serving this population. According to the National Agricultural Workers Survey (NAWS), the native language of 81% of farmworkers is Spanish (United States Department of Labor, 2005). Of these workers, 44% self reported not speaking English at all. Therefore, cultural and linguistic competency is a necessity for providers working with this population.

Health literacy among farmworkers is also a concern. The concept of health literacy can be described as an individual's ability to "obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Selden, Zorn, Ratzan, and Parker, 2000). Research has shown an association between low health literacy and poorer self-reported health, increased hospitalizations, increased use of emergency departments, decreased medical compliance, decreased proficiency in managing disease, and increased health care costs (Joint Commission 1997, Baker et al. 2002, Schillinger et al. 2002, DeWalt et al. 2004, Williams, Baker, Honig, Lee, and Nowlan, 1998, Friedland 1998, Weiss et al 1994, Weiss and Palmer 2004).

In the general U.S. population, low levels of health literacy are common (Kutner, Greenberg, Jin, and Paulsen, 2006, IOM 2004, Berkman DeWalt, and Pignone, 2004). According to the National Assessment of Adult Literacy (Kutner et al. 2006), only 12% of adults had proficient health literacy. More than half (53%) of the study population were classified as having intermediate health literacy, and 36% had basic or below basic health literacy. Hispanic adults had the lowest health literacy of any other racial-ethnic group (Kutner et al. 2006). It has been shown elsewhere that levels of health literacy are decreased for vulnerable populations, including the elderly, minorities, immigrants, and low-income patients. (Rudd, 2007, Williams, Parker, and Baker, 1995, Nurss et al. 1997, Baker et al.1996, Rudd Kirsch, and Yamamoto, 2004).

Research relating to the health literacy of migrant and seasonal farmworkers is limited and published reports are few. Although the NAWS, did not measure health literacy or even literacy, the 2000 report found the median highest level of education completed was sixth grade. Using the guidelines put forth in a separate analysis of California workers, the report infers that 85% of farmworkers would have difficulty obtaining information from written materials (United States Department of Labor, 1993).

Utilizing a Spanish-language version of the Newest Vital Sign tool (Weiss et al., 2005), consisting of a nutrition label commonly found on food items in American grocery stores, and eight comprehension questions, Missik sought to understand the health literacy of farmworkers. This assessment tool was administered to a sample of 28 Hispanic migrant patients at a migrant health clinic in Ohio; more than half of the participants were found to have marginal health literacy, and another third had limited

health literacy (Missik personal communication 2007). However, since participants were already seeking care, it is likely that the health literacy of farmworkers is generally lower.

Communication ability, arguably the most critical component to health literacy is the ability to understand and be understood. While this is particularly challenging for foreign-language patients, this type of literacy goes beyond simply speaking the same language. It includes awareness of cultural differences and assumptions, the ability to request further clarification, and the ability to communicate the reality of one's own situation to the health care providers (Littlefield and Stout, 1987). Longo and Donahue's research with 36 farmworkers in the clinic setting in Nelson County, Virginia reported that 64% of respondents had difficulty talking to doctors or nurses (1997).

### **SECTION 3: THE CASE STUDY**

#### **Context**

Recognizing the dangerous work environment, limited occupational health training among those serving farmworkers, and the limited health literacy of migrant and seasonal farmworkers, the Northeast Center for Agricultural Health (NEC) researchers sought to understand the specific needs of migrant healthcare providers in the Northeast. Upon review of an initial survey conducted in 2004 of migrant health program (MHP) practitioners, 24 of the 25 respondents were interested in occupational health training (Sorensen, 2004 unpublished). However, the preferred training method of practitioners was unclear (See Table 2).

Table 2 - Preferred Training Methods

<b>Training Methods</b>	<b>Responses*</b>
Intensive training course	10
CD Rom	6
Reference manual	8
Web-based	7

\* Participants were able to choose more than one option

This research defined topic areas where healthcare providers needed more information. Out of 25 participants, 13 respondents said they could treat musculoskeletal injuries more effectively with additional training. These findings are supported in the literature. It is estimated that one out of every four medical visits in a primary care setting is for musculoskeletal conditions, yet medical students do not have the training to effectively treat patients (Akesson, Dreinhofer, Woolf, 2003).

Participants in the NEC survey also felt with additional training they could more effectively treat pesticide exposures, dermatitis, and eye disorders. Again, these findings were supported by the literature. In a highly agricultural community in the Pacific Northwest, 92% of provider respondents felt more information on pesticides would be useful in their work (Karr, Murphy, Glew, Keifer, and Fenske, 2006). Respondents of the NEC survey further explained the topics they wanted to see in an occupational health training tool (See Table 3) (Sorensen, 2004 unpublished).

Table 3 - Preferred Topic Areas

<b>Topic Areas</b>	<b>Responses*</b>
Diagnosis and treatment of migrant occupational injuries	19
Basic principles and practices in occupational health for patients (i.e. safety/prevention)	19
How to take an occupational history	17
Finding useful occupational health resource materials	15

\* Participants were able to choose more than one option

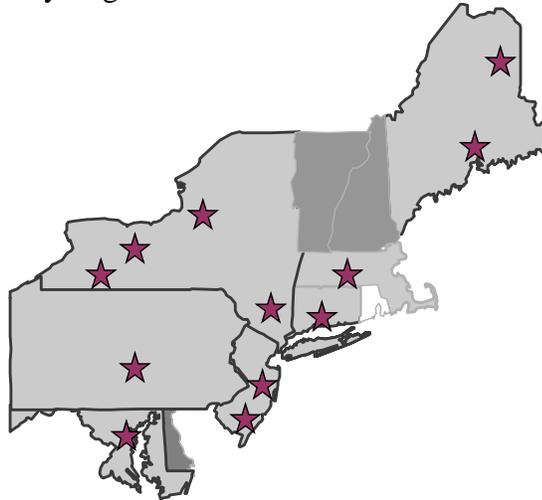
### **Development of Printed Reference Manual**

In a survey conducted by the Migrant Clinician's Network (MCN), in-person workshops were rated as the most effective way to learn about occupational health issues. However, the biggest barriers to training indicated by the survey were lack of time and travel money (Liebman and Harper, 2001). According to the process evaluation reports, personal interviews between NEC researchers and clinicians, suggest that it is difficult to remember all of the information given in a one or two day workshop, two or three months later. Taking these factors into account, clinicians seemed to agree that an ideal training format would be a reference manual that can be accessed when needed and where information provided is succinct, easy to find and easy to read.

Using data generated from the NEC Multi-State Migrant Study, a surveillance project involving migrant health center chart audits at 12 federally-funded migrant health centers in seven states in the Northeast (ME, CT, MA, NY, NJ, PA, MD) (See Figure 3) (Earle-Richardson, 2003 unpublished), an occupational health reference manual was developed for circulation to migrant healthcare programs. The aim of this manual was to increase clinician's knowledge of the most prevalent occupational health conditions and make

treatment of these conditions more effective (Sorensen, May, and Earle – Richardson, 2006).

Figure 3: Multi-State Study Region



A reference manual with tabbed sections was determined to be the most accessible format for clinicians. The manual included: occupational health data specific to farmworkers in the Northeast, a guide to taking an occupational history, proper diagnostic and treatment techniques for farmworker occupational injuries and illnesses, instructions on filling out workers compensation forms, a discussion of cultural competency skills, and commodity profiles (a description of workplace conditions which lead to frequent occupationally related medical complaints).

Given the diverse clinic environments throughout the Northeast, and experience of the providers themselves, this printed reference manual was piloted at several migrant health centers during the 2005 harvest season to determine the most effective way to introduce the manual to migrant clinicians. Three migrant health centers in the Northeast were randomly appointed one of the following introduction methods: PowerPoint presentation

covering aspects of the manual prior to distribution the manual and followed by case studies (led by a practitioner) to practice utilizing the manual; PowerPoint presentation covering aspects of the manual prior to the distribution of the manual; or having the manuals sent to the clinic for distribution. Each clinic received three copies of the manual. There was also a designated control clinic that did not receive the manual. At the end of the harvest season, surveys concerning the utility of the manual were distributed to the providers, which were completed and returned to NYCAMH.

Results indicated that the method of introducing the manual was not as important as simply having access to the resource. Survey participants made content suggestions, which were incorporated with the help of a physician. Researchers then presented the revised manual at a conference of migrant health professionals. The process of incorporating provider feedback continued until the reference manual was completed in 2006.

Upon completion, researchers began disseminating the manual throughout the Northeast. During this process, a decision was made to add the manual to the NEC website making the manual more accessible and as a result, increased usability.

### **Incorporation of Reference Manual to NEC Website**

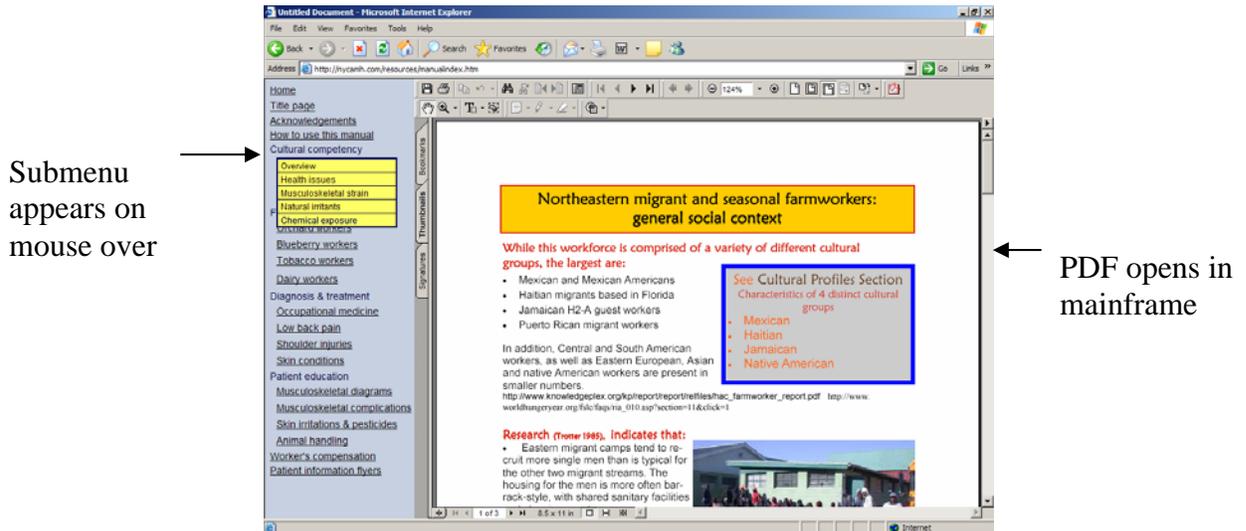
In January of 2007, the “Migrant Farmworker Occupational Health Reference Manual” was posted to the World Wide Web (See Figure 4). The layout consists of a fixed frame to the left and a main frame, which displays the Table of Contents.

Figure 4 - A Migrant Farmworker Occupational Health Reference Manual Homepage



Rollovers expanded the table of contents. When the user holds the mouse over the topic areas, a submenu appears. The user then clicks on the topic of interest and the corresponding Portable Document Format (PDF) opens in the main frame (See Figure 5).

Figure 5 - PDF Display in Main Frame



Developers used this design for a number of reasons. Primarily, they anticipated that the fixed frame table of contents would create an easy navigation system. It was also

expected that a fixed frame would decrease the amount of time it would take for a new page to load.

Incorporating PDFs was primarily a cost saving mechanism. Hard coding the information would have increased the startup costs as well as any future updates or changes to the content. Using PDFs in the main frame also offers advantages to the user. The benefits include convenient formatted printing and the option of zooming in or out to adjust the size of the document.

Although much thought went into the layout of the current website, the usability of the web-based manual was uncertain. NEC researchers recently promoted the manual in both hardcopy format and web format at national conferences, local migrant health programs, and through regional farmworker coalitions. While researchers are encouraged by the amount of interest in the manual, they are concerned about the printing and shipping costs associated with the printed manual. For this reason, a case study assessed why users are requesting hard copies instead of utilizing the online version, and whether or not the migrant health program environment impacts this phenomenon.

The following questions were specifically addressed by the research:

### **Main Research Question**

- What factors impact whether migrant health program providers use the Migrant Clinician's Reference Manual online?

### **Issue Sub Questions**

- To what extent does the migrant health program environment impact the user's ability to interface with the manual online?

- How does prior Internet usage influence the user's decision to use this web-based resource?
- What are the most important characteristics of the design for an online Migrant Clinician's Reference Manual users and are those elements being met?
- Are providers better equipped to treat their patients after using the clinician's manual?

A case study is appropriate because of the unique environments in which the manual is used, as well as the range of possible influencing factors. Furthermore, contradictory findings from two separate studies suggest regional differences among preferred formats. Findings from the *Pacific Northwest Health Professionals Survey on Pesticides and Children* found that "Physicians preferred web-based training materials, while mid-level clinicians requested written summaries" (Karr et al, 2006 p113). However, results from the Migrant Clinician's Network (MCN) survey suggest in-person workshops are the most effective training method. A case study allows for complex responses and confounding factors. It also allows the researcher to see clinicians in their environment.

The system is bound by time. The clinician's manual was posted to the World Wide Web (WWW) in January and this study ended in December 2007. The manual was incorporated into the NEC's website under "Farm Safety Resources". In addition, partnering agency, MCN added a link to the manual from their website. Soon after being posted to the WWW, MCN featured the online manual in their quarterly newsletter, "Streamline" (Liebman and Harper, 2001). The manual has subsequently been incorporated under the "Resources" section of MCN's website.

The manual was also disseminated through conferences and presentations. In May 2007 the project coordinator promoted the manual during a presentation to providers in Pennsylvania. The coordinator continued to inform providers of the manual from March 2007 through August 2007. Providers learned of the manual through presentations at their respective health centers, or through presentations given at regional migrant coalition meetings and conferences. Throughout the dissemination process, the coordinator kept a list of contacts who received the printed manual.

### **Data Collection**

The primary source of data consisted of interviews with participants that have used the print manual, electronic manual, or both. As suggested by Creswell, purposeful sampling was used to gather different perspectives on the manual (1998). Interviews were conducted not only with providers, the intended audience of the Migrant Clinician’s Reference Manual, but with anyone who was included in the distribution list. Participant diversity is illustrated in the Data Collection Matrix (Table 4).

Table 4 - Data Collection Matrix

	Initial Phone Survey	Follow-up Email/Phone Survey
Providers	2	1
Nurses	3	2
Outreach	1	1
Program Developers	2	1
Educators	2	2

During an initial phone call, the purpose of the project was explained and a brief survey was conducted to identify users of the manual (See Appendix C). The overseeing Institutional Review Boards (the Mary Imogene Bassett Hospital Institutional Review Board and the State University of New York Institute of Technology Institutional Review Board) determined this study was exempt from obtaining informed consent.

If the contact was unavailable, a voice message was left. A follow-up email was sent to accomplish the same goal, introduce the study, and establish users of the manual. The survey questions were typed directly into the email, to allow the user to respond with ease.

The outcome of the initial survey led to in-depth semi-structured phone interviews with users of the manual (See Appendix D). In addition, these initial surveys led to snowball sampling, wherein, respondents provided additional contacts. Primarily, these contacts were given because the original recipient had passed the manual onto a coworker.

### **Data Analysis**

At the time of the interviews, detailed notes were taken. Later the interviews were typed into a spreadsheet for analysis. Key responses to the semi-structured interviews are presented in aggregate for each question.

#### **1. How did you hear about the manual?**

One participant discovered the manual online while looking for patient education materials, on the NEC website. The other participants had heard of the Migrant Clinician's Reference Manual through a NEC outreach activity, such as a presentation at the local health center, or the East Coast Migrant Stream Forum.

Project documentation indicated that the printed manual was disseminated before the web version was made available. In addition, promotion of the resource favored the printed manual over the web version. During outreach activities, the printed manual was circulated to the audience, whereas sections of the web version were highlighted during the PowerPoint presentation using screen captures. Being able to hold and look through the manual in its entirety, undoubtedly influenced people's preference in using one version over the other.

## **2. What version have you used, print, web or both? What influenced this decision?**

At the time of the interview, three of the respondents had used only the printed manual, while the other four participants had used both print and web. According to the respondents, the major factors that influenced these decisions were availability and access to printing. A third factor was that the printed manual was what had been made available to the user, who was unaware of the web version.

## **3. What part(s) of the manual have you used?**

Sections the participants reported using include: Patient Educational Materials, Ergonomics, Skin Irritations and Pesticides, and Cultural Differences. In addition, two participants reported using most or all of it. Printing patient educational materials was noted most often for web users.

Project records indicate roughly 3,000 visits were made to the website within the first three months of the manual being available on online. Although the number of visits does

not indicate user satisfaction, it does suggest that the web is a useful tool for sharing information with the target population.

#### **4. Was the amount of information in the manual sufficient for your needs?**

While all participants reported that the amount of information contained within the manual was sufficient for their needs, four made recommendations for future versions. The suggested subject areas included other commodities, mosquitoes, lyme disease, cardiovascular disease, cholesterol, diabetes, and specific information directed at women, including pregnancy issues and environmental factors.

One respondent in particular felt the information covered in the manual would be helpful in program development. The respondent reported spending 30 hours per week utilizing the web to obtain information for program development, and was particularly interested in patient education materials which could be printed. She reported that the patient education materials available through the Migrant Clinician's manual online were printed and handed out to patients as they were waiting to be seen.

#### **5. Having used the manual, do you feel you were better able to serve your farmworker patients? How has using the manual impacted your patients?**

Each respondent reported that they were better able to serve migrant and seasonal farmworker patients. It was suggested that the manual may have implications for patient groups beyond the farmworker population. In one service area, the manual is also being used by physicians to serve patients in urban clinics.

Respondents explained how the manual impacted patient care. Three respondents reported that the patient information materials were important to their program. One respondent explained how “prior to receiving the manual, he was trying to make similar materials on his own, but the manual saved him a lot of work”. The other two respondents explained that the manual helped them treat farmworker patients: “By reading the manual beforehand, I was able to give proper assessment on the first visit.”

Based on survey responses, it appears that the manual afforded health care providers enhanced knowledge of cultural and workplace contexts of farmworkers. This acclimation to the unique farmworker lifestyle most likely allowed for improved communication between patients and providers. Enhanced patient-provider communication has been suggested as a core construct of improving health literacy (Pawlak 2005).

Literature suggests that the utility of a web-based resource for patient care must outweigh the cost, namely time (Ritchie and Gosbee, 1997). According to our respondent feedback as a whole, understanding work related exposures led to accurate assessment and proper diagnosis. With a proper diagnosis, providers were able to prescribe more efficient and effective treatment regimens. This would lead to better informed and satisfied patients, two aspects of patient care identified by Ritchie and Gosbee as offsetting the cost of time (1997).

Usability is another critical component to a web based resource for busy health care professionals (Ritchie and Gosbee, 1997). The web based manual as stated by one respondent provides an “outline on the side that allows you to jump from one topic to

another”. This straightforward access to critical information increases the efficiency of the practice and improves patient care.

### **Web Experience**

#### **6. Can you describe your experience using the manual online?**

Only three of the six respondents used the web version. However, their comments were positive. One web participant explained her experience as “very positive, most information that I sought to obtain was available from the website.” The other online users talked about the ease of printing. Another participant explained that they liked the way the information was broken down and was easy to navigate.

### **Emergence of Themes**

The system in which the Migrant Clinician’s Reference Manual exists in is complex. However, four salient themes emerged that answer the primary research question of whether migrant health program providers use the online manual versus the printed manual. These themes were 1) awareness of the resource, 2) accessibility, 3) time, and 4) purpose.

Not surprisingly, research subjects’ awareness of the online manual impacted their use of the resource. Three participants used the online manual. The other three did not know the online manual existed.

The decision to use one format over the other related to accessibility. As described by one participant, “print goes out in the field”. This feature is imperative with in-camp medical services, wherein providers do not have access to computers.

Time was another key theme. Participants described that during the peak season they will use the printed manual. One nurse manager suggested, “it’s right here, easier to just grab it”.

Purpose was another theme. The benefit of printing patient education materials was specifically repeated throughout the interview process. The web manual provides straightforward navigation when looking for patient education materials, leading “users” to PDF documents. The PDF documents are then easily printed.

### **Public Health Impact**

All interview participants agreed that having used the migrant clinician’s manual, they were better able to serve their farmworker patients, both in terms of patient care and patient education. This is a major contribution to the Healthy People 2010 Health Literacy Initiative which is defined as, "The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”

As defined by this initiative, focus areas that contribute to health literacy and are addressed in this manual include:

- 1) *Access to Quality Health Services*
- 2) *Arthritis, Osteoporosis, and Chronic Back Conditions*
- 3) *Environmental Health*
- 4) *Health Communication*
- 5) *Occupational Safety and Health*
- 6) *Public Health Infrastructure*

Collectively supplying program developers and providers with the necessary information to develop culturally relevant programs and materials contributes to reducing the health disparities in this vulnerable population.

#### **SECTION 4: THEORETICAL CONSIDERATIONS**

Application of the Sense Making theory suggests critical gaps exist in the health literacy of migrant and seasonal farmworkers, wherein the migrant health reference manual serves as a bridge between provider and patient. The Sense Making theory suggests that we, as communicators, find a bridge to make sense of a gap in a given situation (Dervin, 1999). In the context of this case study, the Migrant Clinician's Reference Manual is the bridge for the migrant health center system to improve health literacy and patient care (figure 4).

Moreover, the manual fills this gap by providing contextual background information for more than its intended audience, medical providers. According to one respondent, "As an outreach worker I like to have a general background not only of the jobs patients are doing, but other crops they work on in other states. It was helpful reading about tobacco work."

With a straightforward navigation system the online manual further bridges the communication gap. Health care providers have access to patient education materials that are easily printed. Furthermore, the manual bridges the occupational medicine training gap of providers that has been identified in the literature (Sokas and Cloeren, 1987; Liebman and Harper, 2001).

**Figure 4 - Sense Making Illustration**



## **SECTION 5: DISCUSSION**

### **Conclusions**

According to interview participants the Migrant Clinician's Reference Manual is a valuable resource for more than the intended audience, who were originally thought to be the providers. From program development to outreach services, this reference tool provides a wealth of information. As one program developer stated: "Patient education materials communicate ways that patients can take better care of themselves by taking preventative measures." This outcome contributes directly to increased health literacy among migrant and seasonal farmworkers.

In addition, it is clear from this case study that having both the online and print manuals is essential for this unique setting. **During the off-season users are able to reference the online manual.** However, during the peak season, when they are in the field, pressed for time, or do not have access to a computer, the printed manual is the only

viable option. Furthermore, the online manual, specifically, the incorporation of Portable Document Format (PDF) allows users to print patient educational materials.

### **Recommendations**

At the time of its development, the manual was written by providers for providers. However, in abiding by one of the key components of health literacy, “keep it simple”, **future revisions and additions should minimize medical jargon.** This is essential to aid outreach staff and other non-clinical users in meeting the health needs of migrant and seasonal farmworkers.

Non-occupational health related sections on diabetes, hypertension, heart disease, sexually transmitted diseases, and personal hygiene should be added to the manual.

### **Future versions should also incorporate additional commodity specific sections.**

Among other commodities, the manual should be expanded to incorporate commodities such as mushrooms and citrus fruits that are common to other areas of the country. A section on eye health and safety is also necessary. It was further recommended, because of the increase in women who contribute to the farmworker workforce, that occupational risk factors relating to pregnancy be added.

Regardless of content changes, it is recommended that the electronic navigation system be changed. The current positions of the rollovers make it difficult for the user to know which menu item they are hovering over. When asked about the navigation of the online manual, one participant stated that the “column to the left would be easier to read if there wasn't a pop-up over the section.”

An additional concern about the current navigation system is that it does not allow for content expansion. If another section was added to the web navigation, a scrollbar would be necessary. However, having two scrollbars would decrease the amount of display or screen space for the PDFs. A scrollbar would also make navigation less intuitive: users would have to observe the toolbar to realize that more information existed beyond what appears on the screen.

### **Limitations**

Due to monetary and logistical constraints, this research did not include the perspective of the patients. Further research with migrant farmworkers is needed to fully understand the impact of the manual on patient care, particularly the health literacy of migrant and seasonal farmworkers. Although a number of the patient educational materials include faces or pictures of farmworkers to draw the reader in, the sans serif, or decorative fonts may reduce the legibility of the materials (Brown, 2008). For this reason, the patient information itself should be evaluated from the farmworkers' perspective.

In addition, the layout of the manual content was not addressed. Although not reported by the users, pages within the manual use colors that have been proven to tire a reader. Specifically, red text and yellow highlighting has been incorporated to draw attention to items (<http://cnx.org/content/m17296/latest/> Retrieved 3/15/09). However, the overuse of the color scheme may impact the legibility of the manual.

## **SECTION 6: CLOSING VIGNETTE**

Dr. Jones has just returned from this year's East Coast Migrant Stream Forum, where she learned of the Migrant Clinician's Reference Manual:

I had no idea what to expect from the conference, but I feel invigorated after attending. There was so much positive energy and information sharing. I learned about the Migrant Clinician's Reference Manual, which I have found invaluable.

While I was at the conference I thumbed through the hard copy, but I didn't have time to really see all that it had to offer. Yesterday was the first time I was able to get online and really explore the electronic version.

If I had to find the page on my own, it would probably have taken me a little while, but I had a handout with the web address. On the positive side, I liked the fact that I was able to print off information easily. That feature will come in very handy, especially, for printing patient education materials. The only downfall of the web layout is the use of rollovers; they cover the navigation.

I also wish that there were patient handouts relating to diabetes, hypertension, and other general health ailments. In general I like having both the web and hard copy. I was able to use the web version during the off-season, because I have Internet access. However, during the season we do not have access to computers, and I can foresee myself referencing the print version.

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## Appendix A: Glossary

**Bounded System** – “is bounded by time and place, and it is the case being studied” (Creswell, 1998); this case study is bounded by the product, migrant clinician’s manual, and the time for which the manual was distributed and evaluated, January through November 2007.

**Case Study** – “an exploration of a “bounded system” or a case” (Creswell, 1998); in this instance the case, is an in-depth study of the migrant clinician’s manual, involving interviews.

**Health Literacy** – “The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.” (United States Department of Health and Human Services, 2000)

**Health People 2010** – “Healthy People 2010 reflects the very best in public health planning—it is comprehensive, it was created by a broad coalition of experts from many sectors, it has been designed to measure progress over time, and, most important, it clearly lays out a series of objectives to bring better health to all people in this country.” (United States Department of Health and Human Services, 2000)

**Migrant Health Program** – Federally funded health centers that are committed to serving migrant and seasonal farmworkers either in a clinic or mobile setting.

**Legibility** – “The ease with which the text and graphics can be deciphered” (Brown )

**Purposeful Sampling** – “I prefer to select unusual cases in collective case studies and employ ‘maximum variation’ as a strategy to represent diverse cases to fully display multiple perspectives about the cases.” (Creswell, 1998); this case study employs maximum variation sampling by gathering the perspective of not only providers, but also other migrant health center support staff.

**Rollover** – The process of rolling the mouse over a point within a webpage to create interactivity. ([http://en.wikipedia.org/wiki/Rollover\\_\(web\\_design\)](http://en.wikipedia.org/wiki/Rollover_(web_design)))

**Snowball Sampling** – “Identifies cases of interest from people who know people who know what cases are information-rich” (Creswell, 1998); in this case study snowball sampling was built into the questionnaire. Contacts were asked if there was anyone else in their facilitate that used the migrant clinician’s manual.

**APPENDIX B: ETHICS PERMISSION FORM**



**THE MARY IMOGENE  
BASSETT HOSPITAL**

**MEMORANDUM**

**TO:** Lynae Hawkes  
**FROM:** Dr. Linda Keller *Linda Keller, PhD, CIP*  
Chairman, IRB  
**DATE:** November 16, 2007  
**RE:** **Evaluation of the Migrant Clinician's Manual**

Your project, identified above, has been determined to be exempt from continuing IRB review based on The Code of Federal Regulations Title 45, Part 46 – Protection of Human Subjects. The specific section is identified below.

- 46.101(b)(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.
- 46.101(b)(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph 2)(b) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- 46.101(b)(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.
- 46.101(b)(5) Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- 46.101(b)(6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

If you change the protocol from that described in your submission, the changes should be submitted to the IRB for re-review to assure that the activities continue to qualify as exempt.

## Appendix C: Initial Interview Form

Hi my name is Lynae Hawkes. I work for NYCAMH, the New York Center for Agricultural Medicine and Health. We are conducting an initial assessment of the migrant clinicians manual, for which I believe you received a copy. Do you have a few minutes to give your opinion of this resource?

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Name: \_\_\_\_\_

Age: \_\_\_\_\_ Gender: \_\_\_\_\_

Employer: \_\_\_\_\_ Position: \_\_\_\_\_

Clinical experience (yrs): \_\_\_\_\_ Clinical experience w/farmworkers (yrs): \_\_\_\_\_

Have you received formal occupational health training? **Yes** No

**If yes**, type (and amount): \_\_\_\_\_

Do you work with an interpreter when serving farmworker patients? Yes No

In the past, have you struggled to communicate with your farmworker patients? **Yes** No

**If yes**, please describe the situation: \_\_\_\_\_

In an average week, how many hours do you use the internet? \_\_\_\_\_

What is the primary purpose of your internet usage? \_\_\_\_\_

Have you heard of the migrant clinician's manual? Yes No

Have you used the migrant clinician's manual? **Yes** **No**

**If no**, what is the primary reason you have not used the manual? \_\_\_\_\_

Those are all the questions I have, is there anything that you'd like to add? \_\_\_\_\_

**If yes**, I have a few more questions, that should take about 15 minutes to answer. Would you like to keep talking now, or is there a better time this week for me or one of the other project staff to call?

Is there anyone else at your facility that has used the manual? \_\_\_\_\_

Thank you for the information you have shared so far, we will be in touch soon.

## APPENDIX D: SEMI STRUCTURED INTERVIEW FORM

### Follow-up interview form for those that have used the manual

How did you hear about the manual?

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Did you use the print or web version?      Print      **Web**      **Print & Web**

What influenced this decision?

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How often do you use the manual?      \_\_\_\_\_

What part(s) of the manual did you use?      \_\_\_\_\_

Was the amount of information in the manual sufficient for your needs?    Yes      **No**

**If no**, what was missing? \_\_\_\_\_

**If no**, do you know of someone that could contribute to this section, or are there existing materials that should be included? \_\_\_\_\_

Having used the manual, do you feel you were better able to serve your farmworker patients?    **Yes**    No

**If yes**, how has using the manual impacted your patients?

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*Continue with the following questions if the participant has used the manual online?*

Can you describe your experience using the manual online?

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Where you able to find the manual home page easily?    Yes      No

Once you were on the home page, were you able to navigate the manual?    Yes      No

What functional elements do you consider to be important with this type of resource?

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Of those elements, which were met?

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Did you find what you were looking for?    Yes      No

Have you used the Internet for research in the past?    Yes      No

Where do you access the internet?      \_\_\_\_\_

Is it convenient to access the internet?    Yes      No

Do you have anything else you would like to add related to the clinician's manual?

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**Thank you very much for your time. Would you be willing to write a letter of support for a grant to expand the manual's content?**