

Oregon Migrant and Seasonal Farmworker Health Status

Rolando Cruz

Public Policy Intern

Office of Multicultural Health Services

Table of Contents

Abstract.....	iii
List of Tables.....	iv
List of Figures.....	v
Introduction.....	1
Data Collection.....	1
Literature Review.....	2
Defining the Population.....	2
Access to Healthcare.....	3
Cancer.....	4
Chemicals / Pesticides and Education.....	5
Occupational Hazards.....	10
Oral Health.....	10
Reproductive Health and Prenatal Care.....	11
Social and Mental Health.....	12
Community-Based Participatory Research.....	13
Focus Groups.....	15
Enumeration Profiles Study.....	16
Conclusion.....	17
References.....	19

Abstract of the Literature Review

Oregon Migrant and Seasonal Farmworker Health Status

By

Rolando Cruz

Migrant and Seasonal Farmworkers make up a large population in the State of Oregon. The amount of work this population contributes to the agriculture industry is astonishingly high. However, along with their hard work, come the demands of their trade and the health complications that they face day after day.

This literature review focuses on Oregon specific migrant and seasonal farm worker health research. First it explores the need for more Oregon specific research to be conducted in the area of migrant and seasonal farm worker health. It explores different types of research methods that might be effective within the migrant and seasonal farm worker community. By looking at the current studies it is possible to define the gap between information known and information that needs to be explored by future studies.

List of Tables

Table 1: Final Results of Research Advisory Council.....18

List of Figures

Figure 1: Evolving model for community Participation.....14

Introduction

The agricultural industry has evolved since the end of The Bracero Program in the 1960's. However, migrant and seasonal farmworkers (MSFW) still remain at the top of the list of high mortality rates and low on the list of access to healthcare (Hansen et. al, 2003). Researchers across the State of Oregon have focused on MSFW in an effort to learn the needs of the community.

The work from current studies has helped identify specific problems in the MSFW community but very few give a macro-level viewpoint. It is important to look at the big picture and communicate the needs of MSFWs in Oregon. This literature review helps synthesize Oregon specific information focused on MSFWs in order to identify gaps in current information.

The Office of Multicultural Health Services (OMHS) tasked a research advisory council to lead the efforts of the new study. This group was comprised of community leaders who research and advocate for MSFW populations all over the state of Oregon and also leading researchers from the Oregon University System.

Data Collection

The articles in this literature review are from a database of articles compiled by OMHS. The research advisory council was also asked to contribute additional articles to OMHS in order to put together information featured in the literature review. On May 13, 2011 the research advisory council was asked to add to a list of health disparities faced by the MSFW community. The initial list was compiled from an article by Eric Hansen and Martin Donohoe titled, *Health issues of migrant and seasonal farmworkers* (2003). The research advisory council was then asked to add to the list of health disparities prevalent to MSFWs. This final list served as a comparison to the literature review to measure the gap in information.

Literature Review

Defining the Population

One of the first steps in understanding the needs of MSFWs is to identify who they are and what defines them as a MSFW. The most standard definition of a seasonal farmworker states that they are “individuals whose principal employment (51% of time) is in agriculture on a seasonal basis and have been employed in this line of work in the last twenty-four months” (United States Code, Title 42). As society evolves so has the community and the definition of MSFW should reflect those changes.

Lynn Stephen explains in his work that the difference between migrant households have been discussed in terms of “income, race, origin, and patters of migration” (2001). However, little work has been focused on households based on “gender, legal status, and age”. These new variables redefine who MSFW are and what their needs are. “One family can include legalized male workers with permanent residence, illegal single or married females, and children who are citizens...in the United States” (Lynn, 2001).

The Department of Labor (DOL) under the Migrant and Seasonal Agricultural Worker Protection Act (MSAWPA), defines a migrant agricultural worker as an individual “who is employed in agricultural employment of a seasonal or other temporary nature and is...required to be absent overnight from his permanent place of residence” (Rosenbaum et. al, 2005). A seasonal agricultural worker is defined as,

“an individual who is employed in agricultural employment of a seasonal nature and is not required to be absent overnight from his permanent place of residence: (1) When employed on a farm or ranch performing field work related to planting, cultivating, or harvesting operation; or (2) When employed in canning, packing, ginning, seed

conditioning or related research, or processing operations, and transported, or caused to be transported, to or from the place of employment by means of a day-haul operation.”

The difference in each of the definitions shows that there is not a consensus to the real definition of MSFWs. The most alarming part of this is that without a specific definition any data collected will be hard to compare with other studies across the United States. “Potential eligible migrant and seasonal farmworker population at migrant health centers may be larger than the population counted as farmworkers by the DOL (Rosenbaum et. al, 2005). The inconsistency in definitions could lead to no change for the underserved MSFW population.

Access to Health Care

Health care is a struggle for the majority of Americans in the current economic downfall. MSFWs face even more barriers than the average citizen. For example: lack of transportation, sick leave, threat or fear of job loss, communication issues, and limited clinic hours (Hansen et. al, 2003). According to a study by the Kaiser Commission on Medicaid and the uninsured, the two most prevalent barriers reported amongst MSFW were cost and language (Rosenbaum et. al, 2005). The same study revealed that in 2000 the median income for MSFWs was \$6,250 compared to \$42,000 for U.S. workers. In 2000, 85% of MSFWs were uninsured, compared to 37% of low-income adults nationally.

There are currently fourteen migrant health clinics in Oregon designated to help deliver healthcare to the MSFW community (Oregon.gov). These health centers have been one of the best resources to meet the needs of the underserved migrant population. These clinics are a part of the 843 federally funded health clinics in the nation; 125 specific to MSFWs (Rosenbaum et. al, 2005). The MSFW clinics around the nation served approximately 670,000 people in 2002. Many MSFWs are not eligible for Medicaid because of their fluctuating incomes and their

migratory problems according to the Kaiser study. The ones that are eligible struggle with the enrollment process because of literacy issues.

A survey conducted in Oregon in 2006 showed that 15.7% of Hispanic children were without health coverage compared to 9.5% of non-Hispanic children (Oregon.gov, CAHS). The same study found that 34.2% of those who self-identified as Spanish, Hispanic or Latino were uninsured, twice as much as the general population. The amount of uninsured people could be larger because it does not take into consideration people who are not seeking medical help at all.

Cancer

The Annual Report to the Nation on the Status of Cancer in 2003 showed that Latinos in general had lower cancer incidence rates than non-Hispanic whites (NHW) and non-Hispanic blacks (NHB) in the areas of lung, colon, rectum, breast and prostate cancers (Edwards et al, 2005). However, the report showed that they had higher incidence rates in the area of stomach, liver and cervical cancer in females. Specifically the study found that Latinos have twice as much of an incidence rate in liver cancer.

Latinos, however, were less likely to be diagnosed with localized diseases such as breast, cervix, prostate, lung, colon, and rectum cancer. Although this report does not show Oregon specific statistical data it did survey approximately 90% of the U.S. Latino population in 2006 (Rosenbaum et al, 2005). Howe et al. says that in order to have more specific information there needs to be an increase in “general population and demographic statistics as well as in the records of persons diagnosed and dying from cancer” (2006).

Specifically the chronic exposure to carcinogens like pesticides, have caused MSFWs to have an increase in mortality rates for cancer (Hansen et al, 2004). Studies have shown that lip,

stomach, skin, prostate, testes and hematopoietic and lymphatic systems are prevalent health issues in the farmworker community. An Oregon specific study would serve as a good tool for preventative care and diagnosis. However, with MSFWs, tracking their exposure to carcinogens related to their work in Oregon may be difficult if they working in other areas of the Northwest.

Chemicals / Pesticides and Education

Chemicals and pesticides could be why farm work is considered the second most dangerous occupation in the U.S. (Rothenburg, 1998). Tracking the impact of pesticide poisoning among MSFWs is difficult due to the lack of a formal reporting system, fear from MSFWs, and a constant failure to educate MSFW on the dangers of pesticide-related illnesses (Hansen et al, 2003).

According to the U.S. General Accounting Office, migrant workers suffer the highest of rates of toxic chemical injuries of any group of workers in the United States (1992). The Environmental Protection Agency (EPA) believes that there are approximately 300,000 farmworkers that suffer from acute pesticide poisoning every year (U.S. GAO, 1992).

“Chemical and pesticide poisoning may result from direct spraying of workers; indirect spray from wind drifts; direct dermal contact with residues on crops; bathing in, or drinking, contaminated water; or transfer of residues on crops; bathing in, or drinking, contaminated water; or transfer of residues from contaminated hands while eating, smoking or defecating” (Hansen et al, 2003).

Pesticide exposure in the MSFW community is one of the most prominent areas of focus for researchers. The problem with pesticides is that the workers are still exposed after they clock out. The toxins often make it home on clothes, gloves, and coveralls, making it a family problem (Salvatore et al, 2009). Alicia L. Salvatore, Ph.D., focused a community-based participatory

worksite intervention study to reduce pesticide exposure to farmworkers and their families in 2008.

This worksite intervention was developed and carried out by community partners and University of California - Berkeley along with a number of former farmworkers. Their study focused on Spanish-speaking farmworkers over the age of 18, and consisted of both individual worker education and environmental components such as warm water, soap and protective clothing. Workers received cotton-polyester coveralls, which they left at the worksite in collection bins for washing.

Farmworkers were educated during awareness sessions to promote safe behavior at work and after work. The behaviors were assessed before and after, with a standardized questionnaire. After the worksite changes were made during the trial period, employees became more responsible about their protection. However, very few improvements were made in after-work behaviors.

Although the findings are not generalizable to farmworkers in all crops or regions, this intervention did find that by increasing break time and altering compensation (from piece rate to hourly compensation) hand washing might increase. The study also found that since it is hard to change after-work-behaviors it is important to have pesticide exposure prevention and education at work.

“Acute organophosphate exposure causes increased salivation tearing, blurred vision, nausea, vomiting, abdominal cramps, urinary and fecal incontinence bronchial secretions, cough wheezing, and sweating. In even more severe acute intoxication, dyspnea, bradycardia, heart block, hypotension, pulmonary edema, paralysis, convulsions, or death may occur” (Hansen et al, 2003).

Organophosphates have also been known to affect neurobehavioral (NB) performance. Studies have proven that acute exposure can lead to harsh effects but it has also been established that chronic low-level exposure is also detrimental (Alvana et al, 2004). Studies have found that individuals with histories of toxic exposures to organophosphates have shown a consistent pattern of deficits on measures of motor speed, coordination sustained attention, and information processing speed (Reidy et al, 1992).

To address the NB effects of pesticides a study was conducted based in Oregon by Joan Rothlein, et al (2006). The investigation focused on Oregon farmworkers and the NB performance based on biomarkers of exposure to pesticides. Forty-five controls were recruited for the study.

Carpet dust samples were taken to identify organophosphates in the home. At least one of six homes was traced with organophosphates. Urinary metabolite levels were also measured; a total of 88 valid urine samples were taken.

“After adjusting for age, sex, and years of education, poorer performance on five NB test was associated with higher levels of the average combined thiomethyl metabolites” (Rothlein et al, 2006). Thiomethyl metabolites are a component of pesticides that can cause cancer or neuro toxicity.

Pesticide residues have also been reported in the homes of farmworkers in Hood River, Oregon (McCauley et al. 2001).

“Farmworkers are exposed to pesticides from both work practices and living in housing close to agricultural fields. Although not measured in the present study, we have previously reported the average distance of farmworker housing to agricultural fields is 15 m in the Hood River community”.

McCauley also conducted another Hood River study in 2003 that showed a significant correlation between self-reported hygiene practices and levels of pesticides in home dust. This study explains the importance of health education messages to relay information of measures that growers and farmworkers can take to prevent home contamination.

A CBP study conducted in 2008 found that approximately half of the 150 farmworkers surveyed reported currently working in areas that are treated with pesticides (Farquhar et al). In reality more are exposed to pesticides either through direct contact or the air they intake. All of the pesticide training they attended was either in Spanish or English; no training was conducted in indigenous languages. 76 out of the 150 participants were from an indigenous background.

Another study focusing on pesticide exposure and occupational safety of farmworkers in Oregon was conducted in 2009 (Samples et al, 2009). The National Institute of Environmental Health Sciences, and the National Institute for Occupational safety and Health funded the study. After administering surveys in multiple locations a total of 136 farmworkers participated. The study focused on awareness of pesticides in their place of work, and education.

The findings were that 86% of indigenous workers reported never working with pesticides in comparison to 77% of Latino workers. Indigenous workers also reported that it was more likely for their physicians to not speak their language and they did not have access to an interpreter. During the survey process it was found that indigenous workers preferred a pre-recorded survey rather than a written version.

Children have been the main concern for a majority of studies revolving around pesticides. Their activity patterns, behavior and diet lead to increased risk of exposure in relation to adults caused by “carry-home” toxins (Lambert et al, 2005). William Lambert et al.,

conducted a study that focused on the amount of organophosphates in urine samples collected from migrant farmworker's children.

The Lambert et al., study adds to the already extensive research that finds that organophosphates are present in the bodies of children who live in rural areas. One of the most important findings in the study is that there was a substantial difference from each of the communities surveyed depending on the agricultural industry. The amount of organophosphates found in carpet dust of the homes in Hood River (pear community) was higher compared to homes in Cornelius (berry community) (McCauley et al, 2001).

A study was conducted to assess the NB function with computerized tests in adolescents working in agriculture (Rohlman et al, 2001). The control group was compared to a group of nonagricultural adolescents to find the possible effects of pesticide exposure. The target population for this study was two migrant education programs in Hillsboro, Oregon. The nonagricultural group of adolescents was recruited from a migrant education program from Hillsboro high schools.

The test consisted of a neurobehavioral tests by the Behavioral Assessment and Research System (BARS). BARS carried out a series of eight different tests in order to test NB. A total of 153 adolescents participated in the study, 51 nonagricultural and 102 agricultural. The agricultural group was divided into two groups; post and pre season. The nonagricultural group demonstrated better performance on all of the cognitive tests. However, the nonagricultural group was not always the dominant one. The variable that might have changed the study is finding a control group that had a similar level of education and repeated tests.

When looking at the different pesticide studies it is important to keep in mind that the results are going to vary depending on the migration patterns of families (Lambert et al, 2005).

The diversity in exposure depending on the agricultural community should be taken into consideration when examining these different studies. “Failure to characterize potential differences between communities may introduce exposure misclassification into epidemiologic studies” (Lambert et al, 2005).

Occupational Hazards

MSFW are exposed to a number of occupational hazards. Farm labor is a fast paced industry that requires extreme measures (Hansen et al, 2003). MSFW are required to work during extreme heat, cold, rain and bright sun. These conditions mixed with demanding body positions and large carrying loads can lead to musculoskeletal symptoms.

Studies have established that agriculture is one of the most dangerous fields to work in. As a result, the average life expectancy of MSFW is 49 years, compared to the national average of 75 years (Sandhaus, 1998). As a result of occupational hazards, like heat stress, the Occupational Safety and Health Administration (OSHA) is starting initiatives to promote hydrations and rest. In Oregon a specific campaign has started called “Con Agua Uno Rinde Mas” or “With Water We Last Longer”(Oregon.gov). The campaign is also aimed at ensuring that MSFWs get shade and breaks throughout their workday.

Oral Health

A study in Yakima, Washington found that MSFWs experience 150 to 300 percent more tooth decay than their peers (Koday et al, 1990). This may be due to a lack of knowledge of the relationship between sweet foods and cavities, or the positive effects of good oral hygiene and fluoride on periodontal health (Hansen et al, 2003).

A health survey in Hood River, Oregon found that dental health was the top reported problem in that community (Carne, 2006). A majority of the Spanish-speaking people surveyed

said their dental health was “fair”. “Children who do not receive dental care are at increased risk of developing severe periodontal problems as adults (Koday et al, 1990).

Reproductive Health and Prenatal Care

Standing and bending for a long period of time, insufficient hydration, poor nutrition and pesticide or chemical exposure can lead to complications during reproduction (Hansen et al, 2002). For example, MSFWs can suffer from spontaneous abortion, premature delivery, fetal malformation and growth retardation (Gwyther et al, 1998). Gwyther et al. explains that “low socioeconomic status; frequently young maternal age; and late, little, or no prenatal care increase risk to mother and child. The infant mortality rate among MSFWs is estimated to be twice the national average.

In 1988 a study was conducted in Oregon to show the prevalence of Hepatitis B (HB) among pregnant women in Migrant/Seasonal work (Fehrs et al, 1988). HB screening was recommended for women to lower the risk of HB being transmitted to the newborn. This concern came from the fact that HB is prominent in developing countries with poor hygiene, and crowded households, two common factors in MSFWs. The study found that there were low percentages (5.3%) of HB markers in pregnant women in Oregon. The sources of transmission for this percentage were not identified.

Discrimination in healthcare has been the focus of different studies around the state (De Marco et al, 2008). De Marco et al., focused on the perceived discrimination during prenatal care, labor, and delivery (2008).

“Perceived discrimination in health care was assessed by asking women if they felt they had ever been treated differently by health care providers during prenatal care, labor, or delivery because of their race, culture, ability to speak or understand English, age,

insurance, status, neighborhood in which they lived, religious beliefs, sexual orientation or lifestyle, marital status, or desire to have an out-of-hospital birth”.

The results showed that about one fifth of all women surveyed reported experiencing discrimination by health care providers. However, results indicated that Hispanic women perceived less discrimination than white women. De Marco et al., explains that this could potentially be linked to Hispanic women obtaining more culturally appropriate care, which leads to less discrimination.

Social and Mental Health

MSFWs face a tremendous amount of stress due to job uncertainty, poverty, isolation, poor housing, separation from family and lack of recreation among other things (Hansen, 2002). Most of these stressors can lead to relationship problems, substance abuse, domestic violence and psychiatric illness.

One Oregon-based study focuses on psychosocial stress due to discrimination (McClure et al, 2010). A sample of 132 immigrant adult farmworkers in Oregon was recruited to conduct the study to show the physical effects of psychosocial stress. The study proposed that discrimination can often be measured by elevated systolic blood pressure (SBP), increased body fat, and higher fasting glucose levels.

The results showed that discrimination stress showed up in SBP among men but not women. Perceived discrimination was significantly higher among obese women than among women of normal body mass index. A strong relationship was found between women’s reported discrimination stress and high fasting glucose levels.

“These results suggest that chronic psychosocial stress plays an important role in disease risk among Latin American immigrants, and that male and female immigrants may have

distinctive physiological responses. If confirmed, these findings may have important clinical and public health implications for chronic disease prevention among Latinos”.

According to Alderete et al., prolonged U.S. residence can lead to increased risk of psychiatric disorders (2000). This can be attributed to a loss of cultural ties like language, group identity and family communication. However, even with the stressors MSFWs face, the lifetime prevalence of psychiatric disorders may actually be lower than that of Mexican-Americans.

In 2001 the National Survey of Children with Special Health Care Needs (CSHCN) used a screener tool to identify children with special healthcare needs (Read et al., 2007). The prevalence of special health care needs for Hispanic children was lower than all the other racial and ethnic groups.

To try to comprehend the difference in the lower rates, CSHCN decide to conduct screening interviews in Spanish or English. When parents were interviewed in English 11.7% of the children were identified as CSHCN. However, when families were interviewed in Spanish only 5.1% of the children were identified as CSHCN. This approach shows once again that providing training materials, tests and surveys in a dominant language proves to be more effective and accurate.

Community-Based Participatory Research

MSFW communities have health needs that need to be met, however finding out the most prevalent needs is always a challenge because of their unique dynamics (McCauley et al, 2001). Linda McCauley speaks on the distinct challenges that CBPR poses when working with the MSFW population. A collaboration between two agencies in Oregon resulted in a successful study on pesticides. The study featured qualitative research methods with members of the

community and quantitative approaches to measure “pesticide dust residues in homes” and their effects on health.

McCauley’s article focuses on describing the development of an evolving model that promotes participation of groups that serve migrant farmworkers and consistently help advocate for their needs. In this case the community organization was Oregon Child Development Coalition (OCDC) a private not-for-profit corporation located in Wilsonville, Oregon.

OCDC serves over 2,000 migrant children and their families per year at 25 centers located around the state. In this specific project OCDC allowed researchers to access the migrant farmworker community to generate data that could be used to improve the health status of the MSFW population. Their integration to the study also allowed OCDC to leverage for new funding efforts.

The initial partnership was created between Oregon Health and Sciences University (OHSU) and OCDC. This contract included the collaboration of two bilingual research staff members, one at each organization. The two recruited a research advisory committee “to provide both community and research oversight and advice”. Later on the project aligned itself with two other organizations the first was Oregon Migrant Education Program and CReATe (Creating Roads to Empowerment and Advancement through Education). Figure 1 shows the final alliances formed to benefit the study.

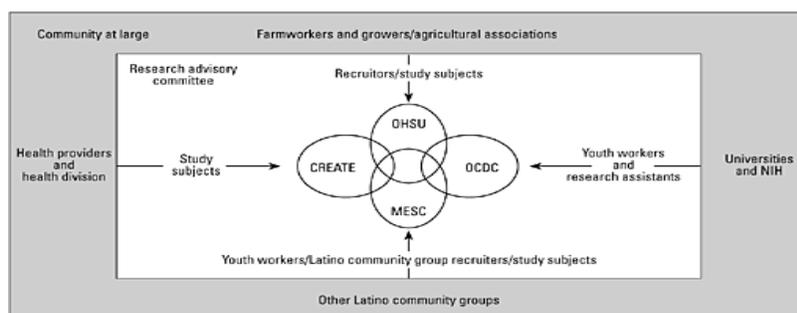


Figure 1. Evolving model for community participation. (McCauley et al, 2002).

McCauley explains that this model is working and the results of this partnership can be seen in the national and international presentations this group has been making. The collaboration has also created new avenues for an increase in funding to survey more adolescent farmworkers. The model does show some signs of communication problems between community advisors and researchers. The highest level of collaboration between advisors and researchers was in data collection and presentation results; the lowest was grant writing. “Although the model is working in this Oregon project, adaptations would be expected in other settings. However the key components of the participatory process should be observable and measurable in any community setting” (McCauley et al, 2002).

“Those who wish to conduct CBPR must think in terms of different designs, as well as adapting methods creatively within more standard designs...it is important to be willing to modify research activities and data collection methods to make them culturally appropriate. As we have seen, designs that incorporate qualitative methods have extremely important to the successful infusion of community participation (Arcury et al, 2009).

Focus Groups

Focus groups can be an effective way to obtain qualitative research information from first hand interviews (Napolitano et al, 2002). Focus groups were the main form of research used for Napolitano et al. in a study focused on reducing pesticide exposure in minority families (2002). The study worked with a similar model as CBPR and focused on making alliances to form focus groups in the MSFW community. In this case the organization was Migrant Head Start (MHS), which provides services to over 2000 migrant children and their families.

In the case of focus groups the environment is one of the keys to success. Things like childcare, neutral location, food, transportation and the time of the interviews were really important as well. The researchers had to adapt to the time constraints the MSFW had set, due to the demands of their labor. An effective method to gain attendance was to schedule focus groups before or after parent education meetings held at MHS.

Having a good moderator was noted as an important piece of a successful focus group. Participants should feel comfortable with the moderator in this case the moderator was a Mexican, bilingual MHS research project coordinator. There also needs to proper training for the moderator in order to be familiar with the questions and keep conversations flowing. One of the downfalls to the focus groups is that sometimes conversations get off track and even though the topic seems relevant it can stray away from the actual study. A good moderator can help control that.

Enumeration Profiles Study

In September of 2002 Alice C. Larson, Ph.D., published an enumeration profile study that featured migrant and seasonal farmworker numbers for the state of Oregon. The purpose of her study was to identify three specific population groups: Migrant farmworkers, seasonal farmworkers, non-farmworkers present in the same household as migrant farmworkers and seasonal farmworkers.

The study involved basic investigation techniques. The first was to mail surveys seeking relevant information and sources. The second was to gather a basic clarification of information. National databases were used to obtain some of the specific information featured in the report. By contacting agencies involved with agriculture and government agencies Larson sent questionnaires to request information for the study.

A thorough search of Internet sites was undertaken and once everything was collected estimates were put into sub-groups. Once the information was cleaned and organized the first draft was sent to 29 individuals with expertise in the area of MSFW. These individuals made suggestions for further topics to be explored.

The study was able to identify the number of MSFW in the state but was limited by secondary source material. The other obstacle was the definition of who should be included as a migrant or seasonal farmworker, because it can be subjective depending on the reporting agency.

Conclusion

The literature review and the research advisory council survey show that there is a tremendous gap in the information we need in order to know the health status of MSFWs. After conducting the literature review and survey, it was evident that the current Oregon specific research was outdated and insufficient. Table 1 shows the original list of prominent health areas based on Hansen et al., 2003, the research advisory council list which was updated on May 13, 2011, and the areas that are covered by current Oregon specific studies.

The column on the left shows the initial list taken from the Hansen article and the middle column shows the updated list by the research advisory council. There were a total of 36 areas of health that the research advisory council thought were relevant to MSFW health. Of those 36 areas only 7 were actually covered by Oregon specific studies.

The literature review showed that there is a number of articles and studies nationally that focus on MSFW. However, very few of the studies are Oregon specific. In order for Oregon to understand how to help MSFWs and their families it is important to fill the gap with current information.

Initial List - Hansen et al., 2003	Updated list – May 13, 2011	Current Studies
Access to Healthcare	Access to Healthcare	X
Cancer	Adult Immunizations	
Child Health	Alcohol and Tabaco Abuse	
Chemical and Pesticide – Related Illness	Alzheimer’s Disease	
Dermatitis	Asthma	
Heat Stress	Births	
	--Number of Births	
	--Number of Preterm Births	
	--Low Birthweight	
	--Teen Pregnancy	
Infectious Diseases	Cancer	
	--HPV	
	--Breast Cancer	
Musculoskeletal Disorder and Traumatic Injuries	Cerebrovascular Disease	
Oral Health	Child Health	X
	-Overweight/Obese Children	
	-Access to Mental Healthcare	
	-Immunizations	
Reproductive Health	Deaths	
	--Adult	
	--Child	
Respiratory Condition	Diabetes	
Social and Mental Health	Domestic Abuse	
	Heart Disease	
	Influenza and Pneumonia	
	Mental Health	X
	Number of Infant Deaths	
	Nutrition	
	-Access to Fruits and Vegetables	
	Obesity	
	Occupational Fatalities	X
	Oral/Dental Health	X
	Pesticides	X
	Physical Activity	
	Prenatal Care	X
	STDs / HIV	

Table 1 – Final Results of Known Studies

References

- Alvana MC, Hoppin JA, Kamel F. (2004). Health effects of chronic pesticide exposure: cancer and neurotoxicity *Annu Rev Public Health* 25:155-197.
- Arcury TA, Quandt SA, Deary A. 2001. Farmworker pesticide exposure and community-based participatory research: rationale and practical applications. *Environ Health Perspect* 109:429–434
- Carne, D. M. (2006). Hispanic and farmworker health : a community health survey of Hood River County, Oregon.. Honors College Theses, 4. Retrieved June 28, 2011, from <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/790/Thesis%20Final%20Copy.doc?sequence=1>
- De Marco M, Thorburn S, Zhao W. Perceived discrimination during prenatal care, labor, and delivery: An examination of data from the Oregon Pregnancy Risk Assessment Monitoring System, 1998–1999, 2000, and 2001. *Am J Public Health* 2008;98:1818–1821.
- Edwards BK, et al. (2005). Annual report to the nation on the status of cancer, 1975-2002, featuring Cancer Among U.S. Hispanic/Latino Populations. *J. Natl. Cancer Inst.* 97: 1407-1427.
- Farquhar S, Shadbeh N, Samples J, Ventura S, Goff N. Occupational conditions and well-being of indigenous farmworkers. *Am J Public Health.* 2008;98:1956–1959.
- Fehrs LJ, Eisele L, Conrad R, Foster LR, Fleming D. (1988). Prevalence of Hepatitis B markers among pregnant Hispanic women in migrant seasonal work in Oregon. *Am J Public Health.* 1988;78: 971-972.
- Gwyther ME, Kenkins M. Migrant farmworker children: Health status, barriers to care, and nursing innovations in health care delivery. *J Pediatr Health Care* 1998 Mar-Apr;12(2):60-66
- Hansen E, Donohoe M. Health issues of migrant and seasonal farmworkers. *J Health Care Poor Underserved.* 2003;14(2):153–164
- "Hispanics Account for More than Half of Nation's Growth in Past Decade." Pew Hispanic Center. N.p., 1 Jan. 2011. Web.
- Koday M, Rosenstein DI, Lopez GM, Dental decay rates among children of migrant workers in Yakima, WA. *Public Health Rep* 1990 Sep-Oct;105(5);530-33.
- Larson AC. Migrant and Seasonal Farmworker Enumeration Profiles Study: Oregon. Vashon Island: Larson Assistance Services; September 2002.

- Lambert WE, Lasarev M, Muniz J, Scherer J, Rothlein J, Santana J, et al. Variation in organophosphate pesticide metabolites in urine of children living in agricultural communities. *Environ Health Perspect*. 2005;113:504–508.
- McCauley LA, Beltran M, Phillips J, Lasarev M, Sticker D. The Oregon migrant farmworker community: an evolving model for participatory research. *Environ Health Perspect* 109(suppl3):449–455 (2001).
- McCauley LA, Lasarev MR, Higgins G, et al. Work characteristics and pesticide exposures among migrant agricultural families: a community-based research approach. *Environ Health Perspective* 2001; 109(5): 533-8.
- McCauley LA, Michaels S, Rothlein J, Muniz J, Lasarev M, Ebbert C. Pesticide exposure and self-reported home hygiene: practices in agricultural families. *AAOHN J*. 2003; 51:113–119.
- Napolitano, M., McCauley, L., Beltran, M., and Philips, J. "The Dynamic Process of Focus Groups With Migrant Farmworkers: The Oregon Experience," *Journal of Immigrant Health* (4:4) 2002, pp 177-182.
- Read, D., Bethell, C., Blumberg, S. J., Abreu, M., & Molina, C. (2007). An evaluation of the linguistic and cultural validity of the Spanish language version of the children with special health care needs screener . *Maternal Children Health Journal*, 11(6), 568-585.
- Reidy T, Bowler R, Raunch S, Pedroza G. (1992). Pesticide exposure and neuropsychological impairment in migrant farmworkers. *Arch Clin Neuropsychol* 7:85-95
- Rohlman DS, Anger WK, Tamulinas A, Phillips J, Bailey SR, McCauley L. Development of a neurobehavioral battery for children exposed to neurotoxic chemicals. *Neurotoxicology*. 2001a;22(5):657–665.
- Rosenbaum S, Shin P. Kaiser Commission on Medicaid and the Uninsured. The Henry J. Kaiser Family Foundation; 2005. Migrant and seasonal farmworkers: Health insurance coverage and access to care.
- Rothenburg, D. (1998). *With These Hands*. New York: Harcourt Brace and Co.
- Rothlein J, Rohlman D, Lasarev M, Phillips J, Muniz J, McCauley L: Organophosphate pesticide exposure and neurobehavioral performance in agricultural and non-agricultural Hispanic workers. *Environ Health Perspect* 2006, 114:691-696.
- Samples J., Bergstad E., Ventura S., Sanchez V., Farquhar S., Shadbeh N. (2009). Pesticide Exposure and Occupational Safety Training of Indigenous Farmworkers in Oregon. *American Journal of Public Health* 11(99), S81-584.
- Sandhaus S. Migrant health: A harvest of poverty. *Am J Nurs* 1998 Sep; 98(9):52-54

Salvatore, A. L., Chevrier, J., Bradman, A., Camacho, J., Lopez, J., Kavanagh-Baird, G., et al. (2009). A Community-Based Participatory Worksite Intervention to Reduce Pesticide Exposures to Farmworkers and Their Families. *American Journal of Public Health*, 11(99), S578-581.

"State of Oregon: Commission on Hispanic Affairs." Oregon.gov Home Page. N.p., n.d. Web. 10 July 2011. <<http://www.oregon.gov/Hispa>

Stephen, Lynn. (2001). Globalization, the State and the Creation of Flexible Indigenous Workers: Mixtec Farmworkers in Oregon. UC San Diego: Center for Comparative Immigration Studies. Retrieved from: <http://escholarship.org/uc/item/4wd691zw>

U.S. General Accounting Office. Hired farmworkers health and well-being at risk: Report to congressional requesters. Washington, DC: U.S. General Accounting Office, 1992.

United States Code: Title 42, TITLE 42—THE PUBLIC HEALTH AND WELFARE | LII / Legal Information Institute. (n.d.). LII | Legal Information Institute at Cornell Law School. Retrieved July 10, 2011, from <http://www.law.cornell.edu/uscod>