Agricultural Injury and Illness Surveillance Project;  
Hillsborough County, FL -- Phase II  
Preliminary Report

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GENERAL DESCRIPTION OF PROJECT

This project is the second phase of a study aiming at the development of a surveillance system to quantify the occurrence of agricultural injuries and illnesses in selected Florida counties, with an emphasis on conditions experienced by workers in crop agriculture. Phases I and II of the study consist of Retrospective Surveillance of visits registered at Rural Health Clinics in Hillsborough County.

During Phase I, the research team developed instruments and procedures for data collection, and gathered information pertaining to three sets of conditions: (a) Musculoskeletal problems, (b) Dermatoses, and (c) Pesticide related problems. Phase I was conducted between October 2000 and June 2001.

The objective of Phase II was to expand retrospective surveillance in order to cover outpatient visits due to three additional sets of conditions known to affect workers in crop agriculture: (a) Eye problems, (b) Allergic rhinitis, and (c) Respiratory conditions. However, once review of the three sets of conditions was finalized, Phase II was expanded to incorporate review of visits due to (d) Carpal tunnel syndrome, (e) Peripheral enthesopathies, and (f) Disorders of Synovium, Tendon and Bursa. Phase II expanded also included review of visits due to (g) Musculoskeletal problems. Phase II was conducted between March 1rst and May 31, 2002.

BACKGROUND AND SIGNIFICANCE

Agriculture is a major industry in the United States, employing about 10 million workers. The risk of occupational injury and illness is greater in production agriculture than in most other industries. Since 1993, agriculture (along with mining) has ranked first in the occurrence of fatal injuries. In addition to an increased risk of death from injury, agricultural workers experience an increased risk of traumatic injury. Moreover, several conditions have been identified as often occurring among agricultural workers, i.e. respiratory illness, musculoskeletal problems, acute and chronic pesticide-related illness, dermatoses, eye conditions, cancer, heat and cold stress, infectious diseases, zoonoses, and hearing loss.
Hired farmworkers in crop agriculture: a special population

Crop agriculture, in particular the production of vegetables, fruits and horticultural specialties (FVH) is heavily dependent on manual labor. Workers on FVH farms perform a wide range of jobs, including planting, pruning, thinning, hoeing, irrigating, fertilizing and field packing. However, more workers are involved in harvesting the crop than in any other activity. Given that harvesting is a time-limited task, and that harvesting periods vary by crop, workers are employed for short periods of time, and usually work in different crops. Workers in crop agriculture are employed on a temporary basis and may work for several different farms to extend their employment.

Hired farmworkers are predominantly young men and overwhelmingly Hispanic, Spanish speaking, and foreign born (Mexico is the most common place of birth). Farmworkers typically have a seventh-grade education, yet they exhibit high levels of functional illiteracy. Nearly half of farmworkers live in poverty. Usually, several members of a farmworker family, including women and children, will work in agriculture. Since most farmworkers and their families live in close proximity to the fields, they are constantly subject to agricultural exposures and risks.

The need for systematic data on the health problems of hired farmworkers in crop agriculture

Hired farmworkers in crop agriculture face a harsh mixture of occupational, environmental and social/economic conditions intrinsically tied to the nature of their work. Although several studies on the health of hired farmworkers in crop agriculture have provided the basis to identify some of the specific conditions which seem to be their most common or most serious health problems, comprehensive data delineating the health status of hired farmworkers is still lacking. Systematic, continuous characterization of work-related illnesses and injuries is recognized as the next step in the effort to define priorities for action, monitoring and evaluation of interventions aimed at improving the health status of hired farmworkers.

Surveillance, “the ongoing collection, analysis and interpretation of health data with the objective of describing and monitoring a health event” has been defined as a critical component in the process leading to disease prevention and health promotion. In the area of hired farmworker health, surveillance objectives include 1) Identification, characterization and prioritization of health problems among farmworkers, 2) Identification of work related exposures, and 3) Continuous monitoring of the health status of farmworkers. Surveillance data is critical to assess the needs of farmworkers, muster resources to meet those needs, and evaluate the effectiveness of intervention efforts such as enforcement and regulatory acts. A comprehensive set of guidelines has been put forward addressing priorities for surveillance and research on the occupational health of hired farmworkers.

Hired farmworkers are a special population not only because they face particular risks and experience specific health problems, but also because they have proven a hard-to-reach group when it comes both to health care and health research. Accordingly, surveillance systems of the occupational health of hired farmworkers have to be developed that address the difficulties of data collection and monitoring inherent in the study of a transient, migratory population with a
high turnover rate. The present “Agricultural Injury and Illness Surveillance Project” aims at developing the basis of such a system for Florida’s farmworkers.

**Developing an agricultural injury and illness surveillance system in Hillsborough County, Florida**

Florida’s agriculture ranks 9th in the nation, with sales of $6.95 billion in 2000. Florida ranks first in citrus production and second in the production of vegetables and horticulture products\(^{18}\). Fruit, vegetable and horticulture production farms are the prime employers of temporary agricultural workers, and the state hosts an estimated 185,000 hired farmworkers and 84,000 family members each year\(^{19}\). The state provides an optimal setting for the development of a surveillance system on the occupational problems of hired farmworkers.

Hillsborough County hosts the second largest group of hired farmworkers in the State of Florida (16,599 workers and 7,500 household members)\(^{19}\). The County’s agriculture is diverse, comprising citrus, berries, vegetables, field crops and horticultural production.\(^{18}\) Hillsborough county was chosen as the first site in the development of an agricultural injury and illness surveillance system because of its agricultural characteristics, and because of the existence of formal and informal ties between the University of South Florida College of Public Health and the agricultural community in this county.

**PHASE II OBJECTIVES**

**Main objectives:**

1. To define the number of occurrences of three sets of occupational conditions among farmworkers seeking health care in rural clinics in Hillsborough County, FL:

   a) Eye conditions (Conjunctivitis, pterygia, eye injuries)

   b) Allergic rhinitis

   c) Asthma and bronchitis

   Within the following time frames:

   - January 1, 2000 – March 31, 2000
   - January 1, 2001 – March 31, 2001
   - October 1, 2001 – December 31, 2001

   The quarters defined above correspond to peak harvest times in Hillsborough County, where the hired farm labor force is at its maximum.

2. To define the number of occurrences of eight sets of occupational conditions among farmworkers seeking health care in rural clinics in Hillsborough County, FL:

   a) Eye conditions (Conjunctivitis, pterygia, eye injuries)
b) Allergic rhinitis
c) Asthma and bronchitis
d) Carpal tunnel syndrome
e) Peripheral enthesopathies
f) Disorders of synovium, tendon and bursa
g) Back pain
h) Sprains and Strains

For the quarter corresponding to January 1 – March 31, 2002

A list of the ICD-9-CM codes used to identify the conditions is presented in Appendix A.

3. To describe the demographic and occupational characteristics of workers who experienced the conditions detailed in (1) and (2) above

4. To describe the characteristics of the work being conducted when the injury/illness developed (commodity, location of work, circumstances at occurrence)

5. To describe characteristics of the injury/illness (body part affected, course of injury/illness, type of health care needed)

Secondary objectives

1. Continue with the testing of instruments and procedures for further retrospective surveillance and for prospective surveillance.
2. Identify strengths and weaknesses of the clinical record to provide the information required.
3. Identify additional components of the case definition that may be used for further studies

RESEARCH DESIGN

Phase II is a descriptive study. It is set up as a cross sectional survey based on retrospective review of clinical records

SOURCE FOR MEDICAL RECORDS

We established a collaborative partnership with Suncoast Community Health Centers, Inc. (Suncoast). This Institution is the major health care provider in rural Hillsborough County. Suncoast operates three clinics located in the South and East areas of the county, the same areas where the majority of crop farms are located. Suncoast Community Health Centers, Inc. is partially funded under Section 329 of the Public Health Service Act to provide health services to the migrant and seasonal agricultural workforce. First established as the “Hillsborough County Migrant Health Center” in 1977, Suncoast has a solid record as the main source of health care for temporary agricultural workers in Hillsborough County.

Suncoast Community Health Centers, Inc. and the University of South Florida College of Public Health have collaborated in various studies and programs related to the health of farmworkers.
Suncoast has become a proactive partner in the effort to develop a surveillance system on the occupational health of hired farmworkers.

PROJECT ACTIVITIES:

Phase II formally started February 15, 2002 and continued through May 31, 2002. A final report of activities was due on June 30, 2002.

The following project components were completed:

1. Study protocol reviewed and approved by the University of South Florida Institutional Review Board (IRB#100048).
2. Collaborative agreement with Suncoast Community Health Centers, Inc. renewed
3. Training of research assistant for record review.
4. Inter- and Intra-rater repeatability evaluated.
5. Data collection (437 sentinel visits reviewed )

RESULTS

1. Review of visits for the first three quarters.

During the first four weeks of data collection, we reviewed records for 250 visits, pertaining to (a) eye problems, (b) allergic rhinitis, or (c) asthma and bronchitis. However, as presented in Tables 1, 2 and 3, only 27 of the visits were by farmworkers (11% overall). No cases of occupationally related conditions were found in this sample.

Table 1. Visits Registered for the Period Jan 1 - March 31, 2000, by Diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9-CM</th>
<th>Visits No.</th>
<th>%</th>
<th>Subject FW* (No.)</th>
<th>No FW (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Allergic Conjunctivitis</td>
<td>372.14</td>
<td>1</td>
<td>0.8</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unspecified Conjunctivitis</td>
<td>372.3</td>
<td>17</td>
<td>13.8</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Pterygium</td>
<td>372.4</td>
<td>5</td>
<td>4.1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Allergic Rhinitis</td>
<td>477.9</td>
<td>50</td>
<td>40.7</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>490</td>
<td>29</td>
<td>23.6</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>Asthma</td>
<td>493</td>
<td>21</td>
<td>17.1</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* FW = Farmworker
Table 2. Visits Registered for the Period Jan 1 - March 31, 2001, by Diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9-CM</th>
<th>Visits No.</th>
<th>%</th>
<th>Subject FW* (No.)</th>
<th>No FW (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Allergic Conjunctivitis</td>
<td>372.14</td>
<td>2</td>
<td>2.8</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Unspecified Conjunctivitis</td>
<td>372.3</td>
<td>2</td>
<td>2.8</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Pterygium</td>
<td>372.4</td>
<td>1</td>
<td>1.4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Allergic Rhinitis</td>
<td>477.9</td>
<td>39</td>
<td>54.2</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>490</td>
<td>16</td>
<td>22.2</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Asthma</td>
<td>493</td>
<td>12</td>
<td>16.7</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td></td>
<td>55</td>
<td>5</td>
<td>67</td>
</tr>
</tbody>
</table>

* FW = Farmworker

Table 3. Visits Registered for the Period Oct 1 - Dec 31, 2001, by Diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9-CM</th>
<th>Visits No.</th>
<th>%</th>
<th>Subject FW* (No.)</th>
<th>No FW (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Allergic Conjunctivitis</td>
<td>372.14</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unspecified Conjunctivitis</td>
<td>372.3</td>
<td>1</td>
<td>1.8</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pterygium</td>
<td>372.4</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Allergic Rhinitis</td>
<td>477.9</td>
<td>33</td>
<td>60.0</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>490</td>
<td>11</td>
<td>20.0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Asthma</td>
<td>493</td>
<td>10</td>
<td>18.2</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td></td>
<td>2</td>
<td>2</td>
<td>53</td>
</tr>
</tbody>
</table>

* FW = Farmworker

The low percentage of visits by farmworkers was due to a glitch in the computer program used to select visits for review. The program selected visits for established, regular patients in the clinics, and missed a majority of visits by farmworkers, which typically may have just one clinic encounter, or may visit the clinic sporadically. Farmworkers may reside in Hillsborough County during harvest time, and then leave due to follow-the-crop migration.

2. Review of visits for the Jan 1- March 31, 2002 quarter.

It was possible to produce a list of visits by farmworkers for the first quarter of 2002. This allowed the review of the majority of farmworker visits, as the records were within the pool of 'current' patients. For this new sample (186 visits), we reviewed clinic encounters due to eight sets of conditions: (a) Eye conditions ( Conjunctivitis, ptentrygia, eye injuries), (b) Allergic rhinitis, (c) Asthma and bronchitis, (d) Carpal tunnel syndrome, (e) Peripheral enthesopathies, (f) Disorders of synovium, tendon and bursa, (g) Back pain, and (h) Sprains and Strains.

I decided to include the eight sets of conditions in order to:

- Evaluate whether eye conditions, allergic rhinitis and asthma/bronchitis would be found in a set with a higher proportion of farmworkers
Evaluate whether a new set of musculoskeletal conditions: carpal tunnel syndrome, enthesopathies and synovitis/tenosynovitis would appear as diagnosis in a sample of farmworkers.

- Compare the frequency of the above conditions to the frequency of back pain and sprains/strains, two sets of conditions found prevalent among farmworkers during Phase I.

Table 4 presents the results obtained in the additional sample.

Table 4. Visits Registered for the Period Jan 1 - March 31, 2002, by Diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9-CM</th>
<th>Visits No.</th>
<th>Subject % FW* (No.)</th>
<th>No FW (No.)</th>
<th>FW with Diagnosis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpal Tunnel Syndrome</td>
<td>334</td>
<td>3</td>
<td>1.6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Blepharo Conjunctivitis</td>
<td>372.21</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unspecified Conjunctivitis</td>
<td>372.3</td>
<td>20</td>
<td>10.8</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Pterygium</td>
<td>372.4</td>
<td>4</td>
<td>2.2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Hordeolum Externus</td>
<td>373.11</td>
<td>2</td>
<td>1.1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Abscess of Eyelid</td>
<td>373.13</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Allergic Rhinitis</td>
<td>477.9</td>
<td>32</td>
<td>17.2</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>490</td>
<td>26</td>
<td>14.0</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Asthma</td>
<td>493</td>
<td>21</td>
<td>11.3</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Back pain</td>
<td>724</td>
<td>60</td>
<td>32.3</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>Peripheral Enthesopathies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adhesive capsulitis shoulder</td>
<td>726</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Enthesopathy elbow</td>
<td>726.3</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Enthesopathy, unspecified</td>
<td>726.9</td>
<td>2</td>
<td>1.1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Synovitis</td>
<td>727</td>
<td>3</td>
<td>1.6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sprains and Strains</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder and Upper Arm</td>
<td>840.9</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Back, unspecified</td>
<td>847</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Other and Ill-defined</td>
<td>848.9</td>
<td>7</td>
<td>3.8</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186</td>
<td>103</td>
<td>83</td>
<td></td>
</tr>
</tbody>
</table>

* FW = Farmworker

As presented in Table 4, there were 103 (55.4%) visits in the Jan-March 2002 sub-sample where the patient was a farmworker. The most common diagnosis among farmworkers was back pain, followed by allergic rhinitis, asthma, and conjunctivitis. However, it was possible to define occupationally-related conditions only among visits for eye conditions (conjunctivitis and hordeolum), back pain and enthesopathies. Detail of the visits where occupationally related conditions were defined is presented in Table 5.

Among visits by farmworkers, 22 (21.3%) were defined as occupationally related. Thus, roughly one-fifth of visits by farmworkers with the conditions included for study could be related to work in agriculture. However, it is likely that this estimate represents the lower end of the true range of occupationally related conditions for farmworkers with the sentinel diagnosis included in the
study. The medical record does not routinely register information as to the occupational nature of a condition. The instances where the defining criteria were met from information present in the medical record probably represent the most obvious occupationally related cases. It is likely that many bonafide cases were missed due to lack of information from the medical record.

Of note, in 50% of visits due to back pain it was possible to define the occupationally-related nature of the condition, as well as in 31% of visits due to conjunctivitis; and 67% of visits due to enthesopathies. These findings support what has been discussed in the literature regarding the most likely nature of occupationally related conditions. (3)

Table 5. Visits where Occupationally-related Conditions Were Defined, by Diagnosis Jan 1 - March 31, 2002.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9-CM</th>
<th>Visits by FW* (No.)</th>
<th>Occ. Rel.* Visits (No.)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unspecified Conjunctivitis</td>
<td>372.3</td>
<td>13</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td>Hordeolum Externus</td>
<td>373.11</td>
<td>1</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Back pain</td>
<td>724</td>
<td>28</td>
<td>14</td>
<td>50.0</td>
</tr>
<tr>
<td>Peripheral Enthesopathies</td>
<td>726</td>
<td>3</td>
<td>2</td>
<td>66.6</td>
</tr>
<tr>
<td>Synovitis</td>
<td>727</td>
<td>1</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>46</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

* FW = Farmworker
** Occ.Rel. = Occupationally related

3. Characteristics of occupationally-related visits

Among 103 visits recorded for farmworkers for any of the diagnosis of interest for the study, 22 (21.3%) were due to occupationally related conditions. Among these, a majority (64%) was due to back pain, 22.7% were due to eye problems, and 13.6% were due to either enthesopathies or synovitis. These findings underscore the importance of musculoskeletal problems as occupational diseases among farmworkers, and provide evidence of an occupationally related etiology for eye problems among farm laborers.


<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9-CM</th>
<th>Occupationally Related Visits (No.)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unspecified Conjunctivitis</td>
<td>372.3</td>
<td>4</td>
<td>18.2</td>
</tr>
<tr>
<td>Hordeolum Externus</td>
<td>373.11</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>Back pain</td>
<td>724</td>
<td>14</td>
<td>63.6</td>
</tr>
<tr>
<td>Peripheral Enthesopathies</td>
<td>726</td>
<td>2</td>
<td>9.1</td>
</tr>
<tr>
<td>Synovitis</td>
<td>727</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

* FW = Farmworker
Visits for occupationally related conditions were equally divided among males (11 visits, 50%) and females. All subjects were of Hispanic descent. Table 6 details the age of subjects and the proportion with each diagnosis by age category. Approximately a third (32%) of conditions occurred among subjects younger than 30 years of age. 80% of episodes of back pain and 71% of episodes of conjunctivitis occurred among subjects younger than 40 years of age.

Table 6. Occupationally-related Conditions: Diagnosis by age category.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Subjects</th>
<th>Condition</th>
<th>Eye problems*</th>
<th>Back pain</th>
<th>Enthesopathies/Synovitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 29</td>
<td>7 (31.8)</td>
<td>2 (40.0)</td>
<td>5 (35.7)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>30 - 39</td>
<td>9 (40.9)</td>
<td>2 (40.0)</td>
<td>5 (35.7)</td>
<td>2 (66.7)</td>
<td></td>
</tr>
<tr>
<td>40 - 49</td>
<td>4 (18.2)</td>
<td>0 (0.0)</td>
<td>3 (21.4)</td>
<td>1 (33.3)</td>
<td></td>
</tr>
<tr>
<td>50 - 59</td>
<td>2 (9.1)</td>
<td>1 (20.0)</td>
<td>1 (7.1)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>

* Includes 4 cases of conjunctivitis and 1 case of hordeolum

Table 7 details the crops being worked when the condition developed, and the proportion with each diagnosis by crop. The crop being worked is unknown in 32% of visits for occupationally related conditions. Nursery work is involved in 27.3% of visits and work in strawberries is involved in 23% of visits for occupationally related conditions. Approximately 36% of visits for occupationally related back pain occur among strawberry workers, 21% among nursery workers.

Table 7. Occupationally-related Conditions: Diagnosis by Crop Worked when Condition Developed

<table>
<thead>
<tr>
<th>Crop</th>
<th>Subjects</th>
<th>Condition</th>
<th>Eye problems*</th>
<th>Back pain</th>
<th>Enthesopathies/Synovitis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Oranges</td>
<td>2 (9.1)</td>
<td>1 (20.0)</td>
<td>0 (0.0)</td>
<td>1 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Strawberries</td>
<td>5 (22.7)</td>
<td>0 (0.0)</td>
<td>5 (35.7)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>2 (9.1)</td>
<td>0 (0.0)</td>
<td>2 (14.3)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Nursery</td>
<td>6 (27.3)</td>
<td>1 (20.0)</td>
<td>3 (21.4)</td>
<td>2 (66.7)</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>7 (31.8)</td>
<td>3 (60.0)</td>
<td>4 (28.6)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>

* Includes 4 cases of conjunctivitis and 1 case of hordeolum
Figure 1 shows the distribution of locations where the subject was working when the condition developed. A majority (54%) of conditions developed in the field or while working at a nursery (27%).

4. Limitations of the Study

There are important limitations to the present study, as detailed below:

a) Completeness of the sample. - As explained, visits reviewed for the Jan-March 2000, Jan-March 2001, and Oct-Dec 2001 quarters were not representative of visits by farmworkers. Accordingly, findings pertaining to those 250 visits do not provide information on the conditions experienced by farmworkers.

The sample of 186 visits for the quarter Jan-March 2002 do provide information on the conditions experienced by farmworkers, as 55% of the recorded visits (n = 103) were for farmworker subjects. However, there is a possibility that a fraction of visits by farmworkers was not incorporated in the sample. During Phase I, it became apparent that some subjects classified as “No- farmworkers” in the clinics’ database were indeed farmworkers. This was particularly true for subjects with a Hispanic surname. In Phase II augmented, we did not review all records of subjects with a Hispanic surname, and it is possible that we have missed a fraction of visits by farmworkers.

b) Lack of validation studies for condition diagnosis, farmworker status and occupational nature of condition. - We did not validate diagnosis, farmworker status and occupational nature of condition. Among these three components, diagnosis and farmworker status have face validity. Each diagnosis recorded in the administrative databases was compared with diagnosis registered in the medical record. Administrative records matched the medical records in 99.8% of instances. With regard to farmworker status, the information to classify a subject as farmworker was obtained from different components of the medical record, and
it was qualified as to the time lag between the source of information on farmworker status and the date of the sentinel visit. Accordingly, it is unlikely that farmworker status was misclassified in this study.

Lack of validation of the occupational nature of the condition is the most important limitation of the present study. It is necessary to measure the extent to which the criteria used to define a condition as occupationally related would stand peer-review, and whether cases defined as occupationally related in the study would be substantiated as such by the usual procedures used to define occupationally-related conditions, for example, in a formal workers' compensation evaluation.

c) Lack of denominator data.- Denominator data is necessary to evaluate whether the percentage distribution of cases by crop follows the percentage composition of the workforce by crop. Also, to gauge the relationship between number of cases seen at Community Health Centers and the number of subjects exposed to agricultural work in each quarter.

5. Conclusions

While all conditions explored in the study occurred among farmworkers, it was possible to define an occupationally related nature only for back pain, eye-problems, and peripheral enthesopathies. Accordingly, these conditions could become the focus of further studies.

The instruments and procedures for data collection developed in Phase I were appropriate for recording of information on the expanded set of conditions evaluated in Phase II.

The medical record is a strong instrument to define occupationally related conditions in the instances where the subject’s occupation and the circumstances surrounding the development of a condition are detailed in the Doctor’s note. However, the information is not uniformly recorded across visits. It is necessary to explore ways in which the recording of occupation and the criteria to define a condition as occupationally related could be routinely registered in the medical record.

The most important limitation of the present study is the lack of validation of criteria used to define an occupationally related condition. Validation of the criteria should become the focus of further work in this area. The second most important limitation of the study is the lack of denominator data. Definition of the population denominator should also be a priority in any further studies.

Overall, it was possible to define an occupationally related nature for the condition in 21.3% of visits by farmworkers with any of the sentinel diagnosis. That is, roughly a fifth of visits were due to conditions related to work in agriculture. This number probably represents the lower end of the true range of potential estimated values for the proportion of visits due to occupationally related conditions.
Some conditions are definitely related to work in agriculture: in 50% of visits due to back pain, in 31% of visits due to conjunctivitis, and in 67% of visits due to enthesopathies the condition could be defined as due to farmwork.

REFERENCES

2. Marshfield Medical Research and Education Center. Agricultural Injury. Fact Sheet 1996 W No. 1
18. Florida Department of Agriculture and Consumer Services. Florida agricultural facts. 1999
APPENDIX A

ICD-9 CODES FOR CONDITIONS OBJECT OF STUDY
Phase II

Eye Conditions

370.40 Keratoconjunctivitis, unspecified

370.9  Unspecified keratitis

372.0  Acute Conjunctivitis
       372.00
       372.03
       372.05

372.13 Chronic follicular conjunctivitis
372.14 Other chronic allergic conjunctivitis

372.2  Blepharoconjunctivitis
       372.21
       372.22

372.30 Other and unspecified conjunctivitis

373.4  Pterygium
       372.40
       372.42
       372.43
       372.44
       372.45

373.0  Blepharitis
       373.00
       373.01

373.31 Eczematous dermatitis of eyelid

376.01 Orbital cellulitis

Allergic rhinitis

477.0  Allergic rhinitis due to pollen
477.8  Allergic rhinitis due to other allergen
477.9  Allergic rhinitis cause unspecified
Bronchitis

490 Bronchitis, not specified as acute or chronic
491.0 Simple chronic bronchitis
491.20 Obstructive chronic bronchitis, no mention of acute exacerbation
491.21 Obstructive chronic bronchitis, with acute exacerbation
491.8 Unspecified chronic bronchitis

4A. Asthma

493 Asthma
493.0 Extrinsic asthma
493.9 Asthma, unspecified

495 Extrinsic allergic alveolitis

Superficial injury of eye and adnexa

918.0 Eyelid and periocular area
918.1 Cornea
918.2 Conjunctiva
918.9 Other and unspecified superficial injuries of eye

Carpal tunnel syndrome

354.0

Backache

724 (unspecified disorders of the back)
  724.1
  724.2
  724.3
  724.4
  724.5
  724.6
  724.7

Peripheral enthesopathies and allied syndromes

726 .0 Adhesive capsulitis of shoulder
726.1 Enthesopathy Shoulder region
726.2 Shoulder (other)
726.3 Enthesopathy elbow
726.4 Enthesopathy wrist
726.5 Enthesopathy hip
726.6 Enthesopathy knee
726.7 Enthesopathy of ankle
726.8 Other Enthesopathy
726.9 Enthesopathy, unspecified

Other disorders of synovium, tendon and bursa

727.0 Synovitis /tenosynovitis
727.2 Bursitis of occupational origin
727.3 Other bursitis
727.4 Ganglion, Cyst
727.5 Rupture of synovium
727.6 Rupture of tendon, not traumatic
727.8 Other disorders of synovium, tendon and bursa
727.9 Unspecified disorder of synovium, tendon or bursa

Sprains and Strains

840 Sprains and strains of shoulder and upper arm
  840.1
  840.2
  840.3
  840.4
  840.5
  840.6
  840.7
  840.8
  840.9

841 Sprains and strains of elbow and forearm
  841.0
  841.1
  841.2
  841.3
  841.8
  841.9

842 Sprains and strains of wrist and hand
  842.0
  842.1

843 Sprains and strains of hip and thigh
  843.0
  843.1
  843.8
  843.9

844 Sprains and strains of knee and leg
  844.0
844.1
844.2
844.3
844.8
844.9

845  Sprains and strains of ankle and foot
    845.0
    845.1

846  Sprains and strains of sacroiliac region
    846.0
    846.1
    846.2
    846.3
    846.8
    846.9

847  Sprains and strains of other and unspecified parts of back
    847.0
    847.1
    847.2
    847.3
    847.4
    847.9

848  Other and ill-defined sprains and strains
    848.0
    848.1
    848.2
    848.3
    848.4
    848.5
    848.8
    848.9