# The Healthy Dairy Worker Study:
# A Longitudinal Cohort Study of Dairy Workers' Respiratory Health

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## Abstract

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**Background:** Studies have reported that Agricultural workers have elevated rates of respiratory health issues; however, the literature on respiratory function in dairy workers is limited and contradictory. Dairy work involves more exposure to dust and gases when compared to other occupations. Dairy workers work in a variety of settings, including increasingly larger and more industrialized farms that involve exposure to multiple biological and chemical substances. Previous studies of dairy workers have reported that dairy work is associated with acute airway obstruction, yet others have reported lower rates of asthma compared to other occupational groups. This thesis presents preliminary data from a study of dairy workers in Washington State. **Objective**: Compare and assess pulmonary function among dairy workers and community controls. **Methods**: Respiratory function was assessed in 40 dairy workers and 22 community controls over a 6-month period. Subjects were asked to complete a questionnaire, spirometry and exhaled nitric oxide at baseline, three, and six months. Descriptive

statistics were used to describe both dependent and independent variables. Linear Mixed Models were used to compare exhaled nitric oxide, $FEV_1$, FVC, and the $FEV_1$/FVC Ratio between cases and controls. **Results:** The dairy workers had a significantly (5.93%) higher $FEV_1$/FVC ratio than the community controls (p=0.009). Within the dairy workers, those who had greater contact with animals had slightly better $FEV_1$/FVC ratio (0.33% for contact with cows, 1.31% for contact with calves) compared to the dairy workers with minimal to no contact with animals. **Conclusion:** The spirometry $FEV_1$/FVC ratio for dairy workers can suggest that dairy workers may have better airway function compared to community members.

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## BACKGROUND

### Consolidation of animal agriculture and implications for worker health

An industrial-scale animal facility (IAF) or Concentrated Animal Feeding Operation (CAFO) are terms used to describe industrial farms and facilities with animals used for food production - cows, swine and fowl. The dairy workplace is changing and growing from family farms, where 100 cows were milked once a day in the morning, to more recently larger industrialized farms with thousands of cows being milked two to three times a day. Nationally, the number of dairy farms with herd sizes over 1000 have increased by over twenty percent, while the smaller farms have decreased.[1] To staff these larger farms, farm owners are hiring more workers, many of whom are immigrant Hispanic individuals. According to a United States Department of Agricultural (USDA) report in 2008, farms with 500 or more cows were being milked by hired workers rather than owners or family members.[2,3]

The population of workers on dairy farms often face language barriers, lack of primary care providers and long work hours that limit them seeking health care to address any health problems, including respiratory health. Other changes to dairy farm production include new technology such as robotic milking and working practices that may have altered exposure patterns for workers. The scale of the production has changed with increased herd size, and worker demographics. Understanding the risk and benefits for this vulnerable population in terms of dairy farm exposure is therefore important. According to Washington State Department of Agriculture, Washington State dairy is the second most valuable agricultural commodity, after apples. In 2014, according to the USDA more than 6,500 million pounds of milk were produced in

Washington dairy farms, 10th in the nation in milk production.[47] This industry is very important to not only our state, but also across the country. This intensification of farming practices raises the possibility of greater exposure of workers to occupational hazards including dust, microbes, endotoxin, and injury risks. However, longitudinal studies of dairy worker health remain limited.

## Dairy Work Environment and exposures relevant to health

In a modern dairy, milking takes place in the milking parlor where cows are being milked two to three times a day, seven days out of the week. This system increases productivity of the milking process because animal handling becomes much easier as well as milking. In the milking parlor design, cleaning of equipment and manure management also becomes more effective and efficient (Image 1). Due to the repetitiveness of this work in the milking parlor, workers are close to the milking cows on a continual basis, which could expose them to dust and its constituents including microbes and endotoxins.[4,5] Specifically, in dairy farms, animal dander, urine and feces are main sources of microorganisms, allergens and toxins.[10] The milking parlor is an important part of milk production, but also the exposure in tasks before and after milking that happen outside of the milking parlor are important settings for assessing occupational exposure.

Dairy worker jobs range from work involving little to no contact with animals (such as field work or maintenance), to dairy workers who spend the entire work shift in close proximity to animals.

In addition to milking, dairy workers experience frequent animal contact during activities associated with the caring and calving for calves and herd health and reproduction. Caring and feeding for calves, starts minutes after calving takes place, the workers take on the role of taking care of the calf from that point forward. Task include disbudding of horns, which is a common practice done to remove horns from calf 1-6 weeks after birth to avoid the calf from hurting the workers or other animals. Caring for calves include proper vaccinations as needed and clean of bedding on a daily basis. During extreme temperatures such as cold winters or hot summers extra measures are taken to care for calves. As the calf gets older and ready for milking, other workers have the task of creating a healthy environment where the cow can be ready for lactation. This includes being part of the insemination and calving (parturition) process, to prepare for lactation. Calving takes place at all hours of the day seven days of the week, so workers are prepared for this at all times. These outside tasks require close proximity to the animals at all times of the day, and exposure to animal contact is great.

Task for the dairy workers who have little to no contact with animals, include things like preparing feed for the cows, maintenance of vehicles and other equipment that is necessary to make the farm function. Other jobs that have little to no contact with animals on the farm include field work that is necessary for the production of hay, wheat or corn. These jobs on the dairy farm have little to no contact with animals, however they are exposed to dusty grain and dry vegetable products as well as variety of chemical constituents to make animal feed or feed supplements, which are then supplied to livestock producers. Airborne microorganisms and allergens cover a broad range of sizes from the smallest viruses to large pollens, fungi, and bacteria. Smaller

organisms may agglomerate, attaching to dust or droplets, and be suspended as larger aerosols. Large organisms may fractionate and be suspended in air as respirable fragments. Many of these substances, however, exist as free aerosols in the agricultural environment and are readily inhaled. Measured components of settled dust such as allergens and endotoxins, a powerful inflammatory agent that can act synergistically with other agents to cause respiratory health effects.[8]

## Dairy Work Occupational Dust Exposure

Dairy workers are exposed to many hazards in their work environment. On a daily basis, dairy workers are exposed to multiple biological and chemical substances. Workers on dairy farms are exposed to endotoxins and other potential respiratory risk factors, such as gram-positive bacteria, molds, fungi, ammonia, and hydrogen sulfide.[10]

Animal agricultural workers have potential inhalation exposures to a very wide range of agents. These agents consist of dust containing microorganisms, mycotoxins, or allergens, decomposition gases, pesticides, etc. These exposures occur when dealing with animals, harvesting, processing or storing grains or other plant matter, or when the soil, plants, or stables are treated with chemical agents such as pesticides and disinfectants.[10] Dairy workers have been found to experience symptoms while handling animals and other tasks such as working with feed.[38]

Animal feces are also a major contributor to endotoxin-contaminated organic dusts which are common in agricultural environments including animal husbandry buidlings.[22,23] Activities such as dropping, chopping, and distributing of straw or hay for calf bedding produces extremely high concentrations of bioaerosols. Studies have

shown that small family-based farms where there may be little task separation, results in a wide range of potential occupational exposures for all involved. For example, in Swine farmers, they are exposed to animal dander's, disinfectants, and other chemical substances, organic feed particulates, bacteria originating from feces, and such gases as NH3 emanating from manure.[10] This can potentially also be true in dairy farms. Where workers may have different task that need to be accomplished throughout the day.

**Dairy Workers and respiratory health**

In the agricultural industry, occupational exposures to organic and inorganic aerosols have been reported to have increased risk for lung disease amongst workers.[9] Studies in Europe have shown significant and consistent associations between agricultural occupation exposure and an increase in respiratory symptoms, especially chronic bronchitis other respiratory illnesses include occupational asthma and Farmer's lung.[11, 21, 23] These exposure studies have reported that dairy workers experience lung conditions such as asthma, Chronic Obstructive Pulmonary Disease (COPD), hypersensitivity pneumonitis, chronic bronchitis, and lung cancer[27,28]. An increase in prevalence of self-reported adult onset asthma among dairy workers compared to controls was also found.[12]

In a cross-sectional study, airway obstruction was measured in dairy farmers that were found to have increased prevalence of respiratory symptoms including cough, phlegm, and dyspnea, as compared to office workers.[12] In another study the relationship between cigarette smoking and acute mountain sickness showed the Forced Vital

Capacity (FVC) of the non-smoking group was normalized after 3 and 6 months but not in the smoking group.[13] In this same study the forced expiratory volume in 1s ($FEV_1$) increased over time in non-smokers but had decreased after 6 months in smokers, suggesting a decrease in lung function from smoking.[13]

A longitudinal study looking at the influence of hay and animal feed exposure on respiratory status indicated that dairy workers showed an increase risk for usual morning phlegm, and after adjusting for age, height, sex and altitude, the dairy farmers had a greater decline in forced expiratory volume in 1s ($FEV_1$)/forced vital capacity ratio ($p=0.01$) than controls.[14] This study also found that animal feed and hay handling was associated with increased risk of respiratory symptoms and animal feed handling was associated with an increased decline in $FEV_1$.[14]

**The "Hygiene Effect"**

At the same time that some studies show worse respiratory outcomes among farmers, other studies have suggested that farm exposure, especially early in life, could have protective effects against asthma and allergy. A prospective birth cohort study in Finland found that contact with farm animals in early childhood reduced asthma and allergic diseases.[16] This other study found that being raised on a farm protects against the adverse effect of lung change.[15] While these studies were done on children, less is known about whether adult exposure to farm environments has a beneficial effect on lung function and allergy.

## Measuring Respiratory Health

Dairy farms, respiratory health can be measured in a variety of ways. The most common tools used are Spirometry and Exhaled Nitric Oxide (eNO) testing. Lung function can be measured with a test called spirometry and airway inflammation can be assessed with eNO. The tests provide information on how well the lungs are working, how much air is moving through the lungs and how quickly air is inhaled and exhaled in the lungs. In a clinical setting the tests are used to help diagnose respiratory conditions such as asthma and chronic obstructive pulmonary disease.

## Spirometry in Dairy Workers

Spirometry is considered the gold standard for accurate and repeatable measurements of lung function and can be used to measure airway obstruction and restriction.[42] It has been used to understand lung function changes due to agricultural dust and assess the impact of inhalation exposures on pulmonary health among farmworkers.[39-41] Spirometry provides different information that can be broken down into measurements in liters and also expressed in percentage of the predicted values for that patient. The FVC (Forced Vital Capacity) is the total volume of air that the patient can forcibly exhale in one breath. The $FEV_1$ (Forced Expiratory Volume in one second) is the volume of air that the patient is able to exhale in the first second of forced expiration. From these two measurements we are able to calculate the ($FEV_1$/FVC) the ratio of $FEV_1$ to FVC, expressed as an absolute percentage. For the purpose of this study we will be using the percentage of the predicted values and the ratio of $FEV_1$/FVC. The percent predicted values are calculate from thousands of normal people

and vary with sex, height, age and ethnicity. By measuring the volume of air that a patient can expel from the lungs, the percent predicted normal values that are determined by age, height, sex and ethnicity can determine airway obstruction for an individual. A ratio of $FEV_1$/FVC is normally between 0.7 and 0.8, values below 0.7 are a marker of airway obstruction. In older adults, 0.65-0.7 values may be normal. In those older than 70, the ratio may need to be lowered to 0.65 as a lower limit of normal.

**Exhaled Nitric Oxide in Dairy Workers**

The exhaled nitric oxide (eNO) test is a way to determine how much lung inflammation is present and how well inhaled steroids are suppressing the inflammation.[27,28,30] The measurement of eNO are correlated with airway inflammation.[24] In other research studies they have used eNO for diseases involving obstructive airway inflammation such as chronic obstructive disease (COPD) and asthma. [25, 27, 28, 30] The American Thoracic Society standardized the eNO measurements. Studies like the National Health and Nutrient Examination Survey have used the eNO measurement.[32] The eNO concentrations are fairly easy to understand. A value of 50 parts per billion (ppb) indicates airway inflammation, anything under 25 ppb will indicate little to no airway inflammation. Due to the individual variation and other important factors in an occupation, a single measurement of eNO may be difficult to interpret, and therefore repeated measure are advised[26, 29]. Researchers have done studies measuring concentrations of eNO after exposure, demonstrating no statistically significant changes when subjects wore personal protective equipment such as a respirator, while those with no respirator saw an increase in eNO concentrations.[31]

Overall, very few studies have evaluated longitudinal changes in eNO and spirometry to occupational dust exposures, specifically in dairy farms.

**Study Question and Aims:**

To investigate the effect of dairy work on respiratory health, we initiated a longitudinal study of dairy worker health (The Healthy Dairy Worker Study). The study explores if working on dairy farms is protective against adverse respiratory health effects. The study examines whether there is a difference in measures of lung health between dairy workers and non-dairy workers by: 1) Assessing whether exhaled nitric oxide is lower in dairy workers vs. non-dairy workers, and 2) Assessing whether levels of lung function will be higher in dairy workers vs. non-dairy workers. This study also allows focusing on the dairy workers alone and the tasks they perform to determine whether there is a difference in measures of lung health between dairy workers who work directly with cows and those who don't work directly with cows. This can be examined in two ways: 1) Assessing whether exhaled nitric oxide will be lower in dairy workers who have contact with cows, and 2) Assessing whether level of lung function will be higher among those dairy workers who have contact with cows.

## METHODS:

**Study Design:**

This paper reports on preliminary findings from a longitudinal occupational health study of dairy workers who will be followed for 2 years with periodic examinations consisting of questionnaires and samples at baseline, 3-months, 6-months, 1-year and

2-years. This paper will focus on data collected over the initial 6-month period. The study includes dairy workers from an agricultural community and community controls. For this paper subjects were enrolled between May 2017 and January 2019, the final cutoff for enrollment for the overall study will occur Fall 2019.

All procedures involving human subjects were reviewed and approved by the University of Washington Human Subjects Review Committee before the study began. Subjects received a stipend for participation at each visit of the study. Following an informed consent, all the subjects completed a survey and two lung function tests: exhaled nitric oxide and spirometry. This was repeated three times, at baseline, 3 months after baseline and 6 months after baseline. Subjects could choose to stop participation in the study at any point without their job being in danger. Subjects were made aware that participation in the study is confidential and precautions were taken to protect subjects in every stage of study. A stipend was given for participation at each visit of the study. Study personnel were trained in the protection of human subjects and HIPAA. Data was collected at convenient times for the subjects, this ranged from pre/post work shift and days off of work.

**Dairy Workers Eligibility**

Participating dairy workers were recruited from Yakima County in Washington State with the assistance of the dairy federation and personal contacts. Three large dairy farms agreed to participate in the study. The dairy farm owner and manager gave us access to talk to the workers to recruit them into the study. The research team contacted the dairy workers at each farm site to describe the purpose of the study and

eligibility criteria. Workers were contacted during work time on the farm, mostly during lunch break and also before and after work hours.

The dairy worker subject selection was based on the following eligibility criteria: 1) must currently work on a dairy farm with at least six months of dairy experience, 2) currently working on a dairy farm without any prior dairy experience, and 3) willingness to provide samples and participate in the collection of data. The original idea of the overall study was to recruit two groups of dairy workers: those with experience and those without experience. Experienced workers where defined as those with at least 6 months of dairy experience. The non-experience workers were those that had not worked on a previous dairy farm prior to the current dairy farm they were at. However, after several months of recruitment activities, the research team was not able to find many workers currently working on a farm that did not have previous dairy farm experience, and therefore the recruited dairy workers all had dairy farming experience.

Forty dairy worker subjects were recruited via study staff, colleagues in the dairy farms, and community partners. Study staff met with prospective subjects to explain the study and provided the opportunity to have the subject's questions answered prior to enrolling in the study. Consent of subjects was obtained using bilingual study staff. At the start of the study we were only able to recruit male dairy workers. The number of women working in the dairy industry is low, and therefore recruitment of women in dairy farms was low for this study.

**Non-dairy workers eligibility:**

Participation of the community members (non-dairy workers) were recruited via a snowball sampling method. The research team contacted community members from non-dairy industries who had participated in previous UW research studies. These subjects had showed an interest to participating in future projects. Non-dairy worker eligibility factors were: 1) not currently working on a dairy farm, 2) no dairy work in the last 5 years, 3) subjects couldn't not be living on a dairy farm, 4) not living with someone who works on a dairy farm, and 5) oversampling of male community controls to provide equivalency to subjects. Twenty-two community members were recruited via study staff and community partners via snowball sampling.

**Questionnaire**

The questionnaire was modified and developed from an instrument used for previous studies of dairy worker health. It was pretested with dairy workers with pilot funding from NIOSH Pacific Northwest Agricultural Safety and Health Center. It was administering by trained interviewers and available in both English and Spanish. The interviewers administrating the survey were both bilingual and bicultural. They also live and are familiar with the community.

Participants were asked questions about occupational tasks, respiratory symptoms at work and home, working history, smoking habits, family history, diet history and standard demographic questions. Respiratory status was defined by shortness of breath, wheezing, dry cough, and coughing with phlegm. Wheezing was defined as the subjects breathing sounding wheezing, whistling or if they had shortness

of breath with wheezing. Dyspnea was defined as shortness of breath when hurrying on level ground or walking up a slight hill, or shortness of breath when walking with someone of the same age on level ground.

Worker exposures were characterized by using responses from a self-report questionnaire that asked subjects about job title, work tasks, number of hours worked per week for each task, amount of contact time with animals, exposures to dust, raw milk use, and other work details. Work tasks were divided into 5 categories: Milking, Maintenance, Herd Health and Reproduction, Feeding Cows, and Field Work (Table 2). The percent time of each task was calculated per worker based on the total number of hours currently working on the farm. Task were also divided based on their potential for contact with animal. For example, specific tasks, such as Milking, and Herd Health Reproduction represents a task that has “high” contact with animals whereas maintenance does not. The cutoff of 50% of work time working with animals was used to separate the workers into the following categories: exposure to cows (group 2), exposure to calves (group 3) and other (minimal to no exposure to animals’ group 1). Exposure to cows and calves was separated due to the fact that some workers spent 100% of their work time caring for calves. See questionnaire in appendix.

**Lung Function Test:**

Lung function was measured using a portable spirometer NDD Easyone_TM Plus Frontline Spirometer (EASYONE, Medical Technologies, INC, Andover, MA). The subjects were assessed on how quickly they can move air out of their lungs. A nose clip was used during all spirometry measurements. Spirometry was measured on the

subjects while in a seated position and instructions were given to each participant on the proper way to exhale into the equipment. The tests were performed according to accepted guidelines from the National Health and Nutrition Examination Survey reference values. Age, sex, height, and weight were recorded at each visit.

The following were measured during each visit: the best effort and the percent predicted for the following: forced expiratory volume in 1 second ($FEV_1$), forced vital capacity (FVC), and ratio of $FEV_1$/FVC. These measurements were taken every 30 – 60 seconds, and a max of 5 attempts per participant. A minimum of three acceptable breaths were measured with less than 5% variability between the three best acceptable measurements. The test administrators were training previously on how to conduct spirometry tests using OSHA's Spirometry Testing in Occupational Health Programs guide and a standard operating procedure was piloted prior to testing subjects. Spirometry was performed at times that were convenient for the subject; this included schedule times before and after work hours and during days off from work.

**Exhaled Nitric Oxide**

Exhaled nitric oxide was measured by a study team member following written protocols. The fraction Exhaled Nitric Oxide (FeNO) was assessed using a handheld device, NIOX VERO (Circassia Pharmaceuticals Inc, Chicago, IL). The exhaled nitric oxide test is recommended to be performed prior to doing the spirometry test, the spirometry maneuvers have been shown to transiently reduce exhaled NO levels.[24] Therefore subjects always did the FeNO exam before the spirometry, it was recorded if this didn't happen. Subjects were asked to refrain from eating and drinking for 1 hour

before eNO test, since an increase in FeNO has been found after ingestion of nitrate or nitrate-containing foods.[24-26] A short demonstration was played on the screen to explain the proper method of blowing in the machine.

**Data Collection and Management:**

Study data were collected and managed using REDCap (Research Electronic Data Capture) tools hosted at University of Washington.[43] REDCap is a secure, web-based application designed to support data capture for research studies by providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data form external sources. A tablet with the REDCap program was used for recording survey responses. For the current paper, data was abstracted for the first 3 visits of each subject. This included, spirometry, exhaled nitric oxide, and the questionnaire data. A number of important assumptions were made about the data. All blank data cells were treated as N/A's. During the data cleaning, multiple subjects had duplicate data, and it was assured that data was the same before keeping only one.

**Data Analysis:**

Data cleaning and statistical analysis was conducted using R Software version 3.4.1.[34] Frequency tables and descriptive statistics on the subjects were created to describe both dependent and independent variables. This included scatter and box plots over the 6-month period for each of dependent variables. The dependent variables

included, $FEV_1$, FVC, $FEV_1$/FVC and eNO. Covariates used in the analysis included the following binary variables: gender, Body Mass Index (BMI), smoking status (current and former), consumption of raw milk, and if subjects had grown on a farm. Specifically, for the dairy workers the following variables were included: contact with animals (cows, calves, and no contact), and usage of personal respiratory protection on the farm. For both dairy workers and non-dairy workers, the following continuous variables were used in analysis: Body Mass Index and age. Linear regression models were conducted at each visit comparing the two groups, and then also within the dairy workers assessing animal contact.

For job title subjects had 7 options to choose from; Farm Owner, Farm Manager/Supervisor, Dairy Worker/Technician, Dairy Product Processor, Crop Manager, Agricultural Student and Other. Many of subjects selected Other because they were doing a lot of different tasks and didn't really have one specific job title. So instead we broke down the Farm Job title into 3 categories. Exposure to cows, Exposure to calves and Other (minimal contact with cows/calves) which included supervisors, field workers on dairy farm, and maintenance workers. We chose not to combine the cows and calves together because the group of works who had contact with calves, spent close to 100 % of their worktime with them. They are two different types of animals and exposure can be different. When caring for calves, much closer contact is required to provide for the calves. Work tasks were broken down into 5 categories: Milking, Maintenance, Herd Health and Reproduction, Feeding Cows, and Field Work (Table 3). This total percentage of working on tasks per farm could exceed 100% because subjects stated that they do multiple tasks throughout the day and week.

Current smoking status was defined as smoking on the day of survey being conducted. Individuals who reported ever smoking in the past were classified as ever smokers.

Relationships among dependent and independent variables were tested using a simple bivariate analyses and testing for correlation of variables. Based on the results of bivariate analysis, a number of multivariable linear mixed models were created. The mixed model accounted for non-independence of results (i.e., repeated measures) for one individual. The mixed model fit a random intercept for each subject and a number of different parameters found on Table 4 and Table 5. Age and gender were only included in the models with FeNO and $FEV_1$/FVC ratio as outcome because the % predicted spirometry outcomes took those parameters into account.

From May 2017 to January 2019, 62 subjects were enrolled (40 dairy workers, 22 community controls). Six subjects dropped out after the baseline visit, 3 dairy workers and 3 community controls. Also, during this time period, 49 subjects had 2 repeated measures, 37 dairy workers, and 12 community controls. Two community controls dropped out after the second repeated measure. 42 subjects had 3 repeated measures, 33 dairy workers, and 9 community controls. All 62 subjects were included in the linear mixed models. No participants were excluded from the descriptive statistics due to small sample size.

## RESULTS

### Descriptive Statistics of Cohort

A summary of the demographics and characteristics of the 62 subjects is included in Table 1. As the table shows, the study population was largely Hispanic in both groups, dairy works and non-dairy workers. Community members were almost 8

years older compared to dairy workers. The community members also reported almost 3 years less of education compared to the dairy workers. Dairy workers reported a mean of 9.82 years of growing up on a farm compared to the community controls of 8.16 years. The dairy workers also reported drinking less milk (10%) than the community controls (18%). As far as smoking goes, twice as many dairy workers reported smoking compared to the community controls and the dairy workers reported 3 years more of education. The average BMI of the subjects in our study is 30.62 for the dairy workers and 30.31 for the community controls. According to the Center for Disease Control and Prevention, a BMI of 30.0 or higher falls within the obese range.

**Job Tasks:**

The dairy worker job tasks and activities are displayed in Table 2. Dairy workers work long hours a week; on average the dairy workers are working 57 hours with a range of 40-70 hours per week. The group of dairy workers have a good breakdown as far as task on the farm. Over half of the workers do some sort of maintenance on the dairy farms. Forty percent of the workers milk at some point throughout the day. Forty-two percent of workers do herd health and reproduction. Thirty percent of the workers are doing field work on the dairy farm, and twenty-five percent of the dairy workers are feeding animals on the farm. Figure 9 can help understand more about the breakdown of the dairy workers task and exposure to animal contact.

**FeNO, $FEV_1$, FVC, and $FEV_1$/FVC ratio at each visit:**

At baseline the dairy workers FeNO average was 19.1 ppb, the $FEV_1$ was 91.9 % of predicted, the FVC was 95.18 % of predicted, and the $FEV_1$/FVC ratio was 78.53%. For the community members at baseline, the FeNO was 23.6 ppb, the $FEV_1$ was 96.2 % of predicted, the FVC was 109.6 % of predicted, and the $FEV_1$/FVC ratio was 72.45%.

At month 3 the dairy workers FeNO average was 18.1 ppb, the $FEV_1$ was 94.6 % of predicted, the FVC was 96.1 % of predicted, and the $FEV_1$/FVC was 80.51%. For the community members at baseline, the FeNO was 27.5 ppb, the $FEV_1$ was 94.7 % of predicted, the FVC was 100.36 % of predicted, and the $FEV_1$/FVC was 75.73 %.

At Month 6 the dairy workers FeNO average was 17.5 ppb, the $FEV_1$ was 91.6 % of predicted, the FVC was 94.2 % of predicted, and the $FEV_1$/FVC was 78.79%. For the community members at baseline, the FeNO was 26.6 ppb, the $FEV_1$ was 98.3 % of predicted, the FVC was 102.8 % of predicted, and the $FEV_1$/FVC was 75.50 %.

Over the 6-month period of study, the community workers had a higher FeNO mean at each visit compared to the dairy workers although these differences did not achieve statistical significance. At baseline the dairy workers had a 4.6 ppb (-4.2, 13.2: p-value= 0.3) lower FeNO measurement than community workers. At 3 months the dairy workers had a 9.4 ppb (-6.5, 25.3: p-value= 0.2) lower FeNO than community workers and at 6 months the dairy workers had a 9.1 ppb (-3.6, 21.7: p-value=0.1) lower FeNO measurement than community workers. This can also be seen in Figure 3. Dairy workers over the 6-month period had a lower percentage predicted at each visit for $FEV_1$ and FVC. However, the dairy workers had a higher $FEV_1$/FVC Ratio at each visit.

**Linear Mixed Effects Models: FeNO Measurements**

The dairy workers had a 6.5 ppb lower FeNO value that was of borderline significance (p=0.1) compared to the community members (Table 3). Among the dairy workers contact with animals, the FeNO in ppb was lowest for the dairy workers who have minimal to no contact with cows and calves at baseline (Table 4). Those with contact with cow saw an increase of 2.7 ppb (p=0.4) and the contact with caves had an increase of 7.9 ppb (p=0.06). Also, in Table 5, the BMI showed a statistically significant effect on FeNO (-0.88 $kg/m^2$, p=0.008).

**Linear Mixed Effects Models: $FEV_1$ Measurements**

No significant difference between the dairy workers and the community controls. The dairy workers had a 4.49 % predicted lower $FEV_1$ value (p=0.176) compared to the community workers (Table 3). In the dairy workers, contact with animals, both contact with cows (4.06%, p=0.41) and contact with calf (0.60%, p=0.916) had lower $FEV_1$ % predicted.

**Linear Mixed Effects Models: FVC Measurements**

The linear mixed-effects model showed a statistically significant effect between the FVC % Predicted and the following parameters: the dairy workers ($p < 0.001$), Former Smoker (p=0.019) and growing up on a farm (p=0.001) (Table 4). The dairy workers had a lower FVC % predicted of 14.64%. The former smokers FVC % predicted increase 8.60% and those who grew up on a farm had a FVC % predicted decrease of 31.48%. The linear mixed model for just the dairy works contacts with animals had no statistically significant effects. Both the workers who had contact with cows and those

with contact with calves had a lower FVC % predicted, 4.72 for workers with cow contact, and 2.41 for workers with calf contact (Table 5). CLARIFY

## Linear Mixed Effects Models: $FEV_1$/FVC Ratio Measurements

The linear mixed-effects model showed a statistically significant effect between the $FEV_1$/FVC ratio and the following parameters: the dairy workers (p=0.009), and those who drink raw milk (p=0.047) (Table 4). The dairy workers had a $FEV_1$/FVC ratio of 5.93% higher than the community members (p=0.009). Growing up on a farm also showed an increase of 8.87% in the $FEV_1$/FVC ratio (p=0.054). Among the dairy workers and contact with animals, those who currently smoke (p=0.044) and growing up on a farm (p=0.002) had a statistically significant effect. Those who currently smoke have a 2.76% lower $FEV_1$/FVC ratio. Similar to those who grew up on a farm they too have a 6.55% lower ratio. For those workers with animal contact, the works with cow contact showed a 0.33% increase in $FEV_1$/FVC ratio, and the workers with calf contact showed a 1.31% increase (Table 5).

## Discussion

This study of lung function in dairy workers had a number of significant findings. We found that mean fractional exhaled nitric oxide (FeNO) was lower in the dairy workers compared to non-dairy workers, implying lower airway inflammation. Despite being not statistically significant, the mean FeNO was lower for dairy workers at all three visits. With lung function, the FEV1/FVC ratio was higher in our dairy workers compared to the non-dairy workers and that was statistically significant, implying better airway

function in the dairy workers compared to controls. In our analysis of just dairy workers in relation to both animal contacts, we found an increase in FeNO for those dairy workers who had contact with calves or cows, although this was not statistically significant. BMI was found to be a significant predictor of FeNO in the dairy workers and community controls, with a decrease of 1.16 ppb for every unit of BMI. These findings have implications for occupational health of dairy workers.

The FeNO was higher in the controls, potentially for a number of different reasons. The first one is due to the healthy worker effect, being that the dairy worker in the study were those dairy workers who were most healthy, and those who were often sick did not participate. The second reason is the protective effect of working on a farm with livestock, the dairy workers in the study average almost 10 years of working in dairy industry, and therefore working on farms with livestock could be protecting the dairy workers in regard to lower airway inflammation.

The $FEV_1$/FVC ratio was found to be statistically significant higher in the dairy workers compared to the community controls. This could be due to the number of years the dairy workers have been working on the dairy farms. Collecting more data from those dairy workers with no experience on dairy farms will be important to distinguish if working on a farm is protective against loss of lung function. The number of community controls was very small, and therefore improving the number of subjects can improve the sample size.

In regard to the dairy workers and contact with animals on the farm. Both groups of workers on the farm that had contact with animals had a higher FeNO compared to the group with little to no contact with animals on the dairy farm. This is interesting

because in table 4, for FeNO the dairy workers demonstrated a better (lower) level of FeNO compared to community controls. Learning more about the workers on the farm that have little to no contact with animals will be important since there could be differential dust exposures between the groups. A study showed exposure of dust was higher when automatic (robotic) milking was used and during re-penning of animals, handling of feed and seeds and handling of silos and distribution of bedding.[45] Dust exposure also increases with use of rail feed dispensing in non-robotic milking.[45] In a study in France, dairy farmers were reported to have significant decline in $FEV_1$/FVC which was attributed to handling animal feed.[46] Therefore, jobs involving less animal handling could involve greater exposure to agricultural dusts.

## Limitations

The sample size in this study is an important limitation, especially among the community controls. Some of the community members where lost after the first or second visit and were no longer interested in participating in the study because they saw no benefit to them. In future studies, increasing the number of dairy farms will help with number of dairy workers being recruited. These dairy farms are also located in a specific geographic location in Washington and may not represent dairy farms across the state of Washington, especially smaller farms because the farms in the study all had thousands of cows being milked per day. It is also possible that the dairy farms that choose not to participate may have known concerns about worker health. Additionally, the dairy workers in the study on average have been working in the dairy industry 11.8 years (Table 1). Both groups, the dairy workers and the community members also had

similar experience of growing up on a farm, 90% of dairy workers, and 85% of community members grew up on a farm from birth to the age of 10. The data may also suggest that a healthy worker effect may exist on the dairy farms because the dairy workers who were sick often or experience health effects would no longer be working in the farms. In multiple occasions, after recruitment over the phone, when follow-up happened 1-2 weeks later, the subject had quit the dairy farm and was no longer working on the farm. Future studies should look into following-up with workers that quit dairy farm to learn more about their health and better understand the reasons for quitting the dairy farms, shortly after being hired.

Similarly, with the community members they all have different occupations with majority of them being agricultural, non-dairy workers. Learning more about the exposures from their occupation and understanding what effect they may or may not have on respiratory health will be valuable. For a future study, focusing on a specific community population instead of being more generalized with the community population may be advantageous. One example, of a specific community population can be individuals that work in a warehouse, such as a fruit warehouse in an agricultural community. Other potential limitations can include the variability in the study staff conducting the spirometry and FeNO measurements and the variability in the calendar seasons. The subjects were all enrolled at different times of the year and having a better understanding on how that can impact lung function is important. For example, considering seasonality as a factor considering fire season, dry winters, or wet springs, etc could be valuable.

Characterizing worker exposures based on self-reported survey has its limitations. The percent of time conducting a task was used as a primary measure of exposure. Many workers were involved in a variety of tasks, and observations were not recorded to assess their potential exposure to air contaminants or allergens. No quantitative data of potential allergens was collected at the farm sites. In addition, researches used their best judgement for classification of animal contact time without observation data. With missing information, misclassification is likely to be considerable and bias results toward the null. Difference in work practices, exposures and controls among the farms are not known, and can lead to incorrect associations among the exposure categories we developed and outcomes of interest.

Further investigation on exposure is needed especially with regards to farm characteristics, detailed workers use of PPE, ventilation use in barns, cleaning procedures, and dust measurements during tasks. Some of this information was collected in the questionnaire but the data was not analyzed during this phase of the study. Other information such as dust measurements were not collected on the farm sites and can be helpful to understand how these farms compared with other farms that have documents adverse respiratory health outcomes.

## Study Strengths

Despite these limitations, the study has numerous strengths, including the volume of data being collected. Building a relationship with the dairy owners and dairy workers should not go unnoticed, building a relationship with dairy ownership has be a challenge and a study focus on respiratory health, will improve the relationship between

academic scientists and the dairy community. This study has a unique group of community controls that could be studied further to better understand occupational health of dairy workers and the community. FeNO is a measurement that has not be used in dairy workers to measure obstructive airway inflammation. This population in general is a vulnerable population that has not participated in respiratory health in the work place as well. Finally, collection of animal and environmental samples will be beneficial to better understand the location and sites of where humans and animals are sharing dust exposures and other respiratory health issues in this longitudinal study.

## Directions for future research

Family farming differs across the world, and many of the dairy farming studies have been done in Europe. This is one of the first studies to look at cohort of dairy workers over time. There is some suggest that dairy farming may be beneficial and have some protection in regard to lung function and airway inflammation, but it is difficulty to draw any firm conclusions based on the limitations above. More longitudinal studies are needed to better understands the farm exposures (endotoxins, dust, pesticides, etc.), including studies that have a more specific control group of non-dairy workers, a specific population in the community. There are many additional analyses that will be performed with the data that has been collected. This pilot study will be critical to better understand the risk and benefits of dairy farm exposures in this vulnerable population.

This study highlights the importance of understanding the exposures on dairy farms and the impact they have on the health of the dairy workers. Moving forward this

study will pave the way to build a strong relationship with the dairy industry and continue working with the dairy owners, dairy workers, and engaging the community in research studies. These results will help continue to build a bridge among academia and industry and support for collaboration between these two groups for future research. By working together with industry this work will shed light to the dairy industry and community members the benefits of working side by side with occupational workers and community engagement.

## Conclusion

The dairy workers showed statistically significant relationship with spirometry $FEV_1$/FVC Ratio based on the linear mixed model. This can suggest that dairy workers may have better airway function compared to community members. The dairy workers also had a lower FVC of 14.64 % (p=0.001) and this showed a negative relationship between FVC and dairy farming.

Increasing the number of new dairy workers could lead to a higher sample size, and a better representation of those dairy workers with no prior dairy exposure. The use of FeNO in a dairy farming study will provide beneficial support to future studies about the importance of the exhaled nitric oxide.

Controlling dust exposure on the farm will continue to be a challenge. Having a conversation with managers and owners to better understand what current practices are being done, and how the farm practices can be improved to better health and well-being of dairy workers.

# Tables and Figures:

***Table 1: Subject Characteristics***

| | Dairy Workers | Community |
|---|---|---|
| Sample Size | N=40 | N=22 |
| Age* | 37.77 (6.48); 22-53 | 45.43 (11.21); 26-70 |
| BMI | 30.62 (4.05): 21.6-39.2 | 30.31 (3.97); 24.1-36.6 |
| Gender (Male) | 97% | 82% |
| Race (W-Hispanic) | 100% | 92% |
| Education (yrs.) | 8.42 (2.97); 3.0-18 | 5.5 (3.30); 1-12 |
| Grow up on Farm (yrs.) | 90% (9.82); 4.0-10 | 85% (8.16); 5-10 |
| Dairy Industry (yrs.) | 11.8 (7.22) 0.1-26 | |
| Current Farm (yrs.) | 8.25 (5.86); 0.1-20 | |
| Unpasteurized Milk | 10% | 18% |
| Smoking Status (%) | | |
| Current Smoker | 32% | 16% |
| Former Smoker | 65% | 68% |
| Never Smoker | 32% | 32% |

***Table 2: Dairy Worker Job Task and Activity***

| | Dairy 1 (N=14) | Dairy 2 (N=12) | Dairy 3 (N-14) | All Farms (N=40) |
|---|---|---|---|---|
| Work Hours (Mean: Range) | 59 (52-70) | 51 (40-60) | 60 (60-60) | 56.98 (40-70) |
| **Job Task:** | | | | |
| Milking | 50% | 58% | 14% | (16) 40% |
| Maintenance | 71% | 50% | 64% | (25) 62% |
| Herd Health and Reproduction | 43% | 50% | 36% | (17) 42% |
| Feeding Animals | 36% | 17% | 21% | (10) 25% |
| Field Work | 29% | 25% | 36% | (12) 30% |
| **Job Categories:** | | | | |
| Other (Group 3) | 7% | 8% | 36% | (24) 60% |
| Working with cows (group 1) | 79% | 67% | 35% | (24) 60% |
| Working with calves (group 2) | 14% | 25% | 28% | (9) 22% |

**Table 3: Linear Mixed Model: Dairy Workers v.s Community Controls**

| Outcome: FeNO | | | | Outcome: Forced Vital Capacity (FVC) % Pred | | | |
|---|---|---|---|---|---|---|---|
| **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** | **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** |
| Intercept | 54.07 [15.77, 92.37] | 18.91 | 0.001 | Intercept | 138.06 [101.37, 174.77] | 18.73 | <0.001 |
| Group | -6.45 [-14.34, 1.43] | 4.02 | 0.109 | Group | -14.64 [-23.43, -5.85] | 4.49 | <0.001 |
| Age | -0.19 [-0.63, 0.25] | 0.22 | 0.405 | BMI | -0.09 [-1.05, 0.88] | 0.49 | 0.862 |
| BMI | -1.16 [-1.96, -0.37] | 0.41 | 0.004 | Current Smoker | -2.10 [-9.96, 5.75] | 4.06 | 0.600 |
| Gender | 6.02 [-14.21, 26.25] | 10.32 | 0.56 | Former Smoker | 8.60 [-1.39 15.08] | 3.68 | 0.019 |
| Current Smoker | -0.79 [-8.25, 6.68] | 3.81 | 0.837 | Asthma | -0.01 [-0.46, 0.43] | 0.23 | 0.969 |
| Former Smoker | -1.66[-8.65, 5.32] | 3.56 | 0.641 | Drink Raw Milk | -9.35 {-21.79, 3.08] | 6.35 | 0.140 |
| Asthma | 4.34 [-5.35, 14.03] | 4.94 | 0.38 | Grow up on farm | -31.48 [-49.59, -13.36] | 9.24 | 0.001 |
| Drink Raw Milk | 5.19 [-4.40, 14.77] | 4.89 | 0.289 | | | | |
| Grow up on farm | 0.20 [-15.77, 16.17] | 8.15 | 0.98 | | | | |
| **Outcome: Forced Expiratory Volume (FEV1) % Pred** | | | | **Outcome: FEV1/FVC Ratio** | | | |
| **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** | **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** |
| Intercept | 116.28 [88.74, 143.81] | 14.05 | <0.001 | Intercept | 75.74 [59.23, 92.25] | 8.43 | <0.001 |
| Group | -4.49 [-10.95, 1.97] | 3.29 | 0.176 | Group | 6.41 [2.58, 10.25] | 1.96 | 0.001 |
| BMI | -0.61 [-1.34, 0.13] | 0.38 | 0.105 | BMI | -0.27 [-0.71, 0.18] | 0.23 | 0.239 |
| Current Smoker | -0.13 [-6.30, 6.29] | 3.21 | 0.967 | Current Smoker | 1.62 [-2.23, 5.47] | 1.96 | 0.41 |
| Former Smoker | 1.05 [-6.30, 6.29] | 3.04 | 0.730 | Former Smoker | -3.64 [-7.30, 0.02] | 1.87 | 0.052 |
| Asthma | -2.70 [-11.34, 5.94] | 4.41 | 0.540 | Asthma | -0.17 [-5.56, 5.23] | 2.75 | 0.951 |
| Drink Raw Milk | 0.85 [-7.86, 9.56] | 4.63 | 0.848 | Drink Raw Milk | 6.18 [1.02, 11.34] | 2.63 | 0.019 |
| Grow up on farm | -1.27 [-14.46, 11.91] | 6.71 | 0.850 | Grow up on farm | 6.89 [-0.89, 14.67] | 3.97 | 0.083 |

**Table 4: Linear Mixed Model: Contact with Dairy Animals**

| Outcome: FeNO | | | | Outcome: Forced Vital Capacity (FVC) % Pred | | | |
|---|---|---|---|---|---|---|---|
| **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** | **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** |
| Intercept | 29.74 [0.54, 58.94] | 14.9 | 0.046 | Intercept | 113.54 [81.32, 145.77] | 16.44 | <0.001 |
| Cow Contact | 2.73 [-4.25, 9.70] | 3.56 | 0.443 | Cow Contact | -4.72 [-14.56, 5.13] | 5.02 | 0.347 |
| Calf Contact | 7.94 [-0.38, 16.25] | 4.24 | 0.061 | Calf Contact | -2.41 [-13.70, 8.88] | 5.76 | 0.676 |
| Age | 0.22 [-0.20, 0.64] | 0.22 | 0.307 | BMI | -0.49 [-1.36, 0.39] | 0.44 | 0.276 |
| BMI | -0.88 [-1.53, -0.23] | 0.33 | 0.008 | Current Smoker | 1.27 [-6.00, 8.53] | 3.71 | 0.733 |
| Gender | -11.73 [-31.09, 7.63] | 9.88 | 0.235 | Former Smoker | -0.75 [-8.54, 7.03] | 3.97 | 0.85 |
| Current Smoker | 2.9 [-3.33, 9.12] | 3.18 | 0.362 | Asthma | -8.97 [-20.0, 2.06] | 5.63 | 0.111 |
| Former Smoker | 2.99 [-3.48, 9.46] | 3.3 | 0.365 | Drink Raw Milk | -1.23 [-14.40, 11.93] | 6.72 | 0.855 |
| Asthma | 13.71 [4.83, 22.59] | 4.53 | 0.002 | Respirator | -0.09 [-0.34, 0.15] | 0.12 | 0.446 |
| Drink Raw Milk | -2.2 [-10.94, 6.55] | 4.46 | 0.622 | Grow up on farm | 1.38 [-14.07, 16.83] | 7.88 | 0.862 |
| Respirator | -0.09 [-0.34, 0.17] | 0.13 | 0.512 | | | | |
| Grow up on farm | 12.12 [-1.83, 26.06] | 7.11 | 0.089 | | | | |
| **Outcome: Forced Expiratory Volume (FEV1) % Pred** | | | | **Outcome: FEV1/FVC Ratio** | | | |
| **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** | **Parameters** | **$\beta$ [95% CI]** | **SE** | **p-value** |
| Intercept | 118.88 [87.24, 150.51] | 16.14 | <0.001 | Intercept | 88.03 [78.69, 97.37] | 4.77 | <0.001 |
| Cow Contact | -4.07 [87.24, 150.51] | 4.94 | 0.41 | Cow Contact | 0.68 [-2.04, 3.40] | 1.39 | 0.624 |
| Calf Contact | -0.60 [-11.70, 10.50] | 5.66 | 0.916 | Calf Contact | 1.27 [-1.92, 4.45] | 1.62 | 0.435 |
| BMI | -0.59 [-1.44, 0.27] | 0.44 | 0.177 | BMI | -0.12 [-0.38, 0.15] | 0.14 | 0.395 |
| Current Smoker | -0.53 [-7.63, 6.56] | 3.62 | 0.883 | Current Smoker | -0.91 [-3.25, 1.43] | 1.19 | 0.446 |
| Former Smoker | -0.39 [-7.99, 7.20] | 3.88 | 0.919 | Former Smoker | -1.28 [-3.79, 1.23] | 1.28 | 0.316 |
| Asthma | -5.78 [-16.54, 4.98] | 5.49 | 0.292 | Asthma | 3.09 [-0.49, 6.67] | 1.83 | 0.091 |
| Drink Raw Milk | -1.10 [-14.08, 11.88] | 6.62 | 0.868 | Drink Raw Milk | -1.33 [-4.59, 1.92] | 1.66 | 0.423 |
| Respirator | -0.10 [-0.34, 0.13] | 0.12 | 0.386 | Respirator | -0.03 [-0.14, 0.09] | 0.06 | 0.653 |
| Grow up on farm | -4.41 [-19.65, 10.83] | 7.78 | 0.571 | Grow up on farm | -5.56 [-9.22, -1.91] | 1.87 | 0.003 |

*Table 5: FeNO and Spirometry measurements*

| | Visit 1 (N=62) | | Visit 2 (N=49) | | Visit 3 (N=42) | |
|---|---|---|---|---|---|---|
| | Community Mean (SD) | Dairy Mean (SD) | Community Mean (SD) | Dairy Mean (SD) | Community Mean (SD) | Dairy Mean (SD) |
| FeNO | 23.61 (17.4) | 19.08 (14.3) | 27.5 (23.3) | 18.1 (10.4) | 26.56 (16.3) | 17.48 (6.46) |
| $FEV_1$ (%) Pred | 96.2 (13.5) | 91.9 (13.7) | 94.72 (10.3) | 94.62 (10.8) | 98.25 (12.2) | 91.64 (12.6) |
| FVC (%) Pred | 109 (26.4) | 95.2 (14.2) | 100 (10.7) | 96.11 (12.4) | 102.8 (10.4) | 94.18 (12) |
| $FEV_1$/FVC Ratio | 72.45(13.2) | 78.53(5.58) | 75.73 (5.14) | 80.51 (4.20) | 75.50 (8.96) | 78.79 (5.22) |

Figure 1: FeNO over 6 months for dairy workers and community controls

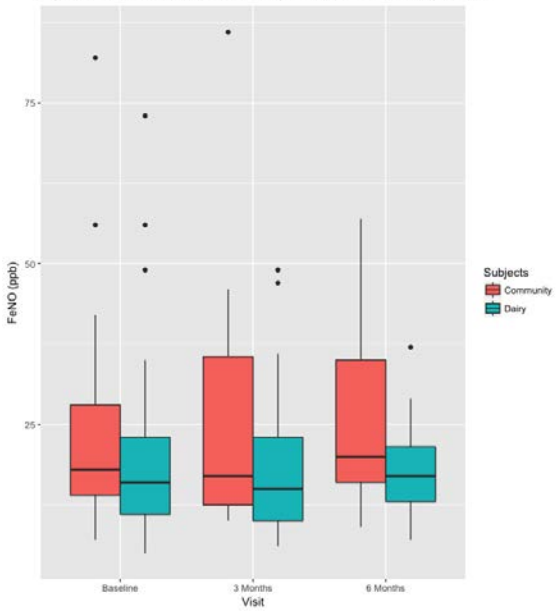



Figure 2: FEV1 % Predicted over 6 months for dairy workers and community contrc

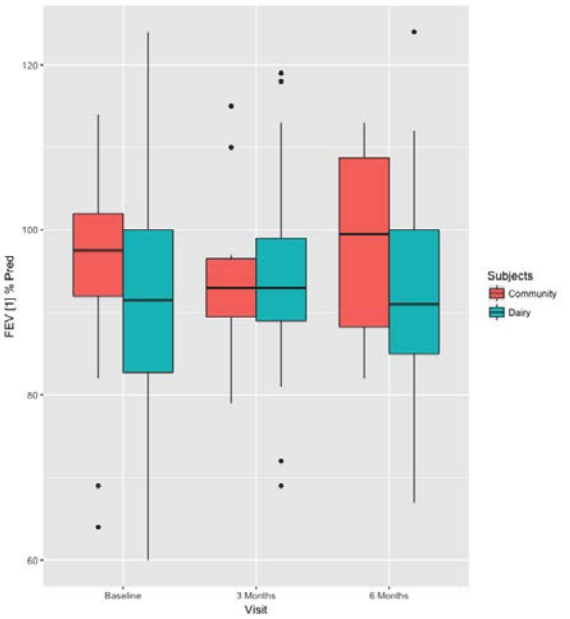



Figure 3: FVC % Predicted over 6 months for dairy workers and community controls

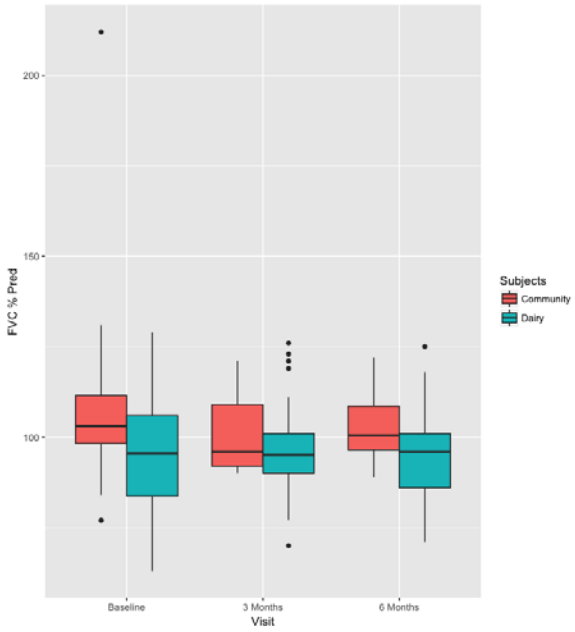



Figure 4: FEV1/FVC Ratio over 6 months for dairy workers and community controls

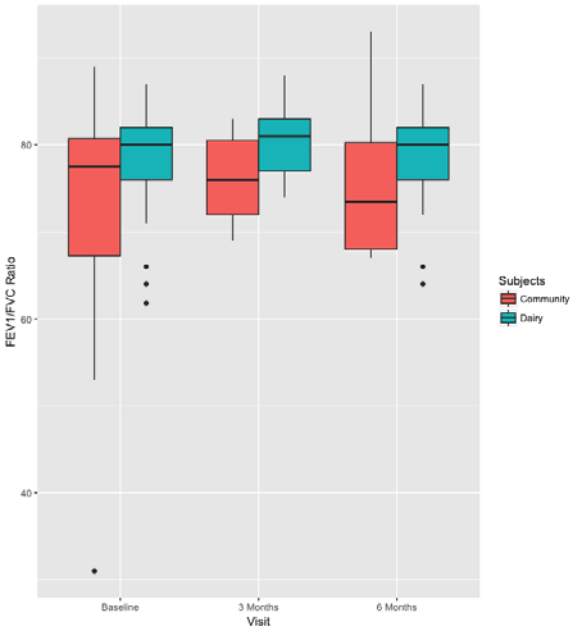


Figure 5: FeNO over 6 months for Animal Contact

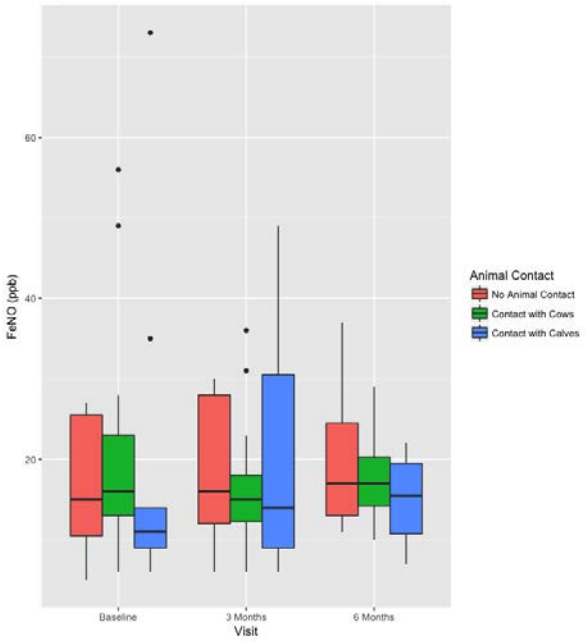



Figure 6: FEV 1 % Pred over 6 months for Animal Contact

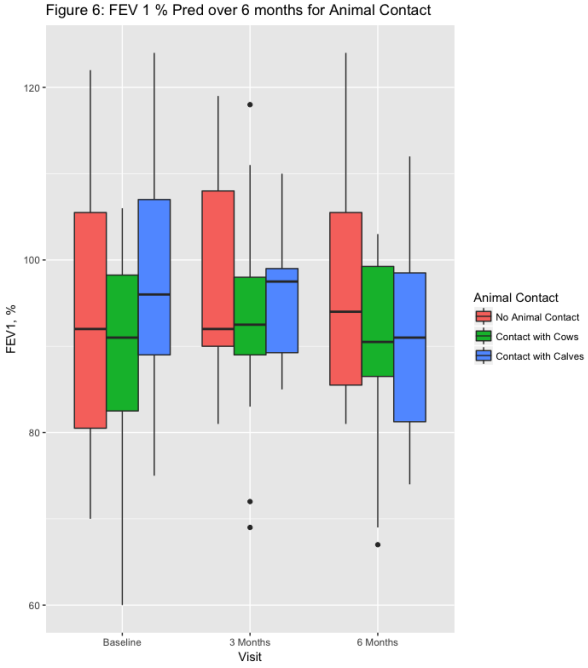



FIgure 7: FVC % Pred over 6 months for Animal Contact

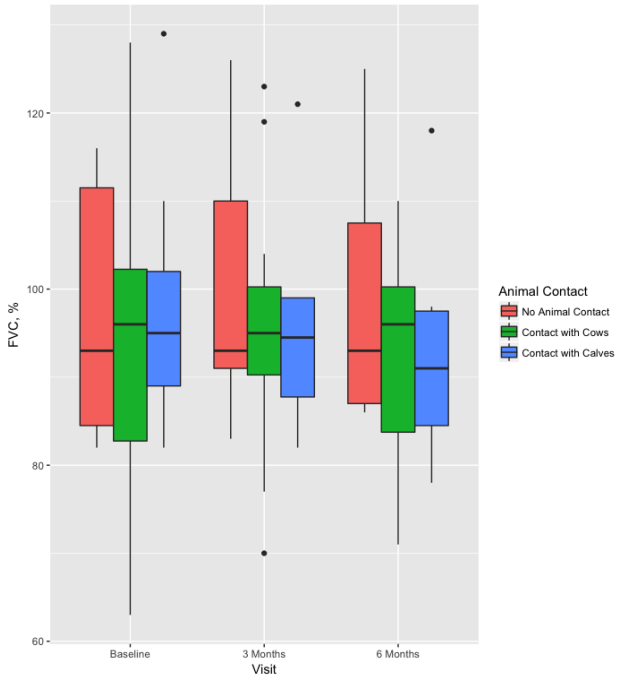



Figure 8: FEV1/FVC Ratio for Animal Contact

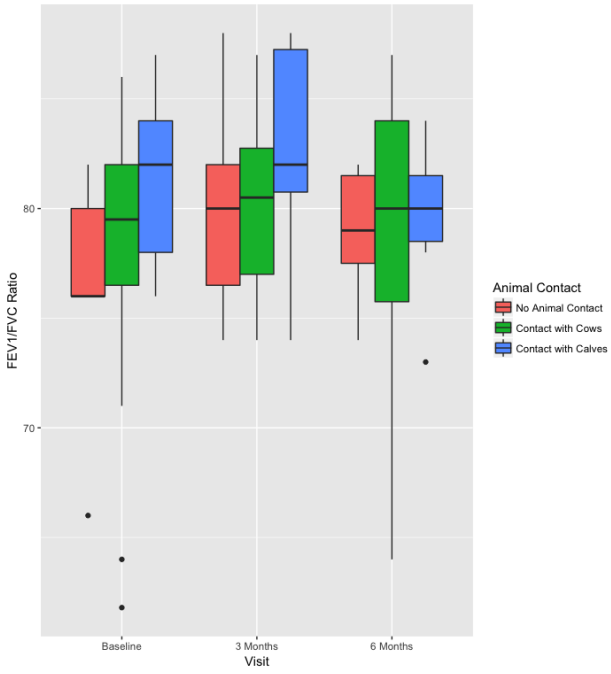


Figure 9: Dairy Worker Hours/Task

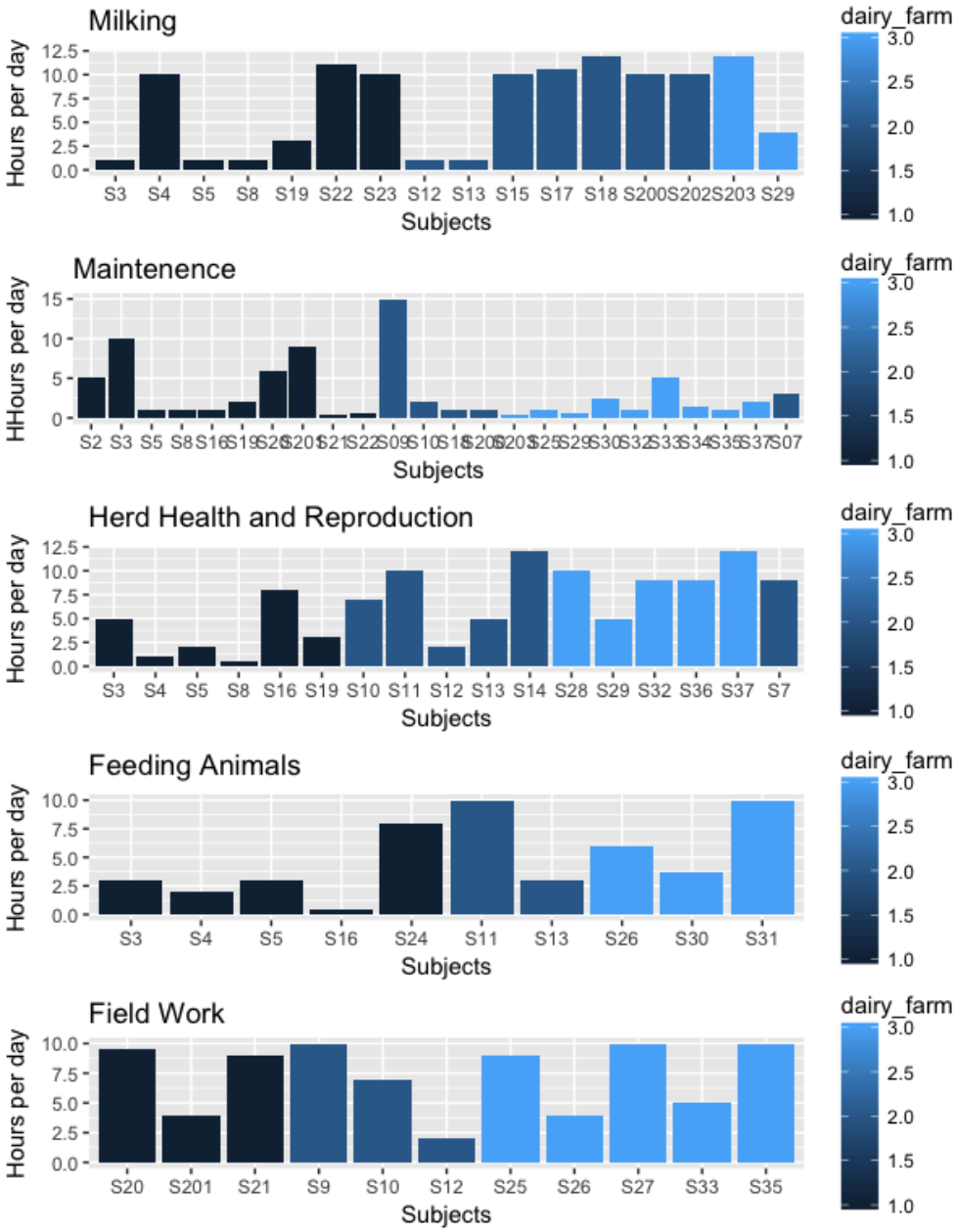
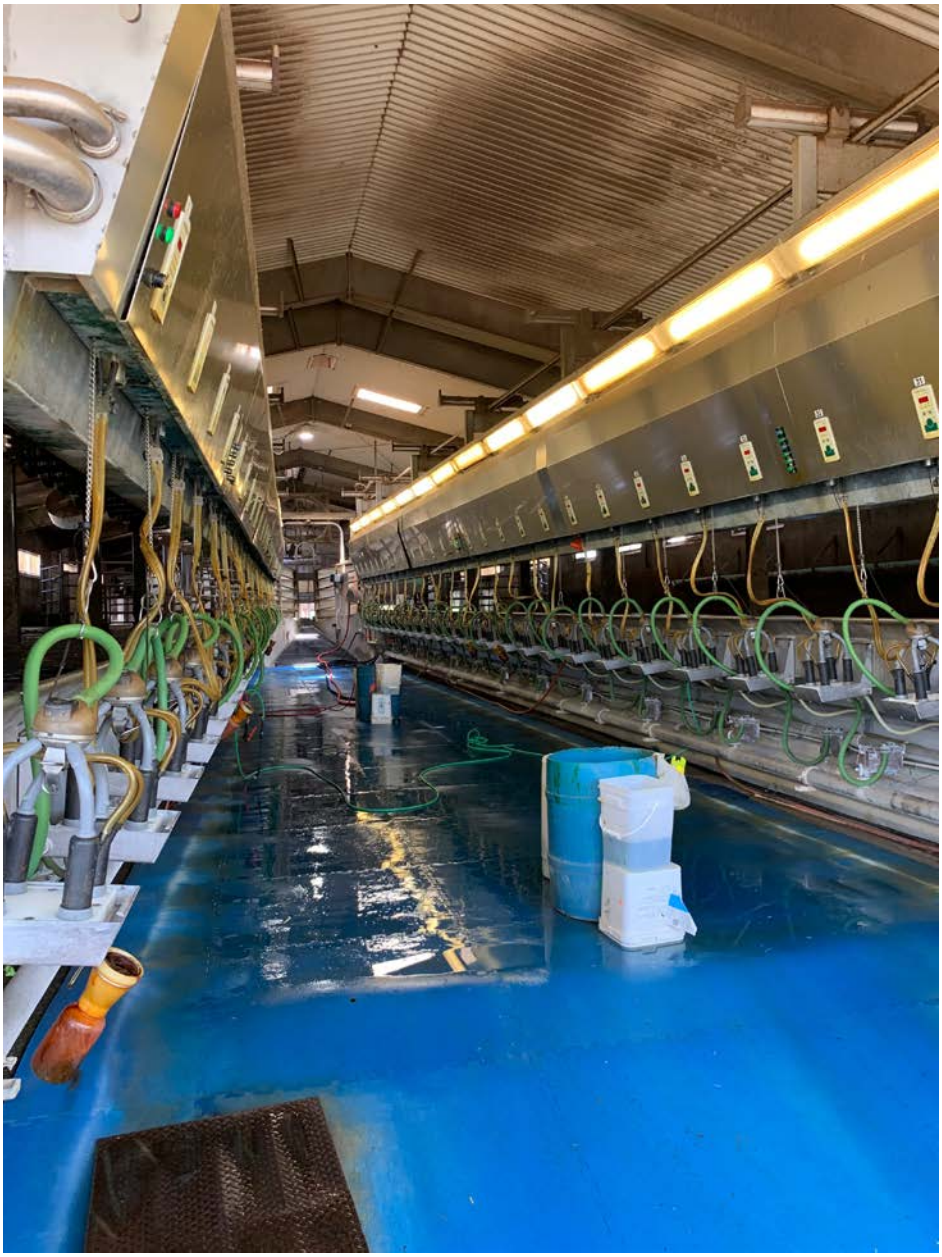


*Image 1*



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# Baseline Worker

Please complete the survey below.

Thank you!

ID Number _____

¿Cuánto tiempo ha trabajado con vacas en esta industria? (al año más cercano) / How long have you been working with cows? (in any capacity, round to the nearest year)

_____

¿Cuánto tiempo ha trabajado en esta lechería? (al año más cercano) / How long have you been working at this farm? (round to the nearest year) _____

Creciste en una granja entre las edades de nacimiento y 10 anos? Did you grow up on a farm between the ages of birth and 10 years old?

- ☐ Si / Yes
- ☐ No / No

Si si, cuantoas anos vivio en un granja? If you did grow up on a farm, how many years did you live on a farm from ages birth and 10 years? _____

Cuál es su t?tulo de trabajo actual? / What is your current Job Title?

- ◯ Dueño de lechería / Farm Owner
- ◯ Mayordomo/supervisor de lechería / Farm Manager/Supervisor
- ◯ Orde?ador/t?cnico en la lechería / Dairy Worker/Technician
- ◯ Procesador de productos de la leche (l?cteos) / Dairy Product Processor
- ◯ Mayordomo de cultivos agr?colas / Crop Manager
- ◯ Estudiante de agricultura / Agricultural Student
- ◯ Otro...especifique, por favor / Other, please specify

If other Jobtitle, please specify _____

Generalmente, ¿Cuántos d?as y horas trabaja en la lechería por semana? D?as por semana: / In general, how many days per week and hours per week do you work at the [site]? Days/ week: _____

Horas por semana / Hours/ week _____

Normalmente, ?cu?ntas horas al d?a pasa usted en un establo o sala de orde?a? Horas por d?a: / How many hours do you spend inside a building where [the specific animals] are held [e.g. milking parlor, housing structure]? _____

En un d?a normal de trabajo, ¿Con cuántos compa?eros de trabajo tiene usted contacto cercano (por ejemplo, saludo de manos, platicar cara a cara, etc.)? / During a typical workday, how many co-workers do you come into close contact with (e.g., hand shake, talking face-to-face, etc.)?

_____

Cuando trabaja en la lechería, ¿Con cuántos visitantes (personas que no están directamente empleadas por la lechería) hace usted contacto en un mes? / When working at the farm, how many visitors (those who are not directly employed by the farm) do you come into close contact with (e.g., hand shake, talking face-to-face, etc.)?

_____

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**¿Con qué componentes del ganado vacuno trabaja en esta lechería? Considerando todas las actividades de trabajo que hace en esta lechería, ?aproximadamente cuántas horas al día pasa usted con cada componente del ganado vacuno? / What are the types of cattle you handle at this farm (cows, bulls, calves, etc.)? b) Given all the tasks you perform, approximately how many hours per week are you in contact with each type of cattle?**

Vacas / Cows

◯ Si / Yes
◯ No / No

Vacas (horas por semana) / Cows (hours per week)

_____

Toros / Bulls

◯ Si / Yes
◯ No / No

Toros (horas por semana) / Bulls (hours per week)

_____

Becerras (0-12 meses) / Calves (0-12mo)

◯ Si / Yes
◯ No / No

Becerras (0-12 meses) (horas por semana) / Calves (0-12mo) (hours per week)

_____

Vaquillas (vacas jóvenes que no han tenido partos) (más de 12 meses) / Heifers (12mo+)

◯ Si / Yes
◯ No / No

Vaquillas (vacas jóvenes que no han tenido partos) (más de 12 meses) (horas por semana) / Heifers (12mo+) (hours per week)

_____

Otro animals / Other animals specify

_____

Además del ganado vacuno, ?trabaja usted con otros animals dom?sticos en la lechería (como puercos y aves)? / At the farm, do you care for other domestic animals (like dogs, cats, swine or poultry) besides cattle?

◯ Si / Yes
◯ No / No

Si s?, an?telos, por favor / If yes, please list them

_____

Con qué frequencia lo hace? / Frequency

◯ Todos los dias / Everyday
◯ 2 a 3 veces por semana / 2-3 times/week
◯ Raramente/Rarely

Actualmente, ?tiene usted otros trabajos fuera de su trabajo en esta lechería?/ Are you currently employed anywhere other than [here, this farm]?

◯ Si / Yes
◯ No / No

Si respondi? s?, ?de donde? If yes, where?

_____

Si respondi? s?, ¿qué tipo de trabajo? / If yes, what category does your other job fall into?

◯ De oficina/Clerical
◯ Educacional / Educational
◯ Culinario o de la industria de servicio de alimentos / Culinary/Food service industry
◯ T?cnico / Technical
◯ Agricultura / Agricultural
◯ Otro...especifique, por favor / Other, please specify

Otro...especifique, por favor / Other, please specify _____

---

**B. ¿qué tipo de trabajo hace en esta lechería? En una semana normal, ?cuantos diás por semana hace Ud. este tipo de trabajo? ?Y cuantas horas por día? Nota: use decimales si es un tipo de trabajo que lo hace mensualmente. / 12. a) What type(s) of work do you do on the dairy? In an average week, how many days do you do any work for this category? How many hours on a given day? Note: use decimal if a monthly task.**

Orde?a /Milking
◯ Si / Yes
◯ No / No

Dias/Semana o Mes /Days/Week or Month _____

Horas/ Dia / Hours per Day _____

Mantenimiento / Maintenance
◯ Si / Yes
◯ No / No

Dias/ Semana o Mes /Days/Week or Month _____

Horas/ Dia / Hours per Day _____

Salud y reproducci?n del ganado / Herd Health and Reproduction
◯ Si / Yes
◯ No / No

Dias/ Semana o Mes /Days/Week or Month _____

Horas/ Dia / Hours per Day _____

Alimentacion de las vacas / Feeding cows
◯ Si / Yes
◯ No / No

Dias/Semana o Mes /Days/Week or Month _____

Horas/Dia / Hours per Day _____

Trabajo de campo/ Field Work
◯ Si / Yes
◯ No / No

Dias/ Semana o Mes /Days/Week or Month _____

Horas/ Dia / Hours per Day _____

**Si responde "si" de las categor?as arriba, qual actividades hace? / For each applicable category below, what activities do you perform?**

Ordeña /Milking

- ☐ Ordeña a mano / Milking by hand
- ☐ Ordeña con m?quinas / Milking using machinery
- ☐ Inspecci?n de vacas por mastitis / Inspect cows for mastitis
- ☐ Procedimientos de maquinaria y limpiando despu?s de la ordeña / Perform machinery and sanitation procedures after milking
- ☐ Limpieza y/o lavado a presi?n del ?rea de ordeña ?rea de espera y cuarto de tanques a granel / Cleaning and/or pressure washing milking parlor, holding area and bulk tank room

Mantenimiento / Maintenance

- ☐ Actividades relacionadas a la alimentaci?n (incluyendo trabajo con forrajes) / Feeding-related activities (includes working with silage)
- ☐ Mantenimiento de equipo y herramientas / Maintaining equipment and tools
- ☐ Limpieza y/o lavado con agua a presi?n de los establos / Cleaning and/or pressure washing stalls
- ☐ Eliminaci?n de camas de establo / Removing bedding
- ☐ Limpiar de esti?rcol/Removing cattle manure
- ☐ Mantenimiento del terreno, pastura, cercas / Maintenance of grounds, pasture, fences
- ☐ Mantenimiento general de las instalaciones / General upkeep of facilities
- ☐ Traslado y/o transporte de los animals fuera de las lechería / Moving and/or transporting animals off-site

Salud y reproducción del ganado
Herd Health and Reproduction

- ☐ Trabajo con archivos o registros y/o revisión rutinaria de los animales Record keeping and/or routine checking of animals
- ☐ Manejo reproductivo (por ejemplo: detecci?n de celo, inseminaci?n artificial, cr?a, etc. Reproductive management (e.g., heat detection, artificial insemination, breeding, etc.)
- ☐ Ayuda con la distocia (parto dif?cil) / Assisting with dystocia (difficult birthing)
- ☐ Dar las vacunas de rutina / Performing routine vaccinations
- ☐ Actividades de tratamiento (por ejemplo: aplicando medicamentos, antibióticos, haciendo cirugías, etc.) / Treatment-related activities (e.g., administering medication, antibiotics, performing surgery etc.)
- ☐ Tirando los animales muertos / Handling and/or disposing of dead animals

Alimentaci?n de las vacas / Feeding cows

- ☐ Alimentaci?n de las vacas / Feeding cows

Trabajo de campo / Field work

- ☐ Esparcimiento del abono / fertilizante / Spreading manure/fertilizer
- ☐ Plantaci?n / Planting
- ☐ Cosecha / Harvesting

Otros...especifique, por favor / Other activities, please describe

_____

Sabe usted de alg?n programa en la lechería que monitorea la salud del trabajador?/ Do you know of any program at [the site] that monitors workers' health?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

Si respondi? s?, usted está participando in el programa que monitorea la salud del trabajador? /If yes, are you participating in the program to monitor worker health?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Su empleador o patr?n en esta lechería tiene una p?liza de pago por ausencia en el trabajo debido a enfermedad? / Does your employer at this farm have a policy where workers can still receive pay when sick at home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Utiliza un respirador para cualquiera de sus tareas en el trabajo? / Do you use a respirator for any of your tasks at work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si respondi? s?, Utiliza un respirador seg?n lo requerido por parte de un programa detallado de protecci?n respiratoria, en el que se incluye entrenamiento, evaluaci?n m?dica y prueba de ajuste? / If yes, do you use your respirator as required by a respiratory protection program that includes training, medical evaluation, and fitness testing?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Existen instalaciones disponibles para lavado de manos en esta lechería, f?cilmente disponibles? / Are hand-washing stations readily available at your job?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Normalmente, ¿qué utiliza para limpiar sus manos en la lechería? (Selecciones todas las que apliquen.) / What do you normally use to clean your hands at [your place of employment/e.g.the farm]? (Check all that apply.)

☐ Jab?n en barra y agua / Bar soap and water
☐ Jab?n l?quido y agua / Liquid soap and water
☐ Desinfectantes de las manos/alcohol / Hand sanitizer/Alcohol
☐ S?lo enjuague con agua / Rinse with water only
☐ Clorhexidina/povidona yodada (Tipo de desinfectantes) / Chlorhexidine scrub/povidone iodine
☐ Otro...especifique, por favor/ Other please specify
☐ No s?/No estoy seguro / Don't know/Not sure

Otro...especifique, por favor / If other, please specify

_____

**Do you wash your hands...**

| | Siempre / Always | A menudo/Often | Algunas veces/Sometimes | Rara vez / Rarely | Nunca/Never | No aplica / N/A |
|---|---|---|---|---|---|---|
| Antes de Comer / Before Eating | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Comer /After Eating | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes Beber /Before Drinking | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Beber /After Drinking | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Masticar chicle / Before Chewing Gum | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de fumar tabaco / Before Smoking | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues fumar tabaco /After Smoking | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Orde?ar / Before Milking | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Orde?ar /After Milking | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Trabajos de mantenimiento / Before Maintenance | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Trabajos de mantenimiento /After Maintenance | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Salud y reproducci?n del Ganado / Before Herd Health | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Salud y reproducci?n del Ganado /After Herd Health | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Quitarse los guantes /After Gloves | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Cuidado medical de los animales / Before Animal Health Care | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Cuidado medical de los animales /After Animal Health | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Alimentacion de los animales / Before Feeding Animals | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Alimentacion de los animales /After Feeding Animals | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Restricci?n de animales / Before Restraining Animals | ○ | ○ | ○ | ○ | ○ | ○ |

| | | | | | | |
|---|---|---|---|---|---|---|
| Despues Restricci?n de animales /After Restraining Animals | ○ | ○ | ○ | ○ | ○ | ○ |
| Antes de Usando de baño / Before Using restroom | ○ | ○ | ○ | ○ | ○ | ○ |
| Despues Usando de baño /After Using restroom | ○ | ○ | ○ | ○ | ○ | ○ |

## Personal Protective Equipment

| | Heavy rubber gloves | Disposable gloves (Nitrile / Vinyl / Latex) | Paper dust mask | N95 Other filter-ing respi-rator | Cart-ridge respi-rator | PAPR (Powered Air Purify-ing Respi-rator) | Rubber poly boots | Eyepro tect-ion (goggles / safety glasses) | Disp o-sable outergar-ments | Waterresistant outergarments (rain gear) | Coveralls | Head hair cover-ing (not includ-ing base-ball caps) | None | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Orde?a / Milking | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Mantenumiento / Maintenance | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Salud y reproducci?n del ganado / Herd Health and Reproduction | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Alimentacion de las vacas / Feeding cows | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Trabajo de campo / Field Work | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Otras actividades / Other tasks | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Estas preguntas son acerca de sus practices y concientizaci?n sobre la prevenci?n de enfermedades en la granja. / These questions ask about your current practices and awareness regarding disease prevention on the farm.**

Podr?a decirme si las vacas con las que trabaja están tal vez enfermas? / Can you tell when cows are sick?

☐ Si / Yes
☐ No / No
☐ No s?/No estoy seguro / Refused
☐ No quiero contester//Unsure

Toma precausiones adicionales al trabajar con animals que posiblemente están enfermos? / Do you take extra precautions with a sick animal?

☐ Si / Yes
☐ No / No
☐ No s?/No estoy seguro / Refused
☐ No quiero contester//Unsure

Si respondi? s?, profavor especifique qué, tipe de precausi?n adicional toma cuando trabaja con un animal posiblemente enfermo. / If yes, please specify what type of extra precaution you take when working with a sick animal:

_____

Está usted preocupado por contraer enfermedades de las vacas? /Are you concerned about getting disease from the cows?

○ Si / Yes
○ No / No

¿Está usted preocupado acerca de pasar (o 'dar') enfermedades a las vacas? / Are you concerned about giving diseases to the cows?

◯ Si / Yes
◯ No / No

Está consciente de algunas gu?as para reducir/prevenir la transmisi?n de enfermedades entre animales y humanos cuando se trabaja en la lechería? /Do you know of any guidelines that exist at this site for reducing or preventing disease transmission between animals and humans?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

¿En general, qué enfermedades le preocupa obtener? / In general, what diseases are you concerned with getting?

_____

está familiarizado con el t?rmino: resistencia antibi?tica (AR)? / Are you familiar with the topic of 'antibiotic resistance' (AR)?

☐ Si / Yes
☐ No / No
☐ No s?/No estoy seguro / Refused
☐ No quiero contester//Unsure

Alguna vez está en contacto con los antibi?ticos que les dan a las ganado? / Do you ever have contact with antibiotics given to cows?

◯ Siempre / Always
◯ A menudo / Often
◯ Algunas veces / Sometimes
◯ Rara vez / Rarely
◯ Nunca / Never
◯ No aplica / N/A

---

**Si s?, ¿Cuáles de los siguientes antibi?ticos ha manejado usted directamente cuando se trata a animales enfermos o sanos en la lechería? If so, what antibiotics have you handled directly when treating sick or healthy animals?**

| | Si / Yes | No / No | No s?/No estoy seguro / Refused | No quiero contester//Unsure |
|---|---|---|---|---|
| Ampicilina (ampicillin) | ◯ | ◯ | ◯ | ◯ |
| Penicilina (penicillin) | ◯ | ◯ | ◯ | ◯ |
| Ceftiofur | ◯ | ◯ | ◯ | ◯ |
| Cefalosporina (cephalosporin) | ◯ | ◯ | ◯ | ◯ |
| Florfenicol | ◯ | ◯ | ◯ | ◯ |
| Tetraciclinas (tetracyclines) | ◯ | ◯ | ◯ | ◯ |
| Tilmicosin | ◯ | ◯ | ◯ | ◯ |
| Trimethoprim-sulfa | ◯ | ◯ | ◯ | ◯ |
| Otro, especifique: /Other, specify: | ◯ | ◯ | ◯ | ◯ |

Antibiotics other, specify

_____

**Cuando trabajas con las vacas de la lechería, ?alguna vez está en contacto directo con lo siguiente? / When working with the cows at the farm how often do you have direct contact with the following?**

| | Siempre / Always | A menudo / Often | Algunas veces / Sometimes | Rara vez / Rarely | Nunca / Never | No aplica / N/A |
|---|---|---|---|---|---|---|
| Sangre /Blood | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Orina /Urine | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Heces fecales/Feces | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Carne del animal /Animal Flesh (including exposed wounds, carcasses, etc) | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Fluidos (como la saliva, l?quido amni?tico)/Fluids (e.g. saliva, amniotic fluids) | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Leche /Milk | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Otro, especifique: / Other, specify | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Recibi? entrenamiento formal en el sitio en el que trabaja antes de trabajar con animales? / Did you receive formal training at the site you work at before working with animals?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si s?, ?que tipo de entrenamiento recibiste? (Selecciones todas las que apliquen.) / If yes, what type of training did you have?

☐ Captura/contenci?n/manipulaci?n de animales / Animal capture/restraint/handling
☐ Tejido y sangre/ Tissue/blood sampling
☐ Prevenci?n/control de enfermedades infecciosas/zoon?ticas/ Infectious/zoonotic disease prevention/control
☐ Seguridad ocupacional / Occupational safety
☐ Preparaci?n para emergencias/ Emergency Preparedness
☐ Bioseguridad/ Biosafety
☐ Exposiciones químicas / Chemical exposures
☐ Restricci?n de ca?das/ Fall restraint
☐ Espacios confinados / Confined Spaces
☐ Nada / None
☐ Respuesta al brote / Outbreak Response
☐ Rechazar / Refused
☐ Otro, especifique / Other, please specify

Otro formal entrenamiento...especifique: /Please specify what the "other" training type was:

_____

Si s?, ?donde recibiste el entrenamiento? / If yes, where did you get this training?

☐ Escuela/ School
☐ Empleador actual / Current employer
☐ Empleador anterior / Previous employer
☐ Otro, especifique / Other, please specify

Otro recibiste el entrenamiento?/Please specify what the "other" source of training was:

_____

Cree usted que su entrenamiento le proporcion? informaci?n adecuada para hacer su trabajo de manera segura?/Do you feel that your training provided you with adequate information to do your work safely?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Usted al momento tiene alguna mascota(s) en su hogar? / Do you currently have any household pets?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

---

**a) Si s?, indique el tipo de mascota (Selecciones todas las que apliquen.); b) numero de animales de cada tipo; y c) numero de años de due?o. d) (Selecciones todas las que apliquen.) / [If yes] What are the type of pet(s), number of animals for each type, number of years owned, and primary food source for that animal**

Perro/Dog

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Perro / Dog-# (mark 0 if none) _____

Perro / Dog-Years owned of oldest pet _____

Gato / Cat

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Gato / Cat-Number (mark 0 if none) _____

Gato / Cat-Years owned of oldest pet _____

Pajaros /Bird

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Pajaros / Bird-Number (mark 0 if none) _____

Pajaros / Bird-Years owned of oldest pet _____

Reptil Reptile

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Reptil Reptile-Number (mark 0 if none) _____

Reptil Reptile-Years owned of oldest pet _____

Otro /Other

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Otro/Other-Type of pet _____

Otro/Other-Number _____

Otro/Other-Years owned of oldest pet _____

Cuanto tiempo de su vida a vivido con mascotas? / How much of your life have you lived with pets?
- ☐ Nunca Never
- ☐ Rarament / Rarely
- ☐ Alg?n tiempo de mi vida / Some of my life
- ☐ La mayor parte o toda mi vida / Most or all of my life

En los ?ltimos 12 meses, tuvo contacto f?sico con animals salvajes In the past 12 months, have you come into physical contact with wild animals?
- ☐ Si / Yes
- ☐ No / No
- ☐ No s?/No estoy seguro / Refused
- ☐ No quiero contester//Unsure

Si respondi? s?, especifica los animales salvajes / If yes, please specify the wild animals _____

Si respondi? s?, cuando fue la ?ltima vez que esto ocurri?? / If yes, when did this last occur? _____

Si respondi? s?, qué tan seguido tiene contacto con los animales salvajes? If yes, how often do you have contact with wild animals [like macaques, rats, bats, etc]?(type animal)
- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Less than Monthly
- ☐ Less than once a yr

?Usted al momento tiene ganado o corral de aves en su hogar? / Do you currently have any household livestock or poultry?
- ☐ Si / Yes
- ☐ No / No
- ☐ No s?/No estoy seguro / Refused
- ☐ No quiero contester//Unsure

---

**Si respondi? s?, indique abajo el tipo de ganado, numero de animales, y numero de anos con los animales. / If yes, Indicate below the type of livestock, # of animals for each type, # of years owned, and whether this livestock type lives within 100 feet of your home.**

Vacas / Cows
- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

Vacas / Cows-Number of animals _____

Vacas / Cows-Years raised this type of livestock or poultry _____

Vacas / Cows- Do these animals live within 100 feet from your home?
- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

Cabra / Goats
- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

Cabra / Goats-Number of animals _____

Cabra / Goats-Years raised this type of livestock or poultry _____

Cabra / Goats - Do these animals live within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Obeja / Sheep

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Obeja / Sheep-Number of animals

_____

Obeja / Sheep-Years raised this type of livestock or poultry

_____

Obeja / Sheep - Do these animals live within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Cerdos / Pigs

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Cerdos / Pigs-Number

_____

Cerdos / Pigs-Years raised this type

_____

Cerdos / Pigs - within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Pollos Chickens

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Pollos Chickens-Number

_____

Pollos Chickens-Years raised this type

_____

Pollos Chickens - within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Patos / Ducks

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Patos / Ducks-Number

_____

Patos / Ducks-Years raised this type

_____

Patos / Ducks - within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Caballos Horses

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Caballos Horses-Number

_____

Caballos Horses-Years raised this type

_____

Caballos Horses - within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Otro, especifique / Other, specify

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Other-Number

_____

Otro / Other-Years raised this type

_____

Otro / Other-within 100 feet from your home?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si no, has estado en contacto directo con cualquier ganado dom?stico fuera de esta granja? / If no household livestock, have you been in direct contact with any domestic livestock and poultry outside of the farm?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si s?, indica cual tipo de animal / If yes, what kind of animal?

☐ Pollo / Chicken
☐ Cerdos / Pigs
☐ Caballo / Horses
☐ Cabra/Obeja/Borrego / Goats/Sheep/Lambs
☐ Vacas / Cows
☐ Otro, especifique / Other, please specify

If other kind of animal, please specify

_____

¿Esté usted consciente de cualquier cosa en su ambiente que podr?a hacerle daño o enfermar? / Are you aware of any things in your environment that could harm you or make you sick?

☐ Si / Yes
☐ No / No
☐ No s?/No estoy seguro / Refused
☐ No quiero contester//Unsure

Si s?, ¿Cuáles son algunos ejemplos? What are some examples?

_____

Hasta el d?a de hoy, ?c?mo considera su estado de salud? / As of today, how would you rate your general health?

◯ Excelente / Excellent
◯ Buena / Good
◯ Justa / Fair
◯ Pobre / Poor
◯ No quiero contestar / Refused

**Ahora me gustar?a hacerle algunas preguntas sobre si fuma en su casa / Now I would like to ask you a few questions about smoking in this home.**

?Usted a fumado? / Have you ever smoked?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Usted fuma a hora? Do you smoke now?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Cu?ntas personas que viven en su casa fuman cigarrillos, cigarros, cigarros peque?os, pipas, pipas de agua, cachimba, o cualquier otro producto de tabaco? (Los productos de tabaco no incluyen marihuana) (Si la respuesta es no, ingrese 0) / How many people who live in your home smoke cigarettes, cigars, little cigars, pipes, water pipes, hookah, or any other tobacco product? (Tobacco products do not include marijuana) (If no one in the house smokes, enter 0)

_____

(No contando cubiertas, porches o garajes aislados) Durante los ?ltimos 7 d?as, que es desde el ?ltimo [D?A DE LA SEMANA], ¿Cuántos d?as fum? tabaco en su casa? / (Not counting decks, porches, or detached garages) During the past 7 days, that is since last [TODAY'S DAY OF WEEK], on how many days did {anyone who lives with you/you}, smoke tobacco inside your home?

_____

?Ha tomado antibi?ticos durante los ?ltimos 3 meses? In the past 3 months, have you taken any antibiotics?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

a) Si s?, ?por qué raz?n tom? antibi?ticos? / If yes, what was the reason for taking antibiotics?

☐ Infecci?n del o?do, sinusitis, infecci?n respiratoria alta / Ear, sinus, upper respiratory infection
☐ Bronquitis/neumon?a / Bronchitis/pneumonia
☐ Infecci?n del tracto urinario / Urinary tract infection
☐ Infecciones de la piel / Skin infection
☐ Acn? / Acne
☐ Limpieza de dientes/cirug?a de la boca / Dental cleaning/oral surgery
☐ Cirug?a u operaci?n m?dica / Surgery
☐ No s?/ No estoy seguro / Don't know
☐ No quiero contestar / Refused
☐ Otro...especifique / Other, specify

If Other reason, please specify

_____

¿qué antibi?tico(s) tom?? / Which antibiotics did you take?

_____

**La siguiente preguntas implica sus preferencias de comida y rutinas diarias en casa y en el trabajo. / The next set of questions involves your food preferences and daily routines at home and at work.**

Desayuno / Breakfast

_____

Almuerzo / Lunch

_____

Cena / Dinner

_____

Botanas/Bebidas / Snacks and Drinks

_____

**En general, ¿con qué frecuencia ha consumido lo siguiente? / In general, how often do you consume the following?**

Productos lacteos (leche, queso, yogur) / Dairy Products (milk, cheese, yogurt)

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Productos lacteos sin pasteurizer / Unpasteurized dairy products

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Arroz/Fideos de arroz / Rice / rice noodles

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Pasta/Fideos de trigo / Pasta/wheat noodles

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Cereales / Cereals (corn, wheat, barley, oats, quinoa)

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Frijoles / Lugumbres / Beans / Legumes

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Vegetales/Verduras / Vegetables

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Frutas / Fruits

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Comida R?pida / Fast food

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Caf?/T? / Coffee / tea

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Pop / soda / cola

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Bebidads Energizantes / Energy Drinks

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Bebidas Alcholicas / Alcoholic Drinks

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Postres / Desserts / sweets

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Carne de res / Beef

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Cerdo / Pork

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Pollo / Chicken

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Borrego / Lamb

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Pescado / Fish

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

Huevos / Eggs

◯ 5-7 veces a la semana / 5-7 times a week
◯ 1-4 veces a la semana / 1-4 times a week
◯ 1-2 veces a el mes / 1-2 times a month
◯ 1-2 veces a el ano / 1-2 times a year
◯ Nunca / Never

?Come usted alguna de las carnes cruda? Do you eat any of the above items raw?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si s?, ?Que comes crudo? If yes, which items do you eat raw?

_____

Su dieta ha cambiado significativamente desde la ?ltima vez que hablamos? / Has your diet changed significantly since the last time we spoke?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused

If yes, please explain how your food has changed.

_____

En el trabajo, come usted en un cuarto separado de las vacas? / At work, do you eat your meals in a separate room away from animals?

◯ S? / Yes
◯ No / No
◯ A veces / Sometimes

?Hay un cuarto separada (lejos de los animales) donde se puede comer / beber en el trabajo? Is there a separate room (away from animals) where you can eat/drink at work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Cuando trabaja, ¿Cuál es su fuente principal de agua para beber? While at work, what is your main source of drinking water?

◯ Agua p?blica (como agua de la llave, agua de una fuente, etc.) / Public water (e.g. tap water, water fountain, etc.)
◯ Agua en botella / Bottled water
◯ Otro...especifique / Other, please specify below
◯ No s?/No estoy seguro / Don't know/Not sure
◯ No quiero contestar / Refused

Other drinking water:

_____

?Consume leche cruda de las vacas de esta lechería? / Do you consume unpasteurized / raw milk?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si s?, ¿con qué frecuencia lo hace? / If yes, how often?

◯ Todos los d?as / Every day
◯ 1-3 veces al mes / 1-3 times per week
◯ 1-3 veces por semana / 1-3 times per month
◯ Otro...especifique / Other, please specify

Otro...especifique / Other, specify

_____

?Tiene ropa que solamente usa para trabajar en esta lechería? / Do you have clothes that are exclusively for working at this farm?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Lleva tu ropa de trabajo a casa contigo? / Do you take your work clothes home with you?

◯ Si, siempre / Yes always
◯ Si, a veces / Yes sometimes
◯ Si, raramente / Yes rarely
◯ No, nunca / No never

¿Dónde está su ropa de trabajo generalmente lavada? / Where are your work clothes usually/most often washed?

◯ Trabajo / Work
◯ Casa / Home
◯ Lavanderia / Laundromat
◯ Otro, especifique / Other, please specify

Otro, especifique, por favor / Other place where you wash work clothes

_____

?Lava su ropa de trabajo junto con otra ropa? / Do you wash work clothes with other laundry?

◯ S? / Yes
◯ No / No
◯ A veces / Sometimes

?Cu?ndo y d?nde se ba?a? Despu?s del trabajo? / When and where do you bathe or shower? Before work?

◯ En casa / Home
◯ En el trabajo / Work
◯ Otro / Other

?Cu?ndo y d?nde se ba?a? Antes del trabajo? / When and where do you bathe or shower? After work?

◯ En casa / Home
◯ En el trabajo / Work
◯ Otro / Other

Durante las ?ltimas 12 semanas, ?ha viajado usted fuera de los Estados Unidos? / In the past 12 weeks have you traveled outside the United States?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Durante las ?ltimas 12 semanas, ?ha alg?n miembro de su familia (encierre en un c?rculo ya sea usted o miembro de su familia) fuera de los Estados Unidos? / In the past 12 weeks have you been in close contact with family, friends or colleagues who have traveled outside of the United States?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

**?Ahora voy a preguntarle acerca de su salud. Voy a leer una lista de art?culos, y por favor, me detenga si en el ultimo ano que ha tenido las siguientes condiciones de salud? I am now going to ask you about your health. I am going to read a list of items, and please stop me if in the last year you ever had the following health conditions?**

Fiebre Fever

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Fever-When was the most recent date this occurred?

_____

Fever-Did you/your family member see a doctor for this issue?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Was the fever related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

P?rdida o ganancia de peso inexplicable / Unexplained Weight loss or gain

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Weight loss or gain-Date of Onset

_____

Weight loss or gain-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Weight loss or gain-Notes

_____

Was the unexplained weight loss or gain related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas oculares que no incluyen impedimentos de la visi?n / Eye problems

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Eye problems-Date of Onset

_____

Eye problems-Most recent

_____

Eye problems-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Eye problems-Notes

_____

Were the eye problems(not related to normal vision impairment) related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas con la orejas, la nariz, la boca o la garganta / Ear, Nose, Mouth or Throat problems

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Ear, Nose, Mouth or Throat problems-Date of Onset

_____

Ear, Nose, Mouth or Throat problems-Most recent

_____

Ear, Nose, Mouth or Throat problems-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Ear, Nose, Mouth or Throat problems-Notes

_____

Were the ear, nose, mouth or throat problems related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas cardiovasculares enfermedad card?aca o presi?n alta / Cardiovascular problems, heart disease or high blood pressure

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Cardiovascular problems, heart disease or high blood pressure-Date of Onset

_____

Cardiovascular problems, heart disease or high blood pressure-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Cardiovascular problems, heart disease or high blood pressure-Notes

_____

Were the cardiovascular problems, heart disease or high blood pressure related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas respiratorios como tos / Respiratory problems, like coughing or breathing problems

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Respiratory problems, like coughing or breathing problems-Date of Onset

_____

Respiratory problems, like coughing or breathing problems-Most recent

_____

Respiratory problems, like coughing or breathing problems-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Respiratory problems, like coughing or breathing problems-Notes

_____

Were the respiratory problems, like coughing or breathing problems related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas gastrointestinales como malestar estómago o diarrea / Gastrointestinal problems like upset stomachs or diarrhea

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Gastrointestinal problems like upset stomachs or diarrhea-Date of Onset

_____

Gastrointestinal problems like upset stomachs or diarrhea-Most recent

_____

Gastrointestinal problems like upset stomachs or diarrhea-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Gastrointestinal problems like upset stomachs or diarrhea-Notes

_____

Are the gastrointestinal problems like upset stomach or diarrhea related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas de salud genital, urinaria o reproductiva / Genital, urinary, or reproductive health issues

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Genital, urinary, or reproductive health issues-Date of Onset

_____

Genital, urinary, or reproductive health issues-Most recent

_____

Genital, urinary, or reproductive health issues-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Genital, urinary, or reproductive health issues-Notes

_____

Were the genital, urinary, or reproductive health issues related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas musculoesquel?ticos como debilidad muscular o artritis / Musculoskeletal problems like muscle weakness or arthritis

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Musculoskeletal problems like muscle weakness or arthritis-Date of Onset

_____

Musculoskeletal problems like muscle weakness or arthritis-Most recent

_____

Musculoskeletal problems like muscle weakness or arthritis-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Musculoskeletal problems like muscle weakness or arthritis-Notes

_____

Were the musculoskeletal problems like muscle weakness or arthritis related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas en la piel como erupciones cut?neas, irritaci?n, picaz?n / Skin problems like rashes, irritation, itching

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Skin problems like rashes, irritation, itching-Date of Onset

_____

Skin problems like rashes, irritation, itching-Most recent

_____

Skin problems like rashes, irritation, itching-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Skin problems like rashes, irritation, itching-Notes

_____

Were the skin problems like rashes, irritation, or itching related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas neurol?gicos como dolores de cabeza, convulsiones / Neurological problems like headaches, seizures

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Neurological problems like headaches, seizures-Date of Onset

_____

Neurological problems like headaches, seizures-Most recent

_____

Neurological problems like headaches, seizures-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Neurological problems like headaches, seizures-Notes

_____

Problemas psiqui?tricos, como depresi?n, ansiedad / Psychiatric problems, like depression, anxiety

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Psychiatric problems, like depression, anxiety-Date of Onset

_____

Psychiatric problems, like depression, anxiety-Most recent

_____

Psychiatric problems, like depression, anxiety-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Psychiatric problems, like depression, anxiety-Notes

_____

Were the psychiatric problems like depression or anxiety related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas endocrinos como tiroides o diabetes / Endocrine problems like thyroid, or diabetes

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Endocrine problems like thyroid, or diabetes-Date of Onset

_____

Endocrine problems like thyroid, or diabetes-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Endocrine problems like thyroid, or diabetes-Notes

_____

Were the psychiatric problems like depression or anxiety related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Problemas de sangre o linf?ticos / Blood or lymphatic problems

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Blood or lymphatic problems-Date of Onset

_____

Blood or lymphatic problems-See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Blood or lymphatic problems-Notes

_____

Were the blood or lymphatic problems related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

S?ntomas de alergia o Problemas Inmune / Allergies or immune problems

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Allergies or immune problems -Date of Onset

_____

Allergies or immune problems -Most recent

_____

Allergies or immune problems -See a doctor

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Allergies or immune problems -Notes

_____

Were the allergies or immune problems related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Cualquiera de los siguientes factores que afectan a la inmunidad: VIH / SIDA, inmunodeficiencia combinada grave, inmunodeficiencia variable com?n, c?ncer, paciente trasplantado, enfermedades cong?nitas que afectan la inmunidad / Any of the following affecting immunity: HIV/AIDS, severe combined immunodeficiency, common variable immunodeficiency, cancer, transplant patient, congenital diseases affecting immunity

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Date of diagnosis for any of the following affecting immunity HIV/AIDS, severe combined immunodeficiency, common variable immunodeficiency, cancer, transplant patient, congenital diseases affecting immunity?

_____

Did you see a doctor for any of the following affecting immunity HIV/AIDS, severe combined immunodeficiency, common variable immunodeficiency, cancer, transplant patient, congenital diseases affecting immunity?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Notes on any of the following affecting immunity: HIV/AIDS, severe combined immunodeficiency, common variable immunodeficiency, cancer, transplant patient, congenital diseases affecting immunity.

_____

Were any of the following affecting immunity (HIV/AIDS, severe combined immunodeficiency, common variable immunodeficiency, cancer, transplant patient, congenital diseases affecting immunity) related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

**Ahora voy a leer una lista de art?culos, y por favor, det?ngame si alguna vez ha sido DIAGNOSTICO con las siguientes condiciones de salud? / I am now going to read a list of items, and please stop me if you have ever been DIAGNOSED with the following health conditions?**

Asma / Asthma

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Asthma-Date of Diagnosis _____

Asthma-Most recent _____

Asthma-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Asma bronquia / Bronchial Asthma

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Bronchial Asthma-Date of Diagnosis _____

Bronchial Asthma-Most recent _____

Bronchial Asthma - Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Bronquitis / Bronchitis

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Bronchitis-Date of Diagnosis _____

Bronchitis-Most recent _____

Bronchitis-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Neumon?a / Pneumonia

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

pneumonia-Date of Diagnosis _____

pneumonia-Most recent _____

pneumonia-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Pleures?a / Pleurisy

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

pleurisy-Date of Diagnosis _____

pleurisy-Most recent _____

pleurisy-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Par?sitos, anquilostoma / Parasites

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

parasites-Date of Diagnosis _____

parasites-Most recent _____

parasites-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Tuberculosis / Tuberculosis

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

tb-Date of Diagnosis _____

tb-Most recent _____

tb-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Eccema / Eczema

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

eczema-Date of Diagnosis

_____

eczema-Most recent

_____

eczema-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Dermatitis / Dermatitis

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

dermatitis-Date of Diagnosis

_____

dermatitis-Most recent

_____

dermatitis-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Neumoconiosis / Pneumoconiosis

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

pneumoco-Date of Diagnosis

_____

pneumoco-Most recent

_____

pneumoco-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Tiroides o diabetes / Diabetes

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Diabetes-Date of Diagnosis _____

Diabetes-Most recent _____

Diabetes-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Gripa / Flu

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

flu-Date of Diagnosis _____

flu-Most recent _____

flu-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Otros problemas en el pechoOther_dx

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Other_dx-Date of Diagnosis _____

Other_dx-Most recent _____

Other_dx-Notes

_____

Do you believe it was related to your work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

Si usted contestá "s?" arriba a creer que la condici?n estaba relacionada con el trabajo, ?Se mejora cuando estás lejos del trabajo?If you answered yes to any of the conditions above being work related, does it get better when you are away from work?

◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

If the symptoms get better away from work, please describe here:

_____

?Cuantas veces tienes que ir al bano (defecacion) en un dia? / How many times do you have a bowel movement in an average day?

- ◯ Menos de una / Less than One
- ◯ Una / One
- ◯ Dos / Two
- ◯ Tres / Three
- ◯ Cuatro / Four
- ◯ Cinco o mas / Five or more

Describe la calidad de tus deposiciones / Describe the quality of your bowel movements

- ◯ Yo tengo estre?imiento (Tengo dificultades para pasar las heces) / I tend to be constipated (have difficulty passing stool) - Type 1 and 2
- ◯ Yo tengo diarrea (heces aguado) / I tend to have diarrhea (watery stool) - Type 5,6,7
- ◯ Yo tengo heces formadas normales / I tend to have normal formed stool - Type 3 and 4

?Experimenta s?ntomas respiratorios (por ejemplo, tos seca, sibilancias en el pecho, tos con flema, dificultad para respirar) más en el trabajo que cuando no está en el trabajo? / Do you experience respiratory symptoms (eg, dry cough, wheezing, coughing with phlegm, shortness of breath) more at work than when not at work?

- ☐ Ninguna / None
- ☐ Tos seca / Dry cough
- ☐ Sibilancias en el pech / Wheezing in chest
- ☐ Tos con flema / Cough with phlegm
- ☐ Dificultades para respirar / Shortness of breath
- ☐ El pecho aprietado / Tightening of Chest

?Normalmente tiene tos? (Cuente una tos con el primer humo o al salir por primera vez afuera. Excluir la claridad de la garganta o una sola tos.)Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing throat or a single cough.)

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?T? toses generalmente como 4 a 6 veces al d?a, 4 o más d?as de la semana?Do you usually cough as much as 4 to 6 times a day, 4 or more days out of the week?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?T? toses generalmente cuando te levantas, o premier mente en la manana?/Do you usually cough at all on getting up, or first thing in the morning?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?T? toses en general durante el resto del d?a o de la noche?/Do you usually cough at all during the rest of the day or night?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?Usted tose como esto en la mayor?a de los d?as por 3 consecutivos? Do you cough like this on most days for 3 consecutive?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?Por lo general saca flema de su pecho, no de la parte posterior de su nariz? (Excluya la flema de la nariz)/Do you usually bring up phlegm from your chest, not from the back of your nose? (Count phlegm with the first smoke or on first going out-of-doors. Exclude phlegm from the nose. Count swallowed phlegm.)

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?Por lo general trae flema as? como dos veces al d?a, 4 o más d?as de la semana?/Do you usually bring up phlegm like this as much as twice a day, 4 or more days out of the week?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

?Por lo general usted levanta flegma al levantarse, o lo primero en la ma?ana?/Do you usually bring up phlegm at all on getting up, or first thing in the morning?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Por lo general usted trae flegma durante todo el resto del d?a o por la noche?/Do you usually bring up phlegm at all during the rest of the day or at night?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Usted trae flegma como esto en la mayor?a de los d?as por 3 meses consecutivos o más durante el año?/Do you bring up phlegm like this on most days for 3 consecutive months or more during the year?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

¿Está usted preocupado por la falta de aliento cuando se apresura a caminar por un peque?o cerro? /Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Tiene que caminar más lento que las personas de su edad debido a la falta de aire? /Do you have to walk slower than people of your age on the level because of breathlessness
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Alguna vez tiene que parar para respirar despu?s de caminar unos 100 metros (o despu?s de unos minutos) en el nivel? /Do you ever have to stop for breath after walking about 100 yds(or after a few minutes) on the level?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

¿Por cuántos años ha tenido esta falta de aire? # de anos_____/For how many years have you had this shortness of breath?
_____

¿Está usted demasiado sin aliento para salir de la casa o sin aliento en vestirse o desvestirse? /Are you too breathless to leave the house or breathless on dressing or undressing?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Su pecho se siente apretado o su respiraci?n se vuelve dif?cil?/Does your chest ever feel tight or your breathing become difficult?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

?Le han diagnosticado una enfermedad que su doctor dijo que usted pudo haber contra?do de los animales?/Have you been diagnosed with a disease that your doctor said you may have contracted from animals?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

S? si ¿qué enfermedad (s)/If yes, what disease?
_____

S? si, ¿cree usted que su m?dico estaba adecuadamente informado sobre pat?genos que podr?an transmitirse de animales acu?ticos?/If yes, do you believe your doctor was adequately informed about pathogens that could be transmitted from animals?
◯ Si / Yes
◯ No / No
◯ No s?/No estoy seguro / Refused
◯ No quiero contester//Unsure

**En los últimos 6 meses, ¿qué medicamentos - incluidos los m?todos tradicionales (remedios) - han tomado y para qué s?ntomas?/In the past 6 months, what medications - including traditional methods (remedies) - have you taken and for what symptoms?**

med1 _____

med1_reason _____

med2 _____

med2_reason _____

med3 _____

med3_reason _____

med4 _____

med4_reason _____

med5 _____

med5_reason _____

med6 _____

med6reason _____

**En los Últimos 6 meses, ¿qué medicamentos - incluidos los m?todos tradicionales (remedios) - han tomado y para qué s?ntomas?/? In the past 6 months, have you taken any vitamins or probiotics for your health?**

vit1 _____

vit1_reason _____

vit2 _____

vit2_reason _____

vit3 _____

vit3_reason _____

**Demographics**

¿Cuál es su g?nero?/What is your gender?

◯ Masculino / Male
◯ Feminino/Female
◯ Otro...especifique, por favor/ Other, please specify

Gender - other _____

?Cual es tu edad?_____ años/How old are you? _____

Aproximadamente cuántos años de escuela has completado? _____ /Approximately how many years of school have you completed? (Enter 99 if "Don't Know" or "Refused".)

_____

¿Qué licenciatura más alto (s) ha recibido?/What is the highest degree you have received?

- ☐ No degree
- ☐ High School / GED
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ PhD
- ☐ DVM / VMD / Other veterinary medical degree
- ☐ MD / DO / other medical degree

¿Qué grupo describe mejor su raza / etnia?/What group best describes your race/ethnicity?

- ☐ White Non - hispanic
- ☐ Black Non - Hispanic
- ☐ White Hispanic
- ☐ Black Hispanic
- ☐ Asian
- ☐ American Indian / Alaska Native
- ☐ Native Hawaiian and other Pacific Islander
- ☐ Refused
- ☐ Other
- ☐ Don't Know

If other race, please specify

_____

?En este momento vives?/Do you currently live in

- ◯ Un hogar permanente / A House
- ◯ Apartamento / An Apartment/Condo
- ◯ Dormitorio / Dorm
- ◯ Otro...especifique / Other

If other home please specify

_____

¿Si casa o apartamento, usted o su familia son due?os de su hogar?/If home or apartment, do you or your family currently own your home?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

¿Cuántas personas viven en su hogar más de 6 meses del año, excluy?ndose usted?/How many other people live in your household more than 6 months of the year excluding yourself?

_____

¿Vive con niños menores de 5 años?/Do you live with children under 5 years old?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

If so, how many?

_____

¿Vive usted con adultos mayores de 65 años? /Do you live with adults aged 65 or older?

- ◯ Si / Yes
- ◯ No / No
- ◯ No s?/No estoy seguro / Refused
- ◯ No quiero contester//Unsure

If so, how many over 65?

_____

¿En qué código postal vive usted?/What postal code do you live in?

_____

¿Cuál es el ingreso anual de su hogar? (USD)/Which of the following categories best describes your average YEARLY household income last year?

◯ Under $20,000
◯ $21,000 - $40,000
◯ $41,000 - $75,000
◯ $76,000 - $100,000
◯ More than $100,000
◯ Unsure
◯ Refused

?Hay algo más que me gustar?a decirme acerca de su contacto con animales?
/Is there anything else you would like to tell me about your contact with animals?

_____