Executive Summary

The HICAHS Advisory Board meeting was attended by 17 advisory board members representing private agricultural industry, Extension agents, safety specialists, occupational health physicians, and academic researchers. In addition to providing an update on the goals and progress of HICAHS research projects board members discussed how to improve HICAHS Outreach. The group provided a great list of suggestions including developing a clearinghouse for educational materials (page 4), creating an OHS “Train the Trainer” program, providing contacts for those involved in OHS training, and strategies for sharing data (see page 11).

Key results from the meeting and discussion are:

- HICAHS has developed a Foundation account for private donations (p. 7). These funds will allow greater flexibility for HICAHS to respond to occupational health needs. Contact Steve or Allison to learn more about having HICAHS help your operations, or to contribute to the Foundation account (hicahs@colostate.edu, 970-491-6152.)
- HICAHS’ focus on the dairy industry has resulted in a new dairy advisory board and an international dairy research consortium (p. 2).
- HICAHS Board members prefer communications via digital newsletters versus social networking outlets (Facebook, Twitter, etc.). Creating a clearinghouse for educational materials would be valued (p.4).
- The recent proposed policy to limit children’s involvement in agricultural work highlighted the need for HICAHS to remain credible with agricultural producers. Much work needs to be done to improve health and safety on farms, but the producer OHS plans need to be communicated to legislators, too. HICAHS’ “translational” work does seek to communicate the OHS findings to ag producers so that they can improve their operations (p. 5-6)
- Ideas for alternative non-federal funding were provided (p.8).
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Complete Minutes

I. Welcome and Introductions (Steve Reynolds)
   a. HICAHS Funding

   Around this time last year HICAHS submitted its grant to receive funding from the National Institute for Occupational Safety and Health for another 5 years. Six of the eight research projects were funded, plus the Administrative Core programs (Pilot Program, Outreach Program, and Evaluation Program).

   b. Congressional Budget Cuts

   All the NIOSH-funded Agricultural Research Centers are under risk of being cut in the federal budget. HICAHS continues to wait on Congressional decisions on which federal programs will be cut. In the meantime, HICAHS has started a Foundation Account so that its programs can be supported through private donations.

   c. HICAHS Advisory Boards

   There are now two advisory boards and one research consortium established by HICAHS:

   i. Dairy Advisory Board

   Goals – Training and development of Occupational Health and Safety management programs

   ii. International Dairy Research Consortium

   Started last year, the group is working on an article for the Journal of Agromedicine.

   iii. External Advisory Board

   Purpose is strategic planning, advising, political advising.

II. Update on HICAHS Projects 2012 – 2016:

   a. Pilot Projects (John Volckens)

      i. Targeted towards young researchers

      ii. Goals:

         1. New and creative research findings
2. Develop new partnerships with neighboring academics

3. Build research capacity (esp by engaging young researchers)

iii. 2012 Funding Cycle

There were 6 applicants, 3 are funded for ~$15K each.

1. In vitro microsystem for acute pesticide toxicity (Meghan Mensack)

2. Acute pesticide poisoning experiences of certified applicators in Colorado (Amy Warner)

3. Bioaerosol Monitoring: preventing the spread of infectious diseases among farmers (Maggie Davidson)

b. Bioaerosol Exposures and Models of Human Response in Dairies and Cattle Feedlots (Steve Reynolds)

i. There have been powerful advances in technology that enable researchers to more accurately measure exposures to potentially harmful bioaerosols. This project is evaluating exposures to gram-positive bacteria using an advanced sampler that uses human lung cells.

c. Dairy Ergonomics (Dave Douphrate and John Rosecrance)

i. This study is a direct response to a previous study on musculoskeletal stress of workers in dairy parlors. There are four components to the study: (1) Comparison of ergonomic exposures in each dairy parlor configuration (rotary, herringbone, parallel), (2) Worker fatigue, (3) Use of lightweight milking clusters, and (4) pit height.

d. Computer-based ROPS Design (Paul Ayers)

i. This project will develop a computer program where you can input tractor info—dimensions and mass—and output a guide to building a ROPS with materials, operators guide, etc to retrofit tractors.

e. Comprehensive Evaluation Project (Vicky Buchan & Louise Quijano)

i. This is an internal HICAHS program that evaluates the effectiveness of HICAHS programs. The program evaluates if each project achieved its objectives, how many partners we have in the region, and evaluating the materials that are produced by each project.

f. Dairy Safety Training (John Rosecrance)
i. This project is working on understanding the language/culture of trainees. The findings will be used to modify/improve existing programs in dairies to fit workforce.

g. Discussion: HICAHS Outreach, Strategies for 2012 and beyond (Allison DeVries, Lorann Stallones)

i. See below for the results from the written responses and poster responses.

**ii. Major discussion point: How to share information with board members?**

1. **Digital Newsletter preferred.** Discussed social networking versus listserv. The group prefers a digital newsletter.

2. Twitter is not commonly used among this group.

3. **Create a clearinghouse.** An online clearinghouse would be a good source for educational materials?

   a. **Evaluating credibility of materials.** Also, would HICAHS evaluate the materials by testing them first or can they simply post them online. Some board members wanted to know how they can tell if materials have been “peer reviewed.”

      i. Bill Wailes says yes—-is important to evaluate to ensure correctness/credibility

      ii. Steele says the peer review process depends on the source of the material. A clearinghouse would be a good idea, but he recommends working with the other centers so that material is not redundant.

      iii. Marc— a clearinghouse contains materials for the public, not for researchers. These educational materials are not all the same quality, but it is most important to simply get the information out to the public.

   b. Steve National AG Safety Database is a good source of ag health and safety materials but we may want to focus on our region or the Dairy industry.
c. **HICAHS Communication Goals.** Danell- what is the goal of HICAHS? To disseminate its own research, or everyone’s research?

   i. Response: We want to facilitate research to practice (r2p) of our research and others’.

   ii. Steve-also, outreach informs what research we choose to do-information is exchanged both ways

   iii. John—The HICAHS Translation program is not just about language—we look at culture to understand how information is received and understood.

   iv. HICAHS could engage the Communications department (technical journalism?) to “translate” its findings. Agricultural Extension used to have money to do that too.

   v. **CCTSI.** The Colorado clinical translational sciences institute works to engage communities and do research that meets community needs. It is led by the community and they provide pilot grants. Marc is on advisory board and HICAHS could collaborate. We would be welcome at PACT council meeting

h. **Discussion point: where can we get data on injuries and illnesses?** These rates are often underreported to insurance and government agencies.

   i. The Colorado Department of Public Health is monitoring occupational health indicators and outcomes.

   ii. Danell—the problem with monitoring is that farmers don't report.

   iii. Steve—HICAHS works with insurance to get information on incidents that are severe enough to get treatment.

i. **Discussion point: What is farmers’ perception of NIOSH, defining HICAHS’ role, maintaining trust, responsibility of producers vs. policy**

   i. Richard Connell- The proposed rules and regulations concerning child labor from DOL have references to NIOSH publications. HICAHS is sponsored by NIOSH and there is a disconnect between niosh and the farming community. HICAHS NEEDS TO STAY CREDIBLE AND MAKE
THE PROCESS TRUSTWORTHY WITH FARMERS. Farmers feel like the information they provide is being used against them.

ii. Should HICAHS be involved in policy? Steve says that we can't get away from policy issues. HICAHS does not want to ignore known problems (e.g. child injuries on farms), but policy needs to be balanced, and constituents need to have a say in it. The Ag Centers can help give farmers a voice other than just NIOSH numbers

iii. Danell—Should focus outreach with groups that already have infrastructure??

iv. Steve—we can't do everything we need to focus

v. Dave—The Ag Centers rely heavily on Extension agents to disseminate Ag Center findings. The agricultural producers in Texas have been proactive in preventing OSHA involvement by involving Extension.

vi. Gilkey—The “translational science” part of HICAHS is involved in interpretation. We don’t want to just give data to policy makers, we want to be involved in interpretation

vii. Dan Hair—NORA (missed it)—some untapped resources

viii. Juan/Maggie—if the industry isn’t proactive then regulation will increase. The next target may be animal welfare

ix. Dan Hair—We need more producers at these meetings and greater involvement with national organizations.

x. Steve—Part of the reason why we are so focused on the dairy industry is that we have lots of connections with producers, but we also don’t want to ignore the rest of the field.

xi. Juan—Some producers are getting so big that they may hire own researchers, and this could impact the integrity of research.

xii. John Rosecrance—like drug companies—we already do that a little because funding so scarce

xiii. Could we do industry-wide monitoring and reporting, like homeland security? Insurance companies already have data and we could just put it out there.

xiv. Steve—we do try to coordinate with other Ag Centers frequently, and these issues are relevant all over the country right now—need to split responsibilities?
xv. Clyde-need to roll out bits of info as it comes out, not just at end of project. This would be better for end users and will also keep them looking for the info coming out.

xvi. Neglecting laborers? Should keep them represented by themselves/organized labor (though not really out there-organized labor taking a hit)

xvii. HERSA (?) Definition of workers categorized as migrants is changing—forestry,floral/landscaping ?? definition is changing—impacts what SALUD will get paid for

III. HICAHS Funding Update (Steve Reynolds) & HICAHS Foundation Account : A means for future private funding (Steve Reynolds)

a. The Federal government zeroed out the NIOSH Agriculture, Forestry, Fishing Program where HICAHS receives its funding. The ERC programs that train occupational health and safety practitioners were also targeted for elimination. The justification incorrectly said that the work was being duplicated by the USDA and other agencies. Steve has been working with the ERCs on a coordinated strategy to get information to members of Congress and accurately describe our impact, our unique strengths, and the business case for occupational health in the U.S.

b. Year 2 funding is looking promising, but we will not know until the President’s budget is released on February 13. We are working with our representatives to garner support and we are also trying to find other funding. We want to not only continue to do research, but come up with timely programs to respond to current needs. We would like to create a management system that includes an occupational health and safety piece. We see that there will be a need because Colorado alone will need 70,000 more cows to supply milk for the new Leprino cheese factory, which will result in new managers that need training. Dave wants to also continue working on training producers on OSHA regulations.

c. Dan—could we get workers’ compensation incentives diverted for center? Steve says that this may not work currently in CO, but it would be worth pursuing in UT with Kurt Hegmann (counterpart in Utah).

d. HICAHS is developing a Foundation Account through the university system so that private donors can contribute to short-term projects that don’t want need a 2 year peer review process. This account will also raise funding for the dues for the organization that provides political representation to the ERCs and Ag Centers.

To contribute to the HICAHS Foundation Account: https://advancing.colostate.edu/cvmbs/erhs/give
e. **Question for everyone: Any suggestions for other strategies for funding?**

   i. Juan – Funds are provided for veterinarians to conduct basic vet research. A post-doc could be used to train employees on collecting data in-house.

   ii. Steve: could use grad students, also for management concerns

   iii. A potential problem is that faculty would be doing business, not research and teaching.

   iv. Using students instead of hiring people could be good for producers. But in Iowa with OH physicians, don’t want university to be competing with other businesses

   v. Need to work on explaining value to potential supporters

   vi. Kevin: Susan Harwood grants

   vii. Go to business and producer organizations

   viii. Mike on competing. When you are specialized — e.g. dairy ergonomics—you can act as consultant without really competing

   ix. Trying to learn from certified safe farms program

   x. Bill—endowment opportunities—will discuss later

   xi. Ed- we’re monitoring more occupations. CO will want 20,000 patients monitored for pesticide exposure—would rather pay university/universities are equipped

   xii. Steve—Toxicology center is set up here

   xiii. Dave Gilkey— not much comes from taxpayers—researchers bring in $400,000,000 to university ??????

   xiv. Dan Hair- Focus on falls, vehical accidents, musculoskeletal issues—businesses are more interested there

   xv. Food Modernization act?? What impact will it have—talk more later

   xvi. Dan Hair- 2014 ASHCA conference in Cleveland or Salt Lake City—could be a large dairy component

IV. Closing & Open Discussion (Steve Reynolds)
**Board Members**

1. **Mitch Anderson**, General Manager & CEO, Ag Land, Inc.
2. **Richard Connell**, Safety and Health Coordinator, Colorado Farm Bureau
3. **Kevin Dalsted**, Assistant Director, Water Resources Institute
4. **Jessica Davis**, Director, Institute for Livestock and the Environment at CSU
5. **Dan Fahrenholtz**, MD, Northern Colorado Family Medicine, CU Denver School of Medicine
6. **Dan Hair**, Senior Vice President & Chief Underwriting and Safety Officer, Workers Compensation Fund
7. **Ed Hendrikson**, MD, Salud Family Health Center
8. **Danell Kalcevic**, President, Colorado Agriwomen
9. **Rachel Motteram**, Director of Member Services, Colorado Livestock Association
10. **Marc Ringel**, MD, Rural Physician, Rural Track Associate Director, Colorado Area Health Education Center
11. **Clyde Serna**, Safety Consultant, Pinnacol Assurance
12. **Doug Steele**, Director, Montana State University Extension Services
13. **Mike Taylor**, Chief Safety, Health, and Environmental Officer, the Church of Jesus Christ of Latter-day Saints
14. **Juan Velez**, V.P. Farm Operations, Aurora Organic Dairy
15. **Bill Wailes**, Extension Specialist, Colorado State University

**HICAHS Staff**

1. **Vicky Buchan**
2. **Kristin Danhoff** (student)
3. **Maggie Davidson**
4. **Allison De Vries**
5. **David Douphrate**
6. **David Gilkey**
7. **Larry Goodridge**
8. **Dennis Lamm**
9. **Louise Quijano**
10. **Stephen Reynolds**
11. **Kyle Root** (student)
12. **John Rosecrance**
13. **Lorann Stallones**
14. **Teresa Tellechea**
15. **John Volckens**
16. **Markley Walsh** (student)

**Teleconference Attendees**

1. **Peter Kolb**, College of Forestry and Conservation, University of Montana
2. **Jeff Levin**, Director, Southwest Center for Ag Health, Injury Prevention, and Education

Total: 33
Outreach is an important component of HICAHS’ activities. Without outreach, the HICAHS center’s specialized knowledge about occupational safety will not reach agricultural workplaces. In the upcoming meeting of the HICAHS Advisory Board, we would like to have a conversation about how our various organizations fit together and how HICAHS can reach the occupational safety and health needs of your organization. To prepare, we hope you can find the time to fill out this brief survey. We’d like everyone to come to the meeting with some thoughts about what your organization(s) can contribute to collaborative work in occupational safety and health.

Please List Things Your Organization Does To Promote Occupational Health and Safety

1. Conduct workshops on safe forestry operating practices
2. Produce informational brochures on safety awareness
3. Builds collaborations with stakeholders
4. Physician, PA, and FNP training
5. Orientation leadership set culture

Types of Resources Your Organization Has Dedicated to Occupational Health and Safety (e.g. expertise in a particular aspect of OHS, money to develop training programs, a large membership, etc.)

1. Organization memberships (e.g. Montana Forest Owners Association)
2. Expert instruction + Workshops
3. Informational Media
4. Lab testing for pesticide exposure
5. Full time employee to promote OH&S
6. Bring in outside resources to inform work force trends and real life issues
7. Insurance Industry Data- Put it out there
8. ATV safety training and outreach
9. Pesticide applicator certification and outreach
10. Youth farm safety field days

How can HICAHS contribute to your organizations goals?

1. Clearinghouse for educational materials
2. Regional contacts + info exchange
3. Cost-share for funding projects
4. Web development update on projects on web
5. Provide training to trainers program for occupational safety
6. Funding/mini-grants for applied research projects and educational outreach
7. Strengthen partnerships, collaborators and networks
8. Real world application of research findings.
9. More policy issues for HICAHS to work on
10. Provide local contacts in occupational health in rural communities where health provider training occurs (medical, PA, nursing, etc.) for enrichment of local ed-experience/curriculum
11. Help contact speakers on rural occupational health for health sciences center and Colorado family medical residencies
12. Promote awareness of all safety training and issues
13. Focus on the basic real high occurrence danger in Ag
14. Healthy habits educational programs for employees
15. Seminars-train the trainers
16. Collaborate on capstone projects and health sciences (small projects, or part of large projects
17. List serve to share producer and H&S tips
   a. Facebook, web, twitter
18. Response to fatalities
19. Credibility related to child labor
   a. NIOSH→DOL
20. Share data found in research process
21. Labor force representation in choices and material development (focus groups)

Ways Your Organization Can Contribute To the Goals of the High Plains Intermountain Center for Agricultural Health and Safety
1. Topic specific training (forestry)
2. Contact with audiences (forest landowners/professional org)
3. Media development
4. Provide input and comment to HICAHS strategic planning and research projects
5. Promote educational outreach and share research findings/recommendations
6. Assist in research protocols and projects
7. Promote HICAHS
8. Serve as a conduit for information

Responses of the same color were from the same person.
All responses were anonymous.

This document was prepared by Allison De Vries.
## HICAHS Advisory Board Meeting

**January 24, 2012**  
10 AM – 3 PM  
Colorado State University  
Student Recreation Center, Room 1090

**AGENDA**

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
<th>Discussion Leader</th>
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<tbody>
<tr>
<td>10:00-10:15</td>
<td>Welcome and Introductions*</td>
<td>Steve Reynolds</td>
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<tr>
<td>10:15-11:00</td>
<td><em>Update on HICAHS Projects 2011 – 2016:</em></td>
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<td>Pilot Projects*</td>
<td>John Volckens</td>
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<td>Bioaerols Exposures and Models of Human Response in Dairies and Cattle Feedlots*</td>
<td>Steve Reynolds</td>
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<td>Dairy Ergonomics*</td>
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<td>Computer-based ROPS Design*</td>
<td>Dave Douphrate and John Rosecrance</td>
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<td>Comprehensive Evaluation Project*</td>
<td>Paul Ayers</td>
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<td>Dairy Safety Training*</td>
<td>Vicky Buchan &amp; Louise Quijano</td>
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<td>11:00-12:00</td>
<td>Discussion: HICAHS Outreach, continued</td>
<td>Lorann Stallones</td>
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<td><em>Strategies for 2012 and beyond</em></td>
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<td>12:00-1:15</td>
<td><em>Lunch</em></td>
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<td>1:15-1:30</td>
<td>Discussion: HICAHS Outreach, continued</td>
<td>Allison De Vries</td>
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<td>1:30-1:45</td>
<td>HICAHS Funding Update</td>
<td>Steve Reynolds</td>
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<td>1:45-2:30</td>
<td>Foundation Account:</td>
<td>Steve Reynolds</td>
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<td><em>A means for future private funding</em></td>
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<td>2:30-3:00</td>
<td>Closing &amp; Open Discussion</td>
<td>Steve Reynolds</td>
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*See Appendices for PowerPoint Presentation*
HICAHS Administrative Overview

Advisory Board Meeting
January 24, 2012
Progress Year 01

Year 01 and 02 Funding Secured

Established HICAHS Foundation

Established Memorial Scholarship –
DeField – Buchan
Env Health Graduate Students
($1600)

Colorado State University

Progress Year 01
Dairy Advisory Board

The Goals of HICAHS Dairy Health and Safety Network:
1) create structure and mechanisms to enhance multi-directional communication among dairy producers and HICAHS researchers, 2) disseminate evidence-based information including best practices and other resources (R2P) to improve health and safety on dairies.

The HICAHS Advisory Board experts in the field of dairy production including extension specialists representing 7 states, dairy owners and managers, dairy equipment manufacturers and producer organizations. The functions of the Board: help identify industry needs and guide, evaluate, direct and facilitate all HICAHS dairy-related projects. Serve as mechanism for dissemination of findings and R2P activities.

Initial meeting – April 2011
OSHA Training
OHS Management Systems Program

Colorado State University
Progress Year 01
International Dairy Research
Consortium

Objective: Collaborate on research and outreach projects that will ultimately result in the reduction of injuries and illnesses among dairy workers internationally.

Meetings: Colorado July 2011, Ireland August 2011
Spain July 2012, Sweden August 2012,
New Zealand September 2012…..

Working Groups Initiated,
Dedicated Edition of Journal of Agromedicine – Fall 2012

HICAHS External Advisory Board

Objectives: Strategic planning; review of HICAHS progress; assessment of regional needs, opportunities, and barriers; identification of emerging issues and future priorities. Assist with dissemination of calls for Pilot/Feasibility studies, assist with organization of regional conferences, and partners in the conduct of many HICAHS projects.

To guide us in expanding our efforts to include forestry, we have added John Hansen, Montana Logging Association, and Peter Kolb, College of Forestry and Conservation, University of Montana to our External Advisory Board.
Pilot Project Program Goals

– To develop new and creative research findings and outcomes related to agricultural and forestry safety and health

– To form new partnerships between HICAHS and:
  • Neighboring academic research organizations
  • Industry
  • Regional State and Federal agencies

– To build research capacity related to health and safety in agriculture and forestry

Colorado State University
2012 Funding Cycle

– RFA issued in November 2011
  • www.hicahs.colostate.edu/grant_opportunities.htm
  • 6 applications received
– Panel review in December 2011
  • NIH style review
  • 3 meritorious applications ($15k each)
  • 50% success rate!

2012 Funded Applications

– “In vitro microsystem for acute pesticide toxicity”
  • Meghan Mensack, PhD
  • CSU Chemistry Department
– “Acute Pesticide Poisoning Experiences of Certified Applicators in Colorado”
  • Amy Warner, MPH
  • Colorado Department of Public Health and Environment
– “Bioaerosol Monitoring: preventing the spread of infectious diseases among farmers”
  • Maggie Davidson, PhD
  • CSU ERHS
Bioaerosol Exposures and Models of Human Response in Dairies and Cattle Feedlots

Advisory Board Meeting
January 24, 2012
[Reynolds, Volckens, Poole, Goodridge, Dooley, Davidson, Keefe, Johnson Siegel, Kirychuk, John Hanson, ]

Objectives:

• Apply powerful new tools to more fully characterize bioaerosols in dairies and cattle feedlots.
• Compare three approaches for studying the pro-inflammatory effects of bioaerosols in the lung: 1) a traditional *in vitro* model using submerged cells, 2) a novel *in vitro* model using an aerosol sampler incorporating primary human lung cells, and 3) nasal cell samples taken from workers in these environments.
Aim 1: Aerosol Characterization
Low- and High-volume Inhalable Aerosols: (2 cattle feedlots + 2 dairies) x 4 seasons x 4 replicates = 64 sample sets
(duplicates provide 128 samples total)

Analyses
Reynolds: Culturable (bacteria, fungi); rFC (endotoxin assay); GC/MS/MS (3OHFA, Muramic Acid, Ergosterol);
Dowd (Texas): 4,5,4-Pyrosequencing bioaerosols (bacteria, fungi, archa): Subset (2 + 2) x 4 x 2 = 32
Kirychuck (Saskatchewan): Proteins, Other components: Subset (2 + 2) x 4 x 2 = 32

Aim 2: Human, In-vitro Lung Models
Subset (2 cattle feedlots + 2 dairies) x 4 seasons = 16 sample sets of aerosols
Analyses
Volckens – Improved Culture System
- IL-8, IL-6, TNF-α
Poole (NE) – Traditional Culture System
- IL-8, IL-6, TNF-α

Aim 3: Worker Exposure/Response (in vivo)
Subset (2 cattle feedlots + 2 dairies) x 4 seasons x 3 workers = 48 sample sets
Analyses
Pre-, Post-shift PFTs, Questionnaire
Personal, Inhalable Dust Exposures:
- rFC – Endotoxin assay
- GC/MS/MS – 3OHFA, Muramic Acid, Ergosterol
Siegel (NIOSH): Post-Nasal/Blood Cytokines – IL-8, IL-6, TNF-α + Sensitization studies

Hypothesis 1
Hypothesis 2a
Hypothesis 2b
Hypothesis 3a

Figure 3. Summary of Study Design

Figure 4. Drawing of the modified Electrostatic Aerosol In Vitro Exposure System (EAVES) to expose bronchial epithelial cells at air-liquid interface directly to airborne particulate matter. Cap is open to show interior and cell culture plate.

Figure 5. Mucociliary differentiation of primary human bronchial epithelial cells grown at air-liquid interface. Left panel shows hematoxylin and eosin-staining. Middle panel shows Alcian blue/periodic acid/Schiff’s reagents. Right panel show immunostaining for acetylated α-tubulin (red), MUC5AC (green), and DNA (blue). Black arrows indicate ciliated cells, blue arrows basal cells, yellow arrows mucin-producing cells, and red arrows show the presence of α-tubulin.
Tasks Remaining Year 01:

Calibrate and Field test IESL High Volume Sampler

Recruit Cattle Feedlots

Initiate Sample Collection and Analysis for Aim 1

Complete preliminary Studies for Aim 2

Revise Questionnaire and obtain IRB approval

Protocol and training on use of Rhino-probe
Significance

• Tractor rollover still the leading cause of agricultural fatalities
• Roll-over Protective Structures (ROPS) virtually eliminate tractor rollover fatalities
• Tractor ROPS (and Tractor ROPS designs) are not available for many agricultural tractors (or costly)
Need - A simple approach to develop ROPS mechanical drawings from tractor dimensions/mass

Input – Tractor dimensions and mass

Output – Mechanical drawings for ROPS construction

Project activities include:

• Review of ROPS design procedures, dimensions and standards
• Development of inputs and outputs for the model
• Develop tractor size (inputs) and ROPS size (outputs) database
• Develop ROPS design model and mechanical drawing generation (Excel/CAD)
• Three phase model verification, validation and accuracy assessment of ROPS design
• Laboratory testing of ROPS designs (SAE J2194)
• Implementation with ROPS mfg and local fabricators
Example - Input Tractor Dimensions

Example - Output ROPS Dimensions
Final Intervention Product

- Excel/CAD (freeware) combined program
- Input – tractor dimensions/mass
- Output – Mechanical drawing of ROPS design, parts list and material costs
- Manual/operators guide

For ROPS construction and testing/not certified as meeting SAE J2194 standard
Specific Aims

1. Evaluate leadership, guidance and management of the Administrative core related to progress on goals, and the integration of Internal and External Center stakeholders.

2. Evaluate Research Core progress on specific aims and translation potential

3. Evaluate Prevention/Intervention Core progress on specific aims and translation potential

Colorado State University
• Specific Aims continued

4. Evaluate Education/Translation Core progress on specific aims and translation potential

5. Evaluate methods and impact of the Outreach Program

6. Evaluate Center Pilot/Feasibility projects for capacity building and regional utility and response to emerging issues
HICAHS Advisory Board

**HICAHS**
Enhancing Dairy Worker Training

Teresa Tellechea, Ph.D.
David Douphrate, Ph.D.
Lauren Menger, graduate student
Extension Dairy Specialists
John Rosecrance, Ph.D.

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### Priorities

**Concerns rank ordered**
Pre 2009 Dairy Workshop | Post 2009 Dairy Workshop
---|---
Ergonomics | **Hired worker Training** | 4.00
**Hired worker training** | Sustainability | 4.00
Infectious Disease | Cow Care | 3.85
Sustainability | Infectious Disease | 3.23
Cow Care | Ergonomics | 2.85
### Priorities

#### Concerns rank ordered

<table>
<thead>
<tr>
<th>Pre 2011 Int. Dairy Workshop</th>
<th>Post 2011 Int. Dairy Workshop</th>
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<tbody>
<tr>
<td>Sustainability 3.56</td>
<td>Hired worker Training</td>
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<td>Hired worker Training 3.44</td>
<td>Sustainability 3.64</td>
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<tr>
<td>Cow Care 3.22</td>
<td>Cow Care 3.09</td>
</tr>
<tr>
<td>Infectious Disease 3.00</td>
<td>Ergonomics 2.73</td>
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<td>Ergonomics 2.67</td>
<td>Infectious Disease 2.00</td>
</tr>
</tbody>
</table>

#### Statements rank ordered

<table>
<thead>
<tr>
<th>Pre 2009 Dairy Workshop</th>
<th>Post 2009 Dairy Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker health can impact production efficiency 4.58</td>
<td>Worker health can impact production efficiency 4.92</td>
</tr>
<tr>
<td>More expensive to replace than maintain workers 4.58</td>
<td>Safety issues can improve production efficiency 4.85</td>
</tr>
<tr>
<td>Comprehensive approach is desirable 4.50</td>
<td>Comprehensive approach is desirable 4.77</td>
</tr>
<tr>
<td>Safety issues can improve production efficiency 4.37</td>
<td>More expensive to replace 4.46</td>
</tr>
<tr>
<td>Comprehensive approach could be cost effective 4.25</td>
<td>Comprehensive approach could be cost effective 4.31</td>
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