Table of Contents
HICAHS Advisory Board Meeting
December 8, 2010

Agenda .................................................................................................................. 2
Attendance List....................................................................................................... 3
Appendix A: HICAHS Plan and Priorities for 2011-2016 Presentation ....................... 4
Appendix B: Regional Needs Assessment Presentation ............................................. 9
Appendix C: Biologically Relevant Ag Aerosols Presentation .................................. 12
# HICAHS Advisory Board Meeting Agenda  
*December 8, 2010*  
9:30 AM – 2:30 PM – Lory Student Center, Long’s Peak Room  
Meeting called by Dr. Stephen Reynolds

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
<th>Discussion Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30-9:45</td>
<td>Welcome and Introductions</td>
<td>Steve Reynolds</td>
</tr>
<tr>
<td>9:45-10:20</td>
<td>HICAHS Plan and Priorities for 2011-2016*</td>
<td>Steve Reynolds</td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>Plans for Outreach</td>
<td>Lorann Stallones and Dennis Lamm</td>
</tr>
<tr>
<td>10:30-10:50</td>
<td>Break – Coffee and Pastries Feedback from Advisory Committee</td>
<td>Steve Reynolds</td>
</tr>
<tr>
<td>10:50-11:00</td>
<td>Regional Needs Assessment for Agricultural Health and Safety – a quick reprise*</td>
<td>Vicky Buchan and Louise Quijano</td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>Proposed HICAHS Projects 2012 – 2016:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pilot Projects</td>
<td>John Volckens</td>
</tr>
<tr>
<td></td>
<td>Pesticide Biomarkers and Reproductive Health</td>
<td>Bill Hanneman</td>
</tr>
<tr>
<td></td>
<td>Biologically Relevant Ag Aerosols*</td>
<td>Steve Reynolds and John Volckens</td>
</tr>
<tr>
<td></td>
<td>Antimicrobial Fates</td>
<td>Paul Gunderson</td>
</tr>
<tr>
<td></td>
<td>Dairy Ergonomics</td>
<td>Dave Douphrate and John Rosecrance</td>
</tr>
<tr>
<td></td>
<td>Translation/Network</td>
<td>John Rosecrance</td>
</tr>
<tr>
<td>12:00-1:00</td>
<td><em>Lunch</em></td>
<td></td>
</tr>
<tr>
<td>1:00-1:30</td>
<td>Proposed HICAHS Projects 2012 – 2016 (cont’d):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ROPS</td>
<td>Paul Ayers</td>
</tr>
<tr>
<td></td>
<td>Dairy HS Worker Training</td>
<td>John Rosecrance and Dave Douphrate</td>
</tr>
<tr>
<td></td>
<td>Dairy Worker Health</td>
<td>Cheryl Beseler and Lorann Stallones</td>
</tr>
<tr>
<td>1:30-2:15</td>
<td>Role of Advisory Committee Members Evaluation overview &amp; request for assistance</td>
<td>Steve Reynolds</td>
</tr>
<tr>
<td></td>
<td>Feedback from Advisory Committee</td>
<td>Vicky Buchan and Louise Quijano</td>
</tr>
<tr>
<td>2:15-2:30</td>
<td>Closing: Next Steps and Letters of Support</td>
<td>Steve Reynolds</td>
</tr>
</tbody>
</table>

*See Appendices for PowerPoint Presentation*
## Advisory Board Members

1. **Mitch Anderson**  
   **Title**: CEO, Ag Land, Inc.  
   **Email**: manderson@Aglandinc.com

2. **Kevin Dalsted**  
   **Title**: Assistant Director, Water Resources Institute  
   **Email**: kevin.dalsted@sdstate.edu

3. **Rachel Motteram**  
   **Title**: Director of Member Services, Colorado Livestock  
   **Email**: rmotteram@coloradolivestock.org

4. **Sherrie Nestor**  
   **Title**: Cargill, Inc.  
   **Email**: Sherrie_nestor@cargill.com

5. **Clyde Serna**  
   **Title**: Safety Consultant, Pinnacol Assurance  
   **Email**: Clyde.Serna@pinnacol.com

6. **Doug Steele**  
   **Title**: Director, Montana Extension Services  
   **Email**: dsteele@montana.edu

7. **J. Michael Taylor**  
   **Title**: Global Manager, Safety, Health, and Environment, HICAHS  
   **Email**: taylorjm@ldschurch.org

## HICAHS

8. **Cheryl Beseler**  
   **Title**: Researcher, Colorado State University  
   **Email**: cbeseler@lamar.colostate.edu

9. **Vicky Buchan**  
   **Title**: HICAHS Deputy Director (ending 2011)  
   **Email**: Buchan@cahs.colostate.edu

10. **Allison De Vries**  
    **Title**: HICAHS Coordinator  
    **Email**: Allison.DeVries@colostate.edu

11. **David Douphrake**  
    **Title**: HICAHS Researcher  
    **Email**: David.I.Douphrate@uth.tmc.edu

12. **Larry Goodridge**  
    **Title**: HICAHS Researcher  
    **Email**: Lawrence.Goodridge@colostate.edu

13. **Paul Gunderson**  
    **Title**: Director, Dakota Center for Technology Optimized  
    **Email**: Paul.d.gunderson.1@lrsc.nodak.edu

14. **Bill Hanneman**  
    **Title**: Colorado State University  
    **Email**: William.Hanneman@colostate.edu

15. **Louise Quijano**  
    **Title**: Colorado State University  
    **Email**: Louise.quijano@colostate.edu

16. **Steve Reynolds**  
    **Title**: HICAHS Director  
    **Email**: Stephen.reynolds@colostate.edu

17. **John Rosecrance**  
    **Title**: HICAHS Researcher  
    **Email**: John.rosecrance@colostate.edu

18. **Lorann Stallones**  
    **Title**: HICAHS Deputy Director (starting 2011)  
    **Email**: Lorann.Stallones@colostate.edu

19. **John Volckens**  
    **Title**: Assistant Professor, Colorado State University  
    **Email**: John.Volckens@colostate.edu
Appendix A: HICAHS Plan and Priorities for 2011-2016 Presentation
Overview/Focus

- While our Major Focus or Theme is *Industrialized Large Animal Production (Dairy, Beef Cattle)*,

- this proposal is also responsive to the unique and diverse needs of this region and reflects our historical strengths in the focus areas of:
  - Organic dusts – bioaerosols,
  - Ergonomics,
  - Pesticides,
  - Tractors and ATVs,
  - Education and training,
  - Research-to-practice through partnerships
  - Training of future Ag Health and Safety researchers/practitioners
  - Evaluation

Examples of HICAHS impact on policy and practice

- **CO Occupational Health Surveillance – Worksafe Colorado**
- **Pinnacol Assurance Brain Trust**
- **MAP ERC collaborations – WESTON etc.**
- **State of Wyoming – Governor’s Office**
- **RWJF Commission to Build a Healthier America**
  - *Healthy Work and Workplace* Field Hearings
- **NIOSH – NORA2/ NAS Reviews**
Dairy Health and Safety Network

Building on almost 10 years of work, including the HIGH PLAINS & MOUNTAIN REGION DAIRY HEALTH & SAFETY WORKSHOP - Fall 2009

We propose to:

Establish and develop a regional Dairy Network. Goals are 1) to facilitate synergy among the HICAHS projects (and other NIOSH Ag Centers- TX) and 2) to build sustainable capacity for OHS in the industry. Meet on an annual basis for further workshops, and website (or dedicated corner of our HICAHS website) could be used for resource sharing/dissemination and communication on a day to day basis.

Organization

- Administrative Core – Reynolds, Stallones
  - Pilots/Emerging Issues – Volckens, Reynolds
  - Outreach – Stallones, Lamm, Douphrate
  - Workshops/Conferences
  - Dairy HS Network
  - Internal Advisory/Leadership
  - External Advisory Board

- Evaluation – Quijano, Buchan

- Research Core

- Prevention/Intervention Core

- Education/Outreach Core

Research Core

- Atrazine and Reproductive Disorders, Cellular and Molecular Effects on Hypothalamic-Pituitary Gonadal Axis (R01)
  - Hanneman, Henry

- Molecular Characterization of Bioaerosols and Validation of a Novel Aerosol Sampler for Measuring Inflammatory Agents in Dairy and Cattle Feedlots (R01)
  - Reynolds, Volckens, Poole

- Analyses of Presence of Shed Tetracycline, It's Metabolites, and Other Structurally Related Transformation Products in High Plains Livestock Fecal Slurry, Field Soil Profiles, and Inhalable Airborne Field Dust (R21 – 3 years)
  - Gunderson, Burmester
Prevention/Intervention Core

- Changing Health Care Utilization Patterns among Dairy Workers (R21 – 2 Years)
  - Beseler, Stallones, Reynolds
- Dairy Interventions
  - Douphrate, Rosecrance
- Computer ROPS Design Model
  - Ayers

Education and Outreach Core

- Translation/Network (R18)
  - Rosecrance
- Dairy Health and Safety Worker Training
  - Douphrate, Rosecrance

Regional Advisors and Partners

- Extension
- Producer Organizations
  - Corn, Livestock, Wine, Wheat, Potato, Grain & Feed
- Workers Compensation Insurance
- Public Health/Academic/Government
  - CDPHE, OSHA, EPA, Utah ERC, NIEHS
- Health Providers/Migrant Health
  - Salud, Sunrise
- Churches, Community Organizations
  - LDS, Native American Coalition
Grant Schedule

- Dec. 6, 2010: Draft Proposals due to Peer Reviewers
- Dec. 6, 2010: Draft Detailed budgets due to Kathy Petersen
- Dec. 8, 2010: Subcontracts identified
- Dec. 8, 2010: Meeting with External Advisory Committee
- Dec. 22, 2010: Feedback from Peer Reviewers to PIs.
- Jan. 4, 2011: Letter of Intent due to NIOSH
- Jan. 7, 2011: Final budgets to Kathy Petersen
- Jan. 13, 2011: Final budgets to Sponsored Programs
- Jan. 14, 2011: Final Write-ups Due to Allison
- Jan. 14, 2011: Letter of Support Due to Allison
- Jan. 21, 2011: Finalize complete grant package
- Feb. 1, 2011: Fed Ex Grant to NIOSH
- Feb. 4, 2011: Grant due at NIOSH
Regional Needs Assessment

HICAHS

2008–2009

Methodology

› Design:
  ☰ Survey
    • Handout at Extension meetings
    • Telephone interview
› Sample:
  ☰ Extension
  ☰ Board

Research Questions

1. What are the health and safety topics of most concern to constituents?
2. What topics would constituents be interested in receiving information about?
3. What is the best way to reach target populations with that information?
4. What are the recommendations for future direction?
How concerned do you believe your constituents are about the following Health and Safety Problems?

### Advisory Board
- **Child Health And Safety**: 3.5
- **Machinery-related accidents**: 3.6
- **Back Injuries**: 3.7
- **Animal-related Injuries**: 3.8

### Cooperative Extension
- **Child Health And Safety**: 3.5
- **Machinery-related accidents**: 3.6
- **Back Injuries**: 3.7
- **ATV-related Injuries**: 3.8

---

If your constituents were interested in more information about the causes and prevention of agricultural related injuries and diseases, what topics would be of most interest?

<table>
<thead>
<tr>
<th>Topic</th>
<th>Advisory Board</th>
<th>Cooperative Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal-related Injuries</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Machinery-related accidents</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pesticide and Fertilizer-related illnesses</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Tractor Related Injuries / Respiratory Problems</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

---

If any of the following services were made available to your constituents which would be most useful?

### Advisory Board
- **Water Contamination Analysis**: 3.2
- **Tests for personal chemical exposure**: 3.3
- **Screening for Hearing Loss**: 3.4
- **Tests for Respiratory Problems**: 3.5

### Cooperative Extension
- **Tractor Safety Consultation**: 3.2
- **Pesticide contamination analysis**: 3.3
- **Tests for Respiratory Problems**: 3.4
The best methods for distributing or presenting the information?

<table>
<thead>
<tr>
<th></th>
<th>Advisory Board</th>
<th>Cooperative Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm / Ranch Publications</td>
<td>1</td>
<td>Cooperative Extension 1</td>
</tr>
<tr>
<td>Veterinarians</td>
<td>2</td>
<td>Websites 2</td>
</tr>
<tr>
<td>Farm / Ranch Org</td>
<td>3</td>
<td>Farm / Ranch Publications 3</td>
</tr>
<tr>
<td>Feed Chemical Equipment Dealers</td>
<td>4</td>
<td>Farm / Ranch Org 4</td>
</tr>
<tr>
<td>Cooperative Extension</td>
<td>5</td>
<td>Feed Chemical Equipment Dealers 5</td>
</tr>
<tr>
<td>Radio</td>
<td>6</td>
<td>Youth Org’s 6</td>
</tr>
</tbody>
</table>

Can you think of any other health or safety issues perhaps related to your constituency or region that concern you?

Future Directions for HICAHS?

- Work more closely with the agricultural associations to spread a safety message
- Linking with the research and ext personnel at land grant universities
- Develop new material on: tractor safety, animal handling, equipment, safety
- Training material for new employees in: equipment, milking parlors, livestock handling (English and Spanish)
- On site safety assessments
- Mock OSHA audits
- Exposure to toxins
Rationale

- Research into respiratory disease and exposures in agricultural settings has focused primarily on Gram-negative bacterial endotoxins.
- Recent studies show bioaerosols in swine and poultry environments dominated by diverse population of Gram positive bacteria. Our work has confirmed this in dairies.
- We also demonstrated that after depletion of endotoxin from dusts significant inflammatory potential retained in-vitro.
- Improved characterization of agricultural aerosols is needed to accurately explain the etiology of respiratory diseases and to help develop interventions that effectively reduce exposures.

Objectives

- To apply powerful new tools to more fully characterize bioaerosols in dairies and cattle feedlots and to compare three different approaches for studying the pro-inflammatory effects of bioaerosols in the lung: a traditional in vitro model using submersed cells, a novel in vitro model using an aerosol sampler incorporating primary human lung cells, and nasal lavage samples taken from workers in these environments.
Aim 1: Characterize the biologically active constituents of agricultural aerosols in two environments (cattle feedlot, dairy) over four seasons, focusing on Gram-positive bacteria and muramic acid.

- 454 Pyrosequencing – to characterize bacteria (16sRNA), fungi (18sRNA) - compare to culture-based methods.
- Also analyzed for endotoxin by rFC assay, 3-hydroxy fatty acids (3OHFA), muramic acid, and ergosterol using GC/MSMS.
- Subset of aerosol samples will be analyzed for proteins and other components using mass spectroscopy and gel electrophoresis.

![Dairy Milking Parlor bacteria/m3](image)

**Dairy Milking Parlor bacteria/m3**

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus</td>
<td>276</td>
</tr>
<tr>
<td>Clostridium</td>
<td>179</td>
</tr>
<tr>
<td>Pseudomonas</td>
<td>160</td>
</tr>
<tr>
<td>Turicibacter</td>
<td>48</td>
</tr>
<tr>
<td>Corynebacterium</td>
<td>40</td>
</tr>
<tr>
<td>Proteus</td>
<td>35</td>
</tr>
<tr>
<td>Akkermansia</td>
<td>35</td>
</tr>
<tr>
<td>Ruminococcus</td>
<td>30</td>
</tr>
<tr>
<td>Conchiformibius</td>
<td>23</td>
</tr>
<tr>
<td>Eubacterium</td>
<td>18</td>
</tr>
<tr>
<td>Finegoldia</td>
<td>13</td>
</tr>
<tr>
<td>Alcaligenes</td>
<td>13</td>
</tr>
<tr>
<td>Peptostreptococcus</td>
<td>12</td>
</tr>
<tr>
<td>Caldilinea</td>
<td>10</td>
</tr>
<tr>
<td>Klyvera</td>
<td>9</td>
</tr>
<tr>
<td>Rothia</td>
<td>9</td>
</tr>
<tr>
<td>Mycobacterium</td>
<td>8</td>
</tr>
<tr>
<td>Adlercreutzia</td>
<td>7</td>
</tr>
<tr>
<td>Mogibacterium</td>
<td>7</td>
</tr>
<tr>
<td>Microvirga</td>
<td>7</td>
</tr>
<tr>
<td>Bifidobacterium</td>
<td>7</td>
</tr>
</tbody>
</table>

Aim 2: Evaluate the performance of a novel aerosol sampler (incorporating normal human bronchial epithelial cells) in comparison to a traditional in vitro model of bioaerosol toxicity in the lung (incorporating the same cells grown in a submerged culture).

- Both systems will be exposed to aerosol constituents collected from dairy and cattle feedlots.
- Primary hypotheses:
  1) Both Gram-negative and Gram-positive bacterial constituents (endotoxin and muramic acid, respectively) will contribute substantially to the accumulation of pro-inflammatory markers (TNF-α, IL-8, IL-6) in both systems; 2) the levels of inflammatory markers measured by the two systems will be consistently comparable.
Aim 3: Evaluate the relevance of the aerosol sampler and submerged cell culture model to human health (immune response and cross-shift pulmonary function).

- Pulmonary function and immune response (nasal lavage) among workers will be compared to both the aerosol sampler and submerged cell culture systems.
- Worker’s personal exposures to inhalable dusts, bioaerosols, endotoxins, 3OHFA, muramic acid, and ergosterol will be measured.

Primary hypotheses:
1) the levels of pro-inflammatory markers (TNF-α, IL-8, IL-6) measured by the two systems will be consistently comparable with the levels of the same cytokines measured in nasal lavage of dairy and cattle feedlot workers.

Impact/Outcomes

This project addresses important knowledge gaps concerning agricultural dust lung disease etiology, and will provide important information that can be used to develop effective interventions (e.g. modification of livestock diet to change gut flora).

Consistent with the HICAHS focus on Industrialized Large-Animal Production and specifically addresses the NORA Strategic Goals:
- 5.0 Agricultural Health (5.2.4 Developing and improving methods for assessment of exposures);
- 2.0 Vulnerable Workers; and 3.0 Outreach/Partnerships.

Has broad implications for improving methods of evaluating respiratory disease pathology and effectively controlling exposures to inflammatory aerosols in a wide range of industries.