Agromedicine: One Medicine In Action

Julia Storm, MSPH
Agromedicine Information Extension Specialist
Department of Applied Ecology
College of Agriculture and Life Sciences, NC State University
Faculty Affiliate, NC Agromedicine Institute
Agromedicine Definition

• Broad, interdisciplinary

• Systematic and collaborative partnership of agricultural and medical professionals to promote occupational and environmental health and safety in agriculture through
  – research,
  – prevention/intervention,
  – education and outreach.
North Carolina Agromedicine Institute

Director: Robin Tutor-Marcom, MPH, OTR/L

North Carolina State University

East Carolina University

North Carolina A&T State University

Community and Agency Partners

University of North Carolina General Administration
Prevention/Intervention, Outreach, and Education

1. *Understanding the Agricultural Health Study*
2. Pesticide Related Illness & Health Issues (CE Course)
3. *Pesticides and Human Health Toolkit*
4. AgriSafe of NC and Certified Safe Farm
5. Risk Mitigation Measures
6. *Agricultural Medicine: Occupational and Environmental Health for Rural Health Professionals* (CE Course)
A prospective epidemiology study of 90,000 pesticide applicators & spouses in Iowa and North Carolina

Designed to assess a wide range of health effects of agricultural exposures in farmers and their families

Conducted by scientists from:
- National Cancer Institute (NCI)
- National Institute of Environmental Health Sciences (NIEHS)
- US Environmental Protection Agency (USEPA)
- National Institute for Occupational Safety and Health (NIOSH)
- Collaborators from academic and private research organizations
Agricultural Health Study
Participants

• Certified pesticide applicators and farmers’ spouses (89,658)
  – North Carolina:
    • Farmers (20,518)
    • Spouses (10,576)
  – Iowa:
    • Farmers (31,877)
    • Spouses (21,771)
    • Commercial applicators (4,916)

• Enrollment: 1993 - 1997
Agricultural Health Study

• Questionnaires (follow-up every 5 years):
  – Demographics
  – Diet and lifestyle factors
  – Medical history
  – Pesticide use, other agricultural exposures and practices
• Linkages to cancer, vital statistic, renal disease registries
• Pesticide exposure estimates validated through field monitoring
• Biological samples (cheek cells) collected for DNA
• Targeted sub-studies
  – collect additional exposure and clinical measures
  – investigate gene-environment interactions and disease mechanisms
Agricultural Health Study
Timeline

1993-1997  Recruit, survey participants
1998-2003  Field test pesticide exposure estimates; collect genetic sample
2004-2008  Assess disease rates, risk factors
2009-2013  Evaluate disease mechanisms
2013-      Continue risk & mechanism studies
Some Pesticide Exposure Findings

14% reported at least one “High Pesticide Exposure Event”

7% reported having sought medical care for pesticide exposure

Use of chemically-resistant gloves increased over a 10 year period (21-46%)
Some Cancer Findings

- Prostate cancer incidence higher among male applicators
- Skin melanoma incidence higher among female spouses
- Pesticides associated with increased cancer risk:
  - Alachlor: all lymphohematopoietic
  - Pendimethalin: lung, pancreas, rectal
  - Carbaryl: melanoma
  - Permethrin: myeloma
  - Metolachlor: lung
  - Trifluralin: colon
- Monoclonal gammopathy of undetermined significance (MGUS) prevalence 1.9x higher in male pesticide applicators compared to MN men
- Cancer among Livestock and Poultry Farmers
  - Raising poultry associated with lower risk of developing lung cancer
  - Raising poultry associated with increased risk of colon cancer, non-Hodgkin’s lymphoma
  - Raising sheep associated with increased risk of multiple myeloma
  - Performing veterinary services associated with increased risk of Hodgkin’s lymphoma
Some Respiratory Findings

- Pesticides: independent risk factors for wheeze, asthma
- Pesticides: associated with allergic (but not non-allergic) asthma among women and men
- Lifetime pesticide use: associated with chronic bronchitis among non-smoking farm women
- High pesticide exposure events: contribute to asthma and chronic bronchitis risk.
- Lung Health Study (ongoing) is collecting:
  - Clinical measures: asthma, other respiratory outcomes, allergy
  - Environmental measures: endotoxin, other biological agents
Agricultural Health Study
Outcomes of Interest

- Autoimmune
- Cancer
- Cardiovascular
- Cause of mortality
- Neurological
- Renal
- Reproductive
- Respiratory
- Thyroid

~180 publications

http://aghealth.nih.gov/
Understanding the Agricultural Health Study

- **For all audiences:** Illustrated Publication Series (75,000 distributed in 10 states)
  1-Overview
  2-Pesticide Exposure
  3-Health Findings

- **For Farmers:** (21,000)
  PowerPoint Presentation included in 2006-2008 NC Private Pesticide Applicator Recertification Curriculum

- **For Rural Health Providers:**
  Continuing Education Course
• Course content meets *National Pesticide Practice Skills Guidelines for Medical and Nursing Practice*
  – Recognition and Management of Pesticide Poisonings
  – Latest Scientific Findings in Chronic Health Effects
  – Case Studies
• Currently under revision; series of 1-hour modules
Pesticides and Farmworker Health Toolkit

- Apples
- Bell Peppers
- Blueberries
- Christmas Trees
- Cucumbers
- Grapes
- Landscape/Turf
- Strawberries
- Sweetpotatoes
- Tobacco
- Tomatoes

http://go.ncsu.edu/pesticide-toolkit
Kelley Donham, DVM, MPH
Agricultural Medicine

• Developed consensus curriculum for Agricultural Medicine course
• Research in lung health of hog confinement farmers and workers
• Commitment to agricultural community
Certified Safe Farm & AgriSafe

- On-Farm Safety Reviews
- Occupational Health Services by an AgriSafe Provider
- Education
- Incentives
Occupational and Wellness Health Screenings
PPE Technical Assistance
Research to Practice: Adapting & Implementing Iowa’s Model in North Carolina

Certified Safe Farm of North Carolina

North Carolina Agromedicine Institute
AgriSafe Network
NC Cooperative Extension

Promoting Certified Safe Farms in North Carolina through AgriSafe health services, on-farm safety reviews and education and outreach to farm families. Funded through the NC Tobacco Trust Fund Commission.
3-year Pilot Results
Johnston, Duplin, Sampson counties

- Outreach, Awareness, or Education 18,612
- Certified Safe Farm Reviews 120
- Gold Star Certified Safe Farms (comprehensive AgriSafe health review) 48 (40%)
- Farms with Approved Cost-Share 38 (32%)
- Average Cost-Share Payment $3,000
- AgriSafe Health Screenings (47 counties) 3800
- Health screenings with referrals 500
Sampson County Farm Cost-Share
Pesticide Safety Improvements

Before

After
Risk Mitigation Measures Project

2010

- Soil fumigant workgroup
- Strategies to assist farmers with implementation of EPA risk mitigation measures (RMM)
- Additional funding from NC Tobacco Trust Fund
Farmers receive respirators to comply with EPA

BY K.J. WILLIAMS
The Daily Reflector

Tobacco growers are getting ready to prepare their fields for planting, and this year that means getting themselves ready with fittings for respirators.

A change to the labeling used on some fumigants has farmers lining up for fittings for the full-face respirators, now necessary for growers if they experience any eye irritation while wearing a half-mask. The new Environmental Protection Agency requirement took effect Dec. 31.

James Corbett, 48, has farmed his whole life in Edgecombe County.

After passing the test on Friday at the Pitt County Agricultural Center, he was handed a respirator.

"This is your safety; the same thing as firefighters," he said. "It used to be like seatbelts. It was your choice. Now it's required."

Corbett likely will only use the mask occasionally when he fumigates his tobacco fields, he said.

He also grows row crops.

Fittings continue today starting at 8 a.m.

George Elderbaum is providing the testing as a contractor for the N.C. Agromedicine Institute, an organization that's a partner-ship between East Carolina University, N.C. State University and N.C. Agricultural & Technical State University.

"Every face is a little different," he said while testing the fit on the respirator worn by Beaufort County lifelong farmer Jimmy Hardison.

Using an analyzer machine with tubes hooked into Hardison's mask, Elderbaum took readings while giving Hardison in-

See FARMERS, B3

ERNEST WINTSTEAD tries on a respirator mask during a fitting session at the Cooperative Extension Service on Friday.
Percentage of individuals with weight and blood pressure concerns 1st Quarter 2011

Overweight/Obese
- Within Normal Limits: 28%
- Overweight: 36%
- Obese: 36%

Hypertensive
- Within Normal Limits: 36%
- Pre-HTN: 28%
- Stage 1 HTN: 16%
- Stage 2 HTN: 20%
Informing

EPA Policy Implementation
Risk Mitigation Measures II
DIY Training: Respirator Fit Test

• Fit Tests Required Annually
• Registration $75.00 ($150)
• Fit test kit $99.31 ($353)
• Earn 3.5 hours pesticide credit (A B G H I K L M N O T D X)
• Upcoming 2014 Dates:
  – January 14: Franklin County Extension
  – January 22 and 29: TBD
  – February 5 and 19: TBD
  – March 11 and 16: TBD
  – April 2 and 8: TBD
• Contact Barbara Gallagher, RN
  AgriSafe Nurse Coordinator
  717-873-5656; gallagherb@ecu.edu
Agricultural Medicine: Occupational and Environmental Health for Rural Health Professionals

• Session I:
  January 30-31, 2014
  Greenville, NC

• Sessions II-VII:
  February – March, 2014
  Via the web

• Session VIII:
  March 27-28, 2014
  Greenville, NC

ECU Continuing Studies: 252.328.9198, 800.767.9111
Get involved in Agromedicine!

NC Agromedicine Institute
252.744.1008
www.ncagromedicine.org