OCCUPATIONAL LUNG/ CARDIOVASCULAR DISEASE RISKS IN NAVAJO COAL MINERS

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Disclosures

- Principal Investigator: Black Lung Clinics Program *(Health Resources and Services Administration)*

- Co-investigator: Clarifying Distribution, Trends, and Determinants of Adverse Health in United States Miners: Exploration and Integration of Existing Data Systems and Clinical Materials *(Alpha Foundation for the Improvement of Mine Safety and Health)*
Overview

- Review personal and mining-related occupational risk factors for cardiovascular disease
- Review spectrum of lung diseases from exposure to coal mine dust
- Share data on rates of cardiovascular and work-related lung disease in Navajo coal miners participating in the Miners Clinic
- Discuss implications for care and prevention
Cardiovascular disease (CVD)

- Leading cause of death in the US.
- > 81 million Americans have CVD, at an estimated cost of $503 billion in 2010.
- Multiple CVD risk factors (personal and occupational).
- Estimated proportion of CVD associated with work-related factors ranges from 15 – 35%.
Personal risk factors for CVD

- Smoking
- High lipids/cholesterol
- Physical inactivity
- Diet/alcohol
- Hypertension
- Obesity
- Diabetes mellitus
- Family history of heart disease
Mining-related occupational risk factors for CVD

- Noise
- Particulates (PM 2.5)
- Stress (high demand/low control; shift work; long hours)
- Vibration
- Temperature extremes
- Carbon monoxide
- Some chemicals and metals (lead, solvents, carbon disulfide, nitrates)
Workplace factors contribute to obesity, smoking, alcohol use, and lack of exercise as well as work-family stress and conflict.
Morbidity & disability among workers ≥18 years in the Mining sector, 1997-2007

- Blue collar workers less likely to have health insurance, health screening, health prevention information;
- More likely to be obese, less likely to exercise, more likely to report risky behaviors (smoking, drinking).

[NIOSH, 2012]
Heart disease prevalence is high in the mining sector.
High prevalence of hypertension is in the mining sector (23.2%).
Coal miners are at risk for work-related lung disease.

Lung diseases from exposure to coal mine dust:
- Black lung (CWP)
- Silicosis
- Emphysema
- Industrial bronchitis
- Diffuse interstitial fibrosis
Miners Clinic Navajo coal miners 5 year medical screening program in Page, AZ
What do we know about rates of cardiovascular and lung disease in participating Navajo coal miners?
Most of our Navajo patients are surface coal miners.
Surface coal mining
Characteristics of 231 Navajo miners

- **Average age:** 61.3 (10.3) years
- **93% men**
- **Ever smoker:** 12.6% (compared to 48% in MCC patients total)
- **Average years worked as a miner:** 20.8 yrs (13.4)
Respiratory symptoms are common.

Symptoms Reported by Navajo (N=231)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percent of Total</th>
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<tbody>
<tr>
<td>Cough</td>
<td>60%</td>
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<tr>
<td>Phlegm</td>
<td>10%</td>
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<tr>
<td>Wheeze</td>
<td>40%</td>
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<tr>
<td>Shortness of Breath</td>
<td>70%</td>
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</tbody>
</table>
Abnormal chest x-ray profusion score on B reading: **24 (10%)**
- 1/0 = 10
- 1/1 = 9
- 1/2 = 5

Benefits counseling and assistance with DOL Black Lung claims
Emphysema in 4-9% of participating Navajo coal miners

- COPD (LLN): 8 (4%)
  - 7 never smokers
- COPD (GOLD): 17 (8.6%)
  - 12 never smokers
Hypertension in coal miners

High blood pressure

- 38% in Navajo coal miners
- 43% in other coal miners

Consequences of untreated hypertension

- 4 times as likely to die of stroke
- 3 times as likely to die of heart disease
- Chronic kidney disease
High rates of treatable and preventable CV diseases risk factors in Navajo coal miners.

1. Obesity (BMI $\geq$ 30): 41%
2. Obstructive sleep apnea symptoms: 17%
   1. Poor concentration/inattention
   2. Errors and accidents (2-3x MVA rates)
3. High blood pressure: 38%
4. Current smoking: 7%
Strategies used in the Miners Clinic to manage medical conditions identified.

- Immediate **face-to-face discussion** and counseling with the patient by the clinic MD
- Urgent finds and recommendations – **immediate written results** for patient to give to provider
- Written **health education materials** provided at the clinic visit
- **Calls to local providers** from MCC MDs to discuss referral and management of more immediate problems
- **Results letters** to patients, with copy to provider if available and with patient’s written permission
- **Follow up phone calls** from case manager
- **Tracking** of calls and results in the BLCP database
Implications and future directions

- Assure that miners with lung and heart disease get medical and preventive care and follow up (work with local MDs, pulmonary rehab, vaccinations, medications, supplemental oxygen)
- Assure that miners with work-related lung disease get the Black Lung benefits they deserve
- Support efforts to limit coal mine dust exposure
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Questions?