Respirator Medical Evaluation Practices
A Survey of Michigan Occupational and Environmental Health Providers

MOEMA Foundation

Nicole Desautels
Wayne State University School of Medicine
M.D. Candidate, Class of 2018

Joy R. Burrell
Michigan State University College of Human Medicine
M.D. Candidate, Class of 2018

Joginder Singh
Michigan State University College of Human Medicine
M.D. Candidate, Class of 2018
Introduction:
Physiologic effects of respirator use

● Respirator type determines the physiological effects.
  ○ SCBA has the most significant physiological effects

● Effects of wearing respirators can include:
  ○ increased airway resistance
  ○ increased airway dead space, leads to increased work of breathing
  ○ increased cardiac work
  ○ other possible considerations
Purpose of Survey

- **Gather information** about variation in clinical practices of OEM Providers in MI for respirator medical examination.

- **Compare** clinical practices to existing guidelines.

- **Gain insight** into clinical decision making process for the respirator medical clearance.
Methods

- A 15 item online survey via SurveyMonkey.
- Questions based on review of OSHA regulations, relevant literature, and policies of two corporations.
Methods (Contd.)

- Link sent via email to members of Michigan Occupational and Environmental Medical Association (MOEMA)
- List generated from membership of MOEMA
  - Initial email invitation sent to 121 individuals
  - Second email reminder sent to 107 individuals
  - Phone call reminder to 88 individuals
    - no phone call reminder to retired members, students, missing phone number: 19 individuals
    - personalized email follow-up if not reached by phone
Results

- 61 responses at close of survey 08/07/15
  - overall response rate: 50%
  - response rate among members practicing clinical medicine: 56%
Q1: Do you do respirator fitness examinations?

Answered: 60  Skipped: 1

Yes: 66.67%  40
No: 33.33%  20

Total: 60
Q2: If YES, please estimate how many respirator fitness exams you perform per year:

Answered: 41    Skipped: 20
As we review survey responses...

- results of survey
- regulations
- recommendations
Medical evaluation for respirator clearance: initial evaluation
Medical evaluation for respirator clearance: initial evaluation

Survey Question 3:

“For the initial exam, what is the basic evaluation you provide all workers for respirator fitness evaluation? (Check all that apply)
Q3: For the initial exam, what is the basic evaluation you provide all workers for respirator fitness evaluation? (Check all that apply)

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Answered</th>
<th>Skipped</th>
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<tbody>
<tr>
<td>Respirator Questionnaire</td>
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<td>Respirator Questionnaire</td>
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<td>Physical exam</td>
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<td>Spirometry</td>
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<td>Additional breathing test</td>
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<td>Chest x-ray</td>
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<tr>
<td>Other (please specify)</td>
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</table>

Answered: 40   Skipped: 21
Medical evaluation for respirator clearance: initial evaluation

Regulations:
● administer OSHA questionnaire

● follow up on positive answers in OSHA questionnaire

● does not mandate a physical exam
Recommendations: (ATS, 1996)
- Use clinical judgement to determine if physical exam needed.
- Evaluate pulse and BP for jobs requiring exertion
- Spirometry
  - “may be useful.. and should be considered” in those older than 45 with strenuous exertion, who wear SCBA
  - “strongly considered” if EE is older than 55 or if EE reports respiratory symptoms with exertion at work
Stratifying evaluations by risk factors of worker
Survey Question 4:

Are there certain groups of workers for whom you do more extensive testing?
Q4: Are there certain groups of workers who you do more extensive testing?

Answered: 39    Skipped: 22

Answer Choices | Responses
--- | ---
Yes | 48.72% | 19
No  | 51.28% | 20
Total | 100% | 39
Stratifying evaluations by risk factors of worker

Regulations:

- NOT required by regulation.
Stratifying evaluations by risk factors of worker

Recommendations:

- Medical Examination for SCBA users and older workers, optional for others (ATS Guidelines, 1996)
- Exercise testing for workers in thermal stress and in high exertion (ATS Guidelines, 1996)
- PFTs for firefighters and asbestos workers (Szeinuk, 2000)
Factors that prompt further evaluation before clearance granted
Survey Question 5:

“For which findings upon initial exam would you do further follow-up evaluation before medical clearance would be granted? (Check all that apply)

A positive answer in the questionnaire for....”
Q5: For which findings upon initial exam would you do further follow-up evaluation before medical clearance would be granted? (Check all that apply)

A positive answer in the questionnaire for....

Answered: 38    Skipped: 23
Factors that prompt further evaluation before clearance granted

Regulations:

- A positive answer on any of the medical history questions of OSHA questionnaire requires follow-up at discretion of health provider.
- If physical examination is used for medical evaluation, then further history or referral if more testing or information is needed.
Factors that prompt further evaluation before clearance granted

Recommendations:
● consistent with regulations
● further evaluation at discretion of provider, with consideration to patient history and testing results.
Tests utilized in respirator clearance evaluation
Tests utilized in respirator clearance evaluation

Survey Question 6:

“Which of the following tests listed below have you used for follow-up evaluation in the past year? (Check all that apply)”
Q6: Which of the following tests listed below have you used for follow-up evaluation in the past year? (Check all that apply)

Answered: 38   Skipped: 23

- Spirometry
- Physical Exam
- Chest x-ray
- EKG
- CT scan of chest
- Referral to a specialist
- Review of medical records
- Other breathing test...
- Other (please specify)
Tests utilized in respirator medical evaluation

Regulations:

- No specific regulations by OSHA.
Tests utilized in respirator medical evaluation

Recommendations:

- **Chest X-ray** (Szeinuk 2000)
  - if abnormality detected in questionnaire/examination
  - can use in eval if CXR performed for other purposes

- **EKG** (ATS, 1996)
  - useful if clinically indicated, by themselves are not predictive of risk from respirator use during exertion

- **Exercise Tolerance Testing** (ATS, 1996)
  - primarily in evaluations for workers using SCBA or re-breather type respirators
Factors utilized in denying medical clearance to wear respirator
Factors utilized in denying medical clearance to wear respirator

Survey Question 7:

“Positive answer to any of the following questionnaire answers (check all that apply)”
Q7: Positive answer to any of the following questionnaire answers (check all that apply)

Answered: 26    Skipped: 35
Factors utilized in denying medical clearance to wear respirator

Survey Question 11:

“Additionally, which of the following do you use to define a person as not "fit" to wear a respirator? (Check all that apply)”
Q11: Additionally, which of the following do you use to define a person as not "fit" to wear a respirator? (Check all that apply)

Answered: 34  Skipped: 27

- Abnormal radiographic...
- Abnormal EKG
- Do Not Use
- Other (please specify)
Factors utilized in denying medical clearance to wear respirator

Regulations:

● No Specific OSHA regulations.
Factors utilized in denying medical clearance to wear respirator

Recommendations:

- Large study (N=5,569), only 0.2% denied clearance (Pappas 1999)
- 1.1% worked received restrictions
- Pregnancy most common cause for denial
- Lung disease, Cardiovascular disease and Claustrophobia most common reasons for restrictions
Use of spirometry in respirator medical evaluation
Use of spirometry in respirator medical evaluation

Survey Question 8:

“Specific Value of FEV1 you use to classify someone is ‘not fit’”
Q8: Specific Value of FEV1 you use to classify someone is "not fit"

Answered: 38    Skipped: 23
Use of spirometry in respirator medical evaluation

Survey Question 9:

“Specific Value of FVC you use to classify someone is ‘not fit’”
Q9: Specific value of FVC you use to classify someone as "not fit"

Answered: 37    Skipped: 24
Use of spirometry in respirator medical evaluation

Survey Question 10:

“Are the FEV1 and/or FVC "pass" values you use flexible?”
Q10: Are the FEV1 and/or FVC "pass" values you use flexible?

Answered: 38    Skipped: 23
Use of spirometry in respirator medical evaluation

Regulations:
● OSHA does not directly address spirometry
● Use of spirometry is dependent on clinician and individual protocols
Use of spirometry in respirator medical evaluation

Recommendations:
ATS statements (1996):

- pulmonary function testing has not been demonstrated to provide sensitive or specific indicators for respirator tolerance or safety
- states that spirometry may be helpful in assessing a worker's general fitness for duty.
- only use PFT to help in decision if patient has lung disease

Szeinuk review (2000):

- Firefighters and Asbestos workers require PFT during respirator certification
Recommendations (continued):

- **ATS Guidelines:**
  - “in the absence of other factors limiting the worker’s overall ability to tolerate demands of the job and the respiratory protective equipment, **FEV, of 60% or greater** of the predicted value suggests that a trial of respirator use is allowable. For light duty work using low resistance respirators, **even lower levels of function may not be disqualifying, but a more thorough clinical evaluation should be done.**“

- **Szeinuk Clinical Practice Review**
  - Decreased FEV1/FVC actual (measured) ratio (<70%) plus an FEV1 of <50% of predicted; or Normal FEV1/FVC actual (measured) ratio (70%) plus an FVC of <50% of predicted
Frequency of clearance for respirator use
Survey Question 12:

“For how long do you approve the worker? / How often do you have the worker reevaluated?”
Q12: For how long do you approve the worker? / How often do you have the worker reevaluated?

Answered: 37  Skipped: 24

- majority of providers approving for 1 year
- some vary by age
Q13: If it varies, what is the minimum time period before they must be reevaluated?

Answered: 20   Skipped: 41
Q14: If it varies, what is the maximum time period before they must be reevaluated?

Answered: 21    Skipped: 40
Survey Question 15:

“For the periodic exam, what is the basic evaluation you require all workers receive for respirator fitness re-evaluation? (Check all that apply)”
Q15: For the periodic exam, what is the basic evaluation you require all workers receive for respirator fitness re-evaluation? (Check all that apply)

Answered: 37    Skipped: 24
Frequency of clearance for respirator use

Regulations:

- There is no annual or periodic requirement for medical reevaluation.
- OSHA standard - 4 conditions that trigger medical reevaluation (1910.134(e)(7)):
  - employee reports signs or symptoms related to the ability to wear a respirator
  - PLHCP, administrator or supervisor determine it is necessary
  - information from the respiratory protection program indicates a need for reevaluation
  - change in workplace conditions substantially increases the physiological burden placed on the employee
Frequency of clearance for respirator use

Recommendations:

- **ATS Guidelines**: Younger workers, without significant medical problems, reevaluation each 2 yr may be adequate. For older workers or for use of SCBA, yearly reevaluation recommended.

- **2013 review article** (Belafsky 2013): several sources recommend every 5 years if under 35, biennially (or every 3 years) if 35-45, and annually if over 45.

- **NFPA**: Annual respirator screening for Firefighters. (Belafsky 2013)
Limitations

• 56% response rate so question of **generalizability** to all occupational medicine practitioners in Michigan

• **Self-Report** – no review of medical records to validate responses
Summary

• 67% of practitioners do respirator exams, 49% more than 200 per year.
• May have potential for future growth
  46% employers did not evaluate employees medical fitness to wear respirator (2001 NIOSH Survey, in Symial 2007)
• 63-75% doing more testing than required by OSHA.
• Criteria for spirometry varies >50% to >70%.
• Wide variation in how frequent periodic exam performed.
Conclusion

● standardized method of stratifying patients by risk
  ○ use of cardiovascular risk assessments

● more research needed

● more specific regulations may be warranted to address workers use of different respirator types


