

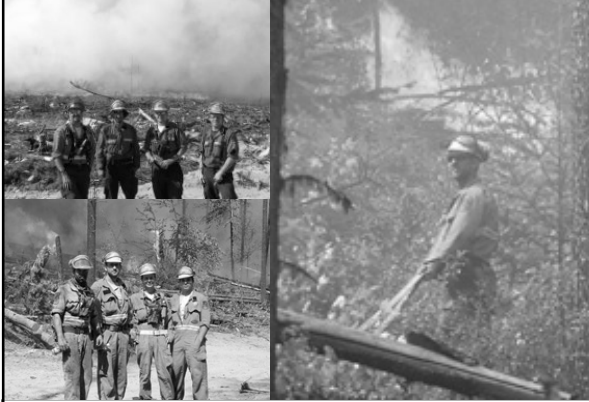
Northern Ontario School of Medicine

## Increased Red Blood Cell Indices & Platelet Numbers After Exposure to Forest Fires:


*Studies in Forest Fire Fighters with the Ontario Ministry of Natural Resources*

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### ~~Forest Fire Fighter Study: Pilot Study Design~~ what actually happened

- Recruit Ontario Fire Rangers
  - n=10-12 *but only 9 came back*
  - M & F 5M, 5F
- 2 time points measured
  - May 2006 (early in fire season, prior to any fire exposure)
  - ~~Within 24 hours of return from a forest fire~~ *with minimal fire exposure at the end of the fire season*


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### Forest Fire Fighter Study: Inclusion/Exclusion Criteria

- Inclusion Criteria:
  - 2006 Ontario Fire Ranger
  - FEV1 >70% predicted
- Exclusion Criteria:
  - Use of immunomodulatory medications
  - Chronic respiratory, cardiovascular, immune-inflammatory disease


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### Forest Fire Fighter Study: Measurements

- Lung function (FEV1, FVC)
- Blood
  - CBC, ESR, CRP
- Induced Sputum
  - Inhalation of nebulized saline (3, 4, 5%, 7 minutes each)
  - Sample processed according to Popov *et al.*
- Post-season fire exposure questionnaire

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### Forest Fire Fighter Study: Subject Characteristics at Entry

- N=10 (50%F)
- Mean age: 27.7y (19-44)
- Previous experience as OFR: 6.7y (2-13)
- FEV1: mean 98.1% predicted (72-200)
- Smoking history: 7 non- or ex-smokers; 3 current smokers (2-5 cigarettes/day)
- 5/10 had exposure to forest fire smoke within 4 weeks; none had exposure within 2 weeks
  - 6/10 reported recent exposure to campfire smoke

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### Forest Fire Fighter Study: Subjects Post-Season

- N=9
  - 1 M lost to follow-up
- Mean time since last exposure to fire: 8.81 d (0.75-22.6)

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### Forest Fire Fighter Study: Lung Function

FEV1

Percent Change in FEV1  
pre vs. post season

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### Forest Fire Fighter Study: Red Blood Cell Findings

red blood cells

hemoglobin

hematocrit

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### Forest Fire Fighter Study: Red Blood Cell Findings

MCV

MCH

MCHC

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### Forest Fire Fighter Study: Systemic Inflammation

CRP

platelets


ESR

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### Forest Fire Fighter Study: Sputum Cells

sputum epithelial cells

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### **Forest Fire Fighter Study:** **Conclusions**

- no significant change in lung function across the season
  - If present, effects reversible in this time frame
- Development of a mild secondary polycythemia
  - CO exposure, impaired gas exchange?
- Significant increase in platelet numbers
  - Evidence of systemic inflammatory response
- Significant increase in sputum epithelial cells
  - Evidence of lung damage

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### **Forest Fire Fighter Study:** **2007 Study**








- Enrolled 10 OFR for the 2007 season
- 4 visits spaced throughout the summer
- Additional measurements:
  - Carboxyhemoglobin, hsCRP, PT-INR, EPO, cytokines
- Prescribed burn study possible in Autumn

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### **The Team**

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