The Future of Smoke Management:
-Wildland Fire Air Quality Response Program

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FOREST SERVICE
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DEPARTMENT OF AGRICULTURE

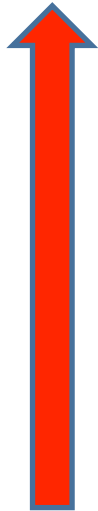# An Evolving Interagency Program-
Wildfire Air Quality Impacts and Prescribed Fire Smoke Management

- One in three households has someone with respiratory issues: child with asthma, COPD, emphysema, etc. 26 million have asthma in US.
- Address sensitive groups at risk: people with asthma, older adults and those of low income. Science: pregnant women, diabetics.
- Public air quality warnings effective and at-risk public responds in kind
- **NO** particulate matter is healthy: Designations & SIPs
- Ozone EPA Science Analysis Effects 60ppb and below
- Medical costs: $8 to $80/day/person exposure to wildfire smoke
- Smoke impacts to public are longer at higher levels
- Wildfire Seasons longer and hotter
- Under the Clean Air Act, States obligated to respond and protect the public from high levels of air pollution
- Land managers know more of what the fire will do in terms of: fire spread, growth, intensity, burnouts, fuels, consumption, emissions, weather, duration,…
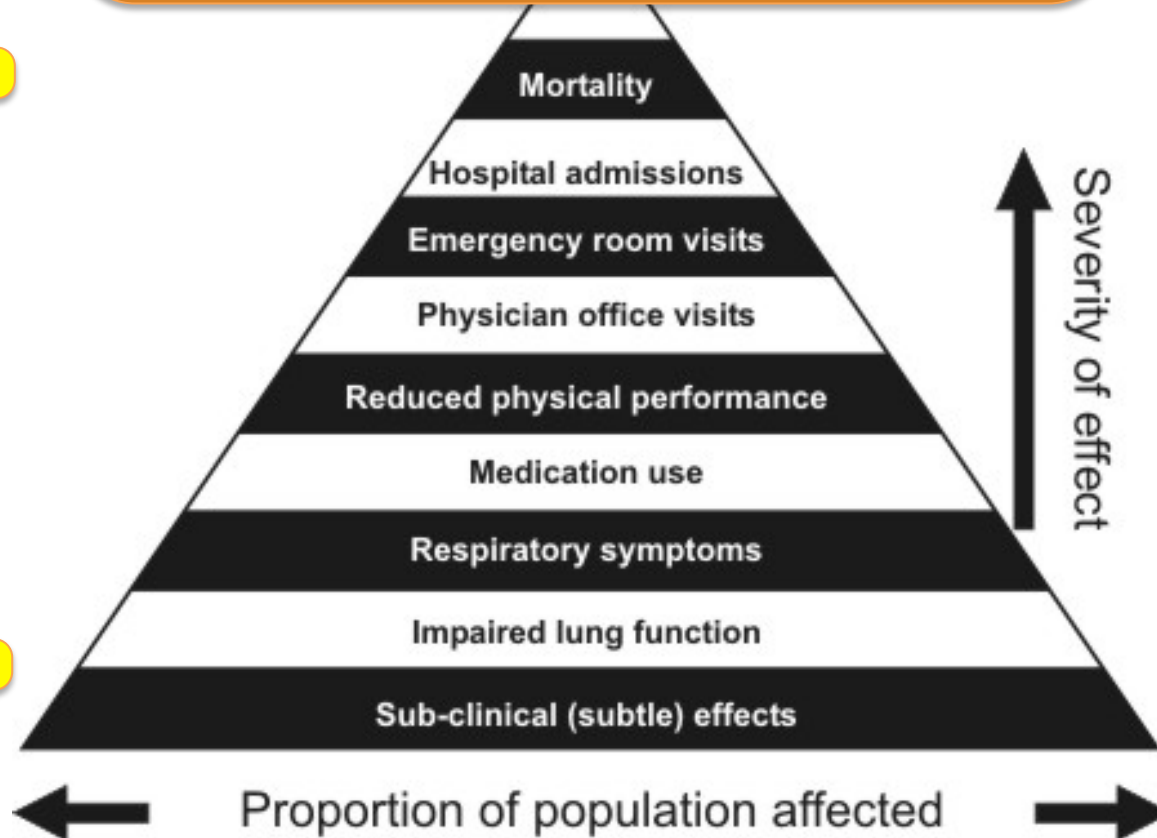- Land managers using risk assessment to manage wildfires now.

Transition from public health to public safety impacts

Safety

Health

Mortality

Hospital admissions

Emergency room visits

Physician office visits

Reduced physical performance

Medication use

Respiratory symptoms

Impaired lung function

Sub-clinical (subtle) effects
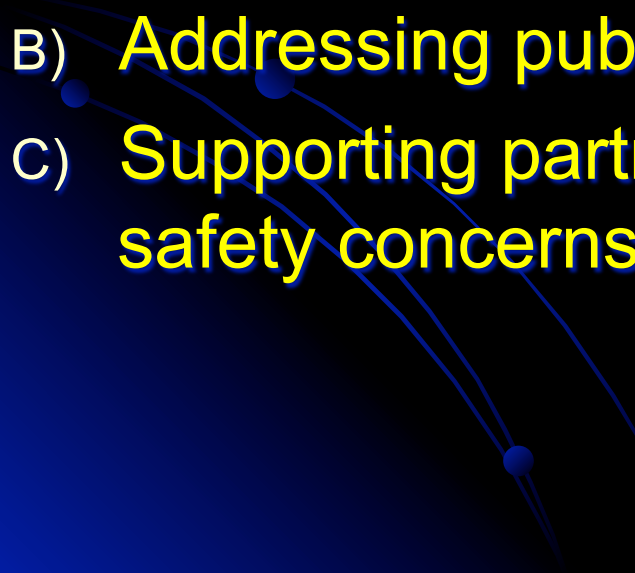
Severity of effect

Proportion of population affected

Wildland Fire Air Quality Response Program

Focus for wildland fires through use of Air Resource Advisors:

1) Smoke impacts to public health and safety
2) Transportation safety (roads & aviation for public & personnel)
3) Fire personnel smoke exposure (on-fireline, ICP, Base Camp)

A) Improving how Air Quality considered on incidents and decisions (risks, exposure, options)
B) Addressing public and fire personnel health & safety
C) Supporting partners addressing public health and safety concerns

Methods-Monitoring, Modeling, Messaging, Coordination

- **Monitoring** – Deployment, Interpretation and Dissemination
  - National Cache of 20 E-SAMPLERs (NFES 5840)
  - EPA contributing 4 E-BAMs –being retrofitted
  - Data via GOES Satellite linkage
  - Data online real-time @ WRCC, EPA AirNow Tech FY15 Public Wildfire Smoke page on AIRNOW – <u>PM2.5 Only</u>

- **Modeling**–Provided by PNW AirFire Team
- Operational incident / regional / national forecasting of air quality impacts
  - BlueSky Playground
  - Fine-scale (1 km) NWS Fire Behavior Grids
  - National scale meteorology and climatology
  - Complexity Analysis tool under development
  - Monitoring Analysis Tool

Wildland Fire Air Quality Response Program

- Messaging – Conveyed via ARA's
  - Cohesive message (State/District Health & Air Quality Agencies, National Weather Service)
  - Transportation Safety Alerts and Warnings
  - Incident public meetings
  - State Smoke Blogs
  - Cooperation with State Emergency Response Agencies
- Stakeholder and Partner Collaboration
  - Planning & communication of fire strategy & tactics translated into smoke impacts and response
  - State Emergency Response Plans for Wildfire Smoke
  - EPA , CDC collaborative efforts
  - Coordinate Interagency Program and ARA cadre
    - Agreements, training, position development

Wildland Fire Air Quality Response Program

- ## National Effort
  - Cadre of Air Resource Advisors (THSP-ARA) Developed
  - Two Training Sessions Held – Trainee Program
  - Training will be held in Spring 2015
  - Range of Skills in 24 ARA, 12 trainees
  - FS, BLM, FWS, NPS, NRCS, AD-Contractor, EPA?, States: GA, NC, FL
  - Coordination/dispatch by Program Manager
  - Dispatches: 2011- handful, 2012-13, 2013-25, 2014-39
  - Requests: IC, other on IMT, FS Regions, National Forests, National Parks, State Forestry?
  - Assignments: Incident Level, Forest, State Level Program Efforts, Agency Admins. ,Area Command , GACC, Regional Wildfire Decision Support Centers

Wildland Fire Air Quality Response Program

- **Wildfire Challenges:**
  - Thresholds for warnings and evacuation
    - Federal/state/districts can have different thresholds
    - No defined evacuation threshold (level, duration, extant)
    - Roles of who issues warnings, when, process, confidence in data
  - PM2.5 Limited Monitoring (small #, device type, placement)
    - Other pollutants: monitors, models, display
    - Other pollutants: combined exposure/thresholds
    - Visibility as a surrogate for monitoring (limits, 3-tiers)
    - Next Generation (non-EPA reference method) Air Monitors and scalable public networks
    - Some states only accept certain types of data
  - Program awareness issues and acceptance (ARAs)
    - Incident Management Teams
    - Agency Administrators
    - Stakeholders/Partners

Wildfire Challenges continued…

- Display of monitored data
  - National, state, tribal, local district
  - Thresholds and duration (1-hr, 3-hr, 24-hr, NowCast)
- Communications
  - Who speaks: authority, responsibility
  - Methods: On-grid (Inciweb, PIO, blogs, Facebook, etc.)
  - Off-grid: rural communities and tribal areas
  - Federal systems, Interagency, Health vs Air Regulators
    - Timing and frequency: weekends, holidays, early in a fire vs after control but smoke is still an issue
  - State Emergency Response Protocols (pre-season)
- Smoke Alerts
  - Shelter in place – criteria for safely staying inside a structure
  - Air Quality Shelters – criteria, access
  - N95 masks – who, when, providers and messages
  - Role and information for medical providers
  - Kids and schools…

Wildfire Challenges continued…

- Program Management Challenges
  - ARA Training and qualifications
  - On-Site expectations and approach standardization
  - Established standard toolset and equipment
  - Interagency pool of ARA's
  - How to address Personnel Exposure Issues
    - 2014 WFSTAR Video – Smoke: Knowing the Risks
      - https://www.youtube.com/watch?v=0gqTbJSQL_U
    - Draft Wildland Fire Personnel Smoke Exposure Guidebook from NWCG Smoke Committee
      - http://www.nifc.gov/wfstar/modules/medical/smoke2014/smoke_exposure_guidebook.pdf
    - CO exposure and other pollutants
    - Monitoring in camps
  - Long Term Program Sustainability, Funding and Growth

Prescribed Fire Challenges:

- New EPA PM2.5 Nonattainment Areas based on 2012 Annual Standard
- New EPA Ozone Standard coming
  - Many new Nonattainment Areas where we burn
- Use of smoke management approaches
  - Smoke Management Programs
  - Basic Smoke Management Practices
- Climate Change and GHG emissions
  - Anthropogenic or Natural
  - Role of fire in carbon security and ecosystem health/resilience