The Potential Role of Industrial Hygienists and the Health Hazard Evaluation (HHE) Program at NIOSH in Bioaerosol Exposure Assessments

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Outline

- Description of Industrial Hygiene
- Overview of Health Hazard Evaluation Program
- Examples of Health Hazard Evaluations Dealing with Bioaerosols
- Role in Identifying Potential Bioaerosol Exposures

INDUSTRIAL HYGIENE

Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Industrial Hygiene

- Part science, part art
- Industrial hygiene is the application of scientific principles in the workplace to prevent the development of occupational disease or injury
- Requires knowledge of chemistry, physics, anatomy, physiology, mathematics

Typical Industrial Hygiene Roles

- Conducting scientific research to provide data on possible harmful conditions in the workplace
- Developing techniques to anticipate and control potentially dangerous situations in the workplace
- Advising and participating in the development of government regulations
- Investigating and examining the workplace for hazards and potential dangers
- Ensuring that workers are properly trained and following health and safety procedures
- Making recommendations on improving the health and safety of workers

Professional Organization

- American Board of Industrial Hygiene (ABIH), www.abih.org, independent organization that administers certification programs for industrial hygiene professionals
  - CIH, Certified Industrial Hygienist
  - Examination
  - Requires maintenance of certification

What Credentials are required to become a Certified Industrial Hygienist?

- Possess a bachelor's degree in biology, chemistry, physics, engineering, industrial hygiene or safety from a regional accredited college or university
- Coursework in industrial hygiene, toxicology, measurements and controls
- 4 years minimum of IH experience
- Professional references
- Pass examination given by ABIH

Code of Ethics established by ABIH

- Priority to protect health and safety of people
- Accept responsibility for their actions
- Practice with fairness and honesty
- See http://www.abih.org/downloads/ABIHCodeofEthics.pdf

Industrial Hygiene

- In summary, the scope of industrial hygiene is:
  - Anticipation,
  - Recognition,
  - Evaluation, and
  - Control of Hazards or Agents

NIOSH AND THE HHE PROGRAM

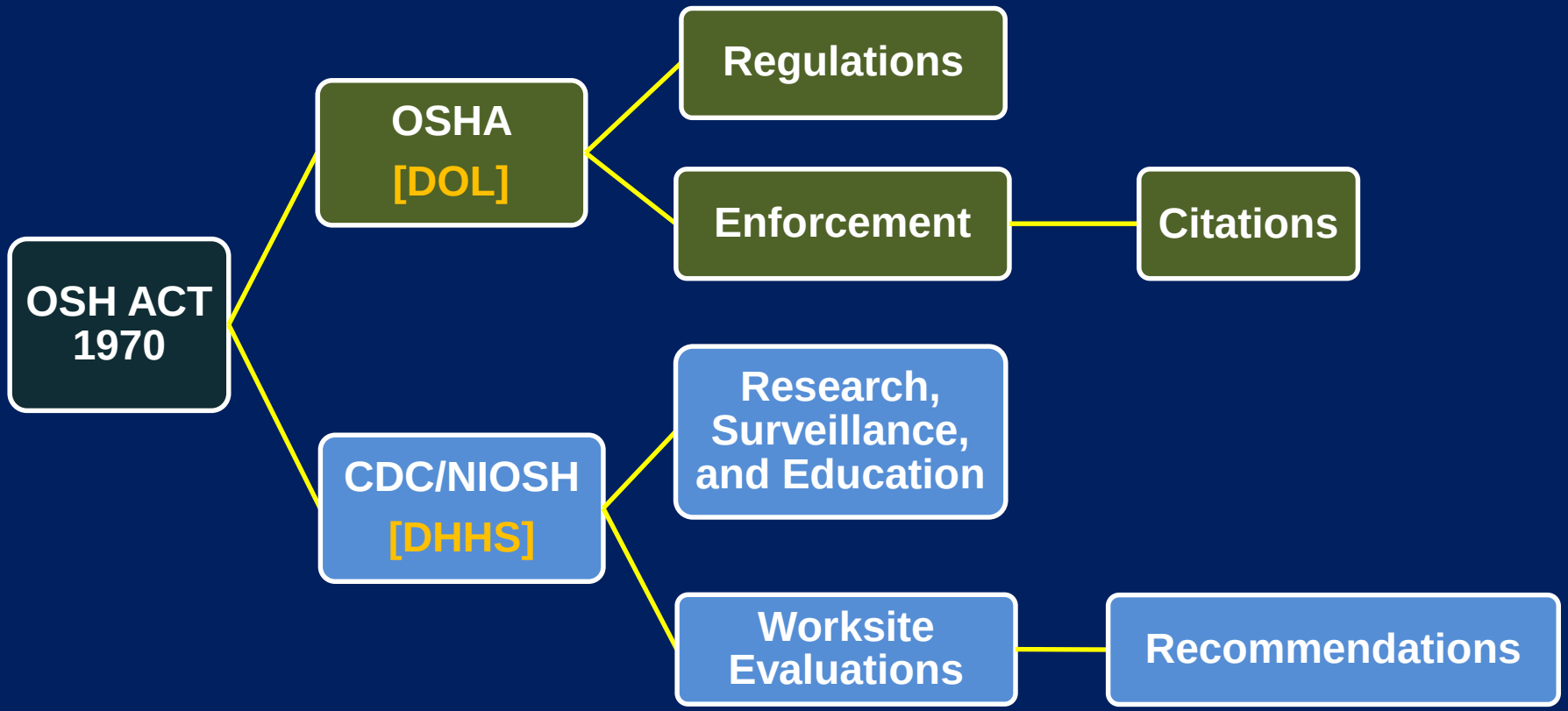
Occupational Safety and Health Act of 1970

"…to assure so far as possible healthful working conditions for every man and woman in the nation."

- **Occupational Safety and Health Administration (OSHA) – Regulatory Agency**

- **National Institute for Occupational Safety and Health (NIOSH) – Research Agency**

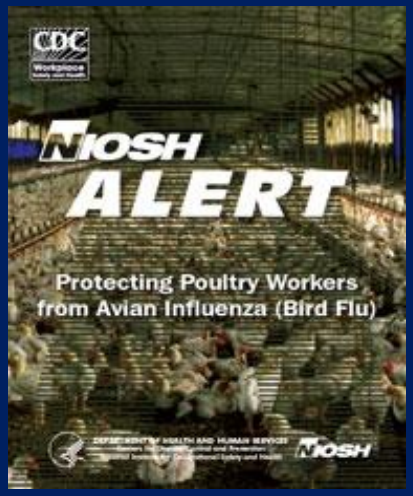
Differences: OSHA and NIOSH

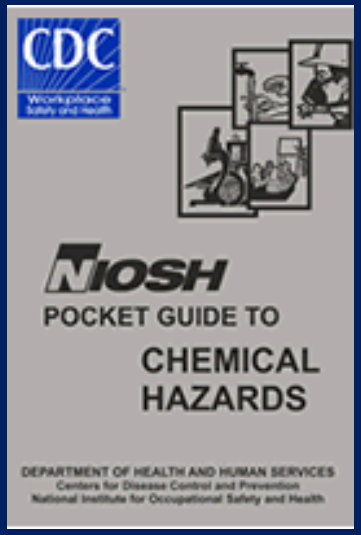


OSHA: Occupational Safety and Health Administration
DOL: Department of Labor
DHHS: Department of Health and Human Services

What Does NIOSH Do?

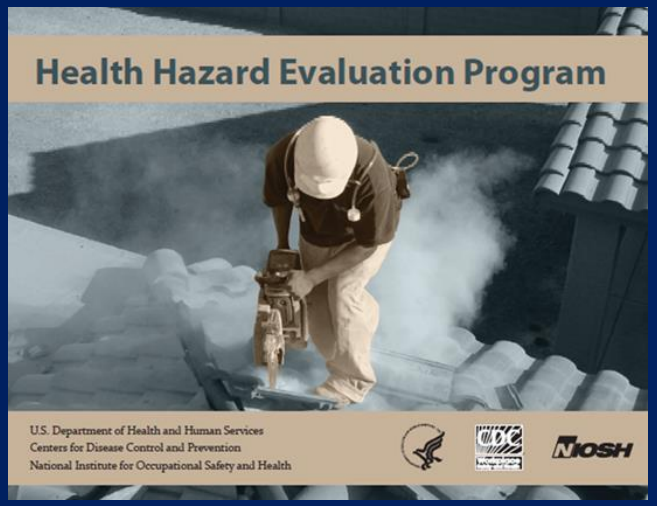
- Occupational health research and surveillance
- Educational and reference materials
- Health hazard evaluations (HHEs)
- Respirator testing and certification
- Emergency response
- Much, much more….





What Is a Health Hazard Evaluation?

- Worksite investigation in response to a request from employees, employers, unions, or government agencies
- Determine whether harmful exposures, processes, or conditions exist and/or cause injuries or illnesses



What Types of Hazards Are Evaluated in a HHE?

- Chemical exposures
- Biological exposures
- Physical hazards
  - Radiologic
  - Noise
  - Heat
- Equipment safety

OSHA Act of 1970

MSHA Act of 1977

- Ergonomic issues
- Work organization/job stress issues

The NIOSH HHE Branch: Many Disciplines

**Physicians/Epidemiologists,
Veterinarian,
Nurse, Statistician,
Behavioral scientist**

**Industrial
hygienists,
Engineers,
Toxicologist,
Communications**

Benefits of a Health Hazard Evaluation

- Provide current health hazard data to employers and employees
- Identify problems and offer workplace solutions
- Generate exposure and human toxicity data
- Identify research gaps

How Do We Get Requests?

- Who can request an HHE?
  - 3 current employees
  - Union
  - Management

- Technical assistance requests
  - Other government agencies
  - Local, state health departments

HHE Site Visit Activities

- Observe production processes and employee work practices
- Collect air and surface samples
- Privately interview employees
- Conduct medical tests or physical examinations of employees
- Evaluate exposure controls
- Review reports of injury and illness and exposure records

Use of smoke tubes to check ventilation system

Measuring noise at an animal shelter

NIOSH Rights in the HHE

- "Right of entry" - we can get into workplaces
- Access to records maintained by the employer or third party pertinent to HHE (…but we always get medical consent)
- Conduct private and confidential interviews with employees
- Require employee representation at meetings and walk-through

Employee Rights

- To private and confidential interviews
- To choose to wear NIOSH sampling devices
- To choose to participate in medical tests
- Access to all interim and final reports

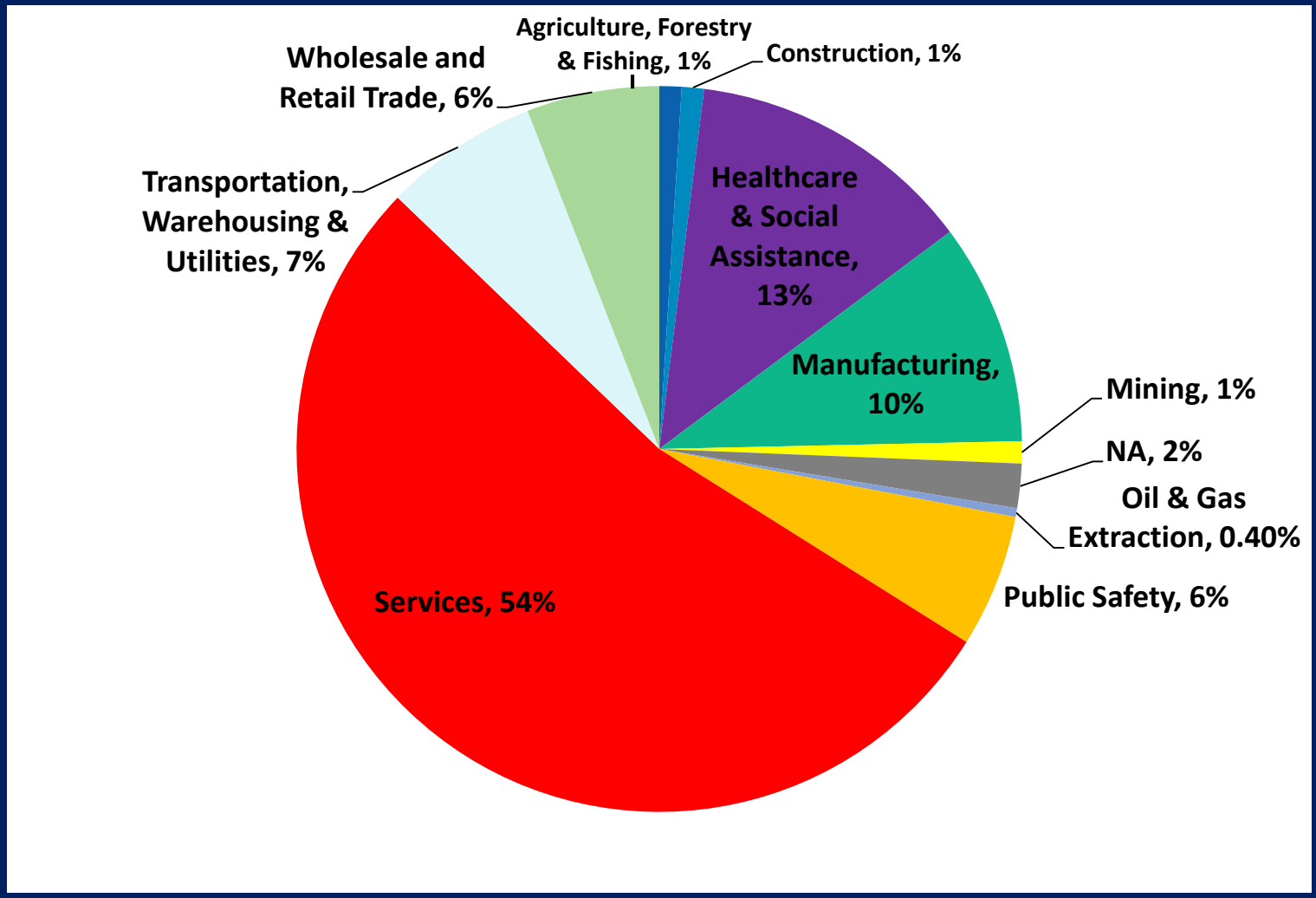
Employee Representative (Union) Rights

- To accompany NIOSH during walk-through
- To attend opening and closing meetings
- To convey additional information related to the HHE request (privately if requested)
- To receive copies of all reports

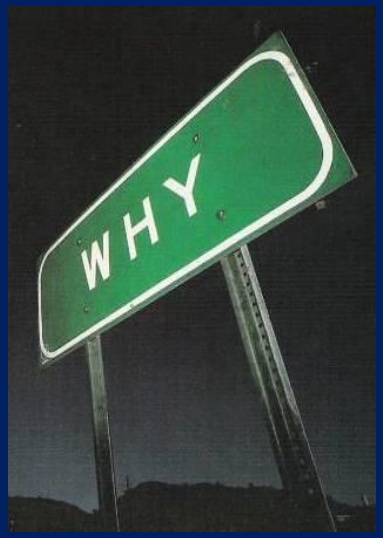
Employer Rights

- To obtain copy of HHE request
- To obtain verbal accounts about NIOSH plans, procedures, findings
- To accompany NIOSH during walk-through
- To observe investigative procedures
- To identify trade secrets and have info safeguarded by NIOSH
- To have NIOSH officers comply with all safety and health rules
- To receive copies of all reports

225 HHE Requests in FY 2014



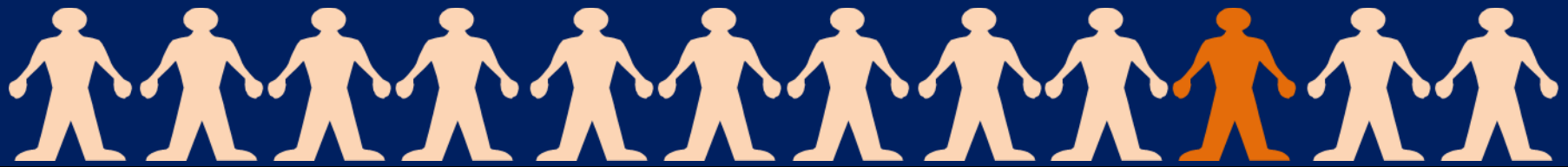
Reasons for an Exposure Assessment



- Determine magnitude/significance of health hazards
- Identify exposure sources
- Regulatory compliance
- Evaluate need for or effectiveness of exposure controls
- Determine need for PPE
- Measure task or process-specific exposures
- Provide exposure data for epidemiology studies, surveillance, or other research

Risk Management Goal

Ensure that no worker has excessive exposure



What Types of Recommendations Are Made?

- **Elimination/substitution**
- **Engineering Controls**
  - Process control
  - Enclosure and/or isolation of emission source
  - Ventilation
- **Administrative Controls**
  - Work practices
  - Communication
  - Medical care
  - Medical surveillance
  - Medical follow up
  - Monitoring exposures
- **Personal protective equipment**

When Can an HHE Help?

- Illnesses of unknown cause
- Old problems, new setting
- New methods, old setting
- New exposures in workplaces
- Exposure to unregulated agents

Examples of Prior HHEs dealing with Various Biological Hazards

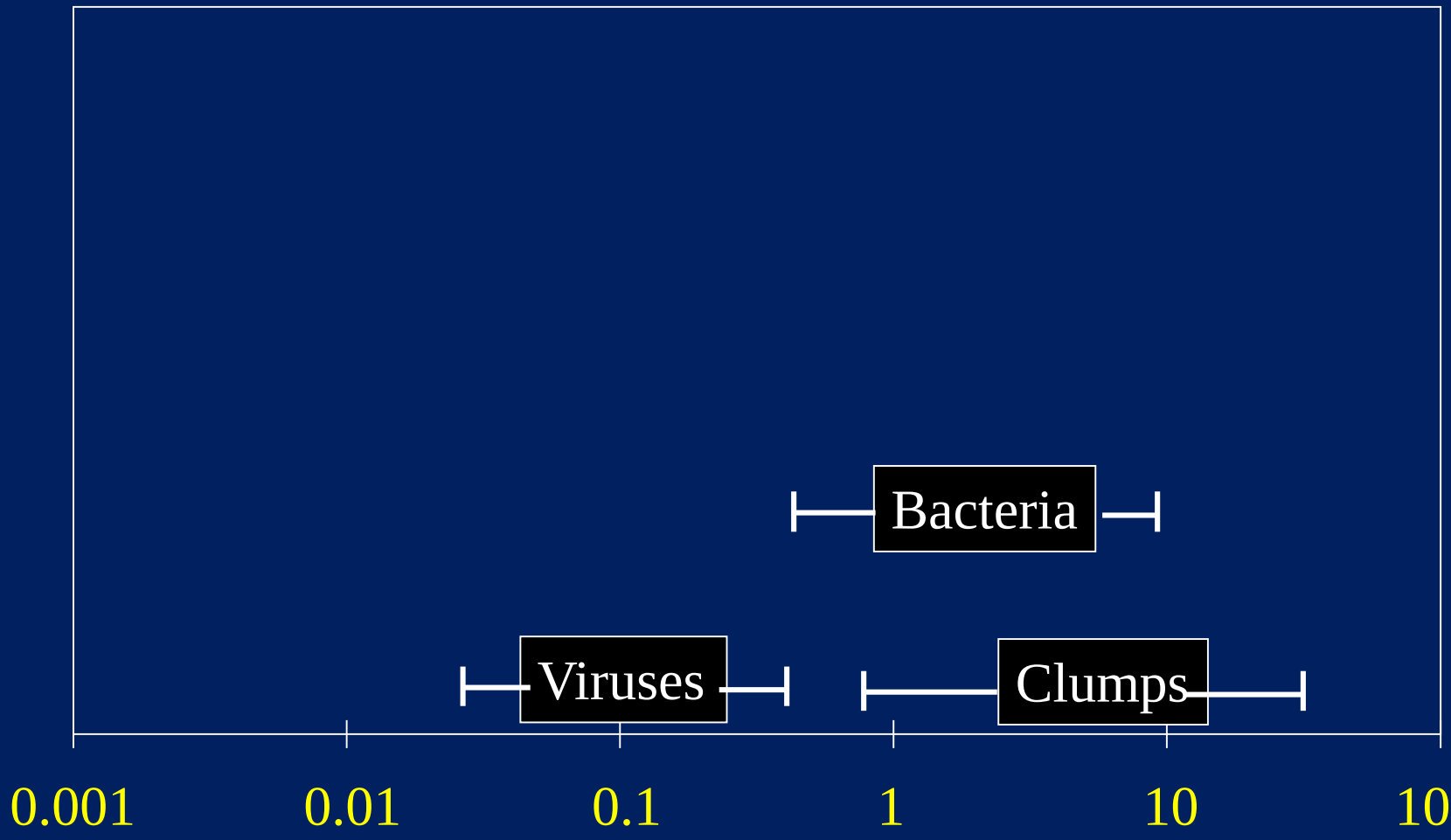
- *Coxiella burnetti* (Q Fever)
- *Mycobacteria tuberculosis*
- *Yersinia pestis*
- Influenza
- Severe acute respiratory syndrome (SARS)
- Campylobacter infection
- In summary, the HHE program is available to look at exposures in the workplace.

BIOAEROSOL SAMPLING

Bioaerosols

- Definition – airborne particles that contain living organisms or were released from living organisms

Aerosol Size Range



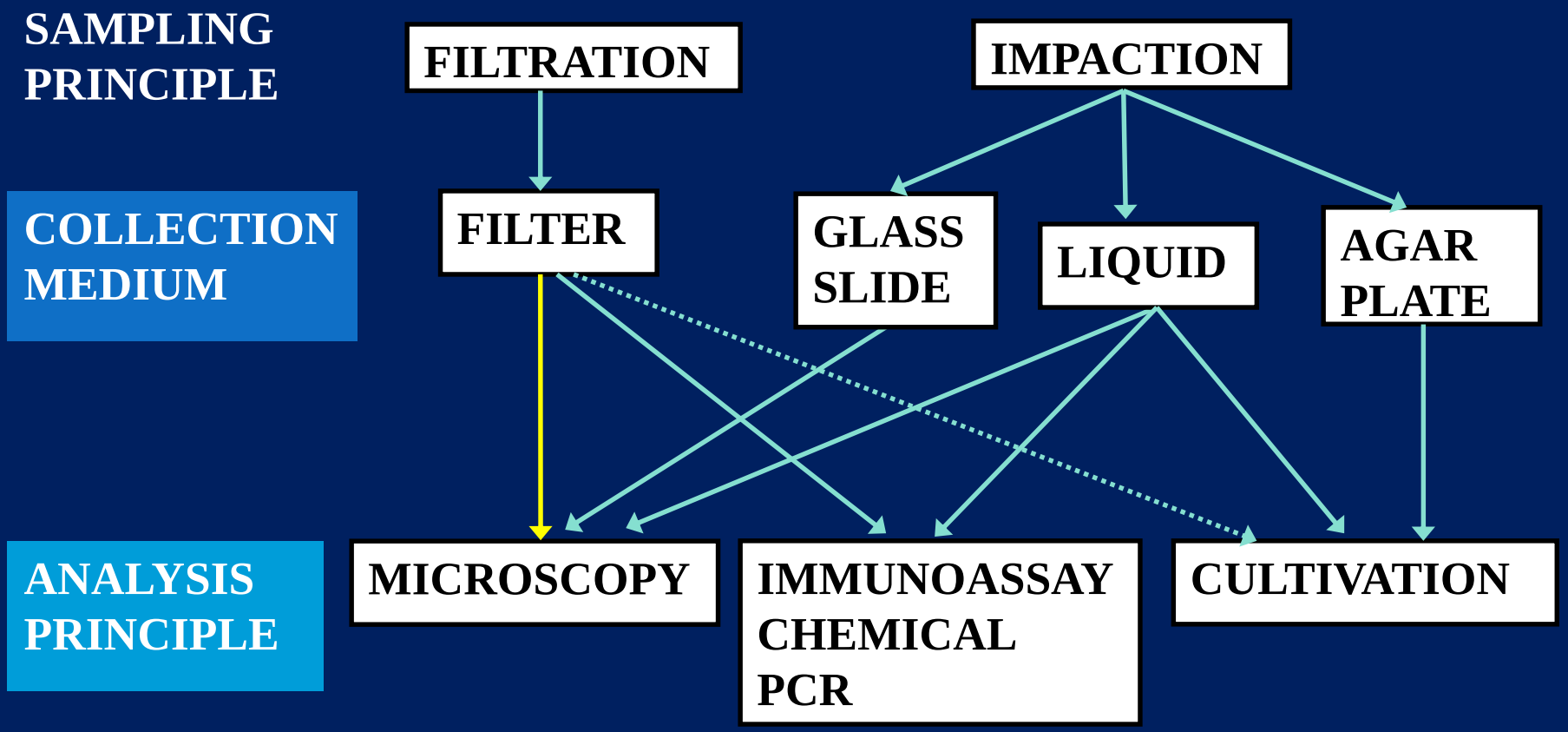
Purpose of Bioaerosol Sampling

- Verify and quantify the presence of bioaerosols
- Identify sources
- Monitor the effectiveness of control measures
- Assess human exposure

Selection of Analysis Method

- Availability of sampling methods
- Cost and length of time for analysis
- Sensitivity and specificity
- Expected characteristics of the bioaerosol of interest

Main Principles For Bioaerosol Sampling and Analysis



Air Sampler Selection

- Specific agents or indicators of interest
- Method of analysis to be used
- Desired information to be obtained
  - Concentrations
  - Species identification
  - Particle size

Air Sampler Selection (cont'd)

- Expected range of bioaerosol concentrations
- Possible constraints on sample collection
  - High or low bioaerosol concentrations
  - Temperature extremes and air movement
  - Access to electrical power and noise

In summary, bioaersol sampling requires knowing what agent you are looking for in order to determine exposures.

Questions?

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