EH&S Program
Measures and Metrics That Matter!

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Colleges and Universities as Worksettings

- Very unique places of work due to the potential for simultaneous exposures to all four hazards types
  - Physical
  - Chemical
  - Radiological
  - Biological
- And a diverse “population at risk”
  - Students, faculty, staff, visitors, “others”
Training Gap

- There are over 4,700 colleges and universities in the US
- Interestingly, none of the EH&S professionals who serve them were formally trained on how universities operate
- This lack of understanding results in a lot of frustration and confusion
- Enhanced understanding can improve services and support
Course Objectives

- To begin to articulate the EH&S needs of an institution, we first must understand its characteristics.
- To accomplish this, we need some basic descriptive institutional data.
- such as...
Basic Questions

- How big is your campus?
- How is size measured?
- What measures are important (e.g. resonate with resource providers?)
- What risks are present?
- How are these risks managed?
- Are these risks real or hypothetical?
- How might you determine that?
- How does management determine that?
Basic Questions

- How many EH&S staff?
- Are others involved with safety aspects?
- In your opinion, are you over or understaffed?
- How would you know?
- How would others know?
- How are you performing?

- How is your EH&S program’s performance measured?
- In your opinion, are these measures true indicators of performance?
- What do the clients served really think of your program?
Basic Questions

- Within the context of the mission of your institution, is your EH&S program viewed as hindering or helping?
- Is this measured?
- Is other feedback garnered?
- Do clients feel there are real (or perceived) EH&S program duplications of effort?
- What does EH&S do that really irritates clients?
Basic Questions

- The age old question for our profession is: “how many EH&S staff should I have?”

- Perhaps a equally important question is: What can the college and university EH&S profession realistically hope to obtain from a benchmarking exercise involving staffing metrics?

- What level of precision can we really expect?

- At best, we can likely only achieve a reasonable estimation of “industry averages”, such as number of EH&S FTE’s for an institution exhibiting certain characteristics
Sampling of Possible Staffing Predictors and Influencing Factors

- **Quantifiable**
  - Institution size
  - Number of labs
  - Age
  - Level of funding
  - Population
  - Geographic location
  - Deferred maintenance
  - Public/private
  - Medical/vet schools
  - Disjunct campus

- **Non-quantifiable**
  - Regulatory history
  - Level of regulatory scrutiny
  - Tolerance of risk by leadership
  - Level of administrative arrogance
  - Level of trust/faith in program
  - Ability of EH&S program to articulate needs
Desirable Characteristics of Predictors for Benchmarking

- Consistently quantifiable
- Uniformly defined by a recognized authority
- Easily obtained
- Meaningful and relevant to decision makers (provides necessary context)

- Consider something as simple as the definition of “number of EH&S staff”
Suggested Definition

- “EH&S Staff”: technical, managerial, and directorial staff that support the EH&S function
  - Suggest including administrative staff, but it probably doesn’t make a big difference
- Can include staff outside the EH&S unit, but must devote half time or greater to institutional safety function (0.5 FTE)
  - Example
    - Safety person in facilities
    - Student workers (>0.5 FTE)
- Contractors included only if on-site time is half time or greater (0.5 FTE)
  - Example –
    - contract lab survey techs, yes if >0.5 FTE
    - Fire detection testing contractors, likely no.
Preliminary Results Based on Roundtable Input

- Findings indicated that Total NASF and Lab NASF are the most favorable (statistically significant) and pragmatic predictors.

- On a two dimensional graph, we can only show 2 parameters, but the relationship between sq ft and staffing is clear....
Number of EHS FTE vs. Total NASF

The scatter plot shows the relationship between the number of EHS FTE (Full-Time Equivalents) and the total NASF (Newspaper Advertising Sales Figures). The x-axis represents the total NASF, while the y-axis represents the number of FTEs. The data points suggest a varied distribution, indicating that the relationship between the number of FTEs and total NASF is not consistent across different levels of NASF.
## Predictability of Various Models (based on n = 69)

<table>
<thead>
<tr>
<th>Total campus sq ft</th>
<th>Lab + non-lab sq ft</th>
<th>In (total campus sq ft)</th>
<th>ln (lab) + ln (non lab sq ft)</th>
<th>Med/vet school</th>
<th>General “others” category</th>
<th>BSL3 or impending BSL4</th>
<th>R Squared Value</th>
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</table>
Current Metrics Model

\[ \# \text{EH&S FTE} = e^{(0.516 \cdot \text{School}) + (0.357 \cdot \ln(\text{Lab NASF})) + (0.398 \cdot \ln(\text{Nonlab NASF})) + (0.371 \cdot \text{BSL})} - 8.618 \]

R\(^2\) value based on 69 observations = 80%

Definitions for predictor variables:

**Lab NASF**: the number of lab net assignable square footage

**Nonlab NASF**: the number of non-lab net assigned square footage (usually obtained by subtracting lab from gross)

**School**: defined as whether your institution has a medical school as listed by the AAMC or a veterinary school as listed by the AAVMC; 0 means no, 1 means yes

**BSL**: this variable indicates if the institution has a BSL3 or BSL4 facility; 0 means no, 1 means yes
Staffing

- The data from 69 institutions from across the country indicate that four variables can account for 80% of the variability in EH&S staffing:
  - Non lab net assignable square footage
  - Lab net assignable square footage
  - Presence of Med or Vet School
  - Existence of BSL3 operations

- These predictors important because they are recognized and understood by those outside the EH&S profession

- With the collection of more data, the precision of the model could likely be improved – to the benefit of the entire profession
Note – even a predictor number for staff doesn’t give us any indication about their proficiency and efficiency

So what should EH&S measure?

And how should they communicate what they do?
Why Metrics?

“When you measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.”

William Thomson, Lord Kelvin
Metrics

What measures?

What units?

How often to collect the data?

How to communicate the information?
Measures versus Metrics

**Metric** is a unit of measurement that objectively quantifies an organization’s performance.

- What’s measured gets managed.
## What Measures?

<table>
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<th>Losses</th>
<th>Compliance</th>
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<td>Personnel</td>
<td>External</td>
</tr>
<tr>
<td>Property</td>
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<td>Financial</td>
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<td>Revenues</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Internal</td>
</tr>
</tbody>
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Measurements as Indicators

Output - workload
- number of individuals trained
- surveys or inspections completed
- violations assessed

Outcomes – does the program achieve its desired results
- is safety training or inspections effective in reducing injury or illnesses
What Units?

$ (Cost)

Square feet

Time

Number of events
Chemical Safety

- Individuals trained
- Laboratories inspections
- Deficiencies identified and resolved
- Incident response
Biological Safety

- Individuals trained
- Laboratory inspections
- Deficiencies identified and resolved
- Incident response
Radiation Safety

- Individuals trained
- Laboratory inspections
- Dosimetry
- Bioassays
- Instrument calibrations
Physical Safety / Fire & Life Safety

- Individuals trained
- Inspections
- Deficiencies identified and resolved
- Incident response
- Plan reviews
Environmental Protection

- Waste weights or volumes
- Disposal costs
- Effluents released
How Often?

“Smell the cheese often so you know when it is getting old.”
– Spencer Johnson

Ongoing metrics communicate the effectiveness of processes

“Every time you get the chance” – Emery
Focus on outcome metrics not output

Select emerging issues and opportunities to communicate

Report on strategic goals

Remember to tie it to the mission of the organization
Caveat

“Not everything that can be counted counts, and not everything that counts can be counted”
- Albert Einstein