TABLE OF CONTENTS

1. Background & Conclusions
2. Objectives & Methodology
3. Participant Profile
4. Study Results
BACKGROUND & CONCLUSIONS
The purpose of this study is to determine current industrial hygiene (IH) practices related to air and noise sampling among IH professionals and their organizations.

A total of 1,251 online surveys were conducted with AIHA members and non-member customers.

Email invitations were sent to a total of 7,072 contacts. Below is a summary of the response rate for the survey:

<table>
<thead>
<tr>
<th>Virtual Attendees</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Invitations Sent:</td>
<td>7,072</td>
</tr>
<tr>
<td>Total Responses:</td>
<td>1,251</td>
</tr>
<tr>
<td>Response Rate:</td>
<td>17.68%</td>
</tr>
</tbody>
</table>

The survey was conducted between 8/20/2020 and 9/3/2020.
CONCLUSIONS

1. Most survey respondents were industrial hygienists working for large private institutions.
   1. 34% of respondents indicated they are employed by a private institution.
   2. 56% of respondents indicated their primary job function is ‘IH/OH staff’
   3. 55% of respondents indicated their organization employs 1,000 or more individuals.

2. While most respondents collect data electronically, a significant number collect data through handwritten notes.
   1. 56% of respondents collect data on a laptop (50%), tablet (5%) or smartphone (1%).
   2. 38% of respondents collect data through handwritten notes.

3. ‘Assessing compliance to a regulatory or authoritative standard’ is the most important reason respondents collect data.
   1. 43% of respondents ranked ‘assessing compliance to a regulatory or authoritative standard’ as the most important reason.
   2. 20% of respondents ranked ‘to define the exposure profile of exposure groups’ as the second most important reason.

4. Most respondents store or maintain IH data and most store that data as computer files of individual exposure monitoring reports.
   1. 89% of respondents indicate their organization stores or maintains data.
   2. 76% of respondents store or maintain IH data as computer files of individual exposure monitoring reports.
CONCLUSIONS (CONT.)

5. Most respondents use spreadsheet software, such as Microsoft Excel, as their analytical software.
   1. 59% of respondents indicated they use spreadsheet software as their analytical software.
   2. 25% of respondents indicated they use IH/OH database software as their analytical software.

6. Only one-quarter of respondents indicated their organization analyzes big data and of those, most break down their data by task for analysis.
   1. 27% of respondents indicated their organization analyzes big data.
   2. Of those who indicated their organization analyzes big data, 76% break down their data by task for analysis.

7. When asked what big data means to their organization, “nothing,” “not much,” or “I don’t know” were the most common responses.
   1. 24% of the open-ended responses to the question, “what does big data mean to your organization,” were “nothing” or “not much.”
   2. 14% of the open-ended responses to the question, “what does big data mean to your organization,” was “I don’t know.”

8. Of those who analyze big data, exposure data was the most common response to what big data is analyzed.
   1. 26% of the open-ended responses to the question, “what big data does your organization analyze,” was ‘exposure data.’
   2. 12% of the open-ended responses to the question, “what big data does your organization analyze,” was ‘IH data.’
CONCLUSIONS (CONT.)

9. Most respondents feel a data dictionary is useful, however most respondents do not use a standardized list of IH data elements or corresponding dictionary.
   1. 63% of respondents feel a data dictionary is extremely useful or very useful.
   2. 57% of respondents indicated they do not use a standardized list of IH data elements and corresponding dictionary.
   3. Of those who do indicated they do not use a standardized list of IH data elements and corresponding dictionary, 46% indicated they are likely or very likely to implement and use a standardized list of IH data elements and corresponding data dictionary.

10. Most respondents indicate that a mobile app or e-tool would be helpful in collecting and standardizing their IH data.
    1. 58% of respondents indicated a mobile app or e-tool would be extremely helpful or very helpful in their IH data standardization and collection.
    2. 32% of respondents indicated a mobile app or e-tool would be somewhat helpful.
OBJECTIVES & METHODOLOGY
PURPOSE & OBJECTIVES

Purpose of Study
• The purpose of this study is to determine current industrial hygiene (IH) practices related to air and noise sampling among IH professionals and their organizations.

Study Objectives
• Identify industry demographics of participants
• Identify how and why organizations currently collect and store data
• Identify what, if any, analytical software is used by organizations
• Determine how individuals and organizations currently define “big data”
• Determine what “big data” is being analyzed and how it is applied
• Determine how “big data” is broken down for analysis
• Understand to what extent data aggregation would be beneficial
• Determine how helpful a data standardization e-tool would be
METHODOLOGY

Pre-Project Planning

• A kick-off meeting was held on 6/18/2020 to identify the survey purpose and objectives.
• A draft questionnaire was provided for review on 7/22/2020.
• The questionnaire was finalized on 8/12/2020.

Database Management

• A list of members and non-member customers was provided by AIHA’s Administrator of Software & Data Services.
• Student, retired, and international members, as well as other miscellaneous contacts were removed.
• Remaining list of attendees contained 7,072 email addresses.

Data Collection

• A total of 1,251 online surveys were completed.
• An initial email invitation was sent on 8/20/2020.
• Two reminder emails were sent to non-respondents.

Report Preparation

• Data from the survey was assimilated and prepared for analysis.
• Appropriate charts, tables, and graphs were developed to illustrate the study results.
• An initial report was completed on 11/30/2020.
PARTICIPANT PROFILE
One-third of respondents (34%) indicated they are employed by a private institution. Nearly one-quarter (23%) indicated they are employed by the government or military.
Which is your primary job function within your organization?

N= 1,249

More than half of respondents (56%) indicated their primary job function is ‘IH/OH staff.’ Nearly one in five respondents (16%) indicated their primary job function is ‘Field IH.’

Other Responses
Manager – 19%
Safety – 17%
EHS – 13%
IH – 11%
Director – 11%
Management – 7%
ORGANIZATION SIZE

More than half of respondents (55%) indicated their organization employs 1,000 or more individuals. One-quarter (26%) indicate their organization employs less than 100 individuals.
STUDY RESULTS
One-half of respondents (50%) indicated their organization primarily collects IH data on a laptop or desktop computer. More than one-third (38%) indicate their organization primarily collects IH data on handwritten notes.

How does your organization primarily collect IH data?

N=1,112

Other Responses
- Handwritten notes – 21%
- Computer – 15%
- Laptop – 15%
- Database – 11%
- Tablet – 8%
COLLECTING DATA

When looking at the weighted average of the importance of collecting data, ‘to assess compliance to a regulatory or authoritative standard’ ranked the highest, followed by ‘to define the exposure profile of exposure groups.’ The weighted average scale was 1 to 5.

Please rank the following statements on collecting data in order of importance. N= 1,113

- To assess compliance to a regulatory or authoritative standard: 4.66
- To define the exposure profile of exposure groups: 4.39
- To confirm control effectiveness of implemented actions: 4.15
- To provide baseline exposure information for project planning: 3.62
- To publish periodic reports with performance metrics or other summary statistics: 2.34
- To assess applicability of proposed sampling and analytical methods: 1.93
COLLECTING DATA – IN DEPTH

When looking at the detailed responses of the importance of collecting data, the percentage of respondents who ranked each statement highest (1) to lowest (6) is shown.

Please rank the following statements on collecting data in order of importance.
N= 1,113

- To assess compliance to a regulatory or authoritative standard: 43% ranked 1, 20% ranked 2, 14% ranked 3, 12% ranked 4, 6% ranked 5, 5% ranked 6.
- To define the exposure profile of exposure groups: 30% ranked 1, 21% ranked 2, 22% ranked 3, 16% ranked 4, 8% ranked 5, 9% ranked 6.
- To confirm control effectiveness of implemented actions: 11% ranked 1, 33% ranked 2, 29% ranked 3, 17% ranked 4, 9% ranked 5, 1% ranked 6.
- To provide baseline exposure information for project planning: 10% ranked 1, 18% ranked 2, 23% ranked 3, 29% ranked 4, 16% ranked 5, 5% ranked 6.
- To publish periodic reports with performance metrics or other summary statistics: 4% ranked 1, 5% ranked 2, 8% ranked 3, 35% ranked 4, 31% ranked 5, 8% ranked 6.
- To assess applicability of proposed sampling and analytical methods: 4% ranked 1, 6% ranked 2, 9% ranked 3, 25% ranked 4, 53% ranked 5, 6% ranked 6.
Does your organization store or maintain IH data?

N= 1,116

- Yes: 89%
- No: 8%
- Don't know: 3%

Nine out of ten respondents (89%) indicated their organization stores or maintains IH data.
HOW DATA IS STORED

Three-quarters of respondents (76%) store or maintain IH data as computer files of individual exposure monitoring reports. Less than half (43%) store or maintain hard copies of IH data. One-third (32%) use specialized computer software or data systems to store or maintain IH data.

Other Responses
- Database – 18%
- Excel – 16%
- System – 9%
- Data – 9%
- SharePoint – 9%
- Server – 9%

How does your organization store or maintain IH data? Select all that apply

N= 993
More than half of respondents (59%) use spreadsheet software (i.e. Excel) as their analytical software. One-quarter (25%) use IH/OH database software.

Other Responses:
- None – 18%
- Software – 16%
- Database – 9%
- Spreadsheet – 7%
- Excel – 4%
BIG DATA DEFINITION

Nearly one-half of respondents (41%) indicate that “big data” means nothing or not much to them or their organization or they don’t know what big data is or are not familiar with the term.

What does “big data” mean to you/your organization?
N = 553

- Nothing/not much
- Don't know
- Large data sets
- Identify trends/patterns
- Enterprise-wide data
- Multiple sources of data
- Ability to analyze data
- Not familiar with the term
- All data/complete data
- Data collected over time
- Determine solutions/make decisions
- Size specific data
- Specialized software needed
- Big picture/summary data
- Predictive analytics/A.I.
ANALYZING BIG DATA

Nearly half of respondents (46%) indicate their organization does not analyze “big data.” One-quarter of respondents (27%) indicate their organization does analyze “big data.” One-quarter of respondents (27%) indicate they do not know if their organization analyzes “big data.”

Does your organization analyze “big data?”
N= 1,097

- Yes: 27%
- No: 46%
- Don't know: 27%
WHAT BIG DATA IS ANALYZED AND HOW IT’S APPLIED

One-quarter of respondents (26%) indicate that exposure data is analyzed.
Three-quarters of respondents (74%) indicate their organization breaks down data by task for analysis. Nearly two-thirds (61%) indicate their organization breaks down data by agent for analysis. More than half (54%) indicate their organization breaks down data by job title.
Nearly two-thirds of respondents (63%) feel a data dictionary is extremely useful or very useful. More than one-quarter of respondents (29%) feel a data dictionary is somewhat useful.

How useful do you feel a data dictionary is?
N = 1,055

- 26% Extremely useful
- 37% Very useful
- 29% Somewhat useful
- 6% Not so useful
- 0% Not at all useful
APPLYING ADDITIVE MIXTURE FORMULA

One-third of respondents (34%) indicated that ‘yes, analytical results for each substance in the mixture is a separate record associated with the TWA and OEL for the mixture.’ Less than one-third (30%) indicated ‘no, analytical results for each substance in the mixture is a separate record associated with the TWA and OEL for that substance.’

When applying the additive mixture formula to the calculation of TWA level and OEL level, are these computed values included in records?

N= 1,051

- Yes, analytical results for each substance in the mixture is a separate record associated with the TWA and OEL for the mixture: 34%
- Yes, analytical results for each substance in the mixture are combined in a single record associated with the TWA and OEL for the mixture: 24%
- No, records of exposure monitoring results are not associated with TWA or OEL values: 4%
- No, analytical results for each substance in the mixture is a separate record associated with the TWA and OEL for that substance: 30%
- Other: 9%
HANDLING DATA POST SAMPLING

One-third of respondents (34%) indicate they have a data manager/analyst or person who handles the IH data post-sampling. Two-thirds (63%) indicate they do not have a data manager/analyst or person who handles the IH data post-sampling.

Does you have a data manager/analyst or person who handles the IH data post-sampling?

N= 1,043

- Yes
- No
- Don't know
BENEFIT OF DATA AGGREGATION

More than half of respondents (59%) feel to a large extent or moderate extent that data aggregation would be beneficial. More than one-quarter of respondents (28%) feel to some extent that data aggregation would be beneficial.

To what extent do you feel data aggregation would be beneficial?

N = 1,034

- To a large extent: 31%
- To a moderate extent: 28%
- To some extent: 28%
- To a small extent: 9%
- Not at all: 5%
HELPFULNESS OF AN E-TOOL

More than half of respondents (58%) indicated a mobile app or e-tool would be extremely helpful or very helpful in their IH data standardization and collection. One third of respondents (32%) indicated a mobile app or e-tool would be somewhat helpful.
Nearly one-third of respondents (30%) indicated they use a standardized list of IH data elements and corresponding dictionary. More than half (57%) indicated they do not use a standardized list of IH data elements and corresponding dictionary.
IMPLEMENTATION & USE OF A STANDARDIZED LIST

Of those who do indicated they do not use a standardized list of IH data elements and corresponding dictionary, less than half (46%) indicated they are likely or very likely to implement and use a standardized list of IH data elements and corresponding data dictionary.

How likely are you or your organization to implement and use a standardized list of IH data elements and corresponding data dictionary?

N = 595