LAB XL PROGRESS REPORT FOR 2004

UNIVERSITY OF MASSACHUSETTS BOSTON

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Section 3: 2004 Lab-XL EPI Overview

Introduction

2004 was a challenging year for UMB EH&S. To start off the year, we were down one full-time staff member. In addition, we used to carry 2-3 part-time (20 hours/week) graduate assistants and in 2004 we only had one. The main focus of EH&S was to re-organize the office and add staff. Consequently, because of reduced staff, we were limited to being in more of a response mode than a proactive mode. In some areas, such as training, we were limited in what we could offer. We did however, maintain laboratory presence, hence our XL program remains strong. In May 2005, we were finally able to hire one full-time environmental technician and we anticipate hiring an additional EH&S technician by the 2005 Fall semester. Once that is accomplished, we will begin to rebuild and strengthen all of our programs including increasing the number of formal training sessions offered campus-wide. We also anticipate placing a large emphasis on re-inventory of all laboratory chemicals. We will start this campus-wide effort with an upgrade of our software and then rollout the program to departments through our intranet. We hope to have at a minimum one staff person per laboratory department participating in the inventory program.

EPI Overview

EPI #1: Annual Surveys of Hazardous Chemicals of Concern

Results to date:

The goal of the first EPI is to assure that outdated hazardous chemicals of concern are appropriately removed from laboratory shelves and disposed properly.

As stated previously, UMass Boston is required by the Boston Fire Department to maintain chemical inventories for all labs. Therefore, all laboratories (100%) have had a survey of Hazardous Chemicals of Concern (HCOCs) and updated these inventories. EH&S implemented a chemical bar code based tracking system on a lab-by-lab basis in 2001/2002. For each Principal investigator, the EH&S Office has taken the inventory from each laboratory and generated Operational Material Safety Data Sheets for each laboratory. In addition, each information package provided by EH&S to a laboratory includes the inventory list with HCOC's marked and an explanation of HCOCs

Lessons learned:

The bar code system is currently operated by EH&S and provides only a snapshot in time of any single lab's inventory.

We are on track to begin re-inventory of labs by September 2005 to verify that our existing tracking measures (e.g., purchasing records, PI updates, waste disposal) can be relied upon to provide accurate snapshots of chemical inventories. A re-inventory will allow us to determine how "accurate" our inventories are at a given time and may give us some information about movement of materials from one lab to another. The re-inventory will also allow more carefully evaluation trends in HCOCs on the shelf.

We believe that the computerized tracking system may enhance the ability of EH&S to identify potential pollution prevention and redistribution opportunities however, we have not investigated this to date. What we hope is that the trend overtime will be that there are fewer chemicals on the shelves in laboratories. This has been difficult to track overtime. We have noticed that laboratory clean-outs have been more frequent and we anticipate that there are fewer chemicals on the shelves but we do not have any real numbers to support that at this time.

We are in the process of upgrading our bar-coding software to allow on-line access to the UMB community. We hope to transfer some of the responsibilities to the researchers in terms of adding new materials. We also hope that this will provide more opportunities for redistribution among laboratories.

Our on-line searchable database for our Operational Material Safety Data Sheets, which allows lab workers in the Chemistry Department to access information on any chemical as needed. We need to spend some time formatting the data sheets for on-line viewing. We anticipate introducing this tool to all lab workers in the Spring 2006 semester.

EPI #2: Verification of HCOC Surveys

Results to date:
The second EPI measures the participation rate in the HCOC inventory effort. As stated above, with the bar-coding system in place, all HCOCs have been identified, and surveys have been conducted for all (100%) labs.

EPI #3: Pollution Prevention Opportunity Assessments

EH&S continues to emphasize pollution prevention concepts during training and researchers are encouraged, during both waste pickups and lab inspections, to incorporate pollution prevention ideas such as product substitution, limited purchasing and waste minimization into their everyday work. The EH&S Office encourages researchers to examine pollution prevention opportunities at the time of experimental design and when they are developing their Standard Operating Procedures. After the experimental design process is in place, we remind them to purchase only what they need. Finally, we suggest that they determine whether a treatment method can be incorporated at the end of the experiment. As a relatively small university, we are able to remind and reinforce the P2 message with faculty, staff and graduate students during our many informal EH&S/researcher interactions.

We believe this approach is quite effective. In 2002/2003 we conducted a P2 survey of all UMB PIs. Results of that survey showed that 73%, nearly ¾ of all PIs had already downsized their experiments, substituted chemicals or changed their processes to use less toxic material in their experiments. The survey also showed that 25% of the PIs would look to another laboratory if they run out of a chemical.

In 2004, we embedded several P2 statements into our Annual Environmental Awareness Survey and asked respondents to rank the statements from 1-5 with 1 being “strongly agree “ to 5 being “strongly disagree”. The survey results were very encouraging and indicated that:

- 100% believed it was the lab workers responsibility to reduce their environmental impact.
- 40% believed they could produce 10% less waste.
- 95% believed scientists should find safer chemicals to use in experiments.
- 92% believed that it was their responsibility to make changes in order to produce less waste.

Similarly in 2005, we asked the same questions in our Annual Environmental Awareness Survey and found that:

- 96% believed it was the lab workers responsibility to reduce their environmental impact.
- 40% believed they could produce 10% less waste.
- 81% believed scientists should find safer chemicals to use in experiments.
- 77% believed that it was their responsibility to make changes in order to produce less waste.

EPI #4: Hazardous Materials Reuse and Redistribution

Results to date:
EH&S continues to evaluate laboratory wastes for reuse when these materials are collected from labs. EH&S maintains a list of excess chemicals and publishes them to the EH&S website. PIs or laboratory workers may request excess re-usable chemicals on the list and EH&S will deliver the material to their laboratory. If an excess chemical remains in the EH&S inventory for more than 2 years, the material will be disposed of. As in previous years,

there have been few inquiries or requests for these excess stock materials. Chemicals were requested from EH&S and delivered to laboratories on only two or three occasions in 2004. Based on usage, EH&S will likely dispose of our current excess chemical stock (400+ chemicals) by the end of the summer. We hope to begin building a more useful collection of materials that can be used by laboratories.

Lessons learned:

We learned from previous years' Pollution Prevention (P2) surveys that P2 is already occurring. PIs report that they have downsized their experiments, substituted chemicals or changed processes to decrease their use of toxic chemicals. These changes have occurred independent of EH&S efforts promoting a central chemical waste reuse program and measuring its success.

Clearly, EH&S cannot dictate how researchers do their work and an EH&S implemented P2 program will not be effective. However, a communication from EH&S to labs on a frequent basis may be of value in reminding researchers to think about P2.

EPI #5: Laboratory Waste Generation Rates

Results to date:

EPI #5 concerns the amount of laboratory waste generated. The data are presented in Figure 1 and Table 1. UMB's hazardous waste generation increased slightly 1% from the previous year. In total however, we have maintained an approximate 25% reduction of hazardous waste since the beginning of the XL Pilot Program. We have also seen the reduction of certain highly hazardous wastes (e.g., organic peroxides, pyrophorics). It is impossible to determine whether these reductions are attributable to a better-managed program or these reductions simply reflect changes in research activities.

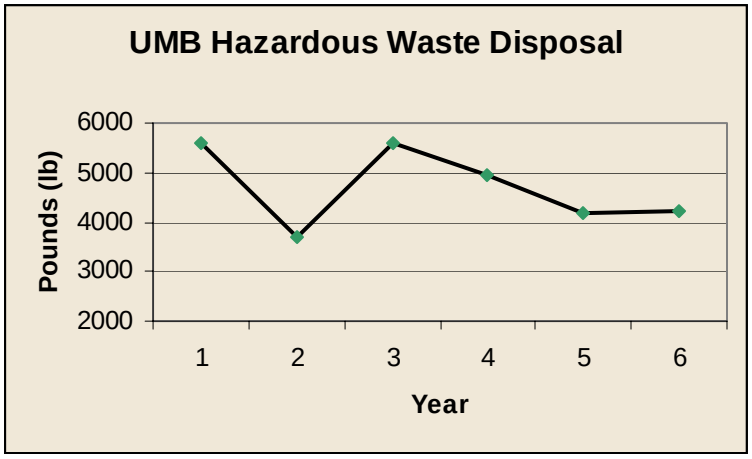

Figure 1. UMB Hazardous Waste Disposal 1999-2004.

Table 1. UMass Boston Laboratory Waste Generation (in lbs)						
Waste Stream	**Calendar Year**					
	1999	**2000**	**2001**	**2002**	**2003**	**2004**
Labpack with poisons	192.83	335.57	1083.36	335.28	374.10	540.95
Labpack with corrosives	1161.46	959.94	2165.53	1497.22	919.95	1238.94
Labpack with acutely hazardous waste	31.48	2.00	16.78	8.39	18.78	8.85
Labpack with misc. hazardous waste	739.57	819.62	31.00	6.00	151.96	450.00
Labpack with organic peroxides	19.57	0.00	8.39	0.00	0.00	3.09
Labpack with combustible material	11.68	0.00	1.00	14.00	2.00	3.25
Labpack with pyrophorics	21.34	10.00	28.39	9.00	2.00	3.00
Labpack with flammable liquids	2470.02	1168.39	1543.44	2010.64	1750.24	1393.06
Labpack with flammable solids	11.70	33.39	15.39	65.57	29.00	257.00
Labpack with oxidizers	148.48	121.75	225.10	303.42	52.39	153.64
Compressed gases and aerosols	264.27	20.00	156.39	15.57	40.39	62.00
Non-hazardous/non-regulated waste	512.07	240.00	310.00	690.00	830.00	100.00
Total	**5584.47**	**3710.66**	**5584.77**	**4955.09**	**4170.81**	**4213.78**
Difference (lbs)		**-1873.81**	**+1874.11**	***629.68**	**-784.28**	**42.97**
%Difference		**-33.75**	**+50.51**	**-11.27**	**-15.83**	**+1.03**
Total % Decrease from baseline						**24.54**

Lessons learned:

Despite seven years of tracking hazardous waste generation at UMass Boston, it is still difficult to gain insight into any trends. While yearly totals continue to vary according to many factors including type and amount of research, number of researchers and other factors, we have maintained for the second year an approximate 25% reduction from baseline in the annual generation of hazardous wastes from laboratories.

EPI #6: Environmental Awareness Survey

Results to date:

Summary results for six years of Environmental Awareness Survey data are shown in Table 2. We continue to use the modified survey developed last year. The new questions were designed to elicit more feedback regarding pollution prevention and other attitudes/behaviors associated with a more mature management program. Many of the questions remain the same as in previous years to ensure year-to-year comparisons. A copy of the survey can be found in the Appendix. Only selected questions that were the same each year are included below in Table 2. The correct answer(s) is italicized.

Table 2
Environmental Awareness Survey Results

	2000	**2001**	**2002**	**2003**	2004	2005
Number of Respondents	87	54	60	45	38	47
2. Ultimately, most chemical wastes generated in laboratories are:						
a. incinerated	*32%*	*17%*	*23%*	*18%*	*34%*	*21%*
b. sent to a land-fill	15%	6%	10%	9%	18%	9%
c. release to a sewer	23%	28%	12%	11%	16%	4%
d. treated	*30%*	*49%*	*55%*	*53%*	*26%*	*72%*
4. Which costs more, purchase or disposal of laboratory chemicals?						
a. disposal costs more	*51%*	*78%*	*77%*	*51%*	*71%*	*62%*
b. purchase costs more	24%	4%	5%	17%	8%	28%
c. costs are roughly the same	25%	18%	18%	15%	13%	13%
6. What is the proper way to dispose of strong mineral acids?						
a. Dilution with water	26%	13%	17%	9%	0%	13%
b. Neutralization with lime	33%	24%	24%	24%	13%	28%
c. Collection for pick-up by hazardous waste personnel	*8%*	*56%*	*53%*	*42%*	*76%*	*62%*
d. Mixing with organic chemicals	8%	0%	3%	2%	0%	0%
e. Other	25%	7%	3%	0%	6%	0%

	2000	2001	2002	2003	2004	2005
Number of Respondents	87	54	60	45	38	47
10. In general, how are fume hood emissions controlled in your laboratory?						
a. Filtration to remove particles	21%	17%	40%	13%	34%	43%
b. Carbon filtration to remove gases	30%	20%	35%	40%	29%	32%
c. Dilution with laboratory room air	*24%*	*63%*	*13%*	*20%*	*32%*	*6%*
d. No hoods in lab		0%	7%	4%	0%	2%
Unknown		0%	5%	22%	3%	
12. Typically, what is the largest environmental impact of laboratory work?						
a. release of toxic chemicals through the fume hood	15%	6%	2%	2%	23%	15%
b. disposal of toxic chemicals with a hazardous waste disposal company	25%	19%	25%	22%	*63%**	*62%*
c. release of chemicals to the sewer system	32%	48%	47%	29%	0%	0%
d. energy use to cool or heat laboratory space	*15%*	*13%*	*23%*	*40%*	*23%**	*15%*
Unknown	13%	14%	3%	7%	3%	0%
	*most gave more than one answer					
Faculty	22%	28%	18%	18%	35%	11%
Staff - Administrator	6%	2%	2%	0%	2%	11%
Staff - Lab Tech	11%	17%	17%	20%	8%	21%
Graduate Student	15%	30%	40%	45%	50%	32%
Undergraduate Student	46%	23%	23%	18%	5%	23%
16. How many years have you been working in college or university laboratories?						
Less than 1 year	40%	22%	16%	13%	13%	21%
1-2 years	22%	20%	39%	18%	21%	27%
3-5 years	10%	17%	20%	16%	18%	21%
more than 5 years	28%	41%	25%	38%	47%	26%
Respondents Trained in CH/EM Plan	0%	68%	47%	53%	71%	38%

Lessons learned:

Respondents generally continue to score at levels recorded during the past two years, or slightly higher. The audience for the surveys has differed over time. This year's respondents were well mixed between faculty, staff and students. The environmental awareness survey continues to provide important feedback with respect to the effectiveness of the EMP at UMB. The results of the survey continue to give us valuable information about the issues that require greater explanation during outreach efforts. Additionally, it gives us an objective measure of how effective our training efforts have been in reaching the laboratory population of interest and generating ideas about how to improve our training.

It is important to train graduate students at UMB because they: (a) are less likely to turnover

on a year-to-year basis; and (b) offer an opportunity to extend training and instruction to temporary lab workers, such as undergraduates.

EPI #7: Environmental Awareness Training

Results to date:

EPI #7 measures the amount of training conducted for laboratory workers with regard to environmental compliance and awareness. EH&S has built an accurate training database. Each year, we send out forms to the PIs asking them to identify all laboratory personnel under their supervision that require training based on criteria for training listed in our Integrated Chemical Hygiene and Environmental Management Plan. Our criteria is: ALL laboratory faculty, staff, and graduate students must complete training in the Project XL laboratory regulations. Undergraduate students are included only if they are conducting independent study or work-study. EH&S has entered the information into a database and is able to generate the information on a yearly basis for the PI to update thus insuring that our training records are accurate and up-to-date. The last update to the training database occurred in the Spring of 2004. We are overdue in conducting the 2005 update due to staffing constraints in EH&S. We anticipate the next update will occur in the Fall semester of 2005. Based on last years' numbers, the number of laboratory workers trained in the CH/EM Program remains consistent with last year at about 60% but is still lower than the high of 89% in 2002. This change is due to two factors: (a) a more accurate database of laboratory workers and (b) EH&S Department cutbacks that curtailed training initiatives. As always, training also occurs on an informal basis during laboratory pickups and inspections. We anticipate that there will be a great increase in formal training session offered in the coming year due to staffing increases in EH&S and updates to our training database anticipated in September.

Lessons learned:

As long as we are flexible and available to provide training in a variety of settings, we should continue to have a high training rate. Additionally, the use of an accurate database, based on information from the PIs, is critical to insure that we are training the correct population. Even though current formal training numbers are low, it is evident that informal training is highly effective based on laboratory audit scores and by responses on our Environmental Awareness Survey. In addition, we believe that since we trained key personnel (PIs and lab supervisors) early in the project and we have a strong management system in place with clear guidelines and standards we still are able to show good performance overall, especially in a year in which not too many new individuals have been trained.

EPI #8: Environmental Management Program Effectiveness

The following list summarizes progress toward the goals of the XL Program as set for in the Project XL FPA. The Project XL goals have acted as the de facto environmental "objectives" for the EH&S Department with respect to the management of laboratories

- EPI#1. It appears as though there is a sharp decline in outdated chemicals in laboratory--however, it has not been directly measured to date.

- EPI#2. The EH&S Office has a complete chemical inventory from the bar-coding system. All HCOCs have been identified and flagged on the inventories.

- EPI#3. P2 continues to be an area that we would like to improve on. At this point, because of our staffing problems, we are not sure exactly how to proceed. We anticipate trying to get more involvement from the Chemical Hygiene Committee and potentially the Dean of Sciences.

- EPI#4. The amount of laboratory waste collected for reuse has increased substantially, however the amount of laboratory waste reused or redistributed has not yet increased by 20%.

- EPI #5. The amount of laboratory waste disposed of increased slightly in total for 2004 by 1% from 2003 and continues to be an approximate 25% decrease from baseline.

- EPI#6 The Environmental Awareness Survey was completed and the results are similar to survey results from 2004.

- EPI#7. The number of laboratory workers trained in the CH/EM Plan remains at 60%. EH&S believes that there are two reasons for the decrease in number of individuals trained. First, our training database is more accurate now than it has been in the past giving us better data. In addition, it appears as though more PIs are listing a greater number of students that should be trained on the plan than in past years. Second, with the decrease in staff in the EH&S Office, fewer training sessions were conducted.

- EPI#8 Some EPIs are on-track (decrease in laboratory waste disposal, outdated chemicals, internal and external audits); while others like pollution prevention continue to need more attention.

- EPI#9. Audits show significant compliance with the Minimum Performance Criteria of the XL Regulation. Overall results were similar to last year. It appears as though the only way that scores can increase in the future is to implement a large-scale P2 program for all laboratories. It is not clear to us that such a large-scale effort is feasible (e.g., EH&S budget cuts) or effective (e.g., see comments in P2 section regarding informal, small university efforts).

EPI #9: Environmental Management Plan Conformance

Results to date:

UMB EH&S staff conducted annual laboratory inspections in June and July 2005 to measure conformance with the Environmental Management Plan. For 2005, inspections were completed, and the results continue to show progress. See Figure 2.

Again, we utilized the C2E2 "audit grading" system that converts the results of the laboratory audit checklist used by the pilot schools into grades on the issues most important to the Lab-XL project:

- Chemical container management
- Laboratory housekeeping
- Pollution prevention
- Laboratory self inspections
- Training and awareness

This grading system was applied to UMB laboratory inspections previously conducted in 2000, 2001, and 2002. In applying scores to each laboratory for the categories listed above, certain assumptions were made. Since training in the Environmental Management Plan was not initiated until 2001, each laboratory was assigned a score of '0' for the 'Training and Awareness' category prior to 2001. In addition, the UMB pollution prevention program was not initiated until 2001, so each laboratory received a score of '0' for the Pollution Prevention' category prior to 2001.

Certain assumptions were made for the 2002 scores as well. In conducting laboratory inspections, it was often impossible to ascertain whether or not everyone who worked in in a laboratory was trained or not, since some labs were unoccupied at the time of inspection and our training database was incomplete. EH&S personnel relied instead upon the presence of the EMP in a laboratory to determine training status. If the EMP was present in a laboratory, it was assumed that some of its regular occupants had been trained in the new regulations, since the Plan was distributed only at training sessions. Thus, a laboratory was assigned a score of '1' for the 'Training and Awareness' category if the plan was present, and '0' if it was not. In both cases, self-inspection grades were solely based in the one page checklist that laboratories send to EH&S monthly, not on the container self-inspection checklists posted in each laboratory. In many cases, the posted checklists were filled out even if the monthly self-inspection sheets had not been sent to EH&S.

For 2003-2005 inspections, audit forms were completed during the inspection and the scores are based on actual observations for container management, housekeeping and self-inspection. For training, EH&S records were examined. Again for pollution prevention, all laboratories were given a score of 1.

Table 3: 2000 Audit Grading Results at UMass Boston						
Score	**Container Management**	**House-keeping**	**Pollution Prevention**	**Self inspection**	**Training**	**Total Grade**
NA	12					
0	6	12	120	103	120	1
1	39	86		16		20
2	63	22		1		31
3						42
4						25
5						1
6						
7						
8						
Total	**120**	**120**	**120**	**120**	**120**	**120**
Average Score						**2.67**

Table 4: 2001 Audit Grading Results at UMass Boston						
Score	**Container Management**	**House-keeping**	**Pollution Prevention**	**Self inspection**	**Training**	**Total Grade**
NA	9					
0		3		83	50	
1	7	33	104	18	54	
2	88	68		3		1
3						7
4						20
5						34
6						33
7						7
8						2
Total	**104**	**104**	**104**	**104**	**104**	**104**
Average Score						**5.13**

Table 5: 2002 Audit Grading Results at UMass Boston						
Score	**Container Management**	**House-keeping**	**Pollution Prevention**	**Self inspection**	**Training**	**Total Grade**
NA						
0		1		29	33	
1	20	36	98	24	26	
2	70	61		45	39	
3	8					1
4						8
5						19
6						16
7						18
8						24
9						7
10						5
Total	**98**	**98**	**98**	**98**	**98**	**98**
Average Score						**6.73**

Table 6: 2003 Audit Grading Results at UMass Boston						
Score	**Container Management**	**House-keeping**	**Pollution Prevention**	**Self inspection**	**Training**	**Total Grade**
NA						
0	2	1	0	6	0	
1	0	14	96	20	15	
2	5	81	0	70	81	
3	89					
4						
5						1
6						0
7						4
8						18
9						25
10						49
Total	96	96	96	96	96	**96**
Average Score						**9.22**

Table 7: 2004 Audit Grading Results at UMass Boston						
Score	**Container Management**	**House-keeping**	**Pollution Prevention**	**Self inspection**	**Training**	**Total Grade**
NA						
0	0	0	0	22	4	
1	0	24	96	1	1	
2	6	72	0	74	91	
3	90					
4						
5						1
6						4
7						10
8						11
9						11
10						59
Total	96	96	96	96	96	96
Average Score						**9.11**

Table 8: 2005 Audit Grading Results at UMass Boston						
Score	**Container Management**	**House-keeping**	**Pollution Prevention**	**Self inspection**	**Training**	**Total Grade**
NA						
0	0	0	0	6	7	
1	0	8	97	16	5	
2	2	89	0	75	85	
3	95					
4						
5						
6						
7						4
8						8
9						21
10						62
Total	97	97	97	97	97	97
Average Score						9.41

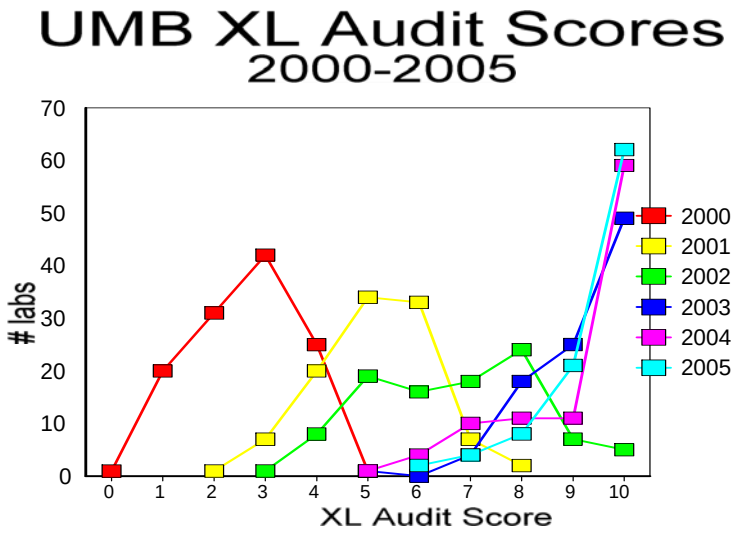

FIGURE 2. Audit scores for the six years of the pilot program.

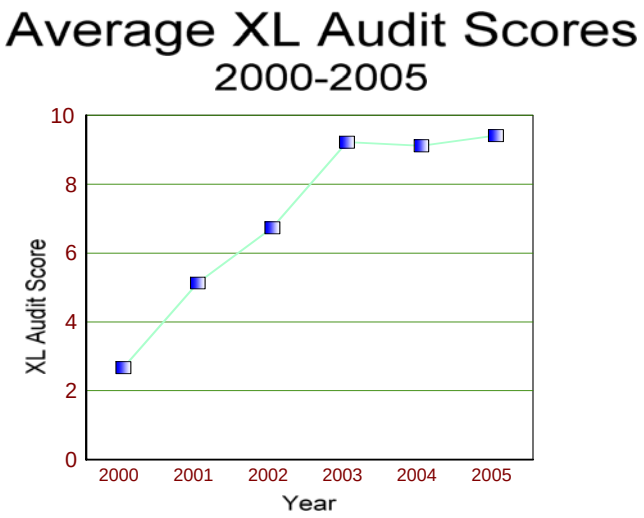

FIGURE 3. Average audit scores for all laboratories from 2000 – 2005.

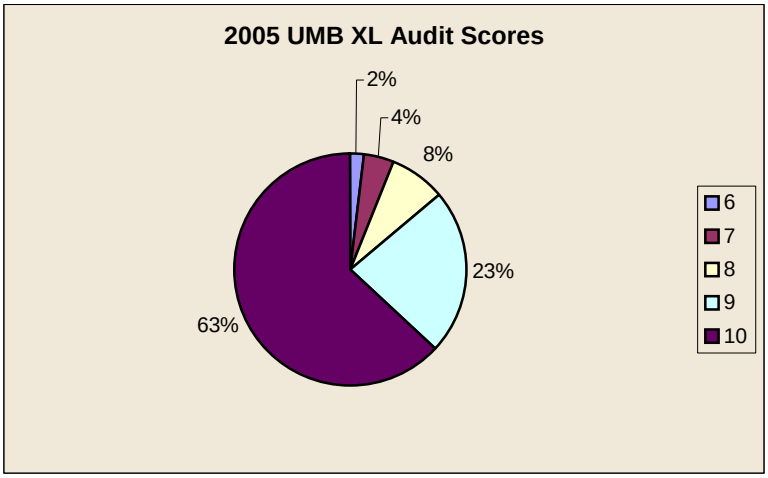

FIGURE 4. 2005 XL Audit Scores for all laboratories. Note that no score was below 6 and 86% scored 9 or 10.

APPENDIX 1

Table 9: UMB Lab Worker Environmental Awareness Survey Spring 2005 (47 Responses)					
Question	**Response chosen (%)**				
1. When I need health/safety information about a chemical I consult (indicate the two most common sources):	*MSDS* 62%	*Merck Manual* 15%	*Hazardous Chemical Desk Reference* 26%	*Supervisor* 38%	*A Lab Colleague 45%*
	Use of toxic chemicals	*Utility use (energy and water)*	*Hazardous waste production*	*Biomedical/sharps waste production*	*Animal waste production*
2. Which of these factors do you think is the largest overall environmental impact of laboratory work:	15%	15%	62%	15%	9%
3. Which of these factors do you think is the largest overall environmental impact of laboratory work:	15%	51%	55%	23%	13%
4. The purpose of a fume hood is to protect (pick the best answer as it applies to your work):	*The laboratory worker* 87%	*Equipment in the laboratory* 34%	*The laboratory building and its occupants* 21%	*The outside environment* 5%	
	1 Strongly agree	**2**	**3**	**4**	**5 Strongly disagree**
5. It is the responsibility of every lab worker to minimize the environmental impact of their work.	91%	4%	2%	0%	2%
6. With careful planning, I would be able to produce 10% less laboratory waste without affecting my research.	23%	17%	21%	13%	6%

Question	Response chosen (%)				
7. Hazardous waste is a necessary byproduct of chemical research.	15%	21%	34%	21%	6%
8. It is important for scientists to find safer chemicals to use in their experiments.	64%	17%	9%	2%	6%
9. It is not my responsibility to make changes in the way my research is done in order to produce less hazardous waste.	9%	2%	11%	28%	49%
10. I have seen articles about pollution prevention in research in my discipline's journals.	32%	11%	22%	13%	11%
11. What is the proper way to dispose of strong mineral acids?	*Dilution with water* 13%	*Neutralization with lime* 28%	*Collection for pick-up by hazardous waste personnel* 62%	*Mixing with organic chemicals* 0%	
12. Ultimately, most chemical wastes generated in laboratories are:	*Incinerated* 21%	*Sent to a landfill* 9%	*Released to a sewer* 4%	*Treated* 72%	
13. In general, the cost of disposal of a chemical is _____ the cost of buying that chemical.	*Less than* 28%	*Equal to* 13%	*A little more (less than twice as much)* 17%	*A lot more (more than twice as much)* 45%	
14. In general, how are fume hood emissions treated before being released to the environment?	*Filtration to remove particles* 43%	*Carbon filtration to remove gases* 32%	*Dilution with laboratory room air* 6%	*Scrubbing to remove particulates, gases and toxics* 21%	
15. Please check the types of laboratory worker training you have received at UMB.	*CH/EM Plan* 38%	*Radiation Safety* 17%	*Biosafety* 30%	*Laser safety* 9%	
16. What is your current role in your laboratory?	*Faculty* 11%	*Staff* 31%	*Grad student* 32%	*Undergrad student* 23%	

17. How long have you been working in a university lab?	*less than 1 year* 21%	*1-2 years* 27%	*3-5 years* 21%	*more than 5 years* 26%	
18. Have you completed an XL Environmental Awareness Survey in the past?	*Yes* 23%	*No* 77%			

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