

# **Knowledge and Awareness of Proper Waste Disposal and Routine Biosafety Measures Among HealthCare Workers in Karachi, Pakistan**

**(JUW-BEP-BSAP Project)**



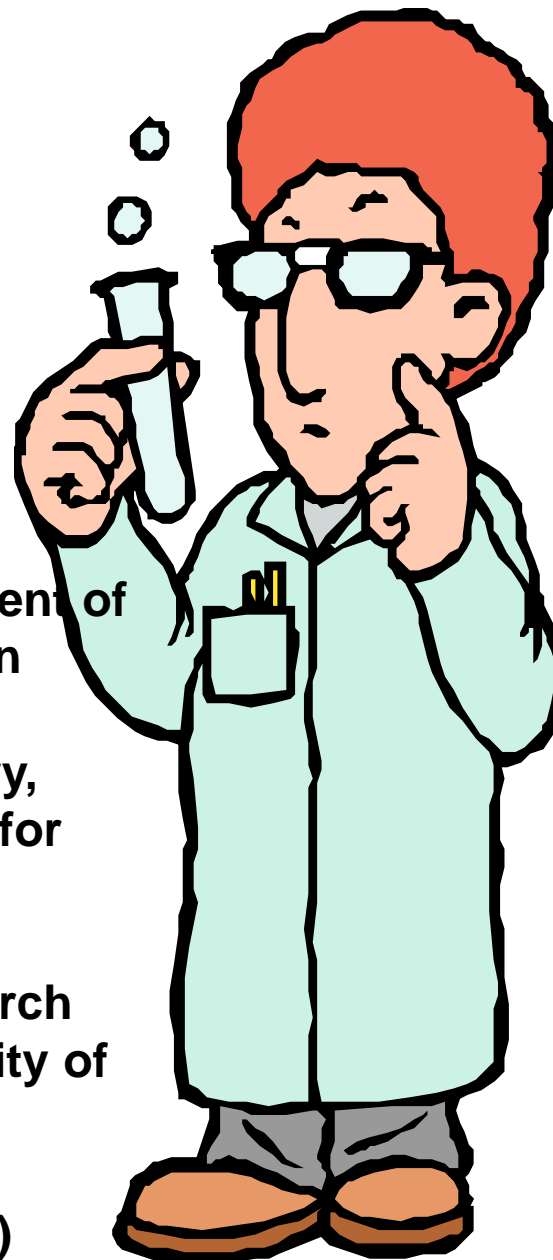
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([www.bsapk.org](http://www.bsapk.org))**



# Health-Care Biosafety

- Personal safety is the right of every concerned and every member of the community has the right to be informed about potential health hazards.
- Promotion of the appropriate handling and disposal of medical waste is important for community health and environment.
- Health-care waste: reservoir of potentially harmful micro-organisms, can infect hospital patients, health-care workers & the general public.



# INTRODUCTION

- Karachi is one of the largest city of Pakistan: both in term of area & population, produces highest amount of waste in the country.
- A series of training workshops have been designed in accordance with the guidelines from BEP-USA to promote the safe, secure and responsible use of biological materials which may be accidental released or intentionally misused.

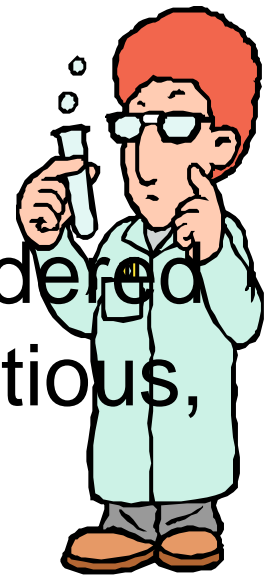


# Current Study

- Current study is the result of first Workshop /Certificate course of the proposed series, primarily designed for the Health Care Workers (HCW) and Waste Management Personnel, Focal Points, and representatives of the state and private sector health care facilities in Karachi.



- In majority of low-income countries, where health-care waste is usually not separated into hazardous and non-hazardous waste, the total health-care waste per person per year is anywhere from 0.5 to 3 kg (WHO Fact sheet N°253 Reviewed November 2007).
- Out of the total health-care waste , only 20% of waste is considered hazardous material that may be infectious, toxic or radioactive.

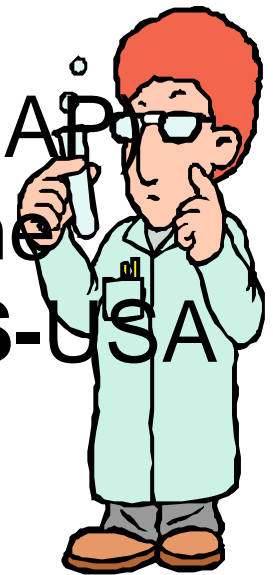


# Metropolitan City of Karachi

- Most of the public and several of private sector healthcare facilities are over utilized with an increasing clientele that comes from outside the city, and also due to explosive mushrooming of substandard diagnostic laboratories, blood banks and medical facilities in the city.
- They handle potentially infectious agents and clinical waste without prior risk assessment and breaches in universal precautions are common in these facilities.



- “Training Workshop On Proper Waste Disposal From Hospitals & Pathological Laboratories In Karachi, Pakistan”
- To address the above mentioned issues Virology & Tissue Culture Laboratory, Department of Microbiology, Jinnah University for Women, Karachi and Bio-Safety Association of Pakistan (BSAP) executed a collaborative project with the financial support from **BEP-USA**, **DOS-USA** and **CRDF** for Health related issues in Developing Countries like Pakistan.





# Selection of Participants of the Training Workshop

- Applicants from some Laboratories where trained biosafety practitioners are working to maintain the standards were not included in the study, preference was given to those who were completely unaware of biosafety and biosecurity practices as identified in PMRC-BSAP

Survey Reports (2010) , and who expressed their desire to get educated about personal safety, appropriate handling and disposal of medical waste to protect their health and the health of the community and environment.



# METHODOLOGY:

- Duration: 11<sup>th</sup> January- 25<sup>th</sup> February, 2011.
- A pre-workshop survey comprised of 50 questions and designed using WHO's standards, BEP's guidelines and Loyola laboratory survey form, was conducted to rule out the available Bio-safety & Biosecurity measures in 250 state and private sector clinical facilities (hospitals & pathological labs.) of the city, especially with reference to the health workers employed in these facilities.



# Methods:

- The whole questionnaire was divided into four sections:
  1. Standard microbiological practices
  2. Special practices
  3. Safety equipments (Primary barriers), and
  4. Laboratory facilities (Secondary Barriers)
- End of the workshop/ post workshop survey was designed by BEP coordinators in order to evaluate the effectiveness of the workshop.



# Interactive Workshop Q&A Session



# Prof. Shazia Hakim – Co-ordinator of Workshop briefing the participants



# During the training Workshop



# Post Workshop Survey Results



# Spill Management Demo.





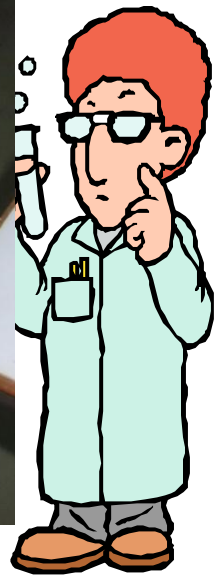
# Workshop Lecture Session :Dr.Khanani



# BSL-2 Level training Set-Up



# PPE Demo. In Progress

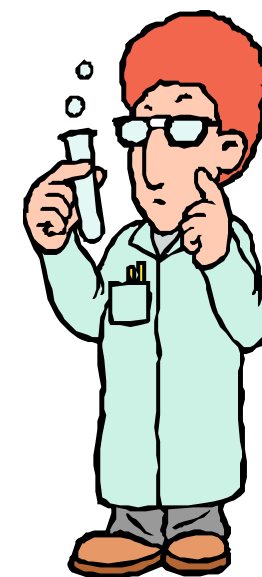


# Workshop Certificate Distribution



**Table 1 Standard Microbiological Practices in Laboratories of Karachi (Section A )**

Question No.	Question	Positive Answers	Chi-square (a)	P-Value
1	Access to laboratory is limited or restricted	163(65.2%)	23.104	0
2	Use of gloves in routine	75(30%)	40	0
3	Washing of hands during laboratory procedures	213(85.2%)	123.904	0
4	Eating, drinking, smoking, handling contact lenses, applying cosmetics prohibited	25(10%)	160	0
5	Mouth pipetting is prohibited	113(45.2%)	2.304	0.129
6	Policies for safe handling of sharps	83(32.2%)	28.224	0
7	Careful procedures to minimize the creation of aerosols	15(6%)	193.6	0
8	Work surfaces are decontaminated at least once a day or on spill	175(70%)	40	0
9	Regulated wastes are decontaminated before disposal by an approved method	55(22%)	78.4	0
10	Effective insects and rodent control program	175(70%)	40	0



# SPECIAL PRACTICES

- 85.2 %(n=213) of the labs. follow precautions: closure of doors of labs during experiments progression ,control of access of labs is under the control of lab director and persons who are at increased risk of having infections are restricted to enter labs
- 87.2% (n=218) of directors establishes policies and procedures to avoid potential biohazards .



- 53 % (n=133) of labs have a hazard warning sign posted to warn workers,
- 0 % (n=25) labs professionals receive regular immunization for agents handled in the labs.
- Serum samples are collected and stored for all laboratory staff or persons at risk in approximately 1% (n=3) of labs.
- 5% (n=13) of labs. have approved
- bio safety manual including preparations and standard procedures.



- 3.2% (n=8) of lab workers received appropriate training on hazard associated in labs.
- Only in 10% of Director ensures that before working in BSL 2/3 person get proficiency in microbiological practices and techniques and operations specific to lab facility.



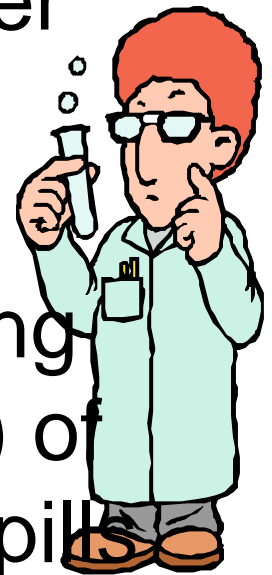


# Survey Results

- 56 % (n=140) have knowledge that they should be very much careful when handling sharp instruments and that plastic wares should be substituted for glassware.
- 9% (n=23) of labs. use needle locking syringes or syringe-needle units are used for injection or aspiration of fluids 7 % (n=18) of labs. Use other safe devices.



- 8% (n=20) of labs follow proper procedure of disposing off of broken glass wares mechanically using tongs and forceps.
- Only 2 % (n=5) of labs use biological safety cabinets when working with infectious material and cleaning of these areas is done with plastic backed paper towels.
- 67.2% (n=168) of the labs follow decontamination of lab equipment using effective disinfectant . Only 2% (n=18) of labs. use proper decontamination of spills involving infectious materials.

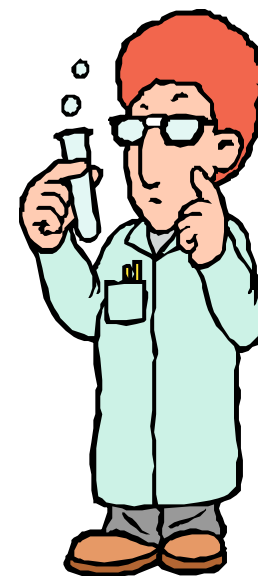


- 10% (n=25) of labs decontaminate contaminated equipments and materials before removal.
- Cultures, body fluids kept in leak proof containers to avoid leakage during transportation .
- 90%(n=225) of lab. Spills and accidents, are reported to director which evaluate provides treatment and records maintained in 75.2%(n=188) of labs.
- Animal and plants are not involved in work areas in 98% (n=245) of labs.



**Table 3 Safety Equipments (Primary Barriers) in Laboratories of Karachi  
(C Section)**

Question No.	Question	Positive Answers (%)	Chi-square (a)	P-Value
1	Protective laboratory clothing are worn by workers	13 (5.2%)	200.704	0
2	Gloves must be worn when handling infectious material	150 (60%)	10	0
3	Frequent changing of gloves	15 (6%)	193.6	0
4	All manipulations of infectious materials are conducted in biological safety cabinet	15 (6%)	193.6	0
5	In the absence of biological safety cabinet appropriate combinations of PPE are used	20 (8%)	176.4	0
6	Respiratory and face protection are used	13(5%)	200.704	0



## LABORATORY FACILITIES (SECONDARY BARRIERS)

- Access to lab is restricted and self closing doors in laboratory are present in 1.2 % ( n=3) of labs.
- 4% (n=10) of labs contains a sink for hand washing which are located near the doors.
- Interior surfaces of walls floors ceilings are washable and made smooth and impermeable to liquids and resistant to chemicals and disinfectants, penetration in walls and ceilings surfaces are sealed and any spaces between doors and frames are sealed to prevent decontamination in 72% (n=180)of labs.
- 98%(n=245) of labs have impervious bench tops which are resistant to moderate heat ,organic solvents ,acid ,alkalis used primarily to decontaminate work surfaces and equipments.

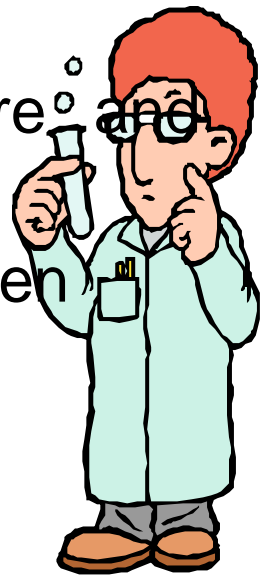


- 83.2% (n=208) of labs. have furniture capable of supporting loadings and accessible for cleaning, chairs and furniture are covered with non- fabric material that is easily decontaminated.
- 89% (n=224) of all labs have windows closed or sealed
- 80% (n=200) of labs follow proper procedure of decontaminating lab materials.
- Biosafety cabinets are present in 4% (n=10) of labs and are located near doors.
- Air ventilation systems that directs clean air from outside towards contaminated areas and through HEPA filters- it gets outside, equipments that may produce aerosols, are handled in safety cabinets in 5 % (n=12)of labs.
- HEPA filters are replaced frequently in 8% (n=20) of labs.
- 3 % ( n=8) of labs have an eye wash station
- 76 % (n=190) have adequate illumination for all activities



# POST- WORKSHOP SURVEY:

- Post-workshop survey was designed by Biosecurity Engagement Program Coordinators and was conducted after completion of the training on waste disposal.
- It was divided into three sections:
  1. Satisfaction with the training program
  2. Results and future plans, and
  3. Recommendations.
- 17 questions were asked in the survey questionnaire and the response rate was 100%.
- Topics like waste segregation, blood-borne pathogen safety, spill response and Operational biosafety practices were welcomed by all.

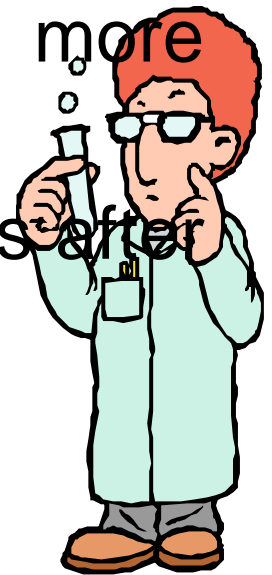


- Majority said that the training provided opportunities to exchange ideas and the training workshop logistics and its overall organization was very good.
- More than 90% participants respond that their overall knowledge after completing the course has increased.
- Almost 95% of participants said that they will share the information and knowledge gained at the workshop with their staff and colleagues, and will also initiate joint projects to implement new strategies for proper waste disposal.





- On the whole the situation is not very promising. Our end of the workshop survey comprised of questions related to level of awareness before and after, introduction to PPEs, concepts of biosafety and biosecurity, use of basic biosafety measures etc.
- The participants who were selected employees of the hospitals and laboratories, were more aware about the personal safety, waste segregation and safe sharp practices after the workshop.



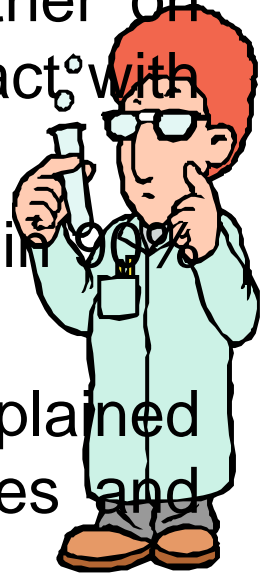
# End of the Workshop Survey

- It was also noted that many of the participants even have not seen different kinds of face masks, and labeled/ un-labeled autoclavable biohazard bags and were not able to distinguish between simple polyethylene made disposable gloves, surgical gloves and examination gloves on the basis of their need and requirements, before the workshop.
- More than 90% participants stressed on more trainings and appreciated the workshop organizers for conducting such a valuable training course.



# CONCLUSION:

- We were not surprised by the results as use of personal protective equipment is not practiced in majority of the facilities (89%), 95% of the hospitals (majority located in moderate to low socio economic areas of the city ) dumped their waste openly inside or outside the premises without proper prior treatment like autoclaving or disinfection.
- Local municipality vehicles collect that waste either on daily or weekly basis, depending upon the contract, with the hospital administration.
- Properly designed storage areas are just a luxury in 90% of facilities.
- Most of the health care workers personnel complained that they were not provided even with the gloves and masks while, handling infectious waste.



- Only 20 (8%) laboratories out of the 250 surveyed facilities had biosafety cabinets and had well maintained waste management plans.
- On the whole we concluded that Health care waste Management and close monitoring is not the only solution, we have to create awareness about the importance of biosafety and biosecurity among the Lab. /hospitals/health care set-up managers , owners ,CEOs , Local Municipal authorities and make them realize their responsibilities . Mass scale education, motivation and sense of ethics among both the stake holders and the Health Care Workers (HCWs), may help to reduce the risk of deadly but preventable infections in our community.



# JUW- BEP- BSAP Workshop

- This JUW-BEP-BSAP joint Workshop / Certificate course conducted was another step towards promoting human, animal agri-biosafety in addition to more than 18 Biosafety Awareness Training Programs which have been successfully organized in different Universities, Hospitals and R&D , Agriculture and Veterinary Institutions of Pakistan and we hope to continue our efforts in future to serve the community.



# ACKNOWLEDGEMENT

## Biosecurity Engagement Program (BEP),

1. **Civilian Research and Development Foundation (CRDF), and**

2. **Department of State (DOS)-USA**

for their financial and moral support to organize the waste disposal workshop.

1. **Dr. Robert Hackert** for providing guidelines for development of workshop curricula.

2. **Prof. Dr. Naeem Farooqui**, Vice Chancellor-JUW and Mr. Wajeeh Ahmed Administrator of Jinnah University for Women, Karachi, Pakistan for providing us space, moral and complete administrative support to organize the workshop at JUW.



**Thank you for your time and  
contribution to  
Human , Animal , Agricultural  
and Enviromental  
Biosafety & Biosecurity**

