

Biorisk Management Initiation Training

for Graduate and Undergraduate Medical and
Co-medical Students in Japan



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Background

Challenges for biosafety environment

They say:

- No worries. There's no major accident, so our lab is safe
- To reduce incidence, we substitute "real" to "mock" pathogen in teaching labs to make it "safe"
- Too busy and no financial support for introducing something new

- Lack of risk recognition and the biorisk assessment based risk management system concept
- Repeated incidents and accidents in teaching and diagnostic laboratories
- Introduction of the legal requirements for pathogen possession and handling
- Resulted in less experienced personnel in BSL2 level labs working with clinical samples with unidentified pathogens

we have and will have public health problems...

Aim



To provide introduction to the systematic training of biorisk management to the students of the clinical laboratory technician to be



To test effectiveness of the multi-methods teaching approach on short and long term knowledge retention of the students



To share a small cohort results of the in-course biosafety education units for post graduate students



Study design

- ➔ **Style:** Small cohort intervention, follow-up study
- ➔ **Period :** 2010 Dec to 2012 Jan (on going)
- ➔ **Place :** Graduate School of Kyushu University, Japan
- ➔ **Subject:** 18 Master course students
- ➔ **Course duration:** 6 Units from 2 existing practical lectures were used for introductory biosafety
- ➔ **Learning evaluation:** Pre-, post- and a year later exam with same set of questions



Subjects

1. Graduate Students of Medical Technology Course,
Department of Health Sciences, Graduate School of
Medical Sciences (N=18, Gender Ratio 5:13, Age 22-23yrs)
 - ✎ 2010 cohort n= 6
 - ✎ 2011 cohort n= 5
 - ✎ 2012 cohort n= 7
2. Majority will work as clinical laboratory technician
3. Good Microbial Practice trained as a part of technical training
4. No biosafety education nor training



Learning objectives

Upon completion of the course assignment, students will be able to:

-  Identify biorisks and risks in the laboratory environment
-  Conduct crude risk assessment for their work and working environment
-  Explain the assessment outcome and selection of mitigation measures
-  Demonstrate biosafety in given laboratory accident settings



Syllabus and teaching methods

0.3u	Pre course exam	Written exam
0.5u	Introduction to the biorisk management: definition and concept	Power point based self-learning + class room lecture
0.5u	Basics of biorisk assessment: likelihood and consequence	Short lecture + group exercise
0.8u	Risk assessment practice	Individual exercise + presentation, challenge and defend
0.1u	Homework: risk identification and assessment	Scenario solving + group discussion
0.7u	Shipping rules and triple packaging (domestic regulations)	Hands on exercise
0.5u	Introduction to the biorisk management: AMP, PDCA and mitigation measures	Visual materials + interactive lecture
0.6u	Engineering control	Problem solving (designing your lab)
0.4u	Communication in procedure control	SOP communication game
0.5u	Overview	Class room lecture + Q&A
0.8u	Emergency response basics	Spill handling practice
0.3u	Post course exam	Written exam

Exam Questions

- 🏆 Define biorisk
- 🏆 Identify bio-hazard from the scenario
- 🏆 What is the most important biorisk management steps
- 🏆 Perform qualitative risk assessment on given situation
- 🏆 What is the packing method for dangerous pathogen for shipping
- 🏆 What will you do and why under given situation (risk assess, choose mitigation measures and prioritize)
- 🏆 Choose correct answer for the given scenario
- 🏆 Reorder listed mitigation measures from higher/wider protection to lower with consideration to the practical reality
- 🏆 Explain tips for writing standard operating procedures for your laboratory

Collaborator

Mika Kigawa ----- University of Toyama



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Results

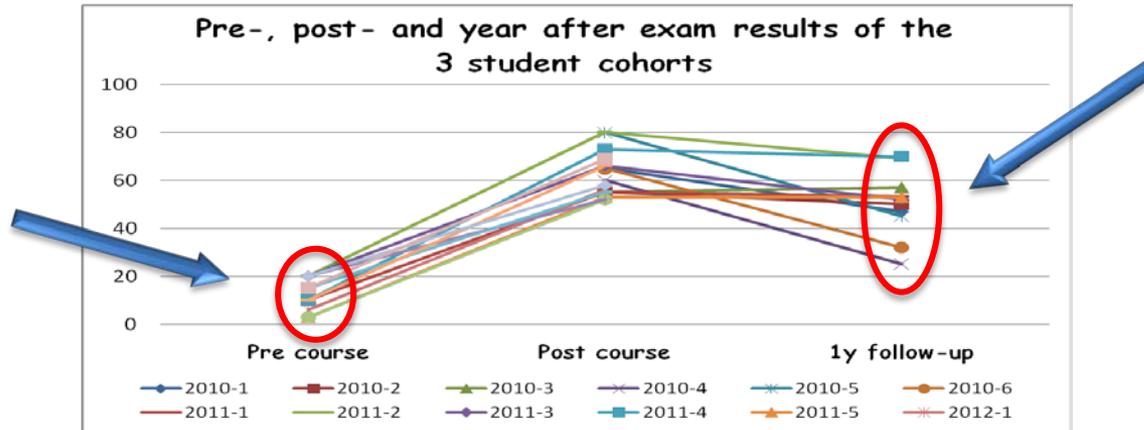


Cumulative data of 18 students exam outcome

	Pre (n=12)*	Post (n=18)	1Y (n=11)**
Average points	12.67	61.94	64.27
SD	±6.60	±9.08	±13.45
Range	[3, 20]	[52, 80]	[25, 70]
Mode	20	55	53



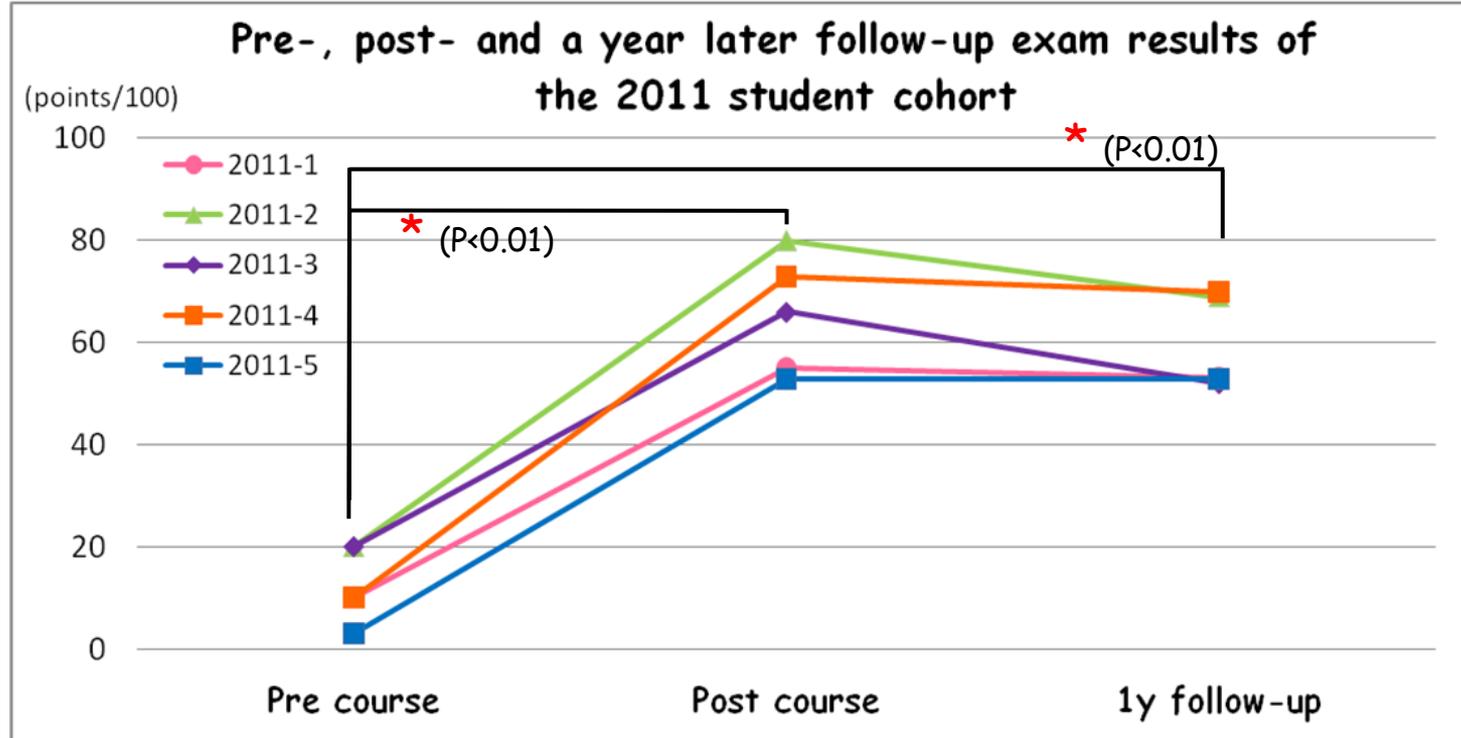
Time trend of each student



Results 2



Focus on a cohort of 2011



*Analyzed by repeated measure ANOVA, then by post-hoc paired t test (Tukey's test)

Discussion 1

Limitation:

- ➡ One course and one cohort each per year (limited opportunity)
- ➡ Daily behavior and practice is not able to observe
- ➡ Multifactorial intervention (new lecture, several teaching methods employed)
- ➡ Strongly trainer availability dependent

Discussion 2

Pros:

- ➔ First step to be included in formal educational programme
- ➔ Good attendance and acceptance of students (though said difficult)
- ➔ Preliminary results shows knowledge (including problem solving ability) remains for a year with statistical significance
- ➔ The background of the subjects were standardized by choosing students who start from the "close to zero knowledge".

Discussion 3

Cons and challenges:

- ✎ Lack of experience in debating and discussion, no culture of risk assessment in working environment (no place to use gained knowledge)
- ✎ Need to wait for a cohort every year (the data pooling takes time)
- ✎ Not all teaching methods are published, available, validated its effectiveness
- ✎ Comparative study for teaching programme evaluation was not possible for our setting
- ✎ Students are only one example. Biosafety involves people from wide range of background. Establishing one single standard system for "training for everybody" may not easy

Conclusion

This 6 units lecture and practice is the first in the country to imbed biosafety and biosecurity education in the laboratory practice course. The result presented learning objectives were met at acceptable level by current teaching methods and programme.

We would hope to continue this course and further expand along side with higher education for laboratory technicians.

In addition, our effort shall be put into introduce new and innovative approach for biosafety educational methods to the course.