UNIVERSITY OF KENTUCKY

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COLLEGE OF PUBLIC HEALTH

M E M O R A N D U M

TO: **Health Care Colleges Council**

FROM: **Linda A. Alexander, EdD**
Associate Dean for Academic Affairs

SUBJECT: **Proposal for New Course: CPH 622 Toxic Agents and Public Health**

DATE: **April 23, 2010**

The College of Public Health wishes to establish a new course: CPH 622 Toxic Agents and Public Health.

This course provides an overview of chemical agents within the environment, their interaction with the human organism, and resultant public health implications. The goal of this course is to utilize toxicological information to create, understand, and explain control strategies that protect and improve public health.

The course proposal has been reviewed and approved by the Academic Affairs Committee and the Faculty Council, according to our college's established bylaws.

Further information about this course can be obtained by contacting the course director, Dr. Terry Bunn.

Office of the Dean
121 Washington Ave., Suite 112 · Lexington Kentucky 40536-0003
(859) 218-2247 · *fax* (859) 323-5698
www.mc.uky.edu/PublicHealth
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COLLEGE OF PUBLIC HEALTH

M E M O R A N D U M

TO: Linda Alexander, EdD
Associate Dean for Academic Affairs

FROM: Graham D. Rowles, PhD
Chair, Faculty Council

SUBJECT: Approval – New Course Proposal CPH 622 Toxic Agents in Public Health

DATE: April 20, 2010

At its meeting on March 9, 2010, the Faculty Council approved the following new course proposal:

CPH 622 Toxic Agents in Public Health

This is now ready to proceed to the next stage of the approval process. Please do not hesitate to contact me if you need additional information or clarification.

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M E M O R A N D U M

TO: Linda Alexander, EdD
Associate Dean for Academic Affairs

FROM: James Holsinger, MD, PhD
Chair, Academic Affairs Committee

SUBJECT: Approval – New Course Proposal CPH 622 Toxic Agents in Public Health

DATE: March 2, 2010

At its meeting today, the Academic Affairs Committee approved the following new course proposal:

CPH 622 Toxic Agents in Public Health

This is now ready to proceed to the next stage of the approval process. Please do not hesitate to contact me if you need additional information or clarification.

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APPLICATION FOR NEW COURSE

1. Submitted by the College of Public Health Date: 02/17/10

Department/Division proposing course: Preventive Medicine and Environmental Health

2. Proposed designation and Bulletin description of this course:

a. Prefix and Number CPH 622

b. Title* Toxic Agents and Their Implications in Public Health

*If title is longer than 24 characters, offer a sensible title of 24 characters or less: Toxic Agents & Public Health

c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week..

(___) CLINICAL (___) COLLOQUIUM (___) DISCUSSION (___) LABORATORY (3) LECTURE

(___) INDEPEND. STUDY (___) PRACTICUM (___) RECITATION (___) RESEARCH (___) RESIDENCY

(___) SEMINAR (___) STUDIO (_____) OTHER – Please explain:

d. Please choose a grading system: ☒ Letter (A, B, C, etc.) ☐ Pass/Fail

e. Number of credit hours: 3

f. Is this course repeatable? YES ☐ NO ☒ If YES, maximum number of credit hours: _____

g. Course description:

This course provides an overview of chemical agents within the environment, their interaction with the human organism, and resultant public health implications. The goal of this course is to utilize toxicological information to create, understand, and explain control strategies that protect and improve public health.

h. Prerequisite(s), if any:

CPH 601 Occupational and Environmental Health I

i. Will this course also be offered through Distance Learning? YES ☐ NO ☒

If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based ☐ Interactive video ☐ Extended campus ☐

3. Supplementary teaching component: ☐ N/A or ☐ Community-Based Experience ☐ Service Learning ☐ Both

4. To be cross-listed as: N/A / _____

Prefix and Number printed name Cross-listing Department Chair signature

5. Requested effective date (term/year): Spring / 2011

APPLICATION FOR NEW COURSE

6. Course to be offered (please check all that apply): ☐ Fall ☒ Spring ☐ Summer

7. Will the course be offered every year? ☒ YES ☐ NO

If NO, please explain: _____

8. Why is this course needed?
Students in the MPH program in the Environmental Health concentration need more content in public health implications of toxic agents.

The students will become familiar with the characteristics of toxic agents commonly encountered in public health practice.

9. **a.** By whom will the course be taught? A faculty member in the Department of Preventive Medicine located within the College of Public Health

b. Are facilities for teaching the course now available? ☒ YES ☐ NO

If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?

10 students

11. **a.** Will this course serve students primarily within the department? ☒ Yes ☐ No

b. Will it be of interest to a significant number of students outside the department? ☒ YES ☐ NO

If YES, please explain.
MPH students in other depatrments of the College of Public Health might also be interested in the effects of chemical exposures on public health.

12. Will the course serve as a University Studies Program course[†]? ☐ YES ☒ NO

If YES, under what Area? _____

[†]AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.

13. Check the category most applicable to this course:

☒ traditional – offered in corresponding departments at universities elsewhere

☐ relatively new – now being widely established

☐ not yet to be found in many (or any) other universities

14. Is this course applicable to the requirements for at least one degree or certificate at UK? ☒ Yes ☐ No

15. Is this course part of a proposed new program? ☐ YES ☒ NO

If YES, please name: _____

16. Will adding this course change the degree requirements for ANY program on campus? ☐ YES ☒ NO
If YES[‡], list below the programs that will require this course:

APPLICATION FOR NEW COURSE

‡In order to change the program(s), a program change form(s) must also be submitted.

17. ☒ The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.

18. ☐ Check box if course is 400G or 500. If the course is 400G- or 500-level, *you must include a syllabus showing differentiation* for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4)*

19. Within the department, who should be contacted for further information about the proposed new course?

Name: Terry Bunn Phone: 859-257-4955 Email: tlbunn2@uky.edu

20. Signatures to report approvals:

DATE of Approval by Department Faculty	printed name	/	Reported by Department Chair	signature
DATE of Approval by College Faculty	printed name	/	Reported by College Dean	signature
* DATE of Approval by Undergraduate Council	printed name	/	Reported by Undergraduate Council Chair	signature
* DATE of Approval by Graduate Council	printed name	/	Reported by Graduate Council Chair	signature
* DATE of Approval by Health Care Colleges Council (HCCC)	printed name	/	Reported by Health Care Colleges Council Chair	signature
* DATE of Approval by Senate Council			Reported by Office of the Senate Council	
* DATE of Approval by University Senate			Reported by Office of the Senate Council	

*If applicable, as provided by the *University Senate Rules. (http://www.uky.edu/USC/New/RulesandRegulationsMain.htm)*

Signature Routing Log

General Information:

Course Prefix and Number: CPH 622

Proposal Contact Person Name: Becki Flanagan Phone: 218-2092 Email: becki@uky.edu

INSTRUCTIONS:
Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Department of Preventive Medicine and Environmental Health	2/13/2009	Robert McKnight/218-2100/rmcknig@uky.edu	
Academic Affairs Committee	10/5/2009	Jim Holsinger/323-6314/jwh@email.uky.edu	
Faculty Council	10/15/2009	Graham Rowles/218-0145/growl2@email.uky.edu	
Academic Dean	4/23/2010	William Pfeifle/218-2054/pfeifle@uky.edu	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[6]
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[6] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

Signature Routing Log

General Information:

Course Prefix and Number: CPH 622

Proposal Contact Person Name: Terry Bunn, PhD Phone: 257-4955 Email: tbunn2@uky.edu

INSTRUCTIONS:
Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Department of Preventive Medicine and Environmental Health		Robert McKnight/218-2100/rmcknig@uky.edu	
Academic Affairs Committee		Jim Holsinger/323-6314/jwh@email.uky.edu	
Faculty Council		Graham Rowles/218-0145/growl2@email.uky.edu	
Academic Dean		William Pfeifle/218-2054/pfeifle@uky.edu	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[6]
Undergraduate Council			
Graduate Council		2010.11.05 14:11:36 -04'00'	
Health Care Colleges Council	9/21/10		
Senate Council Approval		University Senate Approval	

Comments:

UNIVERSITY OF KENTUCKY
COLLEGE OF PUBLIC HEALTH

Draft, Subject to change

Course Syllabus
CPH 622 Toxic Agents and Their Implications in Public Health
Spring 2011

Building/ Rm TBD, Thursdays 12-2:30pm,

Credit hours: 3 semester hours

Contact information

Instructor: Terry Bunn, Ph.D.
Assistant Professor, Preventive Medicine and Environmental Health
333 Waller Ave.
Suite 242

And guest speakers

Telephone: 859-257-4955

E-mail: tlbunn2@uky.edu

Office Hours: Tuesdays 2-4pm or by appointment

The preferred method for students to contact me is through e-mail.

Course description

This course provides an overview of chemical agents within the environment, their interaction with the human organism, and resultant public health implications. The goal of this course is to utilize toxicological information to create, understand, and explain control strategies that protect and improve public health.

Course prerequisites

CPH 601 Occupational and Environmental Health I

Course objectives

Upon completion of this course, the learner will:

1. Understand the characteristics of commonly encountered toxic agents in public health practice
2. Demonstrate a basic understanding of exposure to toxic agents including absorption, distribution, biotransformation and excretion of toxic agents, and the ecological distribution of toxic agents within the environment
3. Assess the public health consequences of toxic agents through:
    a. analysis and critique of published case studies
    b. policy development including regulation and product safety
    c. environmental ethics/environmental justice

Public Health Competencies

This course addresses the following Public Health Competencies in Environmental Health:

1. Describe the direct and indirect human, ecological, and safety effects of major environmental and occupational agents.
2. Specify current environmental risk assessment methods.
3. Describe genetic, physiologic, and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.
4. Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity.
5. Explain the general mechanisms of toxicity in eliciting a toxic response to various environmental exposures.
6. Describe federal and state regulatory programs, guidelines, and authorities that control environmental health issues.

Textbooks

Assigned Reading

All assigned readings must be completed before our class meetings to facilitate adequate discussion of the material presented. Additional materials such as handouts and websites will be made available and assigned throughout the course. These materials will supplement lecture material.

Required Textbook

The required textbook that will be used for this course is:

Richards, I.S. 2008. *Principles and Practice of Toxicology in Public Health,* Jones and Bartlett Publishers, Inc.: Sudbury, MA.

Supplementary Textbooks (not required)

Hughes, W.W. 1996. *Essentials of Environmental Toxicology: The Effects of Environmentally Hazardous Substances on Human Health*. CRC Press. Danvers, MA.

Greim, H., Snyder, R. 2008. *Toxicology and Risk Assessment: A Comprehensive Introduction*. John Wiley and Sons, Ltd., West Sussex, England.

Klaasen, C.D. 2008. *Casarett & Doull's Toxicology: The Basic Science of Poisons.* Seventh Edition. McGraw-Hill Companies, Inc.

Useful Websites

Integrated Risk Information System (USEPA)
http://www.epa.gov/ncea/iris/index.html

National Center for Environmental Assessment
http://cfpub.epa.gov/ncea/

National Toxicology Program
http://ntp.niehs.nih.gov/

Scorecard
http://www.scorecard.org/

Course requirements and learner evaluation

Course grades will be based upon evaluation of the following activities:

100-90 points=A
89-80 points=B
79-70 points=C
0-69 points=E

The course grade is based on:

Group presentation	20 points
Research paper	25 points
IRIS project	25 points
Final exam	30 points
Total	100 points

Group Presentation (20 points)
A group presentation based on the critique of current events from a newspaper and/or magazine article related to toxicology will be due on 2/9/11 during class. Each group will consist of three members and will be responsible for the critique of an article. The article should pertain to the environmental or occupational effects of a chemical agent. Examples include 1) diacetyls in butter flavoring and the development of respiratory disease in workers; 2) PCBs in the Hudson river; and 3) pesticide exposure and the development of Parkinson's disease.

For each article critiqued by the group, the presentation should contain, and will be graded, on the following elements:

SOURCE OF ARTICLE- name the newspaper or magazine
CONTENTS (2 points) - describe what the article is about
TOXICOLOGICAL INFORMATION (6 points) - describe the route of exposure, absorption, metabolism, distribution, and excretion of the chemical agent
CRITIQUE (12 points) - What arguments does the author use to support his article? Is the argument logical and accurate? Is the argument fair?

Research Paper (25 points)
A 10-page research paper (double-spaced, 1 inch margins, 12-point font) will serve as the mid-term exam for the course and will be due on 3/9/11 at noon. The topic for the paper will be based on a specific chemical agent from the list of chemical agents below or one approved by the course instructor. The paper will be based on published findings in peer-reviewed literature pertaining to the chosen chemical and should contain your synthesis and analysis of the published literature. The paper should contain the following elements:

1. Introduction (1 point)
2. Properties of the Chemical Agent (1 point)
3. Toxicological Profile of Chemical Agent (2 points)
    a. route of exposure
    b. absorption
    c. metabolism
    d. distribution
    e. excretion
4. Systemic toxicity of Chemical Agent (5 points)
5. Health effects of Chemical Agent (6 points)
    a. Children
    b. Adults
    c. Elderly
6. Public health measures to reduce exposures and/or reduce health effects (6 points)
7. Conclusions (3 points)
8. Bibliography (1 point) (separate page)

a. At least 10 references should be used.

Note: Papers are due at the beginning of class on March 9th. Late papers will have 3 points deducted for each hour late.

Suggested Chemical Agents

Aflatoxin	Bisphenol A	TCDD	Mirex	Atrazine
Asbestos	Lead	Firemaster BP-6	Pentachlorophenol	Benzene
Mercury	Vinyl chloride	Malathion	Aldrin	Toluene
Nickel	Silica	Parathion	Dieldrin	Acetone
PCBs	Hexachlorobenzene	Methyl parathion	Tributylin oxide	Carbon tetrachloride
Thalidomide	Arsenic	Diazinon	Carbaryl	TCE
Diethylstilbestrol	Halothane	Chlordane	Aldicarb	Cocaine
Ethanol	Cadmium	DDT	Mancozeb	Tobacco smoke

IRIS Project Research Paper (25 points)
You may choose a chemical that is listed on the Integrated Risk Information System (IRIS) website. The website is located at:

http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showSubstanceList

A summary document for each chemical can be accessed under the "IRIS Summary" icon. For your chosen chemical, a review, summary, and critique of the IRIS summary document should be performed. The research paper should be 8 pages long with 1 inch margins, double-spaced, and 12-point font. Papers over 8 pages long will not be accepted.

The paper should contain the following:

1. Your justification for choosing your chemical

2. Choose one of the attributes of your chemical below to critique:
    a. Oral reference dose (RfD) (principal and supporting studies, uncertainty and modifying factors, additional studies/comments, confidence, EPA documentation and review of the oral RfD)
    b. Reference concentration (RfC) (principal and supporting studies, uncertainty and modifying factors, additional studies/comments, confidence, EPA documentation and review of the oral RfD)
    c. Carcinogenicity (evidence for human carcinogenicity, quantitative estimate of carcinogenic risk from oral exposure, quantitative estimate of carcinogenic risk from inhalation exposure, and EPA documentation, review, and contacts (Carcinogenicity Assessment))

3. Critique your chosen attribute (RfD, RfC, or carcinogenicity) by level of agreement with the level of confidence for your chemical and justify your position. What studies were performed to determine the level of confidence? What other studies should be performed to address gaps in knowledge regarding the physiological effects of your chemical?

4. Explain the degree of hazard(s) posed by your chosen attribute to the general public, including infants and children. This exercise will enable you to answer questions on topics such as the risk of cadmium in toy jewelry, phtalates in baby bottles, or asbestos in tiles by making technical data accessible to patients, clients, or customers such as elected officials, or other policy makers who do not have a science background.

5. Use your own words for your critique.

6. Your chosen chemical should receive instructor approval by 3/23/11.

Note: Papers are due at the beginning of class on April 20th. Late papers will have 3 points deducted for each hour late.

Final exam (30 points)

The final exam will cover all lectures, required readings, and discussions, and will be worth 30 points. The final exam will be held in the classroom and the duration will be 2 hours.

Classroom Behavior

Respect for other's opinions and civility is expected of all students and lecturers in the course. Students have the right to voice their opinions and may take reasoned exception to opinions according to university policy (S.R. 6.1.2).

Instructor expectations

1. I expect you to attend every class session. The components are highly interrelated; missing a class will detract from the learning potential of subsequent sessions.
2. I expect you to be in the classroom and prepared to begin work at the scheduled starting time for each session.
3. I expect you to actively participate in the discussions. This is not the type of class where you can "sit back and listen."
4. I expect you to submit papers using proper English grammar, syntax, and spelling. You are encouraged to use spell check and grammar check prior to submitting your written work. The Writing Laboratory is available to anyone who may need

assistance. Grammar, syntax, and spelling will account for 10% of the grade for written work.

5. I expect (and encourage) you to provide honest and timely feedback regarding the content and process of this course throughout the semester.
6. I expect you to share in the responsibility for making this course an enjoyable and beneficial learning experience.
7. Wikipedia *cannot* be used as a cited reference as noted by a co-founder of Wikipedia! You may use Wikipedia to identify appropriate source material. Remember Wikipedia is *not* peer reviewed!
8. I require that each leaner will utilize the *APA Publication Manual* as a guide for writing papers for this course and the grading rubric will be based on its precepts.

Academic honesty

Academic honesty is highly valued at the University. You must always submit work that represents your original words or ideas. If any words or ideas used in a class assignment submission do not represent your original words or ideas, you must cite all relevant sources and make clear the extent to which such sources were used. Words or ideas that require citation include, but are not limited to, all hard copy or electronic publications, whether copyrighted or not, and all verbal or visual communication when the content of such communication clearly originates from an identifiable sources. Please see the University's policies concerning the consequences for plagiarism. Source: www.uky.edu/ombud/plagerism.pdf Policy: www.uky.edu/usc/new/rulesandregulationsmark.htm

Accommodations

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, submit to me a Letter of Accommodation from the Disability Resource Center (www.uky.edu/TLC/grants/uk_ed/services/drc.html). If you have not already done so, please register with the Disability Resource Center for coordination of campus disability services available to students with disabilities.

Inclement weather

The University of Kentucky has a detailed policy for decisions to close in inclement weather. The snow policy is described in detail at http://www.uky.edu/PR/News/severe_weather.htm or you can call (859) 257-5684.

Penalty for failing to attend class

Attendance in this course is mandatory; for a second unexcused absence and each subsequent unexcused absence, the final average for CPH 622 will be reduced by 5 points.

Excused absences (S.R. 5.2.4.2) include:

a. serious illness;
b. illness or death in the family;
c. University-related trips;
d. major religious holidays;
e. other absences that I determine to be of "reasonable cause for nonattendance"

Per university regulations, a student who anticipates an excused absence for a major religious holiday will be expected to notify me of the anticipated absence no later than the last day for adding a class. Students will be expected to notify me of an excused absence before class begins but no later than one week after the excused absence. Students who miss class for an excused absence will be given the opportunity to make up missed work and/or exams.

Policy on absence verification

For each excused absence due to illness or a death in the family, an appropriate verification of absence will be required (S.R. 5.2.4.2). A date stamped University Health Services form available at http://www.uky.edu/StudentAffairs/UHS/ or a signed note from a personal physician will be accepted for excused absences due to illness.

Course schedule and topics

Class	Week	Speaker	General Lecture Topics	Student activities
1/12/11	1	Bunn	Introduction, general principles of toxicology and risk assessment Public health practitioner recognition of environmental exposures as a potential concern	Discussion of syllabus Required reading: Richards, Chapters 1-5
1/19/11	2	Bunn	Factors that affect toxicity: dose and response, absorption, distribution, and excretion Referencing dose to real-life exposures within the community	Required reading: Richards, Chapters 6-8
1/26/11	3	Bunn	Biotransformation: overview of Phase I and Phase II metabolism How biotransformation is affected by age, gender, pre-existing disease, genetics, and nutritional status	Required reading: Richards, Chapter 9
2/2/11	4	Bunn	Toxic agent mutagenesis and cancer Discussion of group presentation assignment Contribution of epidemiological studies to *The Report on Carcinogens* mandated by the Public Health Services Act.	Required reading: Richards, Chapters 10-11 Groopman JD, Kensler TW, Wild CP. 2008. Protective interventions to prevent aflatoxin-induced carcinogenesis in developing countries. *Annu Rev Public Health*. 29:187-203.
2/9/11	5	Bunn	Hepato- and Renal Toxicology	Group presentations

			Public health concern about exposure to chemicals in schools	Required reading: Richards, Chapter 14 Centers for Disease Control and Prevention (CDC). 2008. Hazardous chemical incidents in schools--United States, 2002-2007. *MMWR Morb Mortal Wkly Rep.* 57(44):1197-200.
2/16/11	6	Bunn	Immunotoxicology Effects of toxic agents on the skin Public health practitioner awareness of the immune system as a target for chemicals	Required reading: Richards, Chapters 12 and 13 Dietert RR, Piepenbrink MS. 2008. The managed immune system: protecting the womb to delay the tomb. *Hum Exp Toxicol.* 27(2):129-34.
2/23/11	7	Bunn	Reproductive and Developmental Toxicology Discussion of research paper assignment Lead exposure during pregnancy and postnatal development	Handouts Suggested reading: Klaasen, Chapters 10 and 20 Fitzgerald E, Wartenberg D, Thompson WD, Houston A. 2009. Birth and fetal death records and environmental exposures: promising data elements for environmental public health tracking of reproductive outcomes. *Public Health Rep* 124(6):825-30.
3/2/11	8	Mannino Yokel	Air toxicants Nanotechnology Exposure to asbestos and the development of asbestosis	Required reading: Richards, Chapter 16 12pm-1pm Kuntz SW, Winters CA, Hill WG, Weinert C, Rowse K,

				Hernandez T, Black B. 2009. Rural public health policy models to address an evolving environmental asbestos disaster. *Public Health Nurs.* 26(1):70-8.
3/9/11	9	Bunn	Neurotoxicology	Research paper due Required reading: Richards, Chapter 17 Seafood choices: Balancing benefits and risks, Institute of Medicine Report, October, 2006
3/16/11	10	Bunn	No class- spring break	
3/23/11	11	Gomez	Food-borne toxicants and prevention in toxicology Product labeling for public safety	Handouts Required reading: Richards, Chapter 21 Newsome R, Tran N, Paoli GM, Jaykus LA, Tompkin B, Miliotis M, Ruthman T, Hartnett E, Busta FF, Petersen B, Shank F, McEntire J, Hotchkiss J, Wagner M, Schaffner DW. 2009. Development of a risk-ranking framework to evaluate potential high-threat microorganisms, toxins, and chemicals in food. *J Food Sci.* 74(2):R39-45.
3/30/11	12	Bunn	Metal toxicology Discussion of IRIS project assignment Public health awareness of lead and cadmium in toys	Handouts Suggested reading: Klaasen, Chapter 30 Meyer PA, Brown MJ, Falk H. 2008. Global approach to reducing lead exposure and poisoning. *Mutat Res.* 659(1-