BIOD 751: Biosurveillance

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BIOD 751 will provide an understanding of the capabilities required to provide reliable early warning of disease outbreaks and identify their etiological agents. Assesses strengths and limitations of physicians, laboratories, epidemiologists, aerosol sensors, and syndromic surveillance systems for all hazard surveillance. Considers challenges posed by the integration and analysis of the information collected by these sources.

Textbook – Transforming Public Health Surveillance (Elsevier) – McNabb, Conde, Ferland, MacWright, Memish, Okutani, Park, Ryland, Shaikh, Singh. Readings will be integrated into the weekly assignments

Course Structure – Class Assignments and Final Grade

- Weekly writing assignments (10%)
- Midterm paper (20%)
- Final paper (25%)
- Final presentation (25%)
- Participation (20%)

Weekly Writing Assignments – Written summaries of the reading assignments and/or book chapters describing the results, conclusions, and main biosurveillance take aways. Typically a paragraph per assigned reading.

Midterm Paper – A literature review on a chosen research topic that is written for integration into the final position paper. Literature review should be <3000 words, comprehensive, and should provide good background material for the full position paper to be written and presented on for the final.

Final Paper – The final paper will be the culmination of a semester’s worth of research and study, and will be an opinion article based on the author's position on a key biosurveillance issue. The paper will clearly present an argument related on a topic covered (or not covered) in class, such as USG biosurveillance integration, WHO and biosurveillance, or the role of a certain technology for biosurveillance.

Final Presentation – A final presentation based on the arguments made in the final paper will be presented to the class and open to comments/questions. Presentations should be ~15-20 minutes and will provide context and the student’s argument to the class.

Participation – Participation will be judged by comments, questions, and discussions engaged on a weekly basis related to readings, lectures, and other virtual information shared during class.

SYLLABUS

The readings and courses below are subject to change based on current events or new publications. The course will follow a general format of covering international, USG, and local biosurveillance concepts during the first 8 weeks, and then technology’s role in biosurveillance during the second half of the semester.
WEEK 1: Introduction
- What is biosurveillance?
- Who does biosurveillance?
- Why is biosurveillance important?
- Class information

WEEK 2: Biosurveillance as a concept (International)
- GHSA
- WHO/OIE
- UN/NATO

(Chan et al. 2010; Hartley et al. 2010; Moudy et al.; Stoto)

WEEK 3: Biosurveillance as a concept (USG)
- National Strategies:
- National Strategy for Biosurveillance
- NATIONAL BIOSURVEILLANCE SCIENCE AND TECHNOLOGY ROADMAP
- Current paradigms:
- Who does it in US?
- Who is in charge?

WEEK 4: Biosurveillance as a concept (Local)
How does a local entity think about biosurveillance

http://www.naccho.org/advocacy/positions/upload/06-02-Biosurveillance.pdf
(Fine, Nizet, and Mandl 2013; Toner et al. 2011)

WEEK 5: Biosurveillance Table Top Exercise (TTX)

WEEK 6: TTX Hotwash

WEEK 7: Operational biosurveillance (International)
- Animal biosurveillance
- Zoonotic biosurveillance
- Human biosurveillance
- Integrated biosurveillance

(Brown et al. 2015; Christian et al. 2013; Grubaugh et al. 2015; McNamara et al. 2013)

WEEK 8: Operational biosurveillance (USG/local)
Examples from each biosurveillance organization:
- CDC:
  2009 H1N1
SUBJECT TO CHANGE

-DoD:
Ebola, biodefense
-DHS:
NBIC/NBIS, biowatch
-EPA:
Biowatch, Air+Water monitoring
-FDA:
Ebola EUAs
-USDA:
Current avian influenza

(Goeller et al.; Smolinski et al. 2015; Stehling-Ariza et al. 2015; Yacisin et al. 2015)

**** MID-TERM PAPER DUE ****

WEEK 9-16: Extra credit field trip to biosurveillance location (virtual for students outside the NCR)

WEEK 9: Integrated biosurveillance
-How does everything we've talked about work?

GAO NBIC report

WEEK 10: Technology’s role in biosurveillance (1)
-Detecting and sensing
-Traditional techniques – PCR, immunoassay, culture
-Emerging technologies – assay multiplexing, NGS

WEEK 11: Technology’s role in biosurveillance (2)
-Mapping and electronic data streams for collection and dissemination

(Anema et al. 2014; Barboza et al. 2014; Gajewski et al. 2014; Gates et al. 2015; Gluskin et al. 2014; Hay et al. 2013; Jain et al. 2015; McIver and Brownstein 2014; Olson et al. 2015)

WEEK 12: Predictive epidemiology and biosurveillance (1)
-Projecting the present and Future


WEEK 13: Student Presentations

WEEK 14: Student Presentations

WEEK 15: Student Presentations

WEEK 16: Student Presentations

Week 16: ****RESEARCH PAPER DUE ****
READINGS:


