Major Epidemics in the History of Medicine

Winter 2017

January 4 – February 22
Major Epidemics in the History of Medicine 2016-2017

Course Events

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Location: Becker Medical Library, Center for History Of Medicine and Archives and Rare Books Department

Course Syllabus

Section Links:

1. Faculty Contact Information
2. Course Philosophy/Introduction to the Course
3. Course Objectives
4. Course Materials
5. Policies
6. Professional Expectations
7. Course Updates Based on Student Feedback
8. Concluding Notes

1. Faculty contact information

Course Master: Robert M. Feibel, MD
2. Course Philosophy/Introduction to the course

Points to be emphasized include the world-wide effects of such epidemics (bubonic plague), the discovery of vaccination and the ability to completely eradicate a major disease (small pox), the importance of insect vector diseases, such as malaria and yellow fever, as well as the emergence into the developed world of new insect-carried diseases such as dengue fever and chikungunya, venereal disease, and epidemics of modern times such as influenza and AIDS. Most of the diseases to be discussed are still prevalent, and patients suffering from these diseases will be seen and treated by the medical students during their medical career.

3. Course Objectives

By the end of this course students should be able to:

1. Identify some of the most important and devastating epidemics in the history of medicine, beginning in antiquity and continuing into the 21st century;
2. Describe the clinical and pathological findings of each disease, and how medical science responded to the threat of each epidemic;
3. Understand how immunization and treatments to reduce the spread of epidemics were developed by medical science; and
4. Understand that the threat of epidemic disease still occurs in spite of past advances in medicine and public health.

Each goal is mapped to the WUSM Medical student competency-based learning objectives (indicated in parenthesis). These program level objectives can be found at:

http://bulletinoftheschoolofmedicine.wustl.edu/EducationalPrograms/mdprograms/Pages/Learning%20Objectives.aspx

4. Course Materials

5. Policies

a. Grading.
   - 80% students' discussion of their assigned chapters in the text
   - 10% attendance
   - 10% students' summary of the course to be prepared at the conclusion of the course.

b. Attendance Requirements.
   - Attendance is required.
6. Professional Expectations

7. Course Updates Based on Student Feedback

8. Concluding notes

Course Summary:

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Session Overview - The Black Death: Bubonic Plague

Session Date: Week I - Wednesday, 1/4/17

Robert M. Feibel, MD
Andrej Spec, MD

Session Requirements:

- Read Chapter 4 - Power of Plagues
- See Announcements for individual assignments

Learning Resources:

Ch. 4 - Power of Plaques by Irwin Sherman (updated 11/9/15 by md)
(An Ancient Plague, the Black Death)

Session Objectives:

None available at this time.

Information About the Session:

None available at this time.

Recommended Reading:

Infectious Diseases by Jonathan Cohen and William G Powderly - Chapter 120. Plague (Links to an external site.)

These reading links will be assigned per student:

1. Louis Pasteur, from crystals of life to vaccination (Links to an external site.)
2. Robert Koch and the 'golden age' of bacteriology (Links to an external site.)
3. The History of the plague and the research on the causative agent Yersinia pestis (Links to an external site.) (Zietz)
4. Plague history: Yersin's discovery of the causative bacterium and discovery of antibiotics and vaccines (Links to an external site.) (Butler)
5a. Plague in the US CDC reports (Links to an external site.)
5b. Review of plague in US since 1900 (Links to an external site.) (Kugeler)
6. History of biological warfare and bioterrorism (Links to an external site.) (Barris)

Review Materials:
Session Overview - Smallpox and Vaccination

Session Date: Week II - Wednesday, 1/11/17
Robert M. Feibel, MD
Ige George, MD

Session Requirements:
- Read Chapter 9 - Power of Plagues
- See Announcements for individual assignments

Learning Resources:
Ch. 9 - Power of Plagues by Irwin Sherman (updated 11/13/15 by md)
(Smallpox, the Spotted Plague)

Session Objectives:
None available at this time.

Information About the Session:
None available at this time.

Recommended Reading:
Infectious Diseases by Jonathan Cohen and William G Powderly (Second Edition)

Practice Point - Initial management of a suspected outbreak of smallpox

These reading links will be assigned per student:
1. Eyler: Smallpox in history: the birth, death and impact of a dread disease (Links to an external site.)
2. Rutkow: Zabdiel Boylston and Smallpox Inoculation (Links to an external site.)
3. Smith: Edward Jenner and the small pox vaccine (Links to an external site.)
4. Semba: The Ocular Complications of Smallpox and Smallpox Immunization (Links to an external site.)
5a. The Last Smallpox Epidemic in Boston and the Vaccination Controversy, 1901-1903 (Links to an external site.)
5b. Parmet: Individual Rights versus the Public’s Health – 100 Years after Jacobson v. Massachusetts (Links to an external site.)
6. Stern: The History of Vaccines and Immunization: Familiar Patterns, New Challenges (Links to an external site.)
7. Clemmons: Measles – United States, January 4 – April 2, 2015 (Links to an external site.)
8. Jacobson: Vaccine Hesitancy (Links to an external site.)

Review Materials:
None available at this time.

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Session Overview - Insect-Carried Diseases: Malaria and Yellow Fever

Session Date: Week III - Wednesday, 1/18/17

Robert M. Feibel, MD
Hilary Reno, MD, PhD

Session Requirements:

- Read chapter 7 - *Power of Plagues*
- Read chapter 9 - *Twelve Diseases That Changed Our World*
- See Announcements for individual assignments

Learning Resources:

- **Ch. 7 - Power of Plagues by Irwin Sherman** (updated 11/13/15 by md) *(Malaria, Another Fever Plague)*
- **Ch. 9 - Twelve Diseases That Changed Our World by Irwin Sherman** (updated 11/25/15 by md) *(Yellow Fever: the Saffron Scourge)*

Session Objectives:

None available at this time.

Information About the Session:

None available at this time.

Recommended Reading:

*Infectious Diseases* by Jonathan Cohen and William G Powderly

- Chapter 111. Malaria *(Links to an external site.)*
- Chapter 164. Zoonotic Viruses *(Links to an external site.)*

MALARIA
1. Cox: History of the discovery of the malaria parasites and their vectors (Links to an external site.) (pages 1-6 and page 8)
3. Benedek: History of Malaria Chemotherapy (Links to an external site.)
4. Miller - Artemisinin: Discovery from the Chinese Herbal Garden (Links to an external site.)

YELLOW FEVER

5. Patterson: Yellow Fever Epidemics and Mortality in the United States, 1693-1905 (Links to an external site.)
6. Bean: Walter Reed and Yellow Fever (Links to an external site.)
7. Frierson: The Yellow Fever Vaccine: A History (Links to an external site.)
8. Dick: The History of Dengue Outbreaks in the Americas (Links to an external site.)
9. Peper: That Which Bends Up: A Case Report and Literature Review of Chikungunya Virus (Links to an external site.)
10. Zika virus: History, emergence, biology, and prospects for control (Links to an external site.) (read sections 1, 2, 5, 8, and 9)

Review Materials:

None available at this time.

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Session Overview - Tuberculosis and Syphilis

Session Date: Week IV - Wednesday, 2/15/17

Robert M. Feibel, MD
Jennifer Phillips, MD, PhD

Session Requirements:

- See Announcements for specific assignments.

Learning Resources:

- Ch. 12 - Power of Plagues by Irwin Sherman (updated 11/13/15 by md) (The Great Pox Syphilis)
- Ch. 7 - Twelve Diseases That Changed Our World (updated 11/25/15 by md) (Tuberculosis: the People's Plague)

Session Objectives:

None available at this time.

Information About the Session:

None available at this time.

Recommended Reading:

Infectious Diseases by Jonathan Cohen and William G Powderly

Chapter 30. Tuberculosis and other mycobacterial infections (Links to an external site.)
Chapter 57. Syphilis (Links to an external site.)

Syphilis

1. Frith: Syphilis – Its Early History and Treatment Until Penicillin, and the Debate on its Origins (Links to an external site.)
2. O'Shea: ‘Two minutes with Venus, two years with mercury’ – mercury as an antisypillic chemotherapeutic agent (Links to an external site.)
3. Thorburn: Paul Erhlich: pioneer of chemotherapy and curer by arsenic (Links to an external site.) (1854-1915)
4. Bialynicki-Birula: The 100th anniversary of Wasserman-Neisser-Bruck reaction (Links to an external site.)
Tuberculosis

1. Daniel: The history of tuberculosis (Links to an external site.)
2. Sakula: Robert Koch: centenary of the discovery of the tubercle bacillus, 1882 (Links to an external site.)
3. Sanatoria - Chapter 21 in Daniel's book, Captain of Death, on reserve in the library
4. Chapter 13: Tuberculin
5. Chapter 15: BCG vaccine
6. Kingston: Streptomycin, Schalz v. Waksman, and the Balance of Credit for Discovery (Links to an external site.) (read pages 441-454)

Review Materials:

None available at this time.

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Session Overview - Modern Epidemics: Influenza and AIDS

Session Date: Week V - Friday, 2/17/17

Robert M. Feibel, MD
Ernie-Paul Barrette, MD
Rachel Presti, MD, PhD

Session Requirements:

- See Announcements for individual assignments.

Learning Resources:

- **Ch. 10 - Twelve Diseases That Changed Our World** (updated 11/25/15 md) *(The Great Influenza)*
- **Ch. 5 - Power of Plagues by Irwin Sherman** (updated 11/13/15 md) *(A Modern Plague, AIDS)*

Session Objectives:

None available at this time.

Information About the Session:

None available at this time.

Recommended Reading:

Infectious Diseases by Jonathan Cohen and William G Powderly

Chapter 161. Influenza viruses (Links to an external site.)

1. Taubenberger, Morens: 1918 Influenza; The Mother of All Pandemics (Links to an external site.)
2. Kilbourne: Influenza Pandemics of the 20th Century (Links to an external site.)
3. Taubenberger, Morens: Influenza: The Once and Future Pandemic (Links to an external site.)
4. Bristow: It’s as Bad as Anything Can Be: Patients, Identity, and the Influenza Pandemic (Links to an external site.)
5. Sencer: Reflections on the 1976 Swine Flu Vaccination Program (Links to an external site.)
Chapter 84. Epidemiology of HIV infection (Links to an external site.)

1. A Timeline of AIDS (Links to an external site.)
2. Gallo and Motagnier: The Discovery of HIV as the Cause of AIDS (Links to an external site.)
3. Cohen and Enserink: HIV, HPV Researchers Honored, But One is Left Out (Links to an external site.)
4. Markel - When Germs Travel, pp. 149-153; 159-176.
5. Mustich: A history of AIDS hysteria (Links to an external site.)
6. Altman: 30 Years In, We Are Still Learning From AIDS (Links to an external site.)
7. Maxmen: Ebola Panic Looks Familiar to AIDS Activists (Links to an external site.)
8. Smith: Drugs into Bodies! A History of AIDS Treatment Activism (Links to an external site.)
9. Epstein: The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials (Links to an external site.) (read pages 408-417; 427-430)

Review Materials:
None available at this time.

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Session Overview - The Development of Public Health

Session Date: Week VI - Wednesday, 2/22/17

Robert M. Feibel, MD
William Powderly, MD

Session Requirements:

Required reading for all students before class: Chapter 2 of Historical Developments in Public Health (read only pp. 11-22) - http://samples.jbpub.com/9781449688332/Chapter2.pdf (Links to an external site.)

Learning Resources:

The PowerPoint file will be linked here when available (updated date / time)
(insert comments about file use here)

Link PDF File Here (updated date / time)
(insert comments about file use here)

Link Word File Here (updated date / time)
(insert comments about file use here)

Session Objectives:

After this session, students will be able to:

• Understand the historical development of the field of public health
• Understand the role of government policy in public health
• Understand key achievements of public health in America

Information About the Session:

None available at this time.

Recommended Reading:

1. Ten Great Achievements of Public Health in America: http://www.cdc.gov/about/history/tengpha.htm (Links to an external site.)

Review Materials:

None available at this time.

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Student Comments

• I very much enjoyed class particularly the discussion we had with Dr. Barrette.

• I also wanted to say how much I enjoyed the course, from the topics and readings you selected, to the guest faculty members and discussions we had. It was an enlightening experience, and provided an important perspective I’ll keep with me throughout my education.

• Overall, this was a wonderful course. I really enjoyed learning about how each disease changed the world. It gave me a new perspective that we don’t normally see in our medical school classroom. Also, the scheduling of the class was perfect because the sessions that were on the plague, vaccination, tuberculosis, influenza, and HIV overlapped perfectly with our microbiology course. Thank you also for the opportunity to view the historical texts.

• I really enjoyed the course this winter, thank you!!

• Thank you for teaching Major Epidemics. It was a wonderful class.

• I thoroughly enjoyed the course, and I was grateful to see how much effort was put into clearly defining the structure and expectations of each session. Thank you for helping make the selective a pleasant, informative, and well-organized experience and I hope that the rest of the year treats you well.

• Thank you for being a great guide through the many illnesses we discussed. I really enjoyed this selective and will highly recommend it to incoming students!

• I really enjoyed this elective this semester and I look forward to more talks from the Center of the History of Medicine
While I found many aspects of this course to be intellectually stimulating, one topic of particular interest to me is the “othering” of people who are linked to a certain transmissible disease, and the scapegoating that can result from that. We found this to be true for Jews and the Black Plague, people living in poverty and Malaria, and most notably for me, gay men and AIDS. AIDS did not get the attention it deserved, from the media, government, or the medical community, because it was viewed to only affect this certain subset of the population that was already being stigmatized. It was much easier for many people to blame this disease on the people and their behaviors, rather than investigate its true cause. It took President Reagan years to even mention AIDS publicly, due to the stigma of the disease. Many cite the suffering and eventual death of his friend and actor Rock Hudson as the impetus to address it. I find that in many cases, people don’t become aware of or involved in issues until it happens to them or someone they care about.

What strikes me is whether these pathogens would turn into such large-scale epidemics if it weren’t for othering the victims. If the populations of people becoming ill were treated with proper medical care and respect, they would likely recover faster or at least reduce contagiousness, and prevent the spread of disease to others. Similarly, if the populations affected were deemed important by governing bodies, perhaps more research funds would have been allocated earlier, and diagnoses and treatments could be made at an earlier time.
Major Epidemics Selective Reflection

With my microbiology background in influenza and HIV research, I was originally drawn to this selective because of the microbes that were going to be discussed. After taking this class, I have learned so much about the history and the context of all these diseases and how they affected the world.

During the malaria discussion, I really liked learning about drug discovery that has been happening for hundreds of years, especially of artemisinin. It was very timely to discuss, with the recent Nobel Prize being awarded for Youyou Tu’s discovery. The extra article was great at highlighting how this drug is still relevant now. It was also nice to hear from Dr. Reno about the status of malaria today and learning that they didn’t have the proper medication to treat an infected patient and had to get it shipped from the CDC. This was such an eye-opening reminder that even though we’re reading about these diseases in a historical fashion, they are still very much here today.

During the syphilis discussion, I enjoyed learning about how pervasive the disease was and how each culture blamed others for the disease. The drawings of patients with syphilis were my favorite books in the historical books collection that we saw. In addition, when we discussed Influenza, I didn’t know that the Spanish Influenza origin was unknown. For the past 5 years I had assumed it was in Spain, so this was a shock to me.

Overall, this was a wonderful course. I really enjoyed learning about how each disease changed the world. It gave me a new perspective that we don’t normally see in our medical school classroom. Also, the scheduling of the class was perfect because the sessions that were on the plague, vaccination, tuberculosis, influenza, and HIV overlapped perfectly with our microbiology course. Thank you also for the opportunity to view the historical texts.
One aspect of this course that I found interesting was how the movement of people contributed to the spread of diseases. We explored this concept in the context of many of the epidemics in class, but I found the cases involving yellow fever to be most interesting. Two specific instances of human movement carrying yellow fever are the transatlantic slave trade and French colonists fleeing the Haitian revolution.

Considering the transatlantic slave trade, I found it interesting that the demand for African slaves primarily arose from the decimation of native populations in the new world by smallpox outbreaks brought over by the European colonizers. Additionally, the new world was primed to harbor yellow fever by the introduction of *Aedes aegypti* mosquitoes into the region prior to the start of the transatlantic slave trade, so that by the time the disease was brought over from Africa, the vector necessary for effective transmission was already established in the Americas. The lasting immunity present in many of the African slaves also complicated the issue by making them more desirable on the plantations since they would not get ill during future outbreaks. This immunity led to an increase in the slave trade to supply more labor to the regions of the US that were frequently affected by yellow fever epidemics.

Another interesting human movement driven yellow fever outbreak occurred in Philadelphia in 1793. The cause of this specific epidemic is thought to be French colonial refugees fleeing slave revolts during the Haitian revolution. The arrival of carriers of yellow fever into the city of Philadelphia had profound impacts that summer and even lead to Alexander Hamilton contracting yellow fever. This is a great example of when political events can have unforeseen consequences in the spread of communicable diseases, which continues to be a public health today.

Overall, I really enjoyed learning about how human behavior and political events affected the dynamics of the epidemics we discussed during this course while shedding light on the lasting effects these epidemics still have on our society today.
Of all the readings I was assigned this semester, my final one concerning the advances of family planning in the 20th century was the most striking. Given the never-ending controversy we have in our current society concerning women’s reproductive rights, I knew contraception and family planning has always been a contentious topic. However, I never fully appreciated how restrictive laws were less than a century ago. The fact that it was actually illegal for doctors to provide any form of counseling concerning family planning or even mention contraception due to “anti-obscenity” laws is astounding, and I was particularly amazed by the groundbreaking work performed by Margaret Sanger to get women the access they deserved despite the laws and attitudes at the time. This brief introduction inspired me to look more into her history which unearthed even more incredible efforts such as her “scandalous” (and at the time illegal) publications on sex education and contraception, her targeted efforts in family planning access for minority communities (although interestingly there is much controversy on whether this was borne out of a hidden agenda as a believer in eugenics versus true altruism), and even founding the original Planned Parenthood.

As Dr. Powderly mentioned in class, I do agree that vaccinations may be the most powerful tool in public health advances ever made simply because of the sheer number of lives positively impacted. But, to me, the increasing access and changing attitudes towards family planning has to be a close second in terms of the potential power it allowed half the planet to take control of their lives and achieve their goals. There is still much that needs to be done with family planning in terms of the technology (e.g. reducing side effects of existing contraception, increasing available options for men) and access (e.g. insurance coverage, reducing stigma, increasing awareness of the longer-acting more foolproof methods) but the benefits society will continue to reap from more fine-tuned reproductive control will be well worth it.
After the last meeting of our class, I found myself reflecting on the final question posed by Dr. Powderly, “of the topics we addressed today, which do you think had the most impact in the 20th century?” While there are numbers supporting the assertion that immunizations saved the most lives, I find the role nutrition has played in the past few decades to be under-emphasized. We are currently facing an obesity epidemic, and there have not been many promising reports for the future. Chronic disease management is becoming increasingly more important, as many of the patients I have seen in Barnes so far have multiple conditions complicating their current reason for admission, including type 2 diabetes mellitus, congestive heart failure, and end-stage kidney failure. These conditions, which highly correlate with obesity and poor diets, place an immense burden on the healthcare system as a whole. Some patients no longer fit in imaging machines or on traditional surgical tables, and children are being diagnosed with D2M at increasingly younger ages. The high rates of overweight and obese children, particularly in socioeconomically disadvantaged households, demonstrate the need for changes in how our society views food and the availability of fresh, healthy, and affordable choices in low-income areas. The lobbying powers of various food industries is especially concerning – we cannot address the issue the same way tobacco was fought in the 20th century, simply because food is necessary for survival, and to outlaw advertising or targeting to minors would be impossible. However, serious reform and education initiatives will be imperative to make the necessary impact.
I thoroughly enjoyed a large fraction of the course’s content, particularly the earlier sessions focused on the impact and early treatment of plague and smallpox, but our discussion of the obesity epidemic was the most recent feature that piqued my interest. During our discussion, it seemed taken for granted the epidemic could be attributed to at least two parallel causes: an increase in caloric consumption and a decrease in daily exercise. While this is certainly an intuitive way to think about the epidemic, I was a bit skeptical about whether today’s Americans truly exercise less than their counterparts from the 50’s and 60’s. With a small amount of additional research, I discovered that while modern Americans do not exercise less during their free time, quantitative evidence suggests that they burn slightly fewer calories during their time at work. That being said, the literature is unclear on whether this small reduction in caloric expenditure actually accounts for a significant fraction of the weight gain observed over the last few decades.

In 2011, Church and others published data suggesting that Americans have experienced a roughly 100 kcal decrease in daily caloric expenditure due to occupation-related physical activity over the past few decades. I was hesitant to accept that such a small change in caloric expenditure could have played a significant role in our rising obesity rates, but the authors included a mathematical model suggesting that these changes in activity alone are theoretically capable of completely explaining the increase in Americans’ average weights. However, a 2009 paper by Swinburg and others proposed an alternative model claiming that changes in the American diet alone are sufficient to explain these rising rates, not accounting at all for changes in exercise.

Together, sources like these suggest that the relative contributions of diet and exercise to the obesity epidemic are completely ambiguous. Some models suggest that diet alone is to blame, others point the finger entirely at our “sedentary lifestyle,” and still others fall somewhere in between. I can only hope that future investigations paint a clearer picture, giving us actionable insights into the most efficient way to combat the ever-rising impact of obesity on our healthcare system.
A topic I am very interested in, generally, is the evolution of drug resistance. Throughout my undergraduate career, I did research in a lab that worked with Malaria vector mosquitoes and thus was intimately involved with this world and the research being done. Drug resistance is an ever growing concern and labs are looking to ways to stop the spread through mosquitoes for this reason. The research in mosquito physiology is extensive as they hope to understand how disease spreads from ingestion back to the salivary glands of the mosquito itself. While this work is still in the early stages it is, to me, an interesting approach to combating the growing resistance.

Millions die of malaria each year in which both lack of access and resistance plays a role. While it's very concerning, the rate at which resistance is evolving is inherently fascinating to me. Chloroquine resistance is now almost assumed for all strains and rarely prescribed. Most concerning is the resistance that P. Falciprum has evolved to almost all drugs, as this is the strain with highest mortality. According to the WHO, three out of the five malarial strains have shown resistance to some antimalarial drug. The only tool we seem to have is there are clear geographic patterns of resistance and doctors are able to prescribe drugs based on this.

Overall, I think it would be interesting to discuss more evolution of drug resistance and the role it continues to play. It was fascinating to read about it on such a large scale as shown by malaria but would be interested to hear more about the changes in disease that the emergence is in an earlier stage.
Overall, I found each session in this selective, with its varied topics, to be very informative, fascinating, and contributing a breadth of well-rounded knowledge to our first year curriculum. I decided to enroll in this selective based on two major factors: my love of virtually all history and my interest in large-scale medical illnesses. Specifically, in regards to medical history, I am particularly fascinated in how major epidemics arose in the natural population and how ways of past living perpetuated or further encouraged transmission. Therefore, I found these historical topics for each epidemic to be particularly fascinating. With my personal interests, I felt that these topics culminated in our final Public Health session, in which we discussed the present state of current health issues. However, I found our discussion about exactly how and why today’s public health issues are so highly prevalent, in comparison to the 20th century and prior, to be particularly engaging. Additionally, Dr. Powderly provoked thought into why there have been great transitions in the prevalence of certain illness such as Tb, pneumonia, and cardiovascular disease over the course of the last century. The answer to this greatly correlated with historical practices in housing conditions, daily rituals, changing socioeconomic status, and an overall shift in how people live out their lives. From a historical standpoint, I found this connection between how people live and the great change in public health issues/epidemic status to be an excellent “capstone” for the selective; this session bridged the gap from seemingly ancient history to present day, and how our present history is shaping medicine and the current health status of our world. Simply, learning about how historical practices in daily living contributed to past epidemics, and how our current ways of life contribute to present medical concerns was fascinating. Lastly, I thought that of all our guest clinicians, Dr. Powderly offered the most thought-provoking, insightful, and specific information. It was a great opportunity to hear this kind of knowledge from a person with not only vast experience in public health, as well as a major position in our Public Health Institute at WashU, but from a person who has personally witnessed historical changes in the practice of medicine and practices that contributed to major epidemics. In summary, I feel that our discussions on how historical practices contributed to the occurrence and transmission of major epidemics, along with the “capstone” Public Health session held the most interesting and engaging material. I will take away much new knowledge from this selective, but the aforementioned experiences were of personal interest to me and therefore particularly enjoyable.
I really enjoyed this course. I was particularly taken in by the content, which was both fascinating (despite my concern that it would be the opposite, as I was never much of a history buff) and light (in the sense that it did not take thorough studying to understand it). I liked the structure of the class, because the student presentations ensured our engagement with the material, although I would have liked to have more time for conversation on each topic. I enjoyed thumbing through the old texts, and was impressed by both your and Ms. Brander’s wealth of knowledge.

The most interesting parts of the content, I felt, were the non-medicine components: the scapegoats.

I was moved by the popular press readings on the AIDS hysteria. Up to and especially including this part of our academic careers, we have always been taught things that are already known, we memorize things that have been proven to be factual. It’s disorienting to imagine being faced with something where the response is “we don’t know.” And if the doctors don’t know, I can only imagine how the lay people feel.

Further, it was unsettling to have the bird’s eye view and see so clearly how this fit into a pattern of blaming epidemics on unfavored minority groups (starting with the plague, continuing with smallpox, etc.). I imagine at the time most people genuinely believed that the scapegoat group was the cause, and that the few outspoken against this were ignored as radicals. It makes me wonder what it is we’re doing now that we don’t realize is part of a larger story. History repeats itself and our new political scene does not seem to be on track to be the exception… The AIDS activist group that recognized this in the ebola quarantines was impressively keen.
While there are many topics that we covered in Major Epidemics that I found very fascinating, one concept that particularly struck a chord with me was what Dr William Powderly said about Ebola: that the ebola outbreak in West Africa was one of the greatest public health tragedies of our time - not because of the devastation of the disease itself - but because of the huge disruption it caused in MMR vaccination in those countries. That really surprised me because that was never something I had ever considered with the Ebola outbreak.

I was quite aware of the devastation of the Ebola outbreak before this class but had always just focused on the disease itself. I was actually working at the NIH when the excitement over the Ebola outbreak hit the US. It was on the mind of every scientist and clinician at the NIH, regardless of area of research. I attended numerous talks on Ebola - what it was like treating it first hand, what we know about the disease and the ethics of how to give very limited potential Ebola treatments in the outbreak setting. We actually had an ebola patient come to be treated in the building I worked at. As a volunteer in the OR, I got to attend a frenzied discussion over how we were going to treat the patient, safety concerns and what to do if the ebola patient needed surgery given the lack of protocols for such an event. Then when I worked at the FDA the following year, I attended a talk by Dr. Ian Crozier, an American doctor who treated ebola patients during the outbreak before becoming sick himself and being flown to Emory for treatment. His talk was haunting as he discussed his close colleagues that had died from the disease, the privilege and guilt he had after being flown out to a top medical care facility, and the still unknown surrounding survivors and future potential treatment they may need given the long term effects of surviving the disease (ex uveitis - which 10% of survivors have and without treatment can cause blindness). He emphasised how although the epidemic was almost simmered out, there was still a lot of work that need to be done - a point which resonates well with Dr. Powderly’s comment. It is really easy to get caught up in a disease like Ebola (which caused an estimated 9 thousand deaths during the West Africa outbreak) without thinking about the broader effects the outbreak caused.

Doing some additional reading on the effect of Ebola on MMR vaccination, I learned that there was an estimated 25-75% reduction in vaccination rates during the outbreak which could potentially result in 2,000 - 16,000 additional deaths (1). Many scientists feel a large measles outbreak in those countries isn’t a question of if it will happen but when. One thing I thought was interesting was a discussion on how trying to catch up on vaccination may be tricky given the residual fear and distrust created by the
Ebola outbreak. There were many additional services that were dramatically affected as well - ex in Guinea it is estimated that over 70,000 malaria cases in the country went untreated in 2014 (2).

1) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4590209/
It’s difficult to choose one topic that interested me, but the aspects of this course that I knew the least about were the societal, political, and economic consequences the diseases we covered. In particular, I was unaware of the social dilemmas that arose at the time of the influenza epidemic in 1918 and the factors that determined how medical care was stratified among citizens during trying times. I feel that there are important lessons and valuable insights about human behavior that can be acquired from an understanding of the 1918 influenza pandemic.

First, there was an aura of complacency regarding infectious disease at the time. With the recent discoveries of Koch and others, the verification of germ theory, and the advancements in the field of bacteriology, the general sentiment among the public was that it might be possible to one day remove infectious disease from the list of major causes of death. The flu was also so commonplace; as a result, the influenza epidemic neither generated much fear nor garnered a significant amount of attention when it first erupted.

In today’s society, I wouldn’t find it entirely surprising if a similar epidemic were to occur with devastating outcomes (although I don’t know enough to be sure about this claim). Still, we face issues in regards to the current cultural war against vaccines, complacency among individuals who choose not to receive the flu vaccine, drastically increased public transportation efficiency, etc. Granted, scientific and technological advancements have hopefully improved our preparation for a disease outbreak today (in fact, I would like to learn more about what sorts of preventive and last-resort measures we have available today in case a disease outbreak occurs).

Further, the way poor individuals and minorities were treated during the influenza epidemic was interesting to learn about. Granted, 1918 was a very different time. Still, it was slightly surprising to me that social workers would take advantage of poor immigrants to impose their moral agendas upon them in exchange for charity services. I doubt the social workers acted with malicious intent; rather, their attempts to promote their own agendas led to unfortunate situations for the recipients of their “gratitude.” It speaks to the importance of unconditional charity and how we can still cause harm with good intentions.

Many of these issues arise as a result of the very nature of the human mind; still, as a society, we aim to foster cultural equality, we develop systems to counteract our cognitive biases, and we reward each other for acts of kindness. However, one can easily imagine how such societal systems can easily degenerate under times of panic and uncertainty. It almost seems part of our duty as future physicians
to study how and why history played out the way it did and whether we can use that knowledge to foresee preventable problems. The old adage “history repeats itself” continues to ring true: what have we learned from our past mistakes?
Most Interesting Aspect of the Course

Most interesting to me from this selective has been the sheer amount of pioneering research done in the 19th century by only a few physicians, especially Robert Koch. It is amazing to me that within one lifetime, Robert Koch had the knowledge and resources to study and share his findings to the world on anthrax, cholera, and tuberculosis. Certainly, the scientific community’s understanding of diseases was very limited at the time, most interesting being the prevalent miasmatic theory of diseases. Yet, many of Koch’s four postulates and subsequent hypotheses were surprisingly accurate. I imagine that he had proposed these postulate after a long and arduous process of research, observation and analysis. Indeed, these postulates set the groundwork for his future investigations. His animal experiments were incredibly creative at the time, and despite having only discussed his successful experiments and findings in this course, I can only imagine the number of experiments he had to conduct before discovering something substantial.

At the same time, I am impressed with how efficiently he was able to disseminate his findings to the rest of the scientific community through giving lectures and attending conferences, despite it being the 19th century with no communication networks. As an aspiring medical-scientist in the School of Medicine’s program, I see Koch’s legacy as the epitome of a successful career of a physician-scientist. His research has indeed played a significant role in how we understand and protect ourselves from infectious diseases today. While a career as substantial as his in the 21st century is likely impossible, Koch’s success is a testament to the amount if scientific progress we have made as well as to how much the scientific community has expanded in the past 150 years.
On Patient Autonomy and Mandatory Vaccination

According to the CDC, in 2014, the United States experienced 667 cases of measles, a record number. Investigation revealed that the majority of individuals who contracted measles were unvaccinated and children. As a result of this increase in measles cases, the antivaccination movement received intense scrutiny. Vaccine hesitancy and antivaccination sentiments are not novel developments. They were conceived alongside the earliest vaccine programs for the smallpox vaccine. The most innocuous of concerns regard the safety and risks of vaccines. For many vaccines, such as the smallpox vaccine, these concerns are not unfounded. Improper handling and poor hygiene may lead to incidental vaccinia infections. Some antivaccination proponents have more extreme views and incite hysteria among worried parents using unfounded claims. For example, perhaps the most common falsehood spread by antivaccination proponents is that vaccines cause autism, but no studies have ever revealed any link between vaccines and autism. In many cases, the effects of vaccine refusal may not be that costly as in the case for the flu vaccine. However, in the case of smallpox, refusing to vaccinate could escalate local outbreaks into national epidemics.

In 1905, in the context of smallpox vaccinations, the Supreme Court ruled in favor of allowing compulsory vaccinations in the landmark case *Jacobson v. Massachusetts*. In 1922, the Supreme Court further ruled that schools could deny enrollment of students based on vaccination status. In both cases, the decisions were justified based on suspending individual freedoms to maintain a common welfare in certain dire circumstances, for example smallpox. According to many state laws, exemptions from vaccination based on religious beliefs or documented health conditions are allowed. However, there is legal precedence for overruling religious beliefs when they are deemed insincere and denying vaccine refusal on that basis. Most states do not allow vaccine refusal based on philosophical objections. When mandatory vaccination programs are adopted, it will inevitably affect the public trust in the government. Perhaps one of the most difficult public health challenges today is when the government should infringe on patient autonomy in order to preserve the health and stability of its people.