

PUBLIC HEALTH MATTERS

A NEWSLETTER OF THE PUBLIC HEALTH MUSEUM

3rd Annual Session of Outbreak a Success



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For the third year, the Public Health Museum, in coordination with the Massachusetts Department of Health, Tufts University Schools of Veterinary Medicine and Dental Medicine, the Boston University School of Public Health, the Massachusetts Public Health Nurses Association, and the Massachusetts Occupational Health Nurses Association hosted a week-long course introducing high school juniors and seniors to careers in public health. Twenty students attended the course held at the Public Health Museum in Tewksbury from August 3-7. Faculty provided students with informative sessions on infectious disease epidemiology, statistical data analysis, veterinary medicine, public health dentistry, public health nursing, occupational nursing and ethics in public health. Students also participated in field trips to the William A. Hinton State Laboratory in Jamaica Plain and the William X. Wall Experiment Station in Lawrence to witness public health in action. The Museum is excited to have recently received funding to improve the Outbreak program and looks forward to an exciting session in 2016. Applications for 2016 Outbreak will be accepted in the Spring of 2016 so watch *Public Health Matters* and the Museum web site for more information.



... going in to this (Outbreak) program I thought I knew what Public Health was. I had seen the iron lung in the Museum and equated Public Health as being solely about disease. Public Health is about much more. Public health is about the safety and well-being of people.

Emily (Greater Lowell Technical High School)

Now and Then: Influenza

INFLUENZA CONTROL NOW - 2015

Modern day influenza prevention, surveillance, and control is a collaborative effort between CDC and its many partners in state, local, and territorial health departments, public health and clinical laboratories, vital statistics offices, healthcare providers, clinics, and emergency departments both domestically and globally. While flu seasons vary in severity, CDC estimates anywhere from 5% to 20% of US residents get the flu each year, and more than 200,000 people on average are hospitalized each season for flu-related complications. Deaths due to flu are difficult to track accurately, but are estimated to range from 3,000 to 49,000 per year in the U.S. alone.

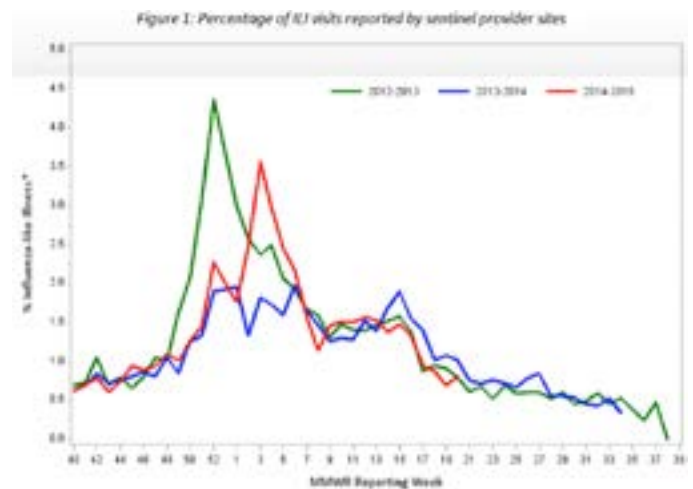


The single best way to prevent the flu is through flu vaccination each season. Viruses are selected for vaccines each year based upon surveillance of circulating strains, and forecasts of dominant strains that will likely be circulating in the coming season. The World Health Organization (WHO) receives samples sent from 113 countries conducting year-round surveillance, and based upon the data, recommends specific vaccine viruses for inclusion in influenza vaccines. With this information, the United States Food and Drug Administration (FDA) determines which vaccine viruses will be used in U.S.-licensed vaccines. The first influenza vaccine was licensed for use in the U.S. in the 1940s; today there are many vaccine options available to address the specific needs of a patient, from administration route (injections vs. nasal spray), to different manufacturing technologies (egg-based vs. cell based, etc.). In 2013, available vaccine options increased to include not just the standard trivalent, but quadrivalent options as well. Quadrivalent formulations have included an additional flu B virus and protect against a total of four viruses.

The Massachusetts Department of Public Health (MDPH) promotes vaccination campaigns annually, and conducts a number of state-wide surveillance activities including collection of electronic labora-

tory reports (automatic reporting of positive influenza tests from different laboratories), and influenza-related hospitalization and death data. MDPH also performs sentinel surveillance among a small network of cross-state providers who report weekly the percentage of office visits related to influenza-like illness. This helps track the severity and spread of influenza during each season and assists in identifying peaks and trends in real time. The Massachusetts State Public Health Laboratory (MA SPHL) also collects specimens from these sites to type circulating virus strains and to test for resistance to antiviral medications. Of particular note, the flu B virus included in all national influenza vaccine formulations during the previous two influenza seasons was identified through these MA SPHL activities and appropriately named for our state (B/Massachusetts/2/2012-like virus).

MDPH Immunization Program



Influenza-like illness (ILI) is reported by Massachusetts Sentinel Surveillance Sites. ILI is defined as fever above 100.0°F in addition to either cough or sore throat. ILI is a marker of influenza and is used throughout the regular influenza season to monitor influenza as most people are not tested for influenza.

A RECENT PANDEMIC

In the spring of 2009, a new flu virus spread quickly across the United States and the world. The first U.S. case of H1N1 (which many referred to as “swine flu”) was diagnosed on April 15, 2009. By April 21, the Centers for Disease Control and Prevention (CDC) was working to develop a vaccine for this new virus. On April 26, the U.S. government declared H1N1 a public health emergency.

By June, 18,000 cases of H1N1 had been reported in the United States. A total of 74 countries were affected by the pandemic. H1N1 vaccine supply was limited in the beginning. People at the highest risk of complications got the vaccine first. By November 2009, 48 states had reported cases of H1N1, mostly in young people. That same month, over 61 million vaccine doses were ready. Reports of flu activity began to decline in parts of the country, which gave the medical community a chance to vaccinate more people. 80 million people were vaccinated against H1N1, which minimized the impact of the illness.

The CDC estimates that 43 million to 89 million people had H1N1 between April 2009 and April 2010. They estimate between 8,870 and 18,300 H1N1 related deaths. On August 10, 2010 the World Health Organization (WHO) declared an end to the global H1N1 flu pandemic. From: [CDC Pandemic Flu History](#)

MDPH Immunization Program

HIGHLY PATHOGENIC AVIAN INFLUENZA IN 2015

MDPH is currently involved with many national, state and local partners in preparing for the possibility that highly pathogenic avian influenza will appear in birds in Massachusetts, due to spread from migratory birds. This is a very serious disease of birds, resulting in catastrophic losses among turkey and chicken producers, but poses minimal risk to the general public. Even those with close contact with infected flocks appear to be at low risk of infection, based on what occurred in the western U.S. and plains region, where many infected flocks had to be euthanized to halt the spread of this virus during the spring of 2015. MDPH, with national, state and local partners, continues to monitor the situation.

MDPH Immunization Program

INFLUENZA THEN

Remember the flu of 1918? Gone? Not forgotten! The 1918 flu aka “Spanish Flu” is still being studied today not only because it was unique but also to find out if history could repeat itself. The 1918 flu is remembered because of high infection rates, 1/3 of the population, and the high mortality rate, estimated at 50 million people (3 times the number killed in WWI). But was that the only thing that made it different?

Decades ago the death rate from the 1918 flu was underestimated as low as 20 million. The infection rate was blamed on things like easier travel and troops living in close quarters. However, this never explained why it took a toll on mostly the young and healthy (age 20 - 40).



Genetic research is starting to provide information about this virus. But where did we get genetic material that was almost 100 years old. The more recent samples were obtained from a body found in the Alaskan permafrost in 2005. Prior to that, in 1995, archival autopsy materials from the fall of 1918 were identified. What they have found so far is that the “high risk,” the very young and old, had likely been exposed to a prior version of the flu that provided antibodies giving some protection from the 1918 flu. It resulted in not getting the flu or just a milder version. In “low” risk healthy adults it seems this flu caused the immune system to overreact. This may have contributed to the swift progression from onset of the flu to pneumonia to death, sometimes in less than 24 hours. Researchers have tested the blood from survivors and found that 90 years later these individuals still had antibodies against 1918 flu. These same antibodies also have some affinity to the 1930 flu strain that was structurally similar to the 1918 version. Flu viruses can change over time but they still may retain similarities to their “mother” virus.

What does this mean for us today? It means not only does the flu vaccine provide you with antibodies against a specific strain of the flu, but those antibodies may mean if you get a similar flu it could at least

cont. on page 4.

What in the World?



Can you identify this piece of a public health history still used today? See page 5 for the answer.

Influenza Then, cont. from page 3.

be a milder version. That's good news! The vaccine used each year is not an exact prediction of what flu strain we will get that year but it is still a good idea to get the vaccine because the antibodies you make if the viruses are similar may make the difference between getting a mild or severe case. Yes, you could still get sick, even a mild flu is not good, but severe flu can lead to pneumonia which can cause death.

Research on flu's of the past can help us understand what the virus has done and may do in the future. The 1918 flu may have been a perfect one time storm but no one knows for sure. Even though having samples of this flu for testing is controversial, the knowledge researcher's gain from this unique strain and the outbreak that followed may allow us to prevent it from happening again.

Joanne Murphy

What's New?

Tewksbury Almshouse records now available

The Tewksbury Almshouse intake records from 1854 through 1884 are now available on line at:

<http://libhost.uml.edu/items/browse?collection=5>

Thanks to the Joe Fisher and the UMass Lowell Library Net for digitalizing these important pieces of history.

Looking to the Future

The Public Health Museum is committed to introducing youth to public health. Programs such as Outbreak provide an overview of public health careers to high schools students and the Museum welcomes school tours of all ages.

Last August Outbreak introduced 20 high school students to careers in public health. The following letter was received from one student following the week-long training. We all enjoyed the participants energy and enthusiasm and look forward to another exciting Outbreak session in 2016!



Outbreak students visit the William A. Hinton State Laboratory Institute.

*Dear Dr. Domoto and the Outbreak 2015 team,
Thank you very much for a great week - you made learning about public health a lot of fun. The entire week was a blast and both the field trips were fantastic. The water treatment and testing facility was very interesting, especially the organic chemistry lab that we visited. I enjoyed learning about how the water was tested and what the scientists were looking for when they tested the samples. The State Lab was also a lot of fun. The mosquito presentation was interesting, but I enjoyed touring the labs the most. The days that we stayed at the Public Health Museum were also great. I enjoyed the interactive activities, especially the ethics debates and the dentist's presentation. I had a great week and hope to see all of you again next year as an alumni. Dr. Domoto, if you would please pass my thanks along to the rest of the Outbreak group I would appreciate it. Thanks again for offering such a great opportunity and all the work you put in to it.*

*Sincerely,
Nate (Holliston High School)*

What in the World?

Sphygmomanometer

William Harvey declared in 1628 that “a perpetual movement of blood in a circle is caused by the beat of the heart.” It was recognized that health and disease affected the force required to push blood through the “closed elastic plumbing system.” But how to measure that pressure in a standard way was not achieved until the 1800s.

Early experimentation on the problem was made mostly on animals but in 1860 French physician Etienne-Jules Marey invented a sphygmograph that clinically recorded (at least for research) pulse and pressure. A lever rested on the artery at the wrist. The other end of the lever scratched undulation of the pulse onto a strip of paper. A more practical version of the instrument was made by Dudgeon in c.1890.

A different approach to the problem originated with Jules Herisson in 1834 and was further pursued by Bloch in 1880. The concept of the sphygmometer (“sphygmo”=pulse) followed a different angle. The artery over an underlying bone was pressed until the pulse ceased, this being the systolic or highest pressure during one cardiac cycle. The pressure was measured and then read on a mercury column. However, there was much variation in the readings and no way to determine the diastolic pressure (lowest pressure of one cardiac cycle).

Vienna’s Professor Samuel von Basch’s experiments in 1876 with his sphygmomanometer led to a clinically workable blood pressure instrument. His invention led to several improved versions. But it was the sphygmomanometer developed by Riva-Ricci in 1895 that had the basic features of the instruments in use today. A rubber bag encircling the arm completely compressed the artery. Air was pumped into the bag. The systolic pressure was read on a mercury column when palpating fingers below the cuff felt the pulse disappear. The release valve on the cuff was opened and the pulse beat followed down until no longer felt, giving the reading for the diastolic pressure.



Prior to the 1900s, the inconveniences and inaccuracies of reading a blood pressure made it impractical for physicians to include it in diagnostic work-ups. With the advent of the improved sphygmomanometer, by 1910, the popularity of use increased with American physicians. Manufacturers quickly developed new accurate, sturdy, simple to use and portable models.

Displayed at the Public Health Museum, the instrument shown to the left was manufactured by UMA, Inc. of New York, NY. The company was founded in 1936 as a manufacturer of medical instrumentation. The Collens Sphygmo-Oscillometer was its primary product. The instrument has two scales on the left, the upper for blood pressure and the lower an oscillometer. On the right is a compartment with the blood pressure cuff and bulb.

To use the instrument, the cuff of the oscillometer was inflated until the pulse in the extremity was completely obliterated. Readings were taken at this point at 10-mm levels until 0 pressure was reached. The maximum oscillation (fluctuation) and the level in millimeters at which it was observed were recorded as the oscillometric index (for example, 7.5 oscillation at 100 mm was recorded as 7.5/100). Readings were made in the upper extremity at the wrist, forearm and arm. In the lower extremity readings were made in the foot, above the ankle, in the leg, at the popliteal level, and at the mid thigh.

The oscillometer was thought to be of some value in the diagnosis of vascular lesions but misleading in arteriosclerosis. The oscillometer did not depict the circulation in smaller vessels and therefore was not accepted as an index of circulatory adequacy. Interpretation required other observations.

Ambrose H. Storck, M.D. discusses the use of the oscillometer in the “Evaluation of the Vascular Status in Traumatic and Nontraumatic Lesions of the Blood Vessels” in the *Surgery in World War II*, prepared by the Historical Unit, Army Medical Service in 1955. For more information on the evolution of blood pressure recording devices, refer to *Antique Medical Instruments* by C. Keith Wilbur, M.D., published in 2008.

Linda Perry

2015 Calendar of Events

PUBLIC HEALTH ACTIVITIES

OCTOBER

Domestic Violence Awareness Month
National Breast Cancer Awareness Month
Dental Hygiene Month
National Down Syndrome Awareness Month
4th - 10th: Mental Health Awareness Week
16th: World Food Day
18th -24th: International Infection Prevention Week

NOVEMBER

19th: Great American Smoke Out
American Diabetes Month
Lung Cancer Awareness Month
COPD Awareness Month
National Alzheimer's Disease Awareness Month

DECEMBER

1st: World AIDS Day
7th-13th: National Influenza Vaccination Week

MUSEUM OF PUBLIC HEALTH ACTIVITIES

SEPTEMBER

30th Tufts University Applied Learning Fair

OCTOBER

20-21st: 50th Annual Meeting of Region I of American Society for Microbiology, Randolph, MA

NOVEMBER

11th, Museum Closed in honor of Veteran's Day
14th, Annual Meeting and Open House, Museum Open 2-4 pm
25 and 26th, Museum closed for Thanksgiving

DECEMBER

HAPPY HOLIDAYS!

Volunteer Activities

Volunteers provide many valuable services to the museum.



The Public Health Museum was well represented at the recent 50th Annual Meeting of Region I of the American Society for Microbiology (ASM) held at The Lantana in Randolph, MA on October 20-21, 2015. Pictured here are Patricia Kludt, Treasurer of Northeast Branch (NEB) ASM (left) and Holly Bodman, Public Health Museum volunteer (right). The Public Health Museum houses the NEB-ASM's archives.

Volunteers Needed!

The Public Health Museum needs your help. For more information on volunteer opportunities, see <http://publichealthmuseum.org/volunteer/> or call the museum at 978-851-7321 EXT 2606.

THE PUBLIC HEALTH MUSEUM IN MASSACHUSETTS

Our Mission

The Public Health Museum is a non-profit educational and cultural museum. The Museum strives to preserve records and artifacts from our nation's public health history; educate the public about the achievements and contributions of public health; and inspire people to build upon the past and continue to advance the future of public health. Our Museum provides a space to explore public health artifacts, inspire future public health professionals, and foster community involvement.

Our History

Incorporated in 1990 and open to the public since 1994, the Museum has the distinction of being the first of its kind in the nation. Massachusetts has a rich history of leadership and notable firsts in the birth of our nation. In the field of public health, Massachusetts was the first to record vital statistics; the first to implement a sustained board of health; and the first to implement a communicable disease surveillance system, among many others.

MUSEUM HOURS

Wednesdays, Thursdays and the first Saturday of each month 10:00am-2:00pm
OR
By Appointment

WALKING TOURS

Seasonal (May through October, weather permitting)
The first Thursday and first Saturday of each month 10:00am-2:00pm
OR
By Appointment

ADMISSION

\$5.00 per person for museum
\$10.00 per person for walking tour

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