

# A History of Public Health

## ABSTRACT

Concepts of preventing infection, malnutrition, and sanitation have existed since ancient times. Ideals of “sanctity of human life” and “improve the world” in Mosaic Law, linked with Greek traditions of healthful nutrition and lifestyle, are relevant in modern public health. Roman sanitary engineering and military medicine made pivotal contributions. Hospital organization and university training for physicians developed during Islamic and Christian periods. The rise of cities, the Renaissance, and rapid changes in agriculture, trade, and industry all contributed to public health. New social, political, and economic reforms in the eighteenth and nineteenth centuries, contributing to sanitation, social reform, and improved nutrition and medical care, led to improved longevity and quality of life in the twentieth century. Immunology, social security, health insurance, and health promotion expanded the scope and effectiveness of global health. Biomedical and social sciences, technology, and public health organization are critical as public health faces old and new health challenges.

## SUPPORT MATERIAL

### Student Competencies: Transferable Knowledge and Skills

The following are points of emphasis highlighting key principles that public health graduates are expected to understand and apply in practice. The key points arise from this chapter and other studies in specialized courses, seminars, readings during public health education, and continuing education. The selected skills and knowledge are divided into two parts. The first consists of core questions pertaining to immediate student requirements, while the second refers to competencies essential for successful public health practitioners. These include competencies recommended by the American Public Health Association in 2007, as well as those of the European Association of Schools of Public Health and the Public Health Agency of Canada's 2008 Report on Core Competencies. For more detailed competencies please consult the Association of Schools of Public Health website at: <http://www.aspsh.org/document.cfm?page=851>

#### Part I: Core Questions

- How did Jenner's discovery of Vaccinia to prevent smallpox lead to total eradication of the disease?
- How did James Lind's discovery of the cure and prevention of scurvy lead to current issues with other micronutrient deficiency conditions?

- How did Peter Panum's work on measles support the germ theory?
- List the 10 greatest public health achievements in the USA in the twentieth century. Describe their significance for the twenty-first century.
- Describe the contributions of the following revolutionary public health leaders:
  - Edwin Chadwick
  - Lemuel Shattuck
  - Robert Koch
  - John Snow
  - Florence Nightingale
  - Louis Pasteur
  - Otto von Bismarck.
- How did the period of the Enlightenment influence advances in public health and medicine?
- Explain how military medicine and the health of soldiers have contributed to modern-day public health and medicine (i.e., nutritional deficiencies, infectious disease, concept of triage, establishment of national health systems).

#### Part II: Knowledge and Skills

- Understand the major historical events which shaped the field of public health as it exists today.
- Recognize that major breakthroughs in public health were initially met with ridicule and opposition.
- Understand the process of development of key scientific advances and their application in public health.
- Appreciate the potential of individual contributions to advances in public health science and technology, and their application.

## BIBLIOGRAPHY

### Electronic Resources

Centers for Disease Control and Prevention. CDC timeline [updated 7 July 2011]. CDC, Atlanta, GA. Available at: <http://www.cdc.gov/about/history/timeline.htm> (accessed 11.08.12).

Centre for History in Public Health. London School of Hygiene and Tropical Medicine, London. Available at: <http://history.lshtm.ac.uk/> (accessed 11.08.12).

Jahan, S., 2010. The MDGs beyond 2015. IDS Bulletin 41, 51059. Available at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1759-5436.2010.00104.x/abstract> (accessed 11.08.12).

Nobelprize.org. The Nobel Prize in Physiology and Medicine. Available at: [http://nobelprize.org/nobel\\_prizes/medicine/](http://nobelprize.org/nobel_prizes/medicine/)

Nobelprize.org. The Nobel Prize in Physiology or Medicine 1908: Ilya Mechnikov, Paul Ehrlich. Available at: [http://www.nobelprize.org/nobel\\_prizes/medicine/laureates/1908/mechnikov-bio.html](http://www.nobelprize.org/nobel_prizes/medicine/laureates/1908/mechnikov-bio.html) (accessed 11.08.12).

Program in the History of Public Health and Medicine. Columbia University Mailman School of Public Health. Center for the History and Ethics of Public Health Academic Programs. Available at: <http://www.mailman.columbia.edu/academic-departments/centers/cheph/academic-programs> (accessed 15.03.14).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: control of infectious diseases. MMWR Morb. Mortal. Wkly. Rep. 48, 621–629. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4829a1.htm> (accessed 11.08.12).

Public Health Infolinks. Rollins School Public Health Emory University, Atlanta, GA. Available at: [http://www.sph.emory.edu/cms/academic\\_programs/research/phi\\_links.html](http://www.sph.emory.edu/cms/academic_programs/research/phi_links.html) (accessed 11.08.12).

US Department of Health and Human Services. Images from the history of the US Public Health Service [updated 5 January 2012]. Department of Health and Human Services, Bethesda, MD. Available at: [http://www.nlm.nih.gov/exhibition/phs\\_history/contents.html](http://www.nlm.nih.gov/exhibition/phs_history/contents.html) (accessed 11.08.12).

## Recommended Reading

Baker, J.P., 1994. Women and the invention of well child care. Pediatrics 94, 527–531. Available at: <http://pediatrics.aappublications.org/content/94/4/527> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: control of infectious diseases. MMWR Morb. Mortal. Wkly. Rep. 48, 621–629. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4829a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: decline in deaths from heart disease and stroke – United States, 1900–1999. MMWR Morb. Mortal. Wkly. Rep. 48, 649–656. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4830a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: family planning. MMWR Morb. Mortal. Wkly. Rep. 48, 1073–1080. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4847a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: fluoridation of drinking water to prevent dental caries. MMWR Morb. Mortal. Wkly. Rep. 48, 933–940. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4841a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: healthier mothers and babies. MMWR Morb. Mortal. Wkly. Rep. 48, 849–858. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4838a2.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: impact of vaccines universally recommended for children – United States, 1990–1998. MMWR Morb. Mortal. Wkly. Rep. 48, 243–248. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00056803.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: improvements in workplace safety – United States, 1900–1999. MMWR Morb. Mortal. Wkly. Rep. 48, 461–469. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4822a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: motor-vehicle safety: a 20th century public health achievement. MMWR Morb. Mortal. Wkly. Rep. 48, 369–374. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4818a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: safer and healthier foods. MMWR Morb. Mortal. Wkly. Rep. 48, 905–913. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4840a1.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: tobacco use – United States, 1900–1999. MMWR Morb. Mortal. Wkly. Rep. 48, 986–993. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4843a2.htm> (accessed 11.08.12).

Centers for Disease Control and Prevention, 2011. Ten great public health achievements – United States, 2001–2010. MMWR Morb. Mortal. Wkly. Rep. 60, 619–623. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6019a5.htm>

Centers for Disease Control and Prevention, 2011. Ten great public health achievements – worldwide, 2001–2010. MMWR Morb. Mortal. Wkly. Rep. 60, 814–818. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6024a4.htm> (accessed 11.08.12).

DeBuono, B.A., 2006. Milestones in Public Health: Accomplishments in Public Health Over the Last 100 Years. Pfizer, New York. Available at: <http://www.soph.uab.edu/isoph/pfizer/Milestones.pdf> (accessed 15.03.14).

Glynn, I., Glynn, J., 2004. *The Life and Death of Smallpox*. Cambridge University Press, New York.

Henderson, D.A., 2009. *Smallpox: The Death of a Disease*. Prometheus Books, New York.

Johnson, N.P., Mueller, J., 2002. Updating the accounts: global mortality of the 1918–1920 “Spanish” influenza pandemic. Bull. Hist. Med. 76, 105–115. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/11875246> (accessed 11.08.12).

Larson, E., 1989. Innovations in health care: antisepsis as a case study. Am. J. Public Health 79, 92–99. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1349481/> (accessed 11.08.12).

Markel, H., 1987. When it rains it pours: endemic goiter, iodized salt, and David Murray Cowie. MD. Am. J. Public Health 77, 219–229. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1646845/> (accessed 11.08.12).

Monteiro, L.A., 1985. Florence Nightingale on public health nursing. Am. J. Public Health 75, 181–186. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1645993/> (accessed 11.08.12).

Ottaviani, R., Vanni, P., Baccolo, G.M., Guerin, E., Vanni, D., 2003. The first Nobel Peace Prize, Henry Dunant (founder of the International Red Cross) and his “mémoirs”. Vesalius 9, 20–27. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/15124521> (accessed 11.08.12).

Roueché, B. (Ed.), 1963. *Curiosities of medicine: an assembly of medical diversions 1552–1962*. Victor Gollancz, London.

Taubenberger, J.K., Morens, D.M., 2006. 1918 Influenza: the mother of all pandemics. Emerg. Infect. Dis. 12, 15–22. Available at: <http://wwwnc.cdc.gov/eid/article/12/1/pdfs/05-0979.pdf> (accessed 11.08.12).

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Bartholomew, M., 2002. James Lind's Treatise of the scurvy (1753). Postgrad. Med. J. 78, 695–696. Available at: <http://pmj.bmjjournals.com/content/78/925/695.long> (accessed 10.08.12).

Camus, A., 1947. *The plague*. Penguin Modern Classics, Middlesex.

Carpenter, K.J., 1986. *The history of scurvy and vitamin C*. Cambridge University Press, Cambridge.

Centers for Disease Control and Prevention. Smallpox [updated 6 February 2007]. Atlanta, GA: CDC. Available at: <http://www.bt.cdc.gov/agent/smallpox/> (accessed 18.07.12).

- Cook, G.C., 2004. Scurvy in the British mercantile marine in the 19th century, and the contribution of the Seamen's Hospital Society. Postgrad. Med. J. 80, 224–229. Available at: <http://pmj.bmjjournals.org/content/80/942/224.long> (accessed 10.08.12).
- Diamond, J., 1997. *Guns, Germs and Steel: The Fates of Human Societies*. WW Norton, New York.
- Dunn, P.M., 2002. Dr William Farr of Shropshire (1807–1883): obstetric mortality and training. Arch. Dis. Child Fetal Neonatal. 8, F67–F69. Available at: <http://fn.bmjjournals.org/content/87/1/F67.full> (accessed 10.08.12).
- Garrison, F.H., 1966. *An Introduction to the History of Medicine*, fourth ed. Republished by WB Saunders, Philadelphia, PA.
- Grob, G.N., 1985. The origins of American psychiatric epidemiology. Am. J. Public Health 75, 229–236. Available at: <http://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.75.3.229> (accessed 10.08.12).
- History of the Microscope. UK: History of the Microscope [updated 2012]. Available at: <http://www.history-of-the-microscope.org/terms.php> (accessed 10.08.12).
- Hollingshead A.B., Redlich F.C. [Excerpts from] Social class and mental illness: a community study. John Wiley; 1958, New York. Reprinted in Am. J. Public Health 97, 1756–1757. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994199/> (accessed 10.08.12).
- Hughes, J.G., 1993. Conception and creation of the American Academy of Pediatrics. Pediatrics 92, 469–470. Available at: <http://pediatrics.aappublications.org/content/92/3/469.abstract> (accessed 10.08.12).
- Knobler, S., Mack, A., Mahmoud, A., Lemon, S., 2005. *The threat of pandemic influenza: are we ready? Workshop summary*. National Academies Press, Washington, DC.
- Mackay J., Mensah G.A. The atlas of heart disease and stroke. Milestones in heart and vascular disorders [updated 2012]. WHO, Geneva. Available at: [http://www.who.int/cardiovascular\\_diseases/resources/atlas/en/](http://www.who.int/cardiovascular_diseases/resources/atlas/en/) (accessed 10.08.12).
- Mayer, K.H., Venkatesh, K., 2010. Antiretroviral therapy as HIV prevention: status and prospects. Am. J. Public Health 100, 1867–1876. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2936983/?tool=pubmed> (accessed 10.08.12).
- McCullough, D., 1977. *The path between the seas: the creation of the Panama Canal 1870–1914*. Touchstone, New York.
- Morabia, A., 2007. Epidemiologic interactions, complexity, and the lonesome death of Max von Pettenkofer. Am. J. Epidemiol. 166, 1233–1238. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17934200> (accessed 10.08.12).
- Nobelprize.org. From thrilling toy to important tool [updated 2012]. Stockholm: Nobel Media. Available at: <http://www.nobelprize.org/educational/physics/microscopes/discoveries/> (accessed 10.08.12).
- Plotkin, S.A., Orenstein, W.A., Offit, P.A., 2012. *Vaccines*, sixth ed. Saunders, Philadelphia, PA.
- Ramazzini, B., 2001. De morbis artificum diatriba [Diseases of workers]. Am. J. Public Health 91, 1380–1382. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1446785/> (accessed 10.08.12).
- Rao, M.S., 1968. The history of medicine in India and Burma. Med. Hist. 12, 52–61. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1033772/?page=4> (accessed 10.08.12).
- Riedel, S., 2005. Edward Jenner and the history of smallpox and vaccination. Proc. Bayl. Univ. Med. Cent. 18, 21–25. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200696/> (accessed 10.08.12).
- Roemer, M.I., 1988. Resistance to innovation: the case of the community health center. Am. J. Public Health 78, 1234–1239. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1349407/> (accessed 10.08.12).
- Rosen, G., 1993. *A History of Public Health*. Expanded Edition. Johns Hopkins University Press, Baltimore, MD.
- Rosenberg, C.E., 1992. *Explaining Epidemics and Other Studies in the History of Medicine*. Cambridge University Press, Cambridge.
- Rosenberg, C.E., Erwin, H., 2007. Ackermann, social medicine, and the history of medicine. Bull. Hist. Med. 8, 511–532. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17873450> (accessed 10.08.12).
- Schultz, M., 2008. Rudolf Virchow. Emerg Infect Dis. 14, 1480–1481. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603088/> (accessed 1.04.14).
- Shattuck L, The Shattuck Report: Report of a general plan for the promotion of public and personal health. Public Health Museum in Massachusetts. Available at: <http://69.89.31.173/~publich4/wp-content/uploads/2012/06/The-Shattuck-Report.pdf> (accessed 15.03.14).
- Smith, J.S., 1990. *Patenting the sun: polio and the Salk vaccine*. Wm. Morrow & Co, New York.
- Sorokina, T.S., 1994. History of medicine. PAIMS, Moscow [In Russian].
- Starr, C.G., 1991. *A history of the ancient world*. Oxford University Press, New York.
- Steckler, A., McLeroy, K.R., Holtzman, D., Godfrey, H., 2010. Hochbaum (1916–1999): from social psychology to health behavior and health education. Am. J. Public Health 100, 1864. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20724676> (accessed 10.08.12).
- Trohler U. James Lind and scurvy, 1747–1795. Bern: James Lind Library. Available at: <http://www.jameslindlibrary.org/illustrating/articles/james-lind-and-scurvy-1747-to-1795> (accessed 10.08.12).
- Tuchman, B.W., 1978. *A distant mirror: the calamitous fourteenth century*. Alfred A. Knopf, New York.
- Tucker, B.J., 2001. *Scourge: the once and future threat of smallpox*. Atlantic Monthly Press, New York.
- World Research Foundation. The oldest medical books in the world [updated 2012]. WRF, Sedona, AZ. Available at: <http://www.wrf.org/ancient-medicine/oldest-medical-books.php> (accessed 10.08.12).
- Foundations of Health Statistics and Epidemiology, Social Reform, Sanitary Movement, and Hospital Reform**
- Dunn, P.M., 2000. Dr Carl Crede (1819–1892) and the prevention of ophthalmia neonatorum. Arch. Dis. Child Fetal Neonatal. Ed. 83, F158–F159. Available at: <http://fn.bmjjournals.org/content/83/2/F158.extract> (accessed 11.08.12).
- Dunn, P.M., 2002. Dr William Farr of Shropshire (1807–1883): obstetric mortality and training. Arch. Dis. Child Fetal Neonatal. Ed. 87, F67–F69. Available at: <http://fn.bmjjournals.org/content/87/1/F67.full> (accessed 11.08.12).
- Dunn, P.M., 2005. Ignac Semmelweis (1818–1865) of Budapest and the prevention of puerperal fever. Arch. Dis. Child Fetal Neonatal. Ed. 90, F345–F348. Available at: <http://fn.bmjjournals.org/content/90/4/F345.full.pdf+html> (accessed 11.08.12).
- Dunn, P.M., 2007. Perinatal lessons from the past: Sir Norman Gregg, ChM, MC, of Sydney (1892–1966) and rubella embryopathy. Arch. Dis. Child Fetal Neonatal. Ed. 92, F513–F514. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17951553> (accessed 11.08.12).

- Emerson, H., 1940. Panum on measles: observations made during the epidemic of measles on the Faroe Islands in the year 1846 (A translation from the Danish). Am. J. Public Health Nations Health 30, 1245–1246. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1530953/> (accessed 11.08.12).
- Fee, E., Brown, T.M., 2005. The Public Health Act 1848. Bull. World Health Organ 83, 866–867. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/16302044> (accessed 11.08.12).
- Mackenbach, J.P., 2007. Sanitation: pragmatism works. BMJ 334, s17. Available at: [http://www.bmjjournals.org/cgi/content/full/334/suppl\\_1/s17.full](http://www.bmjjournals.org/cgi/content/full/334/suppl_1/s17.full) (accessed 11.08.12).
- McNeill, W.H., 1989. Plagues and peoples.** Anchor Books, New York.
- Monteiro, L.A., 1985. Florence Nightingale on public health nursing. Am. J. Public Health 75, 181–186. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1645993/> (accessed 11.08.12).
- Morabia, A., 2007. Epidemiologic interactions, complexity, and the lonesome death of Max von Pettenkofer. Am. J. Epidemiol. 166, 1233–1238. Available at: <http://aje.oxfordjournals.org/content/166/11/1233.full.pdf+html> (accessed 11.08.12).
- Roberts, D.E., Heinrich, J., 1985. Public health nursing comes of age. Am. J. Public Health 75, 1162–1172. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1646373/> (accessed 11.08.12).
- Roemer, M.I., 1988. Resistance to innovation: the case of the community health center. Am. J. Public Health 78, 1234–1239. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1349407/> (accessed 11.08.12).
- Roemer, M.I. (Ed.), 1960. Sigerist on the sociology of medicine.** MD Publications, New York.
- Rosenberg, C.E., Erwin H., 2007. Ackerknecht, social medicine, and the history of medicine. Bull. Hist. Med. 81, 511–532. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17873450> (accessed 11.08.12).
- Rosenberg, C.E., 1962. The Cholera Years, the United States in 1832, 1849, and 1866. University of Chicago Press, Chicago, IL. Available at: <http://press.uchicago.edu/ucp/books/book/chicago/C/b03619098.html> (accessed 15.03.14).
- Sack, D.A., Sack, R.B., Nair, G.B., Siddique, A.K., 2004. Cholera. Lancet 363, 223–233. Available at: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(03\)15328-7/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(03)15328-7/abstract) (accessed 11.08.12).
- Schmidt, A., 2007. Gonorrhreal ophthalmia neonatorum: historic impact of Crede's eye prophylaxis. Pediatr. Infect. Dis. Revisited, 95–115. Available at: <http://www.springerlink.com/content/xtu8475716207264/> (accessed 11.08.12).
- Science Museum. Edwin Chadwick 1800–1900. Science Museum, London. Available at: <http://www.sciencemuseum.org.uk/broughttolife/people/edwinchadwick.aspx> (accessed 11.08.12).
- Slaughter, F.G., 1950. *Immortal Magyar: Semmelweiss, Conqueror of Childbed Fever.* Henry Schuman, New York.
- Snow, J., 1936. On the mode of transmission of cholera. 1854. In: Snow on cholera: being a reprint of two papers. New York: The Commonwealth Fund; London: H. Milford, Oxford University Press, 1936 (accessed 16.03.14).
- Vinten-Johansen, P., Brody, H., Paneth, N., Rachman, S., Rip, M., 2004. Cholera, chloroform, and the science of medicine: a life of John Snow [book review]. Am. J. Epidemiol. 160, 605–606. Available at: <http://aje.oxfordjournals.org/content/160/6/605.full> (accessed 11.08.12).
- World Health Organization. Measles fact sheet [updated April 2012]. WHO, Geneva. Available at: <http://www.who.int/mediacentre/factsheets/fs286/en/> (accessed 11.08.12).
- ### Bacteriological Revolution, Microbiology, and Immunology
- Campagna, E., 2006. Grassi versus Ross: who solved the mystery of malaria? Int. Microbiol. 9, 69–74. Available at: <http://www.im.microbios.org/0901/0901069.pdf> (accessed 11.08.12).
- Carter, K.C., 1991. The development of Pasteur's concept of disease causation and the emergence of specific causes in nineteenth-century medicine. Bull. Hist. Med. 65, 528–548. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/1802317> (accessed 11.08.12).
- College of Physicians of Philadelphia. Jesse Lazear [updated 2012]. College of Physicians of Philadelphia, Philadelphia, PA. Available at: <http://www.historyofvaccines.org/content/jesse-lazear> (accessed 11.08.12).
- College of Physicians of Philadelphia. Library treasures: a visit to Almroth Wright's lab [updated 11 August 2010]. Philadelphia, PA: College of Physicians of Philadelphia. Available at: <http://www.historyofvaccines.org/content/blog/library-treasures-visit-almroth-wrights-lab> (accessed 11.08.12).
- Frederichs, D.N., Relman, D.A., 1996. Sequence-based identification of microbial pathogens: a reconsideration of Koch's Postulates. Clin. Microbiol. Rev. 9, 18–33. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC172879/pdf/090018.pdf> (accessed 11.08.12).
- Global Polio Eradication Initiative. Polio this week – as of 12 March 2014. Global Polio Eradication Initiative, Geneva. Available at: <http://www.polioeradication.org/Dataandmonitoring/Poliothisweek.aspx> (accessed 15.03.14).
- Hawgood, B.J., 2007. Albert Calmette (1863–1933) and Camille Guerin (1872–1961): the C and the G of BCG vaccine [abstract]. J. Med. Biogr. 15, 139–146. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17641786> (accessed 11.08.12).
- History Learning Site. Louis Pasteur [updated 2012]. History Learning Site, UK. Available at: [http://www.historylearningsite.co.uk/louis\\_pasteur.htm](http://www.historylearningsite.co.uk/louis_pasteur.htm) (accessed 11.08.12).
- Johns Hopkins School of Public Health. Genetically engineered bacteria prevent mosquitoes from transmitting malaria [updated 16 July 2012]. JHSPH, Baltimore, MD. Available at: [http://www.jhsph.edu/news/news-releases/2012/jacobs\\_lorena\\_bacteria.html](http://www.jhsph.edu/news/news-releases/2012/jacobs_lorena_bacteria.html) (accessed 11.08.12).
- Last, J.M., 2001. *A Dictionary of Epidemiology*, fourth ed. Oxford University Press, New York.
- Last, J.M., 2006. *A Dictionary of Public Health*. Oxford University Press, Oxford.
- McCullough, D., 1977. *The path between the seas: the creation of the Panama Canal 1870–1914.* Touchstone, New York.
- MedicineNet. Definition of Koch's postulates [updated 10 October 1998]. MedicineNet, New York. Available at: <http://www.medterms.com/script/main/art.asp?articlekey=7105> (accessed 11.08.12).
- Nobelprize.org. The Nobel Prize in Physiology or Medicine 1962: Francis Crick, James Watson, Maurice Wilkins. Nobelprize.org, Sweden. Available at: [http://www.nobelprize.org/nobel\\_prizes/medicine laureates/1962/watson.html](http://www.nobelprize.org/nobel_prizes/medicine laureates/1962/watson.html) (accessed 11.08.12).
- Norrby, E., 2007. Yellow fever and Max Theiler: the only Nobel Prize for a virus vaccine. J. Exp. Med. 204, 2779–2784. Available at: <http://jem.rupress.org/content/204/12/2779.long> (accessed 11.08.12).
- Schultz, M., 2008. Theobald Smith. Emerg. Infect. Dis. 14, 1940–1942. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2634653/> (accessed 11.08.12).

- Science Museum. Louis Pasteur (1822–1895). Science Museum, London. Available at: <http://www.sciencemuseum.org.uk/broughttolife/people/louispasteur.aspx> (accessed 11.08.12).
- Taubeberger, J.K., Hultan, J.V., Morens, D.M., 2007. Discovery and characterization of 1918 pandemic influenza virus in historical context. *Antivir. Ther.* 12, 581–591. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2391305/> (accessed 11.08.12).
- Tulchinsky, T.H., Goldblum, N., 2001. Poliomyelitis immunization [letter to the editor]. *N. Engl. J. Med.* 344, 61–62. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/11187114> (accessed 11.08.12).
- US Department of Energy. History of the Human Genome Project [updated 4 June 2012]. Human Genome Program, US Department of Energy, Washington, DC. Available at: [http://www.ornl.gov/sci/techresources/Human\\_Genome/project/hgp.shtml](http://www.ornl.gov/sci/techresources/Human_Genome/project/hgp.shtml) (accessed 11.08.12).
- World Health Organization, 2013. Cancer. Fact sheet no. 297. WHO, Geneva. Available at: <http://www.who.int/mediacentre/factsheets/fs297/en/> and <http://www.who.int/campaigns/hepatitis-day/2013/event/en/index.html> (accessed 19.05.13).
- World Health Organization, 2012. Ending polio, one type at a time. *Bull. World Health Organ.* 90, 482–483. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3397709/> (accessed 11.08.12).
- World Health Organization, 2012. Prevention and control of viral hepatitis: framework for global action. WHO, Geneva. Available at: [http://www.who.int/csr/disease/hepatitis/GHP\\_framework.pdf](http://www.who.int/csr/disease/hepatitis/GHP_framework.pdf) (accessed 23.06.13).
- ### Maternal and Child Health, Nutrition in Public Health
- Barkan, I.D., 1985. Industry invites regulation: the passage of the Pure Food and Drug Act of 1906. *Am. J. Public Health* 75, 18–26. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1646146/> (accessed 11.08.12).
- Buehler-Wilkerson, K., 1993. Bringing care to the people: Lillian Wald's legacy to public health nursing. *Am. J. Public Health* 83, 1778–1786. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1694935/> (accessed 11.08.12).
- Centers for Disease Control and Prevention, 1999. Achievements in public health, 1900–1999: healthier mothers and babies. *MMWR Morb. Mortal. Wkly. Rep.* 48, 849–858. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4838a2.htm> (accessed 11.08.12).
- Hughes, J.G., 1993. Conception and creation of the American Academy of Pediatrics. *Pediatrics* 92, 469–470. Available at: <http://pediatrics.aappublications.org/content/92/3/469.abstract> (accessed 11.08.12).
- Office of NIH History. Dr Joseph Goldberger and the war on pellagra: Goldberger vs. the south. Office of NIH History, Bethesda, MD. Available at: [http://history.nih.gov/exhibits/goldberger/docs/south\\_6.htm](http://history.nih.gov/exhibits/goldberger/docs/south_6.htm) (accessed 11.08.12).
- Rajakumar, K., Greenspan, S.L., Thomas, S.B., Holick, M.F., 2007. Solar ultraviolet radiation and vitamin D: a historical perspective. *Am. J. Public Health* 97, 1746–1754. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17761571> (accessed 11.08.12).
- Scrimshaw, N.S., 2007. Fifty-five-year personal experience with human nutrition worldwide. *Annu. Rev. Nutr.* 27, 1–18. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17506667> (accessed 11.08.12).
- Sinclair, U., 1906. *The Jungle*. Doubleday, Jabber & Co, New York.
- World Health Organization. Maternal mortality [updated 2012]. WHO, Geneva. Available at: <http://www.who.int/mediacentre/factsheets/fs348/en/index.html> (accessed 11.08.12).
- ### Military Medicine, Globalization of Health, Epidemiological Transition, Public Health Achievements in the Twentieth Century, and Health Systems Management
- Centers for Disease Control and Prevention, 1999. Ten great public health achievements – United States, 1900–1999. *MMWR Morb. Mortal. Wkly. Rep.* 48, 241–243. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00056796.htm> (accessed 11.08.12).
- Crosby, W.H., 1993. A history of military medicine [book review]. *N. Engl. J. Med.* 328, 1427–1428. Available at: <http://www.nejm.org/doi/full/10.1056/NEJM199305133281919> (accessed 11.08.12).
- Deutsche Welle. Focus: Millennium Development Goals [updated 2012]. Deutsche Welle, Bonn. Available at: <http://www.dw.de/focus-millennium-development-goals/a-6003071> (accessed 15.03.13).
- Ferriman, A., 2007. BMJ readers choose the “sanitary revolution” as greatest medical advance since 1840. *BMJ* 334, 111. Available at: <http://www.bmj.com/content/334/7585/111.2?variant=full-text> (accessed 11.08.12).
- Grob, G.N., 1985. The origins of American psychiatric epidemiology. *Am. J. Public Health* 75, 229–236. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1646163/> (accessed 11.08.12).
- Hollingshead A.B., Redlich F.C. [Excerpts from] Social class and mental illness: a community study. John Wiley; 1958. Reprinted in *Am. J. Public Health* 97, 1756–1757 (2007). Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994199/> (accessed 11.08.12).
- Knobler, S., Mack, A., Mahmoud, A., Lemon, S. (Eds.), 2005. The threat of pandemic influenza: are we ready? Workshop summary, prepared for Forum on microbial threats. National Academies Press, Washington, DC. Available at: [http://www.nap.edu/openbook.php?record\\_id=11150](http://www.nap.edu/openbook.php?record_id=11150) (accessed 15.03.14).
- Mackay, J., Mensah, G.A., 2012. The Atlas of Heart Disease and Stroke, Part 5: Milestones in Heart and Vascular Disorders. WHO, Geneva. Available at: [http://www.who.int/cardiovascular\\_diseases/resources/atlas/en/](http://www.who.int/cardiovascular_diseases/resources/atlas/en/) (accessed 15.03.14).
- Mayer, K.H., Venkatesh, K., 2010. Antiretroviral therapy as HIV prevention: status and prospects. *Am. J. Public Health* 100, 1867–1876. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20724682> (accessed 11.08.12).
- Steckler, A., McLeroy, K.R., Holtzman, D., Godfrey, H., 2010. Hochbaum (1916–1999): from social psychology to health behavior and health education. *Am. J. Public Health* 100, 1864. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20724676> (accessed 11.08.12).
- Tarantola, D., 2008. A perspective on the history of health and human rights: from the Cold War to the Gold War. *J. Public Health Policy* 29, 42–53. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/18368018> (accessed 11.08.12).