

Testing for Tuberculosis Workshop PowerPoint Slides References

Slide 5: I. History and Epidemiology of Tuberculosis

- Edvard Munch, *The Sick Child*, 1885–86; Nasjonalgalleriet, Oslo.
<https://www.edvardmunch.org/the-sick-child.jsp>, last accessed 1/24/20.

Slide 6: Global History Tuberculosis

- Marc A. Ruffer: *Studies in the Palaeopathology of Egypt*, ed. by Roy L. Moodie, Chicago, 1921.
- Dubos, Rene Jules; Jean Dubos (1987). *The White Plague: Tuberculosis, Man, and Society*. Rutgers University Press: 175-176
- Brock, Thomas d. (1999). *Robert Koch: A Life in Medicine and Bacteriology*. ASM Press: 120
- Madkour, M. Monir; D. A. Warrell (2004). *Tuberculosis*. Birkhäuser: 49
- Bonah C (2005). "The 'experimental stable' of the BCG vaccine: safety, efficacy, proof, and standards, 1921–1933". *Stud Hist Philos Biol Biomed Sci*. 36 (4): 696–721.
- Daniel, Thomas M. (2006). *Pioneers of Medicine and Their Impact on Tuberculosis*. Boydell & Brewer: 1868
- Murray, JF, Schraunfnagel, DE, Hopewell, PC. *Treatment of Tuberculosis. A Historical Perspective*. *Annals of the American Thoracic Society*, Vol. 12, No. 12, Dec 1, 2015.
<https://www.atsjournals.org/doi/full/10.1513/AnnalsATS.201509-632PS>, last accessed 1/24/20.
- Donald D Speigelburg, "New Topics in Tuberculosis Research"; 7/2/07
- World Health Organization/Stop TB Partnership. *The global plan to stop TB 2016--2020*. Geneva, Switzerland: World Health Organization/Stop TB Partnership; 2010, available at
<http://www.stoptb.org/global/plan>, last accessed 2/6/20.
- R. Mahajan. Bedaquiline: First FDA-approved tuberculosis drug in 40 years. *Int J Appl Basic Med Res*. 2013 Jan-Jun; 3(1): 1-2.

Slides 7-8: Global TB Epidemiology

- Global tuberculosis report 2019. Geneva: World Health Organization; 2019.
https://www.who.int/tb/publications/global_report/en/, last accessed 1/24/20.

Slide 9: BCG (Bacillus Calmette–Guérin) Vaccine

- CDC BCG Vaccine Fact Sheet:
<https://www.cdc.gov/tb/publications/factsheets/prevention/bcg.htm>, last accessed 1/24/20.
- MMWR: The Role of BCG Vaccine in the Prevention and Control of Tuberculosis in the United States A Joint Statement by the Advisory Council for the Elimination of Tuberculosis and the Advisory Committee on Immunization Practices. 4/26/1996/45(RR-4);1-18.
<https://www.cdc.gov/mmwr/preview/mmwrhtml/00041047.htm>, last accessed 1/24/20.
- BCG World Atlas, 2nd Edition; McGill University. <http://www.bcgatlas.org/>, last accessed 1/24/20.
- Global tuberculosis report 2019. Geneva: World Health Organization; 2019.
https://www.who.int/tb/publications/global_report/en/, last accessed 1/24/20.

Slides 10-13: United States TB Epidemiology

- CDC. Data and Statistics: <https://www.cdc.gov/tb/statistics/default.htm>, last accessed 1/24/20.
- Talwar A, Tsang CA, Price SF, et al. Tuberculosis – United States, 2018. MMWR Morb Mortal Wkly Rep 2019;68:257-262. DOI <http://dx.doi.org/10.15585/mmwr.mm6811a2>, last accessed 1/24/20.

Slides 14-17: Michigan TB Epidemiology

- S. Smith, Michigan TB Epidemiology; unpublished data.
- S. Smith, Tuberculosis Cases & Rates Michigan 2015-2019: https://www.michigan.gov/documents/mdhhs/1._Michigan_TB_Cases__Rates_668437_7.pdf, last accessed 2/6/20.

Slide 19: II. *Mycobacterium tuberculosis* Transmission & Pathogenesis

- NIH News Release: Temperature-stable experimental tuberculosis vaccine enters clinical testing; 1/23/19. <https://www.nih.gov/news-events/news-releases/temperature-stable-experimental-tuberculosis-vaccine-enters-clinical-testing>, last accessed 2/6/20.

Slides 20-22: *Mycobacterium tuberculosis* Transmission

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Stop TB Canada: <https://stoptbcanada.org/a-member-of-the-stop-tb-partnership/tuberculosis-tb/>, last accessed 2/6/20.
- 2009 Nucleus Medical Media, Inc: <http://www.empowher.com/media/reference/allergic-bronchopulmonary-aspergillosis-abpa>, last accessed 2/6/20.

Slide 23: Initial Infection

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Berg, RD, Levitte, S et al. Lysosomal Disorders Drive Susceptibility to Tuberculosis by Compromising Macrophage Migration. Cell; 24 Mar 2016; 10.1016.

Slide 24: Active TB Disease

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Stop TB Canada: <https://stoptbcanada.org/a-member-of-the-stop-tb-partnership/tuberculosis-tb/>, last accessed 2/6/20.

Slide 25: LTBI

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Kim, MJ, Wainwright, HC et al. Caseation of human tuberculosis granulomas correlates with elevated host lipid metabolism. EMBO Molecular Medicine; 07 Jan 2010; vol 2 no. 7 258-274.

Slide 26: Reactivation

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Kim, MJ, Wainwright, HC et al. Caseation of human tuberculosis granulomas correlates with elevated host lipid metabolism. EMBO Molecular Medicine; 07 Jan 2010; vol 2 no. 7 258-274.
- Stop TB Canada: <https://stoptbcanada.org/a-member-of-the-stop-tb-partnership/tuberculosis-tb/>, last accessed 2/6/20.

Slide 27: Latent TB Infection (LTBI)

- Deciding When to Treat Latent TB Infection, CDC: <https://www.cdc.gov/tb/topic/treatment/decideltdbi.htm>, last accessed 2/6/20.
- WHO, Guidelines on the Management of Latent Tuberculosis Infection; 2015: http://apps.who.int/iris/bitstream/10665/136471/1/9789241548908_eng.pdf?ua=1&ua=1, last accessed 2/6/20.

Slide 28: TB Infection to TB Disease

- Latent Tuberculosis Infection (LTBI) – FAQs, WHO: <https://www.who.int/tb/areas-of-work/preventive-care/ltdbi/faqs/en/>, last accessed 2/6/20.

Slide 29: Treatment Regimens for Latent TB Infection

- Treatment Regimens for Latent TB Infection (LTBI), CDC: <https://www.cdc.gov/tb/topic/treatment/ltdbi.htm>, last accessed 2/6/20.
- CDC News: CDC Releases Updated Recommendations for Treatment of Latent TB Infection, 06/28/2018 01:20 PM EDT: <https://www.cdc.gov/nchhstp/newsroom/2018/treatment-of-latent-tb-infection.html>, last accessed 2/6/20.

Slide 30: LTBI vs. TB Disease

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.

Slide 32: III. Testing and Evaluating for TB

- Ng Han Guan/AP: <https://www.npr.org/sections/health-shots/2012/06/06/154448297/drug-resistant-tuberculosis-a-serious-epidemic-in-china>, last accessed 2/6/20.

Slide 33: TB Evaluation Process: Medical History & Physical Exam

- CDC, TB 101 for Health Care Workers: <https://www.cdc.gov/tb/webcourses/tb101/page112.html>, last accessed 2/6/20.
- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.

Slide 34: TB Evaluation Process: Testing

- Stop TB Canada: <https://stoptbcanada.org/a-member-of-the-stop-tb-partnership/tuberculosis-tb/>, last accessed 2/6/20.

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.

Slide 35: TB Evaluation Process: Chest Radiography

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.

Slide 36: TB Evaluation Process: Specimen Collection

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Middlesex-London Health Unit: <https://www.healthunit.com/sputum-collection>, last accessed 2/6/20.

Slide 37: TB Evaluation Process: Laboratory

- CDC, TB 101 for Health Care Workers: <https://www.cdc.gov/tb/webcourses/tb101/page3294.html>, last accessed 2/6/20.
- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Online Bacteriology Notes: Cultural Characteristics of Mycobacterium tuberculosis. <https://microbenotes.com/cultural-characteristics-of-mycobacterium-tuberculosis/>, last accessed 2/6/20.

Slide 38: Different Types of Mycobacteria

- Learn about Nontuberculosis Mycobacteria (NTM), American Lung Association. <https://www.lung.org/lung-health-and-diseases/lung-disease-lookup/nontuberculosis-mycobacteria/learn-about-ntm.html>, last accessed 2/6/20.
- Piersimoni, C, Scarparo, C. Emerging infections associated with nontuberculosis mycobacteria in immunocompetent persons. https://openi.nlm.nih.gov/detailedresult?img=PMC2819852_08-1259-F&req=4, last accessed 2/6/20.
- Johnson, MM, Odell, JA. Nontuberculosis mycobacterial pulmonary infections. J Thorac Dis. 2014 Mar; 6(3): 210-220. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3949190/>, last accessed 2/6/20.
- Mycobacterium Tuberculosis Complex, Science Direct. <https://www.sciencedirect.com/topics/medicine-and-dentistry/mycobacterium-tuberculosis-complex>, last accessed 2/6/20.

Slide 39: Testing for TB: Mantoux Tuberculin Skin Test (TST)

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- CDC, TB 101 for Health Care Workers: <https://www.cdc.gov/tb/webcourses/tb101/page202.html>, last accessed 2/6/20.

Slide 40: TST Interpretations & Risk Factors

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005. CDC. MMWR 2005; 54(No. RR-17): 46-48: <http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf>, last accessed 2/6/20.
- ATS/CDC/IDSA Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clinical Infectious Disease, 2017;64(2):e1-e33: https://www.cdc.gov/tb/publications/guidelines/pdf/cid_ciw694_full.pdf, last accessed 2/6/20.

Slide 41: Testing for TB: Interferon-Gamma Release Assay (IGRA)

- Updated Guidelines for Using Interferon Gamma Release Assays to Detect *Mycobacterium tuberculosis* Infection -- United States, 2010. Centers for Disease Control and Prevention. MMWR 2010; 59(No. RR-05): <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5905a1.htm>, last accessed 2/6/20.
- Frequently Asked Questions for healthcare providers, Qiagen: <https://www.quantiferon.com/us/products/quantiferon-tb-gold-plus-us/provider-resources/provider-faq/>, last accessed 2/6/20.

Slides 42-45

- Red Book 2018, 31st Edition: Committee on Infectious Diseases; American Academy of Pediatrics; David W. Kimberlin, MD, FAAP; Michael T. Brady, MD, FAAP; Mary Anne Jackson, MD, FAAP; Sarah S. Long, MD, FAAP: <https://redbook.solutions.aap.org/>, last accessed 2/6/20.
- ATS/CDC/IDSA Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clinical Infectious Disease, 2017;64(2):e1-e33: https://www.cdc.gov/tb/publications/guidelines/pdf/cid_ciw694_full.pdf, last accessed 2/6/20.
- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.

Slides 46-49

- Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005. CDC. MMWR 2005; 54(No. RR-17): 46-48: <http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf>, last accessed 2/6/20.
- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Sosa LE, Njie GJ, Lobato MN, et al. Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. MMWR Morb Mortal Wkly Rep 2019;68:439-443. DOI: <http://dx.doi.org/10.15585/mmwr.mm6819a3>, last accessed 2/6/20.

Slide 50: Review: TST vs. IGRA

- ATS/CDC/IDSA Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clinical Infectious Disease, 2017;64(2):e1-e33: https://www.cdc.gov/tb/publications/guidelines/pdf/cid_ciw694_full.pdf, last accessed 2/6/20.

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.

Slide 52: IV. TB Case Management

- <https://wwwnc.cdc.gov/travel/page/find-clinic>, last accessed 2/6/20.

Slide 53: TB Disease Treatment

- Sami Silva. International website of Médecins Sans Frontières (MSF): India Must Address Worrying Stock Out of Tuberculosis Drugs; 6/17/13: <http://www.msf.org/en/article/india-must-address-worrying-stock-out-tuberculosis-drugs>, last accessed 2/6/20.
- Official American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America Clinical Practice Guidelines: Treatment of Drug-Susceptible Tuberculosis. 2016;63(7):e147-95: https://www.cdc.gov/tb/publications/guidelines/pdf/clin-infect-dis.-2016-nahid-cid_ciw376.pdf, last accessed 2/6/20.

Slide 54: Drug Resistant TB

- CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2019. <https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf>, last accessed 2/21/20.
- S. Smith, Michigan TB Epidemiology; unpublished data.

Slide 55: Roles of the Local Health Department

- NIH Visual Culture and Health Posters: Tuberculosis Robs you, Public Health Protects You. <https://profiles.nlm.nih.gov/ps/retrieve/ResourceMetadata/VcBBBS>, last accessed 2/6/20.
- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- Michigan Public Health Code 333.5111: [http://www.legislature.mi.gov/\(S\(qkgocnkewdmrlggd24g2ur0b\)\)/mileg.aspx?page=GetObject&objectname=mcl-333-5111](http://www.legislature.mi.gov/(S(qkgocnkewdmrlggd24g2ur0b))/mileg.aspx?page=GetObject&objectname=mcl-333-5111), last accessed 2/6/20.
- Michigan Communicable Disease Rule 325.174: https://www.michigan.gov/documents/Communicable_Final_Rule_-_Signed_120104_110923_7.pdf, last accessed 2/6/20.

Resource Slides

- Core Curriculum on Tuberculosis: What the Clinician Should Know. CDC. Sixth Edition, 2013: https://www.cdc.gov/tb/webcourses/Course/main_menu/index.html, last accessed 2/6/20.
- ATS/CDC/IDSA Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clinical Infectious Disease, 2017;64(2):e1-e33: https://www.cdc.gov/tb/publications/guidelines/pdf/cid_ciw694_full.pdf, last accessed 2/6/20.
- Updated Guidelines for Using Interferon Gamma Release Assays to Detect *Mycobacterium tuberculosis* Infection -- United States, 2010. Centers for Disease Control and Prevention. MMWR 2010; 59(No. RR-05): <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5905a1.htm>, last accessed 2/6/20.
- QuantiFERON-TB Gold Plus Package Insert, 8/20/17. <http://www.quantiferon.com/wp-content/uploads/2017/10/QFT-Plus-ELISA-IFU-L1095849-R02.pdf> , last accessed 2/6/20.
- Guidelines for Using the QuantiFERON®-TB Test for Diagnosing Latent *Mycobacterium tuberculosis* Infection, 2003. CDC. MMWR 2003; 52(No. RR-02): 15-18: <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5202a2.htm>, last accessed 2/6/20.
- Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005. CDC. MMWR 2005; 54(No. RR-17): 46-48: <http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf>, last accessed 2/6/20.
- Sosa LE, Njie GJ, Lobato MN, et al. Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. MMWR Morb Mortal Wkly Rep 2019;68:439-443. DOI: <http://dx.doi.org/10.15585/mmwr.mm6819a3>, last accessed 2/6/20.