

# Infectious Diseases of Bolivia

## Summer 2024

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### COURSE DESCRIPTION

Introduces the basic methods for infectious disease epidemiology and case studies of important disease syndromes and entities in Bolivia. Environmental and social factors and the role they play in disease outbreaks will be discussed. Methods include definitions and nomenclature, outbreak investigations, disease surveillance, case-control studies, cohort studies, laboratory diagnosis, molecular epidemiology, dynamics of transmission, and assessment of vaccine field effectiveness.

### COURSE OBJECTIVES

- (1) To introduce students to the concepts of Infectious Disease Epidemiology and the diseases that plague Bolivia
- (2) To introduce students to the complex issues of climate, SES, globalization, and the affect these have on disease spread
- (3) To help students gain a better appreciation for the historical and experimental basis of our current understanding of Public Health.

### COURSE MATERIALS

- A series of scientific articles and readings that will be provided to the students in digital form and/or in a bound print form.

#### Supplementary Materials

In addition to the course materials, students may want to use the following:

- A calculator with square root and logarithmic functions for some of the exercises.

**It is REQUIRED that students read the appropriate material prior to lecture to understand the big picture and contribute to in class discussion and again after the lecture to reinforce the details covered during the class period.**

### COURSE EVALUATION

Class participation and attendance (20%)

Students are expected to keep up to date with readings, attend classes and field trips, and engage in class discussion of readings and field trips.

Each class will be based on 5 points scale: 5 points-attended, participated beyond expectations (spoke at least 3 times), respectful towards lecturer, material, and classmates; 4 points- attended, participated expectedly (spoke at least 2 times), respectful towards lecturer, material, and classmates; 3 points- attended, participated standardly (spoke at least once), respectful towards lecturer, material, and classmates; 2 points-attended, did not participate, respectful towards lecturer, material, and classmates; 1 point-attended or excused absences (each absences will be examined case by case) and/or disrespectful towards lecturer, material, and classmates; 0 points-unexcused absences.

#### Journaling (30%)

Students will keep journal entries that analyze the weekly course materials and cultural encounters. These reflections may be drawn from both courses and should connect their overall experiences in Bolivia with courses' reading materials, lectures, and discussions. Each student will submit TWO 2-3 page (double spaced, Calibri (Body), font 11) analytic journal entries during the course. Due dates are TBD.

#### Final Project Presentation (10%)

Students will give a 15-minute PowerPoint presentation on their final project topic. This presentation should explain the reasons why this topic was chosen, what strategies they would implement to control the problem, and how they plan to disseminate the information to the public.

### Final Project (40%)

Students will develop a 5-8 paged (double spaced, Calibri or Times New Roman, font 11) Final Project on an infectious public health issue in Bolivia that interests them. This topic can be one that was presented throughout the program or one they would like to investigate more after their time spent in Bolivia. The paper will be due exactly two weeks after the program ends.

### Final Grade

Your final grade will be determined by the following (this is approximate and is subject to change):

Journaling	150pts
Final presentation	50 pts
Campaign project	200pts
Attendance	100 pts
<b>Total</b>	<b>500 pts</b>

### GRADE RANGES

A	93.00 – 100%	C	73.00 – 76.99%
A-	90.00 – 92.99%	C-	70.00 – 72.99%
B+	87.00 – 89.99%	D+	67.00 – 69.99%
B	83.00 – 86.99%	D	63.00 – 66.99%
B-	80.00 – 82.99%	D-	60.00 – 62.99%
C+	77.00 – 79.99%	F	59.99 and below

### Academic Integrity

Work is to be completed individually. Homework assignments may be discussed with classmates; however, each student must write and submit their own, individually written homework assignments. Appropriate citations for work derived from published literature or reliable internet sources (this does not include Wikipedia) must be included in written assignments. Cheating/plagiarism of any kind is unethical and WILL NOT be tolerated, this includes copying from other students or from published books and articles including the internet. The use of AI to generate assignments is NOT permitted. All students are expected to adhere to the school's standards of academic honesty. The School of Public Health's policy on academic integrity, which is based on the University's policy, is available online in the Pitt Public Health Academic Handbook. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy as seen here: [www.publichealth.pitt.edu/home/academics/academic-requirements](http://www.publichealth.pitt.edu/home/academics/academic-requirements). Failure to comply will lead to sanctions against the student in accordance with the university policies. Sanctions may include a reduction in grade or failure in the course, depending on the severity of the offense.

### Disability Accommodations

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 140 William Pitt Union, 412-648-7890 as early as possible in the term.

### Sexual Misconduct, Required Reporting, and Title IX Statement

The University is committed to combatting sexual misconduct. As a result, you should know that University faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the University's Title IX office so that the victim may be provided appropriate resources and support options. As your professor, I am required to report any incidents of sexual misconduct that are directly reported to me, or of which I am somehow made aware. There are two important exceptions to this requirement about which you should be aware:

A list of the designated University employees who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <https://www.diversity.pitt.edu/civil-rights-title-ix/make-report/report-form>

An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be

disclosed to the University's Title IX office. If you are the victim of sexual misconduct, Pitt encourages you to reach out to these resources: Title IX Office: 412-648-7860; SHARE @ the University Counseling Center: 412-648-7930 (8:30 A.M. TO 5 P.M. M-F) and 412-648-7856 (AFTER BUSINESS HOURS). Other reporting information is available here: <https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/make-report>

### Diversity Statement

The University of Pittsburgh School of Public Health considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Pitt Public Health is committed to creating and fostering inclusive learning environments that value human dignity and equity and promote social justice. Every member of our community is expected to be respectful of the individual perspectives, experiences, behaviors, worldviews, and backgrounds of others. While intellectual disagreement may be constructive, no derogatory statements, or demeaning or discriminatory behavior will be permitted.

If you feel uncomfortable or would like to discuss a situation, please contact any of the following:

- the course director or a course instructor.
- the Pitt Public Health Associate Dean responsible for diversity and inclusion.
- the University's Office of Diversity and Inclusion at 412-648-7860 or
- <https://www.diversity.pitt.edu/civil-rights-title-ix/make-report/report-form> (anonymous reporting form)

### **COURSE SCHEDULE**

<b>Class</b>	<b>Topic</b>	<b>Reading</b>
<b>1</b>	<b>The Geographical Context of Bolivia (Andean, Amazonian and Chaco regions)</b>	<p><b>Overview: Understanding the geographical location of Bolivia as well as the vast topography of the country to understand the infectious diseases facing Bolivian communities</b></p> <p>Richards K, Smart C. 2009. <i>Bolivia-Culture Smart!: The Essential Guide to Customs &amp; Culture</i>. Kuperard.</p> <p>Escalera-Antezana JP, Rodriguez-Villena OJ, Arancibia-Alba AW, et al. 2020. Clinical features of fatal cases of Chapare virus hemorrhagic fever originating from rural La Paz, Bolivia, 2019: A cluster analysis. <i>Travel Med Infect Dis</i>, 36, 101589. <a href="https://doi.org/10.1016/j.tmaid.2020.101589">https://doi.org/10.1016/j.tmaid.2020.101589</a></p>
<b>2</b>	<b>Visit a public hospital</b>	<b>Journal on experience and questions</b>
<b>3</b>	<b>Medical Systems in Bolivia (Private vs. Public Care)</b>	<p><b>Overview: Understand the current medical system in place for both Public and Private sectors; sanitary problems and public funding</b></p> <p>Angles R, Buchon P, Valero MA, et al. 2022. One Health action against human fascioliasis in the Bolivian altiplano: food, water, housing, behavioural traditions, social aspects, and livestock management linked to disease transmission and infection sources. <i>Int J Environ Res Pub Health</i>, 19(3), 1120. <a href="https://doi.org/10.3390/ijerph19031120">https://doi.org/10.3390/ijerph19031120</a></p>
<b>4</b>	<b>Visit a private hospital</b>	<b>Journal on experience and questions</b>
<b>5</b>	<b>Guest Lecture</b>	<p>How insurance works in Bolivia</p> <p>Students will be in small groups after lecture to ask questions</p> <p><b>Journal</b></p>
<b>6</b>	<p><b>Introduction: Background on Immune functions</b></p> <p><b>Introduction to Microbes</b></p>	<p>Warrington R, Watson W, Kim HL, et al. 2011. An introduction to immunology and immunopathology. <i>All Asth Clin Immun</i> 7, S1. <a href="https://doi.org/10.1186/1710-1492-7-S1-S1">https://doi.org/10.1186/1710-1492-7-S1-S1</a></p> <p>Bruslind Microbiology sections: 1, 4-8</p>

		Explore: <a href="https://microbiologysociety.org/why-microbiology-matters/what-is-microbiology.html">https://microbiologysociety.org/why-microbiology-matters/what-is-microbiology.html</a>
7	<b>Introduction to ecological principles of disease</b>  <b>Introduction to social issues with disease</b>	Mackenzie JS, Jeggo M. 2019. The One Health approach—Why is it so important? <i>Trop Med Infect Dis</i> , 4(2), 88. <a href="https://doi.org/10.3390/tropicalmed4020088">https://doi.org/10.3390/tropicalmed4020088</a>  Buckee C, Noor A, Sattenspiel L. 2021. Thinking clearly about social aspects of infectious disease transmission. <i>Nature</i> 595, 205–213. <a href="https://doi.org/10.1038/s41586-021-03694-x">https://doi.org/10.1038/s41586-021-03694-x</a>
8	<b>Introduction to Epidemiology</b>  <b>Summarizing Data</b>  <b>Measures of Risk</b>	Principles of Epidemiology in Public Health Practice pages 1-1 to 1-80  Principles of Epidemiology in Public Health Practice pages 2-1 to 2-58  Principles of Epidemiology in Public Health Practice pages 3-1 to 3-50
9	<b>Displaying Data</b>  <b>Problem Based Activities</b>	Principles of Epidemiology in Public Health Practice pages 4-1 to 4-79
10	<b>Guest Lecture</b>	How hospitals operate in Bolivia Students will be in small groups after lecture to ask questions  <b>Journal</b>
11	<b>Bacterial Infections in Bolivia</b>  <b>Cholera</b>	Guglielmetti P, Bartoloni A, Roselli M, et al. 1992. Population movements and cholera spread in cordillera province, Santa Cruz department, Bolivia. <i>The Lancet</i> , 340(8811), 113. <a href="http://dx.doi.org.pitt.idm.oclc.org/10.1016/0140-6736(92)90432-3">http://dx.doi.org.pitt.idm.oclc.org/10.1016/0140-6736(92)90432-3</a>  Balasubramanian D, Murcia S, Ogbunugafor CB, et al. 2021. Cholera dynamics: lessons from an epidemic. <i>J Med Microbiol</i> , 70(2), 001298. <a href="https://doi.org/10.1099/jmm.0.001298">https://doi.org/10.1099/jmm.0.001298</a>  <b>In class activity on spread of Cholera</b>
12	<b>Bacterial Infections in Bolivia</b>  <b>Typhoid</b>	Dejung S, Fuentes I, Almanza G, et al. 2007. Effect of solar water disinfection (SODIS) on model microorganisms under improved and field SODIS conditions. <i>J Water Supply: Res Technol—AQUA</i> , 56(4), 245-256. <a href="https://doi.org/10.2166/aqua.2007.058">https://doi.org/10.2166/aqua.2007.058</a>  Pacino NL. 2020. Epidemic Episodes: Disease Outbreaks and State Legitimacy in Post-Revolutionary Bolivia. <i>Latin Americanist</i> , 64(4), 477-500. <a href="https://doi.org/10.1353/tla.2020.0036">https://doi.org/10.1353/tla.2020.0036</a> .
13	<b>Field trip to water purification site</b>	<b>Site TBD</b>  Helgegren I, Rauch S, Cossio C, et al. 2018. Importance of triggers and veto-barriers for the implementation of sanitation in informal peri-urban settlements – The case of Cochabamba, Bolivia. <i>PLoS One</i> , 13(4), e0193613. <a href="https://doi.org/10.1371/journal.pone.0193613">https://doi.org/10.1371/journal.pone.0193613</a>
14	<b>Viral Infections in Bolivia</b>  <b>Vector-borne viral diseases: Dengue, Yellow Fever, Zika, Chikungunya</b>	Quintero J, Brochero H, Manrique-Saide P, et al. 2014. Ecological, biological and social dimensions of dengue vector breeding in five urban settings of Latin America: a multi-country study. <i>BMC Infect Dis</i> , 14, 1-13. <a href="https://doi.org/10.1186/1471-2334-14-38">https://doi.org/10.1186/1471-2334-14-38</a> .

		<p>Ramos-Castañeda J, Barreto dos Santos F, Martinez-Vega R, et al. 2017. Dengue in Latin America: systematic review of molecular epidemiological trends. <i>PLoS Neglect Trop Dis</i>, 11(1), e0005224. <a href="https://doi.org/10.1371/journal.pntd.0005224">https://doi.org/10.1371/journal.pntd.0005224</a></p> <p>Baronti C, Goitia NJV, Cook S, et al. 2011. Molecular epidemiology of yellow fever in Bolivia from 1999 to 2008. <i>Vector-Borne Zoonot Dis</i>, 11(3), 277-284. <a href="https://doi.org/10.1089/vbz.2010.0017">https://doi.org/10.1089/vbz.2010.0017</a></p> <p>Vargas-Cuentas NI, Roman-Gonzalez A, Yumin T. 2018. Spatial-temporal epidemiology study of Chikungunya disease in Bolivia. <i>Adv Astronaut Sci Technol</i>, 1, 69-80. <a href="https://doi.org/10.1007/s42423-018-0014-4">https://doi.org/10.1007/s42423-018-0014-4</a></p> <p>Silva RBD, Araujo MIFD, Barbosa PPDS. 2021. Dengue, Zika Fever and Chikungunya: Biological aspects and situation in south America between 2015 and 2020. <i>Res, Soc, Develop</i>, 10(6), 1-16. <a href="http://dx.doi.org/10.33448/rsd-v10i6.15539">http://dx.doi.org/10.33448/rsd-v10i6.15539</a></p>
15	<b>Viral Infections in Bolivia</b>  <b>Hemorrhagic Fevers: Chapare, hantavirus</b>	<p>Tapia-Ramírez G, Lorenzo C, Navarrete D, et al. 2022. A Review of mammarenaviruses and rodent reservoirs in the Americas. <i>Ecohealth</i>, 19(1), 22-39. <a href="https://doi.org/10.1007/s10393-022-01580-0">https://doi.org/10.1007/s10393-022-01580-0</a></p> <p>Escalera-Antezana JP, Torrez-Fernandez R, Montalvan-Plata D, et al. 2020. Orthohantavirus pulmonary syndrome in Santa Cruz and Tarija, Bolivia, 2018. <i>Int J Infect Dis</i>, 90, 145-150. <a href="https://doi.org/10.1016/j.ijid.2019.10.021">https://doi.org/10.1016/j.ijid.2019.10.021</a></p> <p>Silva-Ramos CR, Faccini-Martínez ÁA, Calixto OJ, et al. 2021. Bolivian hemorrhagic fever: a narrative review. <i>Travel Med Infect Dis</i>, 40, 102001. <a href="https://doi.org/10.1016/j.tmaid.2021.102001">https://doi.org/10.1016/j.tmaid.2021.102001</a></p> <p>Loayza Mafayle R, Morales-Betoulle ME, Romero C, et al. 2022. Chapare hemorrhagic fever and virus detection in rodents in Bolivia in 2019. <i>New Engl J Med</i>, 386(24), 2283-2294. <a href="https://doi.org/10.1056/NEJMoa2110339">https://doi.org/10.1056/NEJMoa2110339</a></p>
16	<b>Parasitic Infections in Bolivia</b>  <b>Protists: Giardia, Chagas</b>	<p>Macchioni F, Segundo H, Gabrielli S, et al. 2015. Dramatic decrease in prevalence of soil-transmitted helminths and new insights into intestinal protozoa in children living in the Chaco region, Bolivia. <i>Am J Trop Med Hyg</i>. 92(4):794-796. <a href="https://doi.org/10.4269/ajtmh.14-0039">https://doi.org/10.4269/ajtmh.14-0039</a></p> <p>Apaza C, Cuna W, Brañez F, et al. 2023. Frequency of gastrointestinal parasites, anemia, and nutritional status among children from different geographical regions of Bolivia. <i>J Trop Med</i>, 2023. <a href="https://doi.org/10.1155/2023/5020490">https://doi.org/10.1155/2023/5020490</a></p> <p>Salm A, Gertsch J. 2019. Cultural perception of triatomine bugs and Chagas disease in Bolivia: a cross-sectional field study. <i>Parasites Vectors</i>, 12(1), 1-19. <a href="https://doi.org/10.1186/s13071-019-3546-0">https://doi.org/10.1186/s13071-019-3546-0</a></p> <p>Jimeno I, Mendoza N, Zapana F, et al. 2021. Social determinants in the access to health care for Chagas disease: A qualitative research on family life in the</p>

		<p>“Valle Alto” of Cochabamba, Bolivia. <i>Plos one</i>, 16(8), e0255226.  <a href="https://doi.org/10.1371/journal.pone.0255226">https://doi.org/10.1371/journal.pone.0255226</a></p>
17	<p><b>Parasitic Infections in Bolivia</b></p> <p><b>Vector-borne bacterial diseases</b></p>	<p>Rodriguez-Morales AJ, Bonilla-Aldana DK, Idarraga-Bedoya SE, et al. 2018. Epidemiology of zoonotic tick-borne diseases in Latin America: Are we just seeing the tip of the iceberg? <i>F1000Res</i>, 7: 1988.  <a href="https://doi.org/10.12688/f1000research.17649.2">https://doi.org/10.12688/f1000research.17649.2</a></p> <p>Lopez JE, Krishnavahjala A, Garcia MN, et al. 2016. Tick-borne relapsing fever spirochetes in the Americas. <i>Vet Sci</i>, 3(3), 16.  <a href="https://doi.org/10.3390/vetsci3030016">https://doi.org/10.3390/vetsci3030016</a></p>
18	<p><b>Parasitic Infections in Bolivia</b></p> <p><b>Helminths, Flatworms</b></p>	<p>Asai T, Córdova Vidal C, Strauss W, et al. 2016. Effect of mass stool examination and mass treatment for decreasing intestinal helminth and protozoan infection rates in Bolivian children: a cross-sectional study. <i>PLoS Neglect Trop Dis</i>, 10(12), e0005147.  <a href="https://doi.org/10.1371/journal.pntd.0005147">https://doi.org/10.1371/journal.pntd.0005147</a></p> <p>Gabrielli S, Macchioni F, Spinicci M, et al. 2022. Long-standing international cooperation in parasitology research: A summary of 35 years of activities in the Bolivian Chaco. <i>Trop Med Infect Dis</i>, 7(10), 275.  <a href="https://doi.org/10.3390/tropicalmed7100275">https://doi.org/10.3390/tropicalmed7100275</a></p>
19	<p><b>Parasitic Infections in Bolivia</b></p> <p><b>Helminths, Roundworms</b></p>	<p>Salvador F, Sulleiro E, Sánchez-Montalvá A, et al. 2016. Impact of helminth infection on the clinical and microbiological presentation of Chagas diseases in chronically infected patients. <i>PLoS Neglect Trop Dis</i>, 10(4), e0004663.  <a href="https://doi.org/10.1371/journal.pntd.0004663">https://doi.org/10.1371/journal.pntd.0004663</a></p> <p>Persson G, Ekmann JR, Hviid TVF. 2019. Reflections upon immunological mechanisms involved in fertility, pregnancy and parasite infections. <i>J Repro Immun</i>, 136, 102610. <a href="https://doi.org/10.1016/j.jri.2019.08.001">https://doi.org/10.1016/j.jri.2019.08.001</a></p> <p>Gétaz L, Castro R, Zamora P, et al. 2019. Epidemiology of <i>Strongyloides stercoralis</i> infection in Bolivian patients at high risk of complications. <i>PLoS Neglect Trop Dis</i>, 13(1), e0007028.  <a href="https://doi.org/10.1371/journal.pntd.0007028">https://doi.org/10.1371/journal.pntd.0007028</a></p>
20	<b>Final Presentations</b>	<b>No reading requirements</b>