

**M19-551 Systematic Reviews and Meta-Analysis in Public Health and Clinical Medicine**

Spring 2020

Fridays, 9:00 am to 12:00 pm

Location: Taylor Avenue Building

2nd floor, Richmond Room

**INSTRUCTORS**

Graham A. Colditz, MD, colditzg@wustl.edu

Carrie Stoll, MSW, MPH, carolyn.stoll@wustl.edu

**OFFICE HOURS**

By appointment and after class

**PREREQUISITES**

Introductory epidemiology and biostatistics 1 (or permission of the course master)

**TARGET AUDIENCE**

Clinicians interested in conducting research synthesis or meta-analysis to inform practice or policy, clinical training program participants, students enrolled in Genetic Epidemiology Master of Science program, students in MPH addressing application of epidemiologic data to prevention. Prior clinical or community research experience is helpful but not required.

**COURSE DESCRIPTION & OBJECTIVES**

Introduction to the use of meta-analysis and related methods used to synthesize and evaluate epidemiological and clinical research in public healthand clinical medicine. Concepts introduced and illustrated through case studies of public health and medical issues.

Objectives are to learn how to use a variety of formal and informal methods for synthesizing epidemiological information on public health risks, to understand how to use these methods to assess the strength of the evidence in policy development and clinical contexts, and to appreciate how research synthesis can contribute to rational policy making in controversial areas.

**COMPETENCIES**

Ability to design research synthesis and meta-analysis

* Define research question
* Define literature search strategy
* Conduct literature search and document the process
* Apply eligibility criteria, data extraction, and data quality scoring
* Develop data analysis plan
* Understand and interpret fixed-effects, random-effects, and meta-regression methods and results
* Recognize heterogeneity and approaches to quantification and reporting of among-study variation

Skills and experience to conduct analysis

* Master data analysis and model fitting in context of meta-analysis
* Quantitatively evaluate publication bias
* Be able to estimate combined results from reports of randomized trials, observational studies, and diagnostic test

Master the core reporting strategies

* Master reporting standards for RCTs and observational data in context of meta-analysis
* Master forest plot, summary tables, and publication bias presentations

Draw inferences from data to inform clinical and public health practices

* Correctly use reasoning for design and methodologies employed
* Present oral and written reports from analyses
* Place inference in context of clinical and public health implications for action and future research

**GRADING**

Your grade will be based on:

* HW 1: Preliminary topic presentation (10%)
* HW 2: Library assignment (10%)
* HW 3: Analysis in STATA (10%)
* HW 4: Data extraction (10%)
* Final presentation (10%) and paper (50%)

Grading Scale

A+: 97-100; A: 93-96; A-: 90-92; B+: 87-89; B: 83-86; B-: 80-82; C+: 77-79; C: 73-76; C-: 70-72

**ATTENDANCE AND PARTICIPATION**

Class attendance is required. As a courtesy to other students, you are expected to arrive on time. More than two unexcused absences from class may result in a lowered grade. Readings assigned for each class should be read ahead of the class and students should be prepared to discuss the material from readings.

**POLICY ON LATE ASSIGNMENTS**

Late assignments will result in a deduction of one grade point (A+ down to A) for each day late (including weekends) unless prior approval is obtained from the instructor or a compelling situation prevents prior approval (i.e. documented health issues or family emergencies).

**READINGS**

**The primary text for the course** is Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith, and Douglas Altman, eds., BMJ Books, 2001. *This book is available in full online from Becker Medical Library.*

Supplemental readings from Introduction to Meta-Analysis, Michael Borenstein, Larry V Hedges, Julian PT Higgins, and Hannah R Rothstein, Wiley, 2009, are also given. Additional readings are indicated below and will be available through Canvas.

**Additional Resources**

BMJ methods <http://www.bmj.com/search?submit=yes&tocsectionid=Research%20Methods> \*

Cochrane library <http://www.thecochranelibrary.com/view/0/index.html>

Cochrane methods group and handbook <http://handbook.cochrane.org/>

UK NICE (National Institute for Health and Clinical Excellence) <http://www.nice.org.uk/>

Australia Handbook. How to use the evidence. NHMRC. <http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/cp69.pdf>

Berkeley Systematic Reviews Group, <http://www.medepi.net/meta/>

PLOS template for systematic review – meta-analysis article preparation

[www.**plos**one.org/static/tpl\_**plos**\_meta.doc](http://www.plosone.org/static/tpl_plos_meta.doc)

**ASSIGNMENTS & DUE DATES**

*Details of all assignments can be found on Canvas*

* **HW 1: Preliminary topic**

Presented in class on Jan 31

Slides are due via Canvas by January 29 at 11:59 pm

* **HW 2: Library assignment**

Due February 7 by 11:59 pm, submit via Canvas AND email to dathomas@wustl.edu

* **HW 3: Analysis in STATA**

Due March 6 by 11:59 pm, submit via Canvas.

* **HW 4: Data extraction form**

Presented in class on March 20

Slides due via Canvas by March 18 at 11:59 pm.

* **Final Presentation**

In class on April 24 and May 1. Students will sign up for a date in February.

Presentation slides are due April 22 and April 29 by 11:59 pm, respectively, via Canvas.

* **Final Paper**

Due May 3 by 11:59 pm via Canvas.

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| **Week** | **Date** | **Topic** | **Assignment****Due** | **Readings** |
| **Class 1** | Jan 17  | Introduction |  | Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 2011; chapters 1 & 2.Mosteller F, Colditz G. [Understanding Research Synthesis (Meta-Analysis](http://www.annualreviews.org/doi/abs/10.1146/annurev.pu.17.050196.000245)). Annual Rev Public Health 1996;17:1-23. Berlin JA, Colditz GA. [The Role of Meta-Analysis in the Regulatory Process for Foods, Drugs, an Devices](http://jama.ama-assn.org/content/281/9/830.full.pdf%2Bhtml) JAMA 1999; 281(9)830-934.*Classic article*Stampfer MJ, Goldhaber SZ, Yusuf S, Peto DPR, Hennekens CH. Effect of Intravenous [Streptokinase on Acute Myocardial Infarction: Pooled Results from Randomized Trials](http://www.nejm.org/doi/full/10.1056/NEJM198211043071904). NEJM 1982;307(19):1180-82.  |
| **Class 2** | Jan 24 | Defining the research question and searching the literaturePresentation by Michelle Doering and Angela Hardi from Becker Library |  | Counsell C. [Formulating Questions and Locating Primary Studies for Inclusion in Systematic Reviews](http://www.annals.org/content/127/5/380.full.pdf%2Bhtml). Ann Inter Med.1997;127:380-387. Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 2011;chapters 3, 4 & 5.Colditz GA, Brewer TF, Berkey CS, Wilson ME, Burdick E, Fineberg HV, Mosteller F. Efficacy of [BCG vaccine in the prevention of tuberculosis: Meta-analysis of the published literature.](http://jama.ama-assn.org/content/271/9/698.full.pdf%2Bhtml) *JAMA* 1994; 271:698 Colditz GA, Berkey CA, Mosteller F, Brewer TF, Wilson ME, Burdick E, Fineberg. [The efficacy of Bacillus Calmette-Guérin vaccination of newborns and infants in the prevention of tuberculosis: Meta-analysis of the published literature](http://www.ncbi.nlm.nih.gov/pubmed/7596718), *Pediatrics* 1995;96:29-35. Tuuli M G, Rampersad RM, Carbone JF, Stamilio D, Macones GA, Odibo AO. [Staples Compared With Subcuticular Suture for Skin Closure After Cesarean Delivery *A Systematic Review and Meta-Analysis*](http://ovidsp.tx.ovid.com/sp-3.4.2a/ovidweb.cgi?WebLinkFrameset=1&S=LIGDFPNNNIDDMPKKNCALDGGCBIEHAA00&returnUrl=ovidweb.cgi%3f%26Full%2bText%3dL%257cS.sh.15.16%257c0%257c00006250-201103000-00023%26S%3dLIGDFPNNNIDDMPKKNCALDGGCBIEHAA00&directlink=http%3a%2f%252)*.* Obstet Gynec 2011; 117:682-90. Lemeshow AR, Blum RE, Berlin JA, Stoto MA, Colditz GA[. Searching one or two databases was insufficient for meta-analysis of observational studies](http://www.sciencedirect.com/science/article/pii/S0895435605001356). J Clin Epidemiol 2005; 58:867-73 Classic article:Dickersin K. Scherer R, Lefebvre C. [Systematic Reviews: Identifying relevant studies for systematic reviews](http://www.bmj.com/content/309/6964/1286?view=long&pmid=7718048) BMJ 1994;309:1286-91. |
| **Class 3** | Jan 31 | STUDENT PRESENTIONSPRELIMINARY TOPIC | **HW 1: Preliminary Topic** |  |
| **Class 4** | Feb 7 | Statistical methods: effect sizes, basic meta-analysis calculations | **HW 2: Library Assignment** | Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 2011; chapters 15 & 16.Normand S-L. [Tutorial in Biostatistics Meta-Analysis: Formulating, Evaluating, Combining, and reporting](http://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291097-0258%2819990215%2918%3A3%3C321%3A%3AAID-SIM28%3E3.0.CO%3B2-P/abstract;jsessionid=1016848EF9F47E84DD5864C5D2FF5625.d02t01). Statist.Med.1999;18:321-359. Laird NM, and Mosteller F. Some statistical methods for combining experimental results. Int J Technol Assess health Care 1990;6(1):5-30.  *Additional readings:* Borenstein, Chapters 3-14*Using meta-analysis for research synthesis: pooling data from several studies. Biostatistics in Clinical Medicine, Chapter 14, 332-360.* |
| **Class 5** | Feb 14 | Statistical methods, continued: regression, cumulative meta-analysis |  | Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 2011; chapters 11,13-16.Tuuli M G, Rampersad RM, Carbone JF, Stamilio D, Macones GA, Odibo AO. [Staples Compared With Subcuticular Suture for Skin Closure After Cesarean Delivery *A Systematic Review and Meta-Analysis*](http://ovidsp.tx.ovid.com/sp-3.4.2a/ovidweb.cgi?WebLinkFrameset=1&S=LIGDFPNNNIDDMPKKNCALDGGCBIEHAA00&returnUrl=ovidweb.cgi%3f%26Full%2bText%3dL%257cS.sh.15.16%257c0%257c00006250-201103000-00023%26S%3dLIGDFPNNNIDDMPKKNCALDGGCBIEHAA00&directlink=http%3a%2f%252)*.* Obstet Gynec 2011; 117:682-90.  |
| **Class 6** | Feb 21 | Heterogeneity: I2, subgroup analysis |  | Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 2011; chapters 8,9Colditz GA, Burdick E, Mosteller F. Heterogeneity in Meta-analysis of Data from Epidemiologic Studies: Reviews and Commentary.AJE 1995;371-81.Colditz Berlin JA. Invited Commentary: Benefits of Heterogeneity in Meta-analysis of Data from Epidemiologic StudiesAJE 1995; 142: 385-8.Higgins JP, Thompson SG, Deeks JJ, Altman DG. [Measuring inconsistency in meta-analyses](http://www.bmj.com/content/327/7414/557?view=long&pmid=12958120), *BMJ* 2003;327:557-60. Gonzales DA, Norsworthy KJ, Kern SJ, Banks S, Sieving PC, Staar RA, Natanson C, Danner RL. [A meta-analysis of N-acetylycysteine in contrast-induced nephrotoxicity: unsupervised clustering to resolve heterogeneity](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2200657/?tool=pubmed), *BMC Medicine* 2007;5:32.  |
| **Class 7** | Feb 28 | Meta-analysis in STATAComputer Lab |  |  |
| **Class 8** | March 6 | Data extractionAssessing quality | **HW 3: Analysis in STATA** | Moher D, Olkin I. [Meta-analysis of Randomized Control Trials](http://jama.ama-assn.org/content/274/24/1962). JAMA 1995:274(24)1962-64. Moher D, Jadad AR, Nichol G, Penman M, Tugwell P, Walsh S. [Assessing the Quality of Randomized Control Trials: An Annotated Bibliography of Scales and Checklists](http://www.sciencedirect.com/science/article/pii/019724569400031W). Controlled Clinical Trials 1995;16:62-73. Assessing the quality of randomized control trials. Current issues and future directions. Moher D, Jadad AR, Tugwell P. Int’l J of Technology Assessment in Health Care 1996;12-1;196-208 (see Canvas)Stewart LA, Palmer MK. Bias in the analysis and reporting of randomized controlled trials. Int’l J of Technology Assessment in Health Care 1996;12-2:264-275.*Additional readings:* Borenstein, Chapter 44 |
| **Class 9** | March 13 | SPRING BREAK |  |  |
| **Class 10** | March 20 | STUDENT PRESENTATIONSExtraction form | **HW 4: Data extraction** |  |
| **Class 11** | March 27 | Meta-analysis in STATAComputer Lab 2 |  |  |
| **Class 12** | April 3 | Analysis combining individual patient data |  | Cholesterol Treatment Trialists [Efficacy and safety of more intensive lowering of LDL cholesterol: a meta-analysis of data from 170,000 participants in 26 randomized trials.](http://www.sciencedirect.com/science/article/pii/S0140673610613505) Lancet 2010;376:1670-81[Breast cancer and hormonal contraceptives: collaborative reanalysis of individual data on 53,297 women with breast cancer and 100,238 women without breast cancer from 54 epidemiological studies](http://www.sciencedirect.com/science/article/pii/S0140673696908065). Lancet 1996;347:1713-27 |
| **Class 13** | April 10 | Drug safety and adverse eventsNetwork analysis |  | Jüni P, Nartey L, Reichenbach S, Sterchi R, Dieppe PA, Egger M. [Risk of cardiovascular events and rofecoxib: Cumulative meta-analysis](http://www.sciencedirect.com/science/article/pii/S0140673604175144), *Lancet* 2004;364:2022-29Loke YK, et al Systematic reviews of adverse effects: Framework for a structured approach. BMC Medical Research Methodology 2007Golder S, Loke YK, Bland M. Meta-analysis of adverse effects data derived from Randomised controlled trials as compared to observational studies: Methodologic overview. PLOS medicine 2011; 8 e1001026Chou R, Aronson N, et al AHRQ Series paper 4: Assessing harms when comparing medical interventions: AHRQ and the effective health-care program. J Clinical Epidemiology 2010 Berlin JA, Colditz GA. [The Role of Meta-Analysis in the Regulatory Process for Foods, Drugs, an Devices](http://jama.ama-assn.org/content/281/9/830.full.pdf%2Bhtml) JAMA 1999; 281(9)830-934.*Additional reading:* Stoto MA, Research synthesis for public health policy: Experience of the Institute of Medicine, in *Meta-Analysis in Medicine and Health Policy*, Stangl D and Berry D., eds., New York: Marcel Dekker, 2000, pp 321-357.  |
| **Class 14** | April 17 | Combining diagnostic test resultsApplying results to policy and practice |  | **Combining Diagnostic Tests**Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 201;chapter 14.Example:Carpenter CR, et al., [Evidence –based diagnostics: Adult septic arthritis](http://onlinelibrary.wiley.com/doi/10.1111/j.1553-2712.2011.01121.x/pdf). Academic Emergency Medicine 2011; 18:782-96Issues in combining independent estimates of the sensitivity and specificity of a diagnostic test. Shapiro DE. Acad Radiol 1995;2:S37-S47.Rutter CM, Gatsonis CA Regression methods for meta-analysis of diagnostic test data. Acad Radiol 1995;2:S48–S56. Further reading on this topic see Rutter CM, Gatsonis CA<http://onlinelibrary.wiley.com/doi/10.1002/sim.942/abstract>Irwig L, Tosteson ANA, Gatsonis C, Lau J, Colditz GA, Chalmers TC, Mosteller F. [Guidelines for Meta-analysis Evaluating Diagnostic Tests](http://www.annals.org/content/120/8/667.full.pdf%2Bhtml). Ann Intern Med 1994;120:667-676 Examples:Hövels AM et al., [The diagnostic accuracy of CT and MRI in the staging of pelvic lymph noted in patients with prostate cancer: a meta-analysis](http://www.sciencedirect.com/science/article/pii/S0009926007003340). *Clinical Radiology* 2008; 63:387-395. Kwok Y et al., [Meta-analysis of exercise testing to detect coronary artery disease in women](http://www.sciencedirect.com/science/article/pii/S0002914998009631), *American Journal of Cardiology* 1999; 83: 660-666. *Additional reading:*Berry DA, Benefits and risks of screening mammography for women in their forties: A statistical approach, *JNCI* 1998; 90:1431-1439.**Applying results to policy and practice**Systematic Reviews in Health Care: Meta-analysis in Context, 2nd Edition, Mattias Egger, George Davey Smith and Douglas Altman eds, BMJ Books 2011;chapter 19, 21, 23Ioannidis J, Karassa F. [The need to consider the wider agenda in systematic reviews and meta-analysis](http://www.bmj.com/content/341/bmj.c4875?view=long&pmid=20837576). BMJ 2010;341:762-65 Kendrick T, Dowrick C, McBride A, Howe A, Clarke P, Maisey S, Moore, Smith PW. [Management of depression in UK general practice in relation to scores of depression severity questionnaires: analysis of medical record data](http://www.bmj.com/content/338/bmj.b750?view=long&pmid=19299475). BMJ 2009;338:b750.Glasziou P, Altman DG, Bastian H, Boutron I, Bride A, Jamtvedt G, Farmer A, Ghersi D, Groves T, Heneghan C, Hill S, Lewin S, Michie S, Perera R, Pomeroy V, Tilson J, Sheppard S, Williams JW. [Taking healthcare interventions from trial to practice.](http://www.bmj.com/content/341/bmj.c3852?view=long&pmid=20709714) BMJ 2010;341:c3852. Bastian H, Glasziou P, Chalmers I. [Seventy-Five Trials and Eleven Systematic Reviews a Day: How Will I Ever Keep Up](http://www.plosmedicine.org/article/info%3Adoi/10.1371/journal.pmed.1000326)? PLoS Medicine 2010;7(9):e1000326Guyatt GH, Oxman AD, Kunz R, Falck-Ytter Y, Vist GE, Liberati A, Schunemann HJ. [GRADE: going from evidence to recommendations](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2364804/?tool=pubmed). BMJ 2008;336:1049-51 |
| **Class 15** | April 24 | **Final presentations** | **Final presentations due** |  |
| **Class 16** | May 1 | **Final presentations** | **Final paper due** |  |

**CLASS PUBLICATIONS**

Many students go on to publish based on the work they performed in this class. Since 2011, the following publications have been produced by participants in this class:

* Salazar AS, Recinos LM, Mian HS, Stoll C, Simon LE, Sekhon S, Colditz GA, Wildes TM. Geriatric Assessment and Frailty Scores Predict Mortality in Myeloma: Systematic Review and Meta-analysis. Clinical Lymphoma Myeloma and Leukemia. 2019;19(8):488-96.e6.
* Cheng S-Y, Davis M, Jonson-Reid M, Yaeger L. Compared to what? A meta-analysis of batterer intervention studies using nontreated controls or comparisons. Trauma, Violence, & Abuse. 2019
* Eskew AM, Bedrick BS, Hardi A, Stoll CR, Colditz GA, Tuuli MG, Jungheim ES. Letrozole Compared With Clomiphene Citrate for Unexplained Infertility: A Systematic Review and Meta-analysis. Obstetrics & Gynecology. 2019 Feb 4.
* Lewkowitz AK, Gupta A, Simon L, Sabol BA, Stoll C, Cooke E, Rampersad RA, Tuuli MG. Intravenous compared with oral iron for the treatment of iron-deficiency anemia in pregnancy: a systematic review and meta-analysis. Journal of Perinatology. 2019 Jan 28:1.
* Yu L, Kronen RJ, Simon LE, Stoll CRT, Colditz GA, Tuuli MG. Prophylactic negative-pressure wound therapy after cesarean is associated with reduced risk of surgical site infection: a systematic review and meta-analysis. American journal of obstetrics and gynecology. 2018;218(2):200-10.e1.
* Karlow N, Schlaepfer CH, Stoll CRT, Doering M, Carpenter CR, Colditz GA, et al. A Systematic Review and Meta-analysis of Ketamine as an Alternative to Opioids for Acute Pain in the Emergency Department. Academic emergency medicine : official journal of the Society for Academic Emergency Medicine. 2018.
* George IA, Thomas B, Sadhu JS. Systematic review and meta-analysis of adjunctive corticosteroids in the treatment of tuberculous pericarditis. The international journal of tuberculosis and lung disease : the official journal of the International Union against Tuberculosis and Lung Disease. 2018;22(5):551-6.
* Vouri SM, Kebodeaux CD, Stranges PM, Teshome BF. Adverse events and treatment discontinuations of antimuscarinics for the treatment of overactive bladder in older adults: A systematic review and meta-analysis. Archives of gerontology and geriatrics. 2017;69:77-96.
* Johnson KJ, Lee JM, Ahsan K, Padda H, Feng Q, Partap S, et al. Pediatric cancer risk in association with birth defects: A systematic review. PloS one. 2017;12(7):e0181246.
* Drewry AM, Ablordeppey EA, Murray ET, Stoll CRT, Izadi SR, Dalton CM, et al. Antipyretic Therapy in Critically Ill Septic Patients: A Systematic Review and Meta-Analysis. Critical care medicine. 2017;45(5):806-13.
* Carter EB, Temming LA, Fowler S, Eppes C, Gross G, Srinivas SK, et al. Evidence-Based Bundles and Cesarean Delivery Surgical Site Infections: A Systematic Review and Meta-analysis. Obstetrics and gynecology. 2017;130(4):735-46.
* Walling EB, Benzoni N, Dornfeld J, Bhandari R, Sisk BA, Garbutt J, et al. Interventions to Improve HPV Vaccine Uptake: A Systematic Review. Pediatrics. 2016;138(1).
* Roland L, Fischer C, Tran K, Rachakonda T, Kallogjeri D, Lieu JE. Quality of Life in Children with Hearing Impairment: Systematic Review and Meta-analysis. Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery. 2016;155(2):208-19.
* Conner SN, Bedell V, Lipsey K, Macones GA, Cahill AG, Tuuli MG. Maternal Marijuana Use and Adverse Neonatal Outcomes: A Systematic Review and Meta-analysis. Obstetrics and gynecology. 2016;128(4):713-23.
* Carter EB, Temming LA, Akin J, Fowler S, Macones GA, Colditz GA, et al. Group Prenatal Care Compared With Traditional Prenatal Care: A Systematic Review and Meta-analysis. Obstetrics and gynecology. 2016;128(3):551-61.
* Boots CE, Meister M, Cooper AR, Hardi A, Jungheim ES. Ovarian stimulation in the luteal phase: systematic review and meta-analysis. Journal of Assisted Reproduction and Genetics. 2016;33(8):971-80.
* Yarbrough CK, Ong CJ, Beyer AB, Lipsey K, Derdeyn CP. Endovascular Thrombectomy for Anterior Circulation Stroke: Systematic Review and Meta-Analysis. Stroke; a journal of cerebral circulation. 2015.
* Stout MJ, Conner SN, Colditz GA, Macones GA, Tuuli MG. The Utility of 12-Hour Urine Collection for the Diagnosis of Preeclampsia: A Systematic Review and Meta-analysis. Obstetrics and gynecology. 2015;126(4):731-6.
* Rowland KJ, Jin LX, Moley JF. Biochemical cure after reoperations for medullary thyroid carcinoma: a meta-analysis. Annals of surgical oncology. 2015;22(1):96-102.
* Rashidi A, Ebadi M, Colditz GA, DiPersio JF. Outcomes of Allogeneic Stem Cell Transplantation in Elderly Patients with Acute Myeloid Leukemia: A Systematic Review and Meta-analysis. Biology of blood and marrow transplantation : journal of the American Society for Blood and Marrow Transplantation. 2015.
* Levy PT, Machefsky A, Sanchez AA, Patel MD, Rogal S, Fowler S, et al. Reference Ranges of Left Ventricular Strain Measures by Two-Dimensional Speckle-Tracking Echocardiography in Children: A Systematic Review and Meta-Analysis. Journal of the American Society of Echocardiography. 2015.
* Kumar G, Uhrig D, Fowler S, DeLaney MC, Alexandrov AV. Intravenous Recombinant Tissue Plasminogen Activator Does Not Impact Mortality in Acute Ischemic Stroke at Any Time Point up to 6 Months: A Systematic Review and Meta-Analysis of Randomized Controlled Clinical Trials. CNS drugs. 2015;29(8):659-67.
* Davis J, Sanford D, Schilling J, Hardi A, Colditz G. Systematic Review of Outcomes after Non-Cardiac Surgery in Patients with Implanted Left Ventricular Assist Devices. ASAIO journal (American Society for Artificial Internal Organs : 1992). 2015.
* Levy PT, Sanchez A, Machefsky A, Fowler S, Holland MR, Singh GK. Normal Ranges of Right Ventricular Systolic and Diastolic Strain Measures in Children: A Systematic Review and Meta-Analysis. Journal of the American Society of Echocardiography : official publication of the American Society of Echocardiography. 2014;27(5):549-60.e3.
* Kumar G, Shahripour RB, Alexandrov AV. Recanalization of acute basilar artery occlusion improves outcomes: a meta-analysis. Journal of neurointerventional surgery. 2014.
* Fayanju OM, Stoll CR, Fowler S, Colditz GA, Margenthaler JA. Contralateral prophylactic mastectomy after unilateral breast cancer: a systematic review and meta-analysis. Annals of surgery. 2014;260(6):1000-10.
* Conner SN, Frey HA, Cahill AG, Macones GA, Colditz GA, Tuuli MG. Loop electrosurgical excision procedure and risk of preterm birth: a systematic review and meta-analysis. Obstetrics and gynecology. 2014;123(4):752-61.
* Leinicke JA, Elmore L, Freeman BD, Colditz GA. Operative management of rib fractures in the setting of flail chest: a systematic review and meta-analysis. Annals of surgery. 2013;258(6):914-21.
* Kumar G, Goyal MK. Warfarin versus aspirin for prevention of stroke in heart failure: a meta-analysis of randomized controlled clinical trials. Journal of stroke and cerebrovascular diseases : the official journal of National Stroke Association. 2013;22(8):1279-87.
* Jungheim ES, Schon SB, Schulte MB, DeUgarte DA, Fowler SA, Tuuli MG. IVF outcomes in obese donor oocyte recipients: a systematic review and meta-analysis. Human reproduction (Oxford, England). 2013;28(10):2720-7.
* Jim J, Caputo FJ, Sanchez LA. Intentional coverage of the celiac artery during thoracic endovascular aortic repair. Journal of vascular surgery. 2013;58(1):270-5.
* Fayanju OM, Stoll CR, Fowler S, Colditz GA, Jeffe DB, Margenthaler JA. Geographic and temporal trends in the management of occult primary breast cancer: a systematic review and meta-analysis. Annals of surgical oncology. 2013;20(10):3308-16.
* Tuuli MG, Frey HA, Odibo AO, Macones GA, Cahill AG. Immediate compared with delayed pushing in the second stage of labor: a systematic review and meta-analysis. Obstetrics and gynecology. 2012;120(3):660-8.
* Rachakonda T, Lieu JEC, Thorne MC. Quality of Life in Childhood Hearing Loss: Systematic Review. Otolaryngology -- Head and Neck Surgery. 2012;147(2 suppl):P235.
* Goetzinger KR, Harper LM, Tuuli MG, Macones GA, Colditz GA. Effect of regional anesthesia on the success rate of external cephalic version: a systematic review and meta-analysis. Obstetrics and gynecology. 2011;118(5):1137-44.

**DROP DATES**

You may drop for any reason during the course of the semester. However, you may only receive a partial or no tuition reimbursement depending upon how far into the semester you drop the course. See the [MPHS Student Handbook](https://mphs.wustl.edu/students/student-handbook/). Late withdrawals will appear on your transcript as a withdrawal.

MPHS Academic Policy Guidelines:

Guidelines regarding MPHS course registration and enrollment, grades, tuition obligation, and academic leave are consolidated in the[**MPHS Student Handbook**](https://mphs.wustl.edu/students/student-handbook/). Please review this document.

MPHS Guidelines for Academic and Non-Academic Transgressions:

By registering for this course you have agreed to the terms of the **MPHS Academic Integrity Policy, outlined below and in more detail in the MPHS Student Handbook**. Please review this policy before submitting your first graded assignment.

## Academic Integrity/Plagiarism Policy:

* Academic dishonesty is a serious offense that may lead to probation, suspension, or dismissal from the University. Academic dishonesty includes plagiarism (the use of someone else’s ideas, statements, or approaches without proper citation). Academic dishonesty also includes copying information from another student, submitting work from a previous class for a new grade without prior approval from your instructor, cheating on exams, etc. You are responsible for reviewing [WashU’s academic integrity resources](https://studentconduct.wustl.edu/academic-integrity/) to become aware of all the actions that constitute academic dishonesty.
* All instances of academic dishonesty will be reported to the Office of the Registrar for investigation and potential disciplinary action. In addition, the instructor will make an independent decision about the student’s grade on any assignment in question. The MPHS process regarding academic dishonesty is described in the [MPHS Student Handbook](https://mphs.wustl.edu/students/student-handbook/)

**DISABILITY RESOURCES**

It is the goal of Washington University to assist students with disabilities in removing the barriers their disabilities may pose and provide support in facing the challenge of pursuing an education at Washington University.

Washington University recognizes and accepts its professional, legal and moral responsibility to avoid discrimination in the acceptance and education of qualified students with disabilities and to provide reasonable accommodations to such students consistent with the principles embodied in the law. These guidelines apply to students seeking admittance as well as to those who become disabled while they are enrolled.

Washington University makes every effort to insure that all qualified applicants and students can participate in and take full advantage of all programs and opportunities offered within the university. Washington University encourages and gives full consideration to all applicants for admission. Washington University does not discriminate in access to its programs and activities on the basis of age, sex, sexual orientation, race, disability, religion, color or national origin.

To learn more about services provided to students with disabilities, initiate the process of formal documentation and/or to arrange for accommodations, please review the [Disability Resources](http://bulletin.wustl.edu/medicine/policies/wusm-other/#Disabilities) for the Med School at the start of the course.

**MENTAL HEALTH RESOURCES**

Mental Health Services’ professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See: [shs.wustl.edu/MentalHealth](http://shs.wustl.edu/MentalHealth).

**Sexual Assault Resources**

You can also speak confidentially and learn about available resources by contacting Dr. Gladys Smith, PhD, Sexual Violence Prevention Therapist and Licensed Psychologist at the Medical Campus, (314) 362-2404. Additionally, you can report incidents to the Office of Student Affairs or by contacting WUSM Protective Services 314-362-4357 or your local law enforcement agency.

**Bias Resources**The University has a process through which students and staff who have experienced or witnessed bias, prejudice or discrimination against a student can report their experiences to the University’s Bias Report and Support System (BRSS) team.  For details see: [diversityinclusion.wustl.edu/brss/](https://diversityinclusion.wustl.edu/brss/).

**Office of the Associate Vice Chancellor for Diversity, Equity and Inclusion (DEI)**

**The DEI Training Team**designs, facilitates and leads diversity education programming for faculty, staff and students on a wide range of topics including: creating a climate of respect, the value of diversity and the role of biases in our day-to-day lives.
[diversity.med.wustl.edu/training/](https://diversity.med.wustl.edu/training/)

**The Office of Diversity Programs** promotes diversity among and prepares medical students to lead in a global society. A priority for the Office of Diversity Programs is to cultivate and foster a supportive campus climate for students of all backgrounds, cultures and identities.
[mddiversity.wustl.edu/](https://mddiversity.wustl.edu/)

**The Diversity and Inclusion Student Council**promotes an inclusive campus environment for all School of Medicine students.
[sites.wustl.edu/disc/](https://mailingsresponse.wustl.edu/trk/click?ref=z1030up2e7_2-bdaex3ab88x0844&)

**The Office for International Students and Scholars** embraces the university’s mission of welcoming promising students from around the world.
[wumma.wustl.edu/](https://mailingsresponse.wustl.edu/trk/click?ref=z1030up2e7_2-bdaex3ab89x0844&)