

CHL5129: Introduction to Mixed Methods Research for Public Health

Instructor:

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Sessions: Mondays, 1:00pm to 4:00pm

Location: HS100

Prerequisites: This course is intended for students in the 2nd year of the Master's program or any year of the PhD program. Students must have, or be concurrently taking, a graduate level course in either quantitative methods (e.g., CHL5201 or equivalent) or qualitative methods (e.g., CHL5221, JRP1000 or equivalent). The course is designed for students who have a foundation in one strand of research (qualitative or quantitative), in order that they can focus their learning on developing a foundation in the other strand and understanding how the strands can be mixed. The course is not recommended for students who do not already have a foundation in either quantitative or qualitative methods.

Acknowledgment of Territory

The Dalla Lana School of Public Health would like to acknowledge the land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today this meeting place is still the home to many Indigenous people from across Turtle Island, and we are grateful to have the opportunity to work on this land.

Research has been used as a colonial tool for oppression of Indigenous peoples, and used in ways that has harmed many other communities in Canada and around the world. My teaching of research methods in this course will centre a social justice lens, and consider the ways in which mixed methods approaches to research can be used for social change. I encourage students to bring a decolonial, anti-oppressive, and social justice lens to all course materials, assignments, and discussion.

Objective:

The goal of this course is to introduce the use of mixed methods public health research. Mixed methods approaches are becoming increasingly common in research across areas of public health. However, most research methods courses focus on either qualitative or quantitative methods, and rarely address how to meaningfully integrate the two. In this course, students will explore the epistemological and methodological issues involved in conducting mixed methods research in public health. Students will acquire the skills to critique mixed method research designs and will design their own mixed methods study in an area of public health of interest to them. Both students who are primarily trained in quantitative methods (e.g.,

epidemiology) and students primarily trained in qualitative methods (e.g., social sciences) will benefit from this course, and opportunities will be provided for students to learn from one another's expertise. By the end of the course, students can expect to be able to a) identify whether a mixed methods design is appropriate for their research problem; and b) identify learning gaps to be addressed through future advanced qualitative, quantitative and/or mixed methods courses.

Topics to be covered include:

- Review of the key strengths and limitations of monomethod (qualitative and quantitative) designs
- Strengths and limitations of mixed methods approaches in public health research
- Theoretical and paradigm issues in mixed methods research
- Mixed methods research questions and study designs
- Mixed methods approaches to sampling, data collection and data analysis
- Quality appraisal in mixed methods research
- Writing and publishing mixed methods research

Evaluation:

Grades for this course will be based on one primary assignment, which will be broken into its component parts.

Over the duration of the course, students will be required to develop a proposal for a mixed methods study on a public health topic of interest to them. As part of this, students will be required to: 1) write a short paper to present the proposed research question, explain why a mixed methods approach is appropriate to address it, and situate it within an appropriate paradigm; 2) deliver an oral presentation (videorecorded to be viewed outside of class time) to describe the research design, sampling strategy, and data collection plan for instructor and peer feedback; and 3) prepare the full proposal as a final written assignment. Additional information about each assignment (including grading rubrics) will be posted on Quercus.

Grades for the course will be determined as follows:

Research questions paper: 20%

Oral presentation: 30%

Final assignment (full proposal): 50%

Formatting of Written Assignments

Please double space all assignments using a 12 point font and 1" margins. Any standard referencing style (e.g., Vancouver, APA, ASA) is acceptable so long as it is used consistently throughout the entire paper.

Submitting Written Assignments

Please submit documents in Microsoft Word format with your name as part of the filename. Written assignments must be emailed to the instructor and teaching assistant by 1:00 pm on the deadline (as specified on the assignment instructions).

Late Assignment Penalties

As we are all still navigating challenges associated with COVID-19, late submissions will not be penalized so long as you let me know in advance (i.e., at least 24 hours prior to the deadline) that you will need more time. All course assignments must be submitted within three weeks of the last session of the course (i.e., by December 19); any assignments not submitted by this time will receive a grade of zero (unless previous arrangements have been made with the instructor and graduate office).

Please note that if you submit assignments after the deadline, it may take more time than usual to return your grade (I aim to return assignment feedback within 2 weeks of submission for assignments that are submitted on time, so it may require more time than this for late assignments). Please also note that the assignments in this course are scaffolded – each one builds upon the next. You will be best placed for success in the course if you have received and had time to integrate feedback on each assignment before you begin work on the next one. From this perspective, it is to your advantage to hand assignments in on time.

Exceeding Word Limit

Because concise writing is a foundational academic skill, a penalty will be applied to assignments that exceed the word limit indicated in the assignment instructions. Deductions will be: 10 percentage points for excess length of between 10 and up to 20 percent, and 20 percentage points for excess length of between 21 and up to 40 percent. Assignments with excess length of over 40 percent will not be accepted. Please note that word limits do not include references and in text citations.

Communication:

You should feel free to contact either the instructor or teaching assistant with questions at any time. Email is the preferred method of contact for both of us, and we will respond within 2 business days. Please note that we will not normally be available to respond to emails during the weekend, so if your question pertains to an assignment, please give us enough time in advance of the deadline to respond. It is helpful if you can include the course code (CHL5129) in the subject line of your email. We do not keep specific office hours each week, but are both happy to schedule one-on-one meetings for a mutually convenient time, as required.

Important University Policies and Resources:

Academic Integrity

Students must adhere to the [Code of Behaviour on Academic Matters](#). **It is your responsibility to know what constitutes appropriate academic behaviour.** You are responsible for ensuring that you do not act in such a way that would constitute cheating, misrepresentation, or unfairness, including but not limited to committing plagiarism. For more information see the [U of T Academic Integrity](#) website.

Academic integrity includes understanding appropriate research and citation methods. If you are uncertain about this, please seek out additional information from the instructor or from other institutional resources including the following:

- This tip sheet provides clear and helpful information about appropriate academic citation: <http://guides.library.utoronto.ca/citing>
- This site offers a series of scenarios to help students understand how to prevent themselves from being subject to academic offence allegations: <https://www.utm.utoronto.ca/academic-integrity/students/scenarios>
- Before handing in assignments students can also review this [academic integrity checklist](#) provided by the UofT Centre of Teaching Support & Innovation:
 - I have acknowledged the use of another's ideas with accurate citations.
 - If I used the words of another (e.g., author, instructor, information source), I have acknowledged this with quotation marks (or appropriate indentation) and proper citation.
 - When paraphrasing the work of others, I put the idea into my own words and did not just change a few words or rearrange the sentence structure
 - I have checked my work against my notes to be sure I have correctly referenced all direct quotes or borrowed ideas.
 - My references include only the sources used to complete this assignment.
 - This is the first time I have submitted this assignment (in whole or in part) for credit.
 - Any proofreading by another was limited to indicating areas of concern which I then corrected myself.
 - This is the final version of my assignment and not a draft.
 - I have kept my work to myself and did not share answers/content with others, unless otherwise directed by my instructor.
 - I understand the consequences of violating the University's Academic Integrity policies as outlined in the [Code of Behaviour on Academic Matters](#).

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

Support and Accommodation

All learning styles and needs are welcome and valued in this course. Please feel free to speak to me directly if there are supports or accommodations that would enable you to do your best learning in this course, and/or you may choose to register with the Accessibility Services office. For more information, or to register with Accessibility Services, please visit: <http://studentlife.utoronto.ca/as>.

Please be kind to yourselves and each other as we continue to navigate COVID-19 and life's various other challenges. Below is a non-exclusive list of resources that may provide support:

Student Mental Health Resources

- [U of T's Central Hub for Student Mental Health Resources](#)
- [SGS Graduate Wellness Services](#)
- [Student Life Health and Wellness](#)
- MySSP: 1-844-451-9700 (or use the app)
- Good2Talk: Call: 1-866-925-5454 or Text: GOODTOTALKON to 686868

Mental health/distress contacts in the community:

- Anishnawbe Health Toronto Mental Health Crisis Line: <http://aht.ca>
- Black Youth Helpline: <https://blackyouth.ca>
- ConnexOntario: <https://www.connexontario.ca>
- Distress Centres of Greater Toronto: <https://www.dcoft.com>
- LGBTQ Youthline: <https://www.youthline.ca>

Other Resources and Supports for DSLPH Graduate Students

Resource	Summary Description
The Office of Graduate Affairs	Provides a variety of services, including academic, program and personal advising. DSLPH students that require any assistance or information regarding coursework extension, program requirements, etc..
Graduate Department of Public Health Sciences Student (GDPHS) Handbook	This resource provides comprehensive information on getting started, enrolment, policies and procedures, financial matters, awards and funding opportunities, student services and more.
DLSPH Student Resources	This resource site includes information for incoming students, the GDPHS Student Handbook, program requirements, policies and forms, online learning resources, timetables, course database, information for international students, professional opportunities, mentorship program, health & well-being, public health students' association, and PhD Final Oral Exams.

Schedule for 2022:

Session/Date	Topic	Assignment Deadlines
1) Sept. 12	Introduction: What is mixed methods and why do we use it?	
2) Sept. 19	Paradigm issues in MMR	
3) Sept. 26	Mixed methods research questions and hypotheses	
4) Oct. 3	Qualitative and quantitative research designs	Assignment 1 due
Oct. 10	Reading week – no class	
5) Oct. 17	Mixed methods research designs	
6) Oct. 24	Sampling, recruitment and sample size	
7) Oct. 31	Data collection methods	
8) Nov. 7	Qualitative and quantitative data analysis	Assignment 2 due
9) Nov. 14	Mixed methods data analysis	
10) Nov. 21	Quality and rigour	
11) Nov. 28	Writing and publishing mixed methods research	
Dec. 5		Final proposal due

Readings:

Required Text:

Creswell JW, Clark V. 2018. Designing and conducting mixed methods research (3rd ed.). Thousand Oaks: Sage.

Other Recommended Readings:

Creswell JW & Creswell JD. 2017. Research design: Qualitative, quantitative and mixed methods approaches (5th ed). Thousand Oaks: Sage. <https://us.sagepub.com/en-us/nam/research-design/book255675>

Teddlie C, Tashakkori A. 2009. Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences. Thousand Oaks: Sage. <http://www.sagepub.com/textbooks/Book226302>

Mertens DM. (2018) Mixed methods design in evaluation. Thousand Oaks: Sage. <https://us.sagepub.com/en-us/nam/mixed-methods-design-in-evaluation/book249777>

Other Course Readings: (subject to revision, based on student needs and interests. The final version of the reading list will be the one posted on the course website prior to each session)

Introduction

Creswell & Plano Clark text, Chpt 1.

Mertens, DM (2015). Mixed methods and wicked problems. *Journal of Mixed Methods Research*, 9, 3-6.

Paradigm Issues in MMR

Required:

Creswell & Plano Clark text, Chpt 2. *(see especially pages 26-27 on “Paradigm Debate Period” and 34-43 on “Philosophical Foundations”. This introduces the idea of paradigms, explains why paradigms are important in MMR, and describes and compares four common paradigms: postpositivist, constructivist, participatory, and pragmatist.)*

Bunniss, S., & Kelly, D. R. (2010). Research paradigms in medical education research. *Medical Education*, 44, 358-366. *(This paper compares the four paradigms most commonly used in health research. It is particularly helpful in illustrating the value of interpretivist/constructivist approaches for the reader who is most familiar with the positivist orientation typical in health sciences).*

Recommended:

Shannon-Baker, P. (2015). Making paradigms meaningful in mixed methods research. Journal of Mixed Methods Research, DOI: 10.1177/1558689815575861 (*This article provides a fuller explanation of four paradigms commonly used in mixed methods research: pragmatism, transformative paradigm, dialectics, and critical realism.*)

Given, L.M. (2017). It's a new year...so let's stop the paradigm wars. International Journal of Qualitative Methods, 16, 102. (*This recent article discusses the current state of the 'paradigm wars', and implications for mixed methods.*)

Research Questions and Hypotheses

Thabane L, Thomas T, Ye C, Paul J. Posing the research question: not so simple. *Can J Anaesth.* 2009 Jan;56(1):71-9. doi: 10.1007/s12630-008-9007-4. Epub 2008 Dec 24. Review. PubMed PMID: 19247780.

Morgan DL. From themes to hypotheses: following up with quantitative methods. *Qual Health Res.* 2015 Jun;25(6):789-93. doi: 10.1177/1049732315580110. Epub 2015 Apr 9. PubMed PMID: 25857655.

Teddle C, Tashakkori A. 2009. Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences. Chapter 6: Generating Questions in Mixed Methods Research. Thousand Oaks: Sage.

Qualitative and Quantitative Research Designs

Dew K. A health researcher's guide to qualitative methodologies. *Aust N Z J Public Health.* 2007 Oct;31(5):433-7. PubMed PMID: 17931290.

Goldberg RJ et al. Greater knowledge and appreciation of commonly used research study designs. *Am J Internal Med* 2013 Feb;126(2): 169e1-169e8.

Koretz RL. Considerations of study design. *Nutrition in Clinical Practice.* 2007 Dec;22: 593-598.

Noordjiz M et al. Study designs in clinical research. *Nephron Clin Pract.* 2009 113: c218-c221.

Starks H, Trinidad SB. Choose your method: a comparison of phenomenology, discourse analysis, and grounded theory. *Qual Health Res.* 2007 Dec;17(10):1372-80. PubMed PMID: 18000076.

Recommended: (these are some key texts on some of the qualitative approaches we will be discussing. Let me know if you plan to you a different approach and would like more resources)

Smith JA, Flowers P, Larkin M. Interpretative phenomenological analysis: Theory, method and research. 2009. Sage. *(reference text for phenomenology)*

Corbin J, Strauss A. Basics of qualitative research: Techniques and procedures for developing grounded theory. 2008. Sage. *(reference text for grounded theory)*

Shaw SE, Bailey J. Discourse analysis: What is it and why is it relevant to family practice? Family Practice 2009 Oct; 26(5): 413–419. *(introduction to discourse analysis)*

Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology 2006 3(2):77-101 *(seminal paper on the thematic analysis)*

Mixed Methods Research Designs

Creswell & Plano Clark text, Chpt 3.

Creswell & Plano Clark text, Chpt 4,; Appendices A-G.

Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs: Principles and practices. Health Services Research. 2013. 48(6): 2134-2156.

Sampling in Qualitative and Quantitative Research

Required:

-Marshall MN (1996) Sampling in qualitative research. *(This is a very quick and clear read explaining why the sampling approaches and sample sizes typical of quantitative research are not appropriate for qualitative research.)*

Recommended for those new to qualitative research:

-Patton, M. (1990) Designing qualitative studies: Purposeful sampling. *(This is a chapter from an older edition of a widely used qualitative methods textbook. It provides a very clear description of the various forms of purposeful sampling, and at the end, recommendations about sample size for qualitative research.)*

Recommended for those new to quantitative research:

-McCrum-Gardiner, E. (2010). Sample size and power calculations made simple. *(This is a very accessible read explaining the basis of sample size calculations for quantitative studies.)*

Sampling in Mixed Methods Research

-Collins et al. (2007) A mixed methods investigation of mixed methods sampling designs in social and health sciences research. *(Please focus on pages 267-279, which outlines key issues related to sampling strategies and sample sizes for both qualitative and quantitative studies, and then integrates this information into a framework for mixed methods sampling designs. Feel free to also read the rest of the paper, which examines how common each of these sampling designs are in mixed methods research in the social and health sciences.)*

Data Collection Methods

Required Readings: For this week there are no specific required readings, since there is usually nothing MMR-specific about data collection (although I have tried to include readings that discuss use of various data collection methods in mixed methods research). For this week, please focus your reading on the data collection approaches that you anticipate using in your work. Below are some suggestions, but feel free to read beyond this list if your data collection approaches are not mentioned or you have more useful sources.

Creswell & Plano Clark Chapter 6 - Collecting Data in Mixed Methods Research. *Reviews key issues to consider for each of the core mixed methods designs.*

For a helpful introduction to measurement issues in quantitative methods:

DePoy E and Gitlin LN. (2016) Introduction to Research: Understanding and Applying Multiple Strategies. 5th Edition. Chapter 17: Collecting Data Through Measurement in Experimental-Type Research. Missouri: Elsevier.

For a helpful introduction to data collection in qualitative methods:

DePoy E and Gitlin LN. (2016) Introduction to Research: Understanding and Applying Multiple Strategies. 5th Edition. Chapter 18: Gathering Information in Naturalistic Inquiry. Missouri: Elsevier.

Arts-Based Methods:

Watson, A. (2020). Methods braiding: A technique for arts-based and mixed-methods research. *Sociological Research Online*, 25(1): 66-83.

Gladstone, B. (Centre for Critical Qualitative Health Research). Digital storytelling. (Video). <https://www.youtube.com/watch?v=s-fPc5jWUkc&feature=youtu.be>

Boydell KM, Gladstone BM, Volpe T, Allemang B, & Stasiulis E: The production and dissemination of knowledge: A scoping review of arts-based health research. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 2012,13.

<https://www.qualitative-research.net/index.php/fqs/article/view/1711>

Catalani C, Minkler M. (2010). Photovoice: A review of the literature in health and public health. *Health Education & Behavior*, 37, 424-451.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_proquest_miscellaneous_742714068

Focus Groups:

Cyr, J (2017). The unique utility of focus groups for mixed-methods research. *Political Science and Politics*, 50(4), 1038.

Sakamoto, I. (Centre for Critical Qualitative Health Research). Focus groups or discussion groups: Experiences of participants and researchers. (Video).

<https://www.youtube.com/watch?v=4fjhrxOtqxc>

Morgan, DL (1997). *Focus groups as qualitative research (2nd Ed)*. Sage.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106817848906196

Kitzinger, J (1995). Introducing focus groups. *BMJ*, 311, 299-302.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_public_primary_oai_pubmedcentral_nih_gov_2550365

Access Alliance (2012). *Community-based Research Toolkit: Resources and tools for doing research with community for social change*. [http://accessalliance.ca/wpcontent/uploads/2015/03/CBR Toolkit Jan2012.pdf](http://accessalliance.ca/wpcontent/uploads/2015/03/CBR_Toolkit_Jan2012.pdf) (Links to an external site.)

(see especially sections on creating interview/focus group questions, conducting the interview, the art of probing, and trouble shooting for interviews and focus groups)

Indigenous methodologies:

Tuhiwai Smith, L (2021). *Decolonizing methodologies: Research and Indigenous peoples*. Zed Books.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106921818206196

Ray, L (Centre for Critical Qualitative Health Research). Engaging with critical methodologies in the era of Truth and Reconciliation. (Video).

<https://www.youtube.com/watch?v=blj-DPjpfhk&feature=youtu.be>

Mashford-Pringle, A (Centre for Critical Qualitative Health Research). Circles: Indigenous research methods. (Video).

<https://www.youtube.com/watch?v=5KkvYigsyNg&feature=youtu.be>

Martel R, Shepherd M, Goodyear-Smith F (2021). *He awa whiria – A “Braided River”*: An Indigenous Maori approach to mixed methods research. *Journal of Mixed Methods Research*,

16, 17-33.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_proquest_journals_2611585907

Chilisa B, Tsheko GN (2014). Mixed methods in Indigenous research: Building relationships for sustainable intervention outcomes. *Journal of Mixed Methods Research*, 8, 222-233.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_proquest_miscellaneous_1692290504

Qualitative interviewing:

Gardner, P (Centre for Critical Qualitative Health Research). Qualitative interviewing: More than asking questions and getting answers. (Video).

<https://www.youtube.com/watch?v=3nviCBklmfQ>

Hermanowicz, JC (2002). The great interview: 25 strategies for studying people in bed. *Qualitative Sociology*, 25, 479-499.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_proquest_miscellaneous_60449045

Access Alliance (2012). *Community-based Research Toolkit: Resources and tools for doing research with community for social change*. [http://accessalliance.ca/wpcontent/uploads/2015/03/CBR Toolkit Jan2012.pdf](http://accessalliance.ca/wpcontent/uploads/2015/03/CBR_Toolkit_Jan2012.pdf) (Links to an external site.)

(see especially sections on creating interview/focus group questions, conducting the interview, the art of probing, and trouble shooting for interviews and focus groups)

Scale development:

Zhou (2019). A mixed methods model of scale development and validation analysis. *Measurement: Interdisciplinary research and perspectives*, 17(1), 38-47.

András P. Keszeia, Márta Novak, David L. Streiner. Introduction to health measurement scales. *Journal of Psychosomatic Research* 68 (2010) 319–323.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_proquest_miscellaneous_742717497

DeVellis, RF (2012). *Scale development: Theory and application*. Sage. Available in hard copy at the UofT library:

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106224712506196

Space-time epidemiology:

Rucks-Ahidiana & Bierbaum (2015). Qualitative spaces: Integrating spatial analysis for a mixed methods approach. *International Journal of Qualitative Methods*, April, 92-103.

Meliker, JR & Sloan CD (2011). Spatio-temporal epidemiology: Principles and opportunities. *Spatial and Spatio-Temporal Epidemiology*, 2, 1-9.

https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_crossref_primary_10_1016_j_sste_2010_10_001

Survey design:

Creswell & Hirose. (2019). Mixed methods and survey research in family medicine and community health. *Fam Med Comm Health*, 7, e000086.

A helpful introduction to issues in survey research:

Meadows KA. (2003) So you want to do research? 4: An introduction to quantitative methods. *Br J Community Nurs*. 2003 Nov;8(11):519-26.

Aday, Lu Ann & Cornelius, Llewellyn J. (2006). *Designing and Conducting Health Surveys; A Comprehensive Guide*, 3rd Edition. Jossey-Bass: A Wiley Imprint. San Francisco, CA. Available in hard copy at the UofT library:
https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/14bjeso/alma991106737685206196

Abramson JH, and Abramson ZH. *Research Methods in Community Medicine: Surveys, Epidemiological Research, Programme Evaluation, Clinical Trials*. John Willey& Sons; 6th Edition, 2008. Digital copy: <http://go.utlib.ca/cat/8051246> (Links to an external site.)

Data Analysis Methods

Creswell, Chapter 7: "Analyzing and Interpreting Data in Mixed Methods Research"

Östlund U, Kidd L, Wengström Y, Rowa-Dewar N. Combining qualitative and quantitative research within mixed method research designs: a methodological review. *Int J Nurs Stud*. 2011 Mar;48(3):369-83. doi: 10.1016/j.ijnurstu.2010.10.005. Epub 2010 Nov 16. Review. PubMed PMID: 21084086.

Michael D. Fetters, Leslie A. Curry, and John W. Creswell. (2013). Achieving Integration in Mixed Methods Designs—Principles and Practices. *Health Serv Res*. 2013 Dec;48(6 Pt 2):2134-56

Recommended readings for those new to quantitative data analysis:

Gaddis ML, Gaddis GM. Introduction to biostatistics: Part 1, Basic concepts. *Ann Emerg Med*. 1990 Jan;19(1):86-9. PubMed PMID: 2297161.

Gaddis GM, Gaddis ML. Introduction to biostatistics: Part 2, Descriptive statistics. *Ann Emerg Med*. 1990 Mar;19(3):309-15. PubMed PMID: 2310070.

Gaddis GM, Gaddis ML. Introduction to biostatistics: Part 3, Sensitivity, specificity, predictive value, and hypothesis testing. *Ann Emerg Med*. 1990 May;19(5):591-7. PubMed PMID: 2331107.

Gaddis GM, Gaddis ML. Introduction to biostatistics: Part 4, statistical inference techniques in hypothesis testing. *Ann Emerg Med*. 1990 Jul;19(7):820-5. PubMed PMID: 2389867.

Gaddis GM, Gaddis ML. Introduction to biostatistics: Part 5, Statistical inference techniques for hypothesis testing with nonparametric data. *Ann Emerg Med*. 1990 Sep;19(9):1054-9. Review. Erratum in: *Ann Emerg Med* 1991 May;20(5):573. PubMed PMID: 2203291.

Gaddis ML, Gaddis GM. Introduction to biostatistics: Part 6, Correlation and regression. *Ann Emerg Med*. 1990 Dec;19(12):1462-8. PubMed PMID: 2240762.

Quality and Rigor

Vandenbroucke JP. STREGA, STROBE, STARD, SQUIRE, MOOSE, PRISMA, GNOSIS, TREND, ORION, COREQ, QUOROM, REMARK... and CONSORT: for whom does the guideline toll? *J Clin Epidemiol*. 2009 Jun;62(6):594-6. doi: 10.1016/j.jclinepi.2008.12.003. Epub 2009 Jan 31. PubMed PMID: 19181482.

Pluye P, Gagnon MP, Griffiths F, Johnson-Lafleur J. A scoring system for appraising mixed methods research, and concomitantly appraising qualitative, quantitative and mixed methods primary studies in Mixed Studies Reviews. *Int J Nurs Stud*. 2009 Apr;46(4):529-46. doi: 10.1016/j.ijnurstu.2009.01.009. Epub 2009 Feb 23. Review. PubMed PMID: 19233357.

Morse JM. Critical Analysis of Strategies for Determining Rigor in Qualitative Inquiry. *Qual Health Res*. 2015 Sep;25(9):1212-22. doi: 10.1177/1049732315588501. Epub 2015 Jul 16. PubMed PMID: 26184336.

Brown KM et al. Searching for rigor in the reporting of mixed methods population health research: A methodological review. *Health Education Research*. 2015 30(6): 811-839.

Writing and Publishing Mixed Methods Research

Required

-Stange KC, Crabtree BF, Miller WL. 2006. Publishing multimethod research. *Annals of Family Medicine*, 4(4), 292-294.

Recommended

-Creswell text, chapter 8

-Curry L & Nunez-Smith M (2015). Publishing mixed methods studies in the health sciences. In: *Mixed methods in health sciences research*. Sage. *(For those interested in academic publishing: this very practical chapter provides suggestions for every stage of the process, from choosing your target journal through to responding to reviewer comments. Although it's specific to mixed methods, much of the material is applicable beyond that as well).*

Examples of published mixed methods studies, to give you an idea of what mixed methods might look like in your fields of study:

-Ross LE et al. 2016. Bisexuality, poverty and mental health: A mixed methods analysis. *Social Science & Medicine*, 156, 64-72.

-Gesink D et al. 2016. Cancer screening barriers and facilitators for under and never screened populations: A mixed methods study. *Cancer Epidemiology*, 45, 126-134.