

Malawi-Liverpool-Wellcome Trust (MLW)

Public Health Research Group

Group Manual

MLW conducts internationally excellent research to benefit health and trains the next generation of researchers. MLW is based in Blantyre, Malawi, where nearly one-in-five adults are HIV-positive, and an estimated 1% of adults have active pulmonary tuberculosis.

If you are reading this Group Handbook, you have probably recently joined the Public Health Research Group at MLW.

Welcome and Zikomo Kwabiri!

We are really glad to have you here, and will do what we can to make sure that your time with the group is rewarding. We hope that you will learn a lot about public health and epidemiology, develop new skills (coding, data analysis, writing, giving talks), make new friends and collaborations, and have lots of fun along the way.

When you join the group, you are expected to read this manual and sign a form indicating that you have done so.

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1. Essential background

Despite a well-functioning public healthcare system, Malawi has a substantial burden of infectious and non-communicable diseases that contribute to excess mortality, disability and poor quality of life. Conditions within urban Blantyre are highly conducive to the transmission of infectious diseases, and to outbreaks of emerging infections.

The Public Health Group uses the principles of public health practice (epidemiology, statistics, microbiology, mathematical modelling, qualitative research, health economics, communication) to identify and respond to important infections and non-communicable diseases, and to develop and evaluate novel approaches to interrupt transmission, reduce the time to diagnosis and improve the control of public health priority infections.

2. Mission statement

Key research questions (to be answered in the next 5-10 years)

- 1) *Reducing mortality* In health facilities, how can screening for undiagnosed TB and HIV be used to maximize health benefits and sustainability, while minimizing harms and costs?
- 2) *Improving case detection* In communities, can public health interventions be more effectively targeted through better understanding of urban transmission networks and heterogeneity in risk factors and access to care?
- 3) *Optimising treatment and retention in care* For people receiving care, which novel or repurposed regimens and supportive interventions can improve retention in care, adherence and treatment outcomes?

Current specific objectives

1. *Reducing mortality*

- To design and rigorously evaluate the effectiveness and cost-effectiveness of existing and novel TB/HIV diagnostic interventions in healthcare settings to increase the yield of diagnosis, reduce the time to treatment, and reduce mortality

2. *Improving case detection*

- To use the principles of epidemiology and surveillance to identify geographical areas and populations with high prevalence of undiagnosed disease and transmission and poor access to care to better direct targeted interventions
- To use innovative epidemiological, statistical and randomised trial methods, - including pragmatic and Bayesian trial methods – to improve disease control, mitigate risk factors, and provide high-quality evidence that is relevant to national, regional and global policymakers

3. *Optimising treatment and retention in care*

- To develop capacity to better understand the drivers of suboptimal adherence and retention in care, and to develop and evaluate novel interventions to improve treatment outcomes and reduce the adverse health consequences.

3. Roles and expectations

Everyone

Science is hard. But it's also fun. In the Public Health Group, we want to make sure that everyone experiences a positive, engaging, hostility-free, challenging, and rewarding environment. To maintain that environment, we all have to do a few things.

- Work on what you're passionate about, work hard at it, and be proud of it. Be so proud of it that you have to suppress bragging (but it's ok to brag sometimes).
- Scientists have to be careful. Don't rush your work. Think about it. Implement it. Double and triple check it. Incorporate sanity checks. Ask others to look at your code or data if you need help or something looks off. It's ok to make mistakes, but mistakes shouldn't be because of carelessness or rushed work.
- If you do make a mistake, you should definitely tell your collaborators (if they have already seen the results, and especially if the paper is being written up, is already submitted, or already accepted). We admit our mistakes, and then we correct them and move on.
- We all want to get papers published and do great things. But we do this honestly. It is never ok to plagiarise, tamper with data, make up data, omit data, or fudge results in any way. Science is about finding out the truth, and null results and unexpected results are still important. This can't be emphasized enough: no academic misconduct!
- Support your fellow researchers. Help them out if they need help (even if you aren't on the project), and let them vent when they need to. Science is collaborative, not competitive. Help others, and you can expect others to help you when you need it.
- Respect your fellow researchers. Respect their strengths and weaknesses, respect their desire for quiet if they need it, and for support and a kind ear when they need that. Respect their culture, their religion, their beliefs, and their lifestyles.
- If you're struggling, tell someone (feel free to tell Peter!). Your health and happiness come first. The Group looks out for the well-being of all its members. We are here to help. It's ok to go through hard patches (we all do), but you shouldn't feel shy about asking for help.
- If there is any tension or hostility in the Group, something has to be done about it immediately. We can't thrive in an environment we aren't comfortable in, and disrespect or rudeness will not be tolerated. If you don't feel comfortable confronting the person in question, tell Peter. In any case, tell Peter.

- If you have a problem with Peter and are comfortable telling him about it, do! If you aren't comfortable, then tell a senior member of MLW academic staff (e.g. MLW Deputy Director or Director).
- Stay up to date on the latest research, by using PubMed alerts and getting emails of journal table of contents. Also consider following scientists in the field on Twitter
- Have a life outside of the Group, take care of your mental and physical health, and don't ever feel bad for taking time off work.

There are a few day-to-day things to keep in mind to keep the Group running smoothly.

- If you're sick, stay home and take care of yourself. Because you need it, and also because others don't need to get sick. If you're sick, reschedule your meetings and study activities for the day (or the next couple of days) as soon as you can.
- You aren't expected to come into work on weekends and holidays, and you aren't expected to stay late at night. You are expected to get your work done (whatever time of day you like to do it).
- Show up to your meetings, show up to run your studies, show up to your classes, and show up to Group and MLW meetings.
- Dress code is smart-casual (and you can dress up if you want!), but not too casual. When interacting with participants and policymakers, or presenting your work, consider dressing up.
- Be on time: respect that others have busy days and everyone's time is valuable.

Group Head

All of the above, and I promise to also...

- Support you (scientifically, emotionally, career)
- Give you feedback on a timely basis, including feedback on project ideas, conference posters, talks, manuscripts, figures, grants
- Be available in person and via e-mail on a regular basis, including regular meetings to discuss your research (and anything else you'd like to discuss)
- Give my perspective on where the Group is going, where the field is going, and tips about surviving and thriving in academia
- Support your career development by introducing you to other researchers in the field, promoting your work at talks, writing recommendation letters for you, and letting you attend conferences as often as finances permit
- Help you prepare for the next step of your career, whether it's a post-doc, a faculty job, or a job outside of academia
- Care for your emotional and physical well-being, and prioritise that above all else

Post-docs

All of the above, and you will also be expected to...

- Develop your own independent programme of research
- Help train and mentor students in the Group (both undergraduate and postgraduate) when they need it – either because they ask, or because I ask you to
- Present your work at MLW events, at other Groups/institutes (if invited), and at conferences
- Apply for grants
- Apply for jobs/promotion (within MLW, at other academic institutes or outside of academia) when you're ready. If you think you'd like to leave academia, that's completely ok – but you should still treat your post-doc seriously, and talk to me about how to best train for a job outside academia
- Challenge me (Peter) when I'm wrong or when your opinion is different, and treat the rest of the Group to your unique expertise

PhD Students and Masters Students

All of the above, and you will also be expected to...

- Develop your dissertation research. Your dissertation should have at least 3 substantial objectives that answer a big-picture research question that you have. Much of your work will be done independently, but remember that others in Group (especially Peter!) are there to help you when you need it
- Help mentor interns and volunteers in the Group when they need it – either because they ask, or because I ask you to. Interns can also help you collect data, but should be discussed with Peter first.
- Present your work at Group Meetings, MLW events, at other institutes (if invited), and at conferences
- Apply for grants with the support of senior PIs. It's a valuable experience, and best to get it early.
- Think about what you want for your career (academia – research or teaching, industry, science writing, something else), and talk to Peter about it to make sure you're getting the training you need for that career
- Make sure you meet all institutional deadlines (e.g., for your exams, PGR requirements, upgrading, and thesis) – and make sure Peter/your other supervisors are aware of them!
- Prioritise time for research. Coursework and teaching are important, but ultimately your research gets you your degree and prepares you for the next stage of your career.

Interns and volunteers

All of the above, and you will also be expected to...

- Develop your weekly schedule by talking to your supervisor. You should be coming in every day (apart from holidays and weekends), and scheduling enough time to get your work done
- Assist other Group members with data collection and analysis if agreed with your supervisors
- Complete and write-up your research project - students who produce high-quality papers and presentations will be more likely to be successful in future fellowship applications
- Start planning for fellowship/funding applications early. If you want to progress to do a Masters or PhD, identify sources of funding, and meet the deadlines for application. Please discuss all planned applications very early with your supervisors +/- Peter - at least 6 months is usually required to prepare a good Masters Fellowship application, and perhaps longer for a PhD application.

Code of Conduct

The Public Health Group, and MLW, is an environment that must be free of harassment and discrimination. All Group members are expected to abide by the CMLW on discrimination and harassment, which you can (and must) read about here (Peter to add link).

The Public Health Group is committed to ensuring a safe, friendly, and accepting environment for everybody. We will not tolerate any verbal or physical harassment or discrimination on the basis of gender, gender identity and expression, sexual orientation, disability, physical appearance, body size, race, or religion. We will not tolerate intimidation, stalking, following, unwanted photography or video recording, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome sexual attention. Finally, it should go without saying that lewd language and behavior have no place in the Group.

If you notice someone being harassed, or are harassed yourself, tell Peter immediately. If Peter is the cause of your concern, then reach out to a senior member of MLW Staff (e.g. MLW Deputy Director or Director).

Scientific Integrity

The Public Health Group, and MLW, is committed to ensuring research integrity, and we take a hard line on research misconduct. We will not tolerate fabrication, falsification, or plagiarism.

A big problem is why people feel the need to engage in misconduct in the first place, and that's a discussion that we can have. If you are feeling pressured to succeed (publish a lot, publish in high impact journals), you should reach out to Peter and we can talk about it – but this pressure is something we all face and is

never an excuse to fabricate, falsify, or plagiarise. Also, think about the goal of science and why you are here: you're here to arrive at the truth, and to improve the health of the people of Malawi. Not only is research misconduct doing you a disservice, it's also a disservice to the people of Malawi. And it risks your entire career. It is never right and never worth it. Don't do it.

4. Open Science and data analysis

We believe that science should be open, reproducible, and freely available so that it can have the greatest possible impact.

Reproducible science If you gave someone else your raw data, they should be able to reproduce your results exactly. This is critical, because if they can't reproduce your results, it suggests that one (or both) of you has made errors in the analysis, and the results can't be trusted. Reproducible research is an essential part of science, and an expectation for all projects in the Group.

Reproducible research requires that each step of the research process is documented and organised and stored. To facilitate reproducible research, we do the following:

- Use standardised naming, filing and version control for all documents and files produced by your project. We follow this approach to file naming and version control
- Write a project concept note using this template, and submit for review by the Group Head - projects will be logged in the Group Project Google Spreadsheet
- Write a study protocol, and publish (if possible) before the project begins
- Write an analysis plan, detailing the analytic approaches that will be taken, pre-specifying all analysis as far as possible
- Register the study, e.g. with clinicaltrials.gov
- Use MLW-approved data collection systems, with auditable storage and cleaning of raw data
- For statistical analysis, we use R. Interfacing to R through RStudio will make your life considerable easier! For an introduction to R, we recommend the R for Data Science textbook.
- Manage all of your data (raw, cleaned for sharing), and analysis and output files (markdown, tables, figures, manuscripts) within an R package. This will make sharing and collaboration easier. Instructions for making an R package are here. The `usethis` package automates much of this process.
- Get a GitHub username, and apply for a free educational license to allow you to create private repositories (to allow version control while you are doing analysis - once analysis is complete, you can convert to a public repository for sharing with the world!). Using GitHub facilitates collaborative analysis with your research team and statistician. Instructions for setting working with GitHub and RStudio can be found here
- Distribute the protocol, analysis plan, and statistical analysis package with all papers that you publish, unless there are compelling public safety or privacy reasons not to do so. Be careful not to share personally-identifying information in the package.
- Things are changing quickly. If you find a new approach to doing reproducible research that you think will work, share it with the group.

Freely available science MLW receives substantial core funding for research from Wellcome. Additionally, many group members and projects will receive funding from charities, governments and research institutes. For science to progress, it is essential all of our research is available freely, and as soon as possible. We follow Wellcome's Open Access Policy in our approach to publication:

- All research articles must be made freely available through PubMed Central and Europe PMC at the time of publication.
- All articles must be published under a Creative Commons attribution licence (CC-BY)
- Authors or their institutions must retain copyright for their research articles and hold the rights necessary to make a version of the article immediately available under a compliant open licence.

- We will no longer support publishing in subscription journals ('hybrid OA'), outside of a transformative arrangement.
- Where there is a significant public health benefit to preprints being shared widely and rapidly, such as a disease outbreak, these preprints must be published:
 - before peer review
 - on an approved platform that supports immediate publication of the complete manuscript
 - under a CC-BY licence.

5. Publications

Authorship

We follow ICMJE guidelines for authorship.

Authorship is based on four criteria:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Authorship should usually be defined at the start of a project, before any data collection or analysis has taken place, and recorded on the Project Concept Note form. At the start of a new project, the student or post-doc taking on the lead role (i.e. the person who is leading the analysis and writing) can expect to be first author (talk to Peter about it if you aren't sure). Peter will typically be the last author, unless the project is primarily under the guidance of another PI and Peter is involved as a secondary PI – then Peter will be second to last and the main PI will be last. Students and post-docs who help over the course of the project may be added to the author list depending on their contribution, and their placement will be discussed with all parties involved in the paper. If a student or post-doc takes on a project but subsequently hands it off to another student or post-doc, they will most likely lose first-authorship to that student or post-doc, unless co-first-authorship is appropriate. All of these issues will be discussed openly, and you should feel free to bring them up if you are not sure of your authorship status or want to challenge it.

Publication of manuscripts We aim to submit manuscripts as soon as possible to share results and facilitate open science. Before submission of a manuscript, the project lead should ensure that:

- All authors meet authorship criteria, and have read/edited the manuscript and approved the decision to submit.
- All authors' names and affiliations are correct
- An ORCID ID is provided for each author (where it is possible to do so)
- The manuscript will be published under a Creative Commons attribution licence (CC-BY)
- All funding sources are acknowledged appropriately

Increasingly, manuscripts will be published as pre-prints, and we encourage this. Pre-print servers include:

- biorXiv
- medRxiv

Before selecting a journal to submit the manuscript to, make sure that:

- The project senior author is aware and happy of the selection of journal

- The journal is reputable, and not predatory
- If you are struggling to find a suitable journal, talk to the senior author, or try JANE

Orphened projects If a student or post-doc collects a dataset but does not completely analyse it or write it up within two years after the end of data collection, Peter will re-assign the project (if appropriate) to another person to expedite publication. If a student or post-doc voluntarily relinquishes their rights to the project prior to the two-year window, Peter will also re-assign the project to another individual. This policy is here to prevent data (especially expensive data, and data of public health importance) from remaining unpublished, but is meant to give priority to the person who collected the data initially.

6. Communications and engagement

Communications with Group Head In addition to Group Meetings meetings (see below), you can find Peter at his desk. He is almost always available; feel free to ask for a chat. He will always say yes, though sometimes se can only spare a couple of minutes or might ask you to let him finish typing a sentence. If Peter is not at his desk, assume that he is either gone, in a meeting, or does not want to be disturbed – so please send a message (WhatsApp or e-mail) rather than waiting around.

Email and other communication etiquette

We expect you to work hard and enjoy science whilst at work, but to be able to relax and enjoy your time away from work. Work communications out of hours can be intrusive and stressful - think twice before pressing send: nearly always, it can wait until tomorrow. Although some people work at the evenings or weekends, not everyone wants to, or is able to - please respect your colleagues home life by limiting work communications to work hours. If you receive a work communication outside of work, do not feel as though you have to respond until you are back at work.

Email

- Work emails should be sent using a work email address (e.g. with suffix .ac.uk, or .mlw.mw) - try to avoid mixing personal/home emails accounts and work email accounts.
- If you send an email outside of work hours, **do not** expect a response until the next working day (at the very earliest) - receiving work emails can serious impact work-life balance. There is virtually nothing so important that it cannot wait until the next day for a response.
- Please be polite and respectful when sending emails - you are writing to your professional colleagues
- **Do not** send “reply-all” emails, unless everyone in the email group needs to read your response.
- Be mindful when forwarding emails - did the original sender want to have their email sent to someone else?
- Make sure email addressed are spelled correctly, and beware of autocompleting addresses - check the “TO” list twice before pressing “Send”
- **Do not** send any personally-identifying information about study participants by email

WhatsApp

- WhatsApp can be useful for communicating quickly with colleagues, often with questions that don’t need an email.
- Set-up a work WhatsApp group for your project.
- Try not to send WhatsApp messages about work outside of work hours. This can be intrusive, and impact upon work-life balance.
- Don’t send personal/non-work messages to your work WhatsApp groups.

Calendars

We have a Google calendar for Group Meetings. Please ask Thandie to add you to it.

If you receive a calendar invite, please respond to it, either by accepting or declining. This lets the organiser know who is able to attend.

Twitter

Twitter can be an excellent medium for engaging with fellow scientists and the public.

Here is some advice about using Twitter in science.

We encourage you to:

- Open a Twitter account
- Follow your colleagues and fellow scientists in the field
- Tweet about new papers published, interesting manuscripts you have read, new grants, other achievements
- Retweet tweets from your colleagues, using hash-tags and mentions
- Consider reading a scientific paper a day, and Tweeting about it using the **#paperaday** hashtag.

Be careful not to publish personally-identifying information about study participants (e.g. photos, names etc without consent). Speak to Peter or MLW SciComm Depart if you want further help on using Twitter.

7. Resources

(This is a working document, so please add resources that you find to be helpful here).

In general, ask Peter to borrow hard copies if needed.

Statistics and Epidemiology

- Statistical Rethinking: A Bayesian Course with examples in R and Stan - Richard McElreath
- [Modern Epidemiology - Kenneth J. Rothman, Sander Greenland, Timothy L. Lash](https://books.google.mw/books/about/Modern_Epidemiology.html?id=Z3vjT9ALxHUC&redir_esc=y)
- Regression Modelling Strategies - Frank E Harrell Jr
- The Art of Statistics - David J Spiegelhalter
- Bayesian Approaches to Clinical Trials and Health-Care Evaluation - David J. Spiegelhalter Keith R. Abrams Jonathan P. Myles
- Basic Epidemiology - R Bonita, R Beaglehole, T Kjellstrom

Scientific (and general) writing

- The Sense of Style. The Thinking Person's Guide to Writing in the 21st Century - Steven Pinker
- Clear and Simple as the Truth - Francis-Noël Thomas & Mark Turner

Tuberculosis and HIV

- Epidemiological basis of tuberculosis control - Hans L. Rieder

8. Meetings, journal clubs and seminars

Group Meetings

Public Health Group meetings are held *every Thursday between 9am and 10.30am*. All group members are expected to attend and participate. Meetings rotate weekly between:

- Scientific, comprising of a research update presentation, and a journal club presentation.
- Project Technical, comprising of a review of the progress of all group projects.

Projects with a laboratory component (or any other Group Members who are interested) should attend the TB Lab Meeting, held at the College of Medicine on every second Wednesday morning. Ask Thandie or Doris for the schedule.

Peter, or his nominated deputy, will attend the monthly MLW Research Strategy Committee. If you have a project LOI that is being reviewed, please ensure that they are briefed in advance of the meeting.

Please review the schedule regularly, and ensure that you are prepared to present when it is your turn. If you need help with a presentation or journal club, ask Peter.

Other meetings/seminars

- All group members should attend the MLW Project Progress Report Presentations (PPR), held in Nyika Room at 15.30-16.00pm on Monday each week. All Masters, PhD and Post-Doc students should participate in the presentation schedule.
- Additionally, when senior investigators visit MLW, they will often give a “Cutting Edge” presentation. All group members should attend.
- Feel free to attend other MLW Group’s Journal Clubs, but beware of committing to participating in another rotation of presentations/journal clubs, as time demands can become unmanageable.

9. Conferences

Presenting your research at conference is a great way to share your results with the scientific community and the public, and to make new links with fellow scientists in the field.

Similar for publications, you should follow authorship guidelines for conference submissions

- Generally, it is good to present new results that haven’t yet been published at conferences. This means you need to plan submission carefully to fit timelines for publication.
- Make sure supervisors and authors are aware of the proposed submission, and have read and approved the abstract
- Consider who is going to pay for the costs of the conference (there is generally no “pot” of money available, and you shouldn’t pay for these yourself) — Travel, including airplane flights if required — Visas — Hotels/accommodation — Travel/health insurance — Conference registration — Local expenses (travel, food, etc)

Remember that when you are at a conference, you are representing the Public Health Group and MLW - follow the Group Code of Conduct.

Essential Conferences

You should always submit abstracts to:

- The MLW Annual Scientific Meeting
- The College of Medicine Research Dissemination Conference

- Conferences required by your institute (e.g. LSTM PGR Student Conference)
- The MLW/NTP TB Researchers meeting (if relevant to your research)

Other Conferences

If you have new results to report, consider submitting abstracts to:

- The Union World Conference on Lung Health, including TB Science Conference (Focus on TB and Lung Health, held annually)
- CROI: Conference on Retroviruses and Opportunistic Infections (Focus on HIV and opportunistic infections, including TB, held annually in North America)
- IAS/AIDS (Focus on HIV, held annually)

There are other important conferences that you might consider submitting an abstract to. Discuss with Peter/your supervisors before submitting. This list is a helpful resource of conferences.

Presenting at conferences

If you are presenting a **poster**:

- Use the Public Health Group Poster template (add a link here for this).
- Prepare a 1-2 minute summary of your poster. You should be able to give this fluently to people who ask you about your research (practice with your supervisors/Peter if necessary)
- Think about how you are going to get your poster printed, and take it to the conference (fabric printing is very convenient)
- Don't put your poster up, then ignore it. Standing by your poster at the poster sessions is a great way to meet scientists interested in your research.

If you are giving an **oral presentation**

- Use the Public Health Group PowerPoint template (add link here for this)
- Write out your talk, and practicing it lots (practice with your supervisors/Peter, as well as with your colleagues in the Group: is usually best to arrange formal practice sessions)
- Usually, it is a good idea to stick to one slide per minute available, and one message per slide. Most people try to put far too much on slides, and they end up becoming unreadable.
- Use high-resolution images and figures (not less than 300 dots per inch)
- Make sure that you load your slides at the conference venue (usually at the media centre), and check that the formatting is all correct (issues often with fonts and image resolution/corruption)

Here are some examples of good slide design:

- <http://www.mjskay.com/presentations/openvisconf2018-bayes-uncertainty-2.pdf>
- (Add more here as a resource)