



Research Toolkit for Public Health Professionals



APHL Knowledge Management Committee
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The Research Toolkit provides a single comprehensive knowledge management resource to support Public Health research efforts and collaborations. While the primary target audience is Public Health Laboratories, the Toolkit can apply to any Public Health arena or system partner.

1. Organizational Sustainability

- ❖ Leadership must promote and support applied research as a priority.
- ❖ Leadership must assure a defined infrastructure and resources are available.
- ❖ Investigators need to be able to attend national meetings to present their findings and network.
- ❖ Dedicated time to focus on research functions, including preparing manuscripts and white papers. Publish the results of studies in peer reviewed literature which is critical to success in obtaining funding from some sources.

2. Getting Started in the Applied Research Arena

- ❖ Have a mentor (either external or internal). Initial success can be very challenging without a mentor.
- ❖ Form internal/external Communities of Practice (CoPs) to identify interests/passion, focus areas, and training needs.
- ❖ Participate in continuing education/training (how to write effective proposals, project management skills, effective team building and team leadership).
- ❖ Conduct regular literature reviews, join and participate in listservs, and engage/contribute to professional associations (participate in committees/workgroups, present at conferences). *See Resource List below*

Supplemental Information- Observations and Formation of the Research Question

Before you begin searching for funding or writing a research proposal, you first need to identify your research strategy and interests. A good first step is to formulate a *research question*, a statement that identifies the phenomenon to be studied. To develop a strong research question from your ideas, you should consider:

How well do I understand the field and related literature?
What are the important research questions in my field?
What focus areas need further exploration?
Could my study fill a gap or lead to greater understanding?
Has a large amount of research already been conducted in this topic area?
Has this study been done before? If so, are there opportunities to enhance or modify the approach?
Is the timing right for this question to be answered? Is it an emerging issue or becoming obsolete?
Would funding sources be interested?
If you are proposing a service program, is the target community interested?
Most importantly, will my study have a significant impact on the field?

A strong research question should pass the “so what” test, addressing the potential impact or benefit (e.g. new methodology to improve sensitivity or reduce response time), the population it potentially impacts, and how the research supports the 11 Core Functions? If you cannot make a definitive statement about the purpose of your research, it is unlikely to be funded.

A research question should be narrow, not broad-based. A well-thought-out and focused research question leads directly into development of a hypothesis.

Supplemental Information- Creating the Hypothesis

The **hypothesis** is a tentative statement that proposes a possible explanation to some phenomenon or event. The hypothesis is the foundation of a research proposal and is a specific prediction about the nature and direction of the relationship between two variables. There are two kinds of variables in research. An **independent variable** (the intervention) is a condition implemented by the researcher or community to see if it will create change and improvement. This could be a program, method, system, or other action. A **dependent variable** is what may change as a result of the independent variable or intervention. A dependent variable could be a behavior, outcome, or other condition. A smoking cessation program, for example, is an independent variable that may change group members' smoking behavior, the primary dependent variable.

Normally, no more than three primary hypotheses should be proposed for a research study. A proposal that is hypothesis-driven is more likely to be funded than a "fishing expedition" or a primarily descriptive study. Strong hypotheses:

- Give insight into a research question;
- Are testable and measurable by the proposed experiments;
- Spring logically from the experience of the staff;

A useful hypothesis is a **testable** statement which may include a prediction. Usually, a hypothesis is based on some previous observation. For example you may perform an experiment to test how two variables might be related. Any laboratory standard operating procedure (SOP) is not an experiment but rather a demonstration of what is already known.

Formalized Hypotheses contain the words, **if** and **then**, but not all if-then statements are hypotheses. In a formalized hypothesis, a tentative relationship is stated. Formalized hypotheses contain two variables; one is "independent" and the other is "dependent." The independent variable is controlled by the researcher while the dependent variable is the result that is observed and/or measured. The ultimate value of a formalized hypothesis is it forces researchers to think about what results they should monitor in an experiment.

Supplemental Information- Conducting a Literature Review (See Section 7)

A **literature review** surveys scholarly, peer-reviewed articles, books and other sources (e.g. dissertations, conference proceedings) relevant to a particular issue, area of research, or theory, providing a description, summary, and critical evaluation of each work. The purpose is to offer an overview of significant literature published on a topic.

Conducting the literature review requires four stages:

- Problem formulation—which topic or field is being examined and what are its component issues?
- Literature search—finding materials relevant to the subject being explored
- Data evaluation—determining which literature makes a significant contribution to the understanding of the topic
- Analysis and interpretation—discussing the findings and conclusions of pertinent literature

Literature reviews should comprise the following elements:

- An overview of the subject, issue or theory under consideration, along with the objectives of the literature review
- Division of works under review into categories (e.g. those in support of a particular position, those against, and those offering alternative theses entirely)
- Explanation of how each work is similar to and how it varies from the others
- Conclusions as to which pieces are best considered in their argument, are most convincing of their opinions, and make the greatest contribution to the understanding and development of their area of research

In assessing each piece, consideration should be given to:

- Provenance—What are the author's credentials? Are the author's arguments supported by evidence (e.g. primary historical material, case studies, narratives, statistics, recent scientific findings)?
- Objectivity—Is the author's perspective even-handed or prejudicial? Is contrary data considered or is certain pertinent information ignored to prove the author's point?
- Persuasiveness—Which of the author's theses are most/least convincing?
- Value—Are the author's arguments and conclusions convincing? Does the work ultimately contribute in any significant way to an understanding of the subject?

A literature review may constitute an essential chapter of a thesis or dissertation, or may be a self-contained review of writings on a subject. In either case, its purpose is to:

- Place each work in the context of its contribution to the understanding of the subject under review
- Describe the relationship of each work to the others under consideration
- Identify new ways to interpret, and shed light on any gaps in, previous research
- Resolve conflicts amongst seemingly contradictory previous studies
- Identify areas of prior scholarship to prevent duplication of effort
- Point the way forward for further research
- Place one's original work (in the case of theses or dissertations) in the context of existing literature

Supplemental Information- Searching for Funding Opportunities (See Sections 5 -8)

3. Tips to Support Proposal Development

- ❖ Centralize all grant/proposal development and awards within one administrative function.
- ❖ Sign-up for funding notices. (*see section 9 below*)
- ❖ Use a shared internal calendar to monitor announcements and funding cycles to help plan dedicated effort and time needs.
- ❖ Create a grant team- assign roles for writing, completing forms, and submission process. Use checklists, regular updates and timelines to stay on track. Review proposal requirements, understand the forms, and ask questions early in the process.
- ❖ Create a single proposal template that includes all the required formatting and headers, and is organized according to required content and evaluation criteria.
- ❖ Save electronic copies of grant forms and narratives.

- ❖ Keep up-to-date CVs/biosketches in the appropriate format/form for key staff.
- ❖ Maintain current boilerplate language for key organizational resources (facilities, equipment, space, accreditations)

Supplemental Information- The Request for Proposal (RFP)

Funding agencies solicit project proposals to meet research needs formally through issuance of a RFP. Programs through funding agencies commonly run on funding cycles that include either competitive and/or non-competitive announcements. Competitive RFPs allow for new research applicants to submit proposals if they meet the eligibility requirements. Non-competitive renewals are offered to current award recipients who demonstrate successful progress during the previous funding cycle. RFPs are commonly driven by very specific requirements. They are dependent on program requirements and legislation, as well as the source of funding, particularly if derived from federal or state dollars. Becoming familiar with agencies that provide funding for your research interest provides higher probability that you can maximize the time available to develop a proposal when a RFP is published.

Helpful hints:

- Thoroughly read every section of the RFP.
 - Understand the level of competition and response time. Note who is eligible to apply, the number of awards, the proposal submission deadline, the award date, and the funding available.
 - Create a list of specific questions for any requirements that are unclear and submit according to the funding agency guidelines and contact personnel.
 - Participate in any conference calls or webinars. These are offered shortly after publication of the RFP.
- Visit the funding agency's web-site and review any historically funded projects. Are there themes or specific focus areas that emerge?

Supplemental Information- Letter of Intent (LOI) and Pre-proposals

To accommodate the potential number of proposal that may be submitted for a particular RFP, an increasing number of funding agencies require a letter of intent (LOI). Each funding agency has specific criteria for the LOI; one may only require written notice with reference to the particular RFP, another may require an executive summary, and another may require inclusion of letters of support from project collaborators. Thoroughly read every section of the RFP to ensure all proposal requirements are met according to their timeline.

Some funding agencies may require a pre-proposal. This is a shortened version of a robust and comprehensive proposal and used as a screening mechanism to identify those that can demonstrate alignment with agency needs. Pre-proposals also have criteria and submission requirements; however, only after review will the funding agency invite you to submit a full proposal package.

Supplemental Information- Proposal Development Process (the Draft)

- Form your grant team and commit your project plan to paper, following the guidelines provided by the funding agency. Thoroughly develop every step in your approach and challenge the plan.

How does your project align with the funding agency's need?

Is the plan realistic to achieve within the funding agency's timeframe?

What is the hypothesis and the rationale? What are the specific aims (the steps you are going to take to test your hypotheses and what you want to accomplish.)

What makes your project unique and innovative?

What historical data (graphs, tables, analyses) is available to support your project approach?

What methods will you use?

What will be the deliverables?

How will you evaluate the project and what are the measures of success?

What are the critical milestones to achieve?

What expertise do you have and are there any gaps to fill on the project team?

How can you collaborate with other PHL system partners to strengthen your plan?

What will be the role of each project team member?

What resources, knowledge, and expertise do you and your organization possess to support your project plan?

How can you demonstrate that you are the best investment of research dollars? (e.g. awards, appointments, accreditations, facilities and space, personnel experience)

- Use your project plan to construct a timeline for key activities and accomplishments, ensuring they meet the funding agency's timeframe.
- Develop your budget to align with your project plan (staff, supplies, materials, equipment, travel), again ensuring that budgetary line items meet the funding agency's criteria. Develop a budget justification and describe specifically how each budget line item will be utilized.
- Support the project plan with key information such as charts, graphs, and data. Include relevant references from your literature review.

Supplemental Information- Institutional Review Board (IRB) Process

The protection of the rights and privacy of human subjects involved in research activities is mandated by federal law. The National Research Act Public Law 99-158, The Health Research Extension Act of 1985, and the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research provide guidelines for research with human subjects to ensure their protection in the design and conduct of research. These federal regulations require that any institution requesting and receiving funds from a federal department or agency for research involving human subjects must assure that such research is reviewed and approved by the institution's institutional review board (IRB).

While IRBs can be more inclusive or restrictive, under the statute, exemptions to IRB approval include research activities in which the only involvement of human subjects will be in one or more of the following categories:

- A. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as
 1. research on regular and special education instructional strategies, or
 2. research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

B. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:

1. information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
2. any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

C. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (B)(2) of this section, if:

1. the human subjects are elected or appointed public officials or candidates for public office;
2. federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

D. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

D. Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine:

1. public benefit or service programs;
2. procedures for obtaining benefits or services under those programs;
3. possible changes in or alternatives to those programs or procedures; or
4. possible changes in methods or levels of payment for benefits or services under those programs.

F. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

The IRB process is different for every institution, and you should consult your organization's Director, Grants/Contracts Manager, or Division of Sponsored Programs for information on how to complete the IRB process.

Supplemental Information- Preparing the Final Proposal

- Identify someone outside your project team to evaluate the proposal for content, flow, and logic. Is it concise? Could a reviewer who has no prior knowledge of your organization or your project easily follow and understand your research plan and approach?
- Review the proposal for grammatical errors. Consistently use the active voice. Do not use jargon. Spell out all acronyms the first time they are cited.
- Follow the formatting requirements, deadline date for submission, and submission criteria as stated in the RFP. **Failure to follow these rules will likely disqualify your proposal.**
 - Font and size
 - Page margins, section limits, page and word limits
 - Spacing, headings, page numbering
 - Use of table of contents
 - Use of graphs, tables, and charts
 - Appendices (including biosketches, resumes/CVs, letters of support, references, supplemental information)

- Required forms or submission packages (may also require a copy of your organization's 501(c)(3) determination or "not a private foundation" from the IRS and a copy of your organization's budget and most recent audit).
- Deadline date for submission and submission criteria (hardcopy, numbers of copies, email submission, web-site data upload).

4. Tips to Support Post-Award Management

- ❖ Use a shared internal calendar for critical deadlines, including progress reports, budget monitoring, and other deliverables. Create templates. Assign roles and due dates.
- ❖ Use project management tools. Establish a regular schedule to monitor progress. Organize a shared electronic directory to maintain and share all relevant grant information with the team.

Supplemental Information- Publication and the Peer-Review Process

When a research project is completed, the research team may pursue publication, describing the experimental procedure and results via a transcript. Transcripts must follow publication guidelines provided by each journal.

Peer review, also known as refereeing, is the cornerstone of science. It is a process whereby a scientist's research is assessed for quality before it is funded or published. The "peer" in peer review means that the scientist in question will submit his work to other experts in the field. It's the responsibility of the reviewers to comment on the quality, significance and originality of the research. Reviewers aren't the ultimate arbiters about whether research should be funded or published, but their comments inform the decision makers. All scholarly journals have editors who reign as the ultimate decision makers, but they rely on comments from the reviewers to decide which papers they will publish.

The path to acceptance begins with the journal editors who conduct first review to evaluate subject-matter focus and editorial platform. Following this initial evaluation, the transcript enters a formal peer review process. Generally the process involves an exchange between a journal editor and a team of reviewers, also known as referees. Referees provide individual critiques, usually within two to four weeks, and include:

- Validity of the science, identify scientific errors and evaluate the design and methodology used.
- Judge the significance- evaluate the importance of the findings.
- Determine the originality of the work based on how much it advances the field. Identify missing or inaccurate references.
- Recommend that the paper be published or rejected. Editors don't have to heed this recommendation, but most do.

In the most traditional approach to peer review, known as **single-blind review**, reviewers know the author's identity, but not vice versa. Blinding the identity of reviewers enables them to comment freely and not worry about disgruntled authors seeking retribution for negative reviews. Another approach is **double-blind review**, in which the identities of the author and referees are both hidden, making it easier for reviewers to focus on the paper itself without being swayed by any preconceived ideas about the author or his institution. Finally, many journals have adopted **open peer review**. In this model, the author's and reviewers' identities are known to each other, a situation that forces reviewers, who can't hide behind a veil of anonymity, to provide more thoughtful critiques.

5. Applied Research Examples

❖ Method development/Validation Studies

Ex: Real-time RT-PCR assays, (APHL/CDC Influenza Validation Studies)

A matrix gene-based multiplex real-time RT-PCR for detection and differentiation of 2009 pandemic H1N1 and other influenza A viruses in North America

<http://onlinelibrary.wiley.com/doi/10.1111/j.1750-2659.2010.00153.x/full>

Ex: Pharmaceutical and personal care products

❖ Surveillance Studies

Ex: CSTE/CDC Influenza Incidence and Surveillance Project

Optimizing Influenza Sentinel Surveillance at the State Level

<http://aje.oxfordjournals.org/content/170/10/1300.short>

Ex: Water quality studies

Cerro Gordo Arsenic Study

<http://www.cdc.gov/nceh/ehs/ehsnet/partners/cerro-gordo.htm>

<http://www.shl.uiowa.edu/publications/lablink/201012/cerrogordo.xml>

<http://www.cghealth.com/index.php/service-sections/environmental-health/arsenic>

Water Quality Data for Private Wells for the Agricultural Health Study Cohort

<http://www.cheec.uiowa.edu/research/current.html>

Comprehensive Assessment of Rural Health in Iowa: the Carroll County Well Water Study

<http://www.cheec.uiowa.edu/research/archives.html>

Occurrence of viruses and unregulated contaminants in Iowa public water supply groundwater

<http://www.cheec.uiowa.edu/research/archives.html>

Arsenic speciation in Iowa's groundwater and surface water

<http://www.cheec.uiowa.edu/seedgrant/2007.html#arsenic>

Iowa Community Private Well Study

<http://www.cheec.uiowa.edu/research/archives.html>

❖ Quality Improvement & Lab Systems

Ex: APHL Innovations Grant (LSIP/Baldrige logic model for improvement planning)

http://www.aphl.org/MRC/Documents/LSS_2012Aug_PHP-User-Guide-Iowa-Public%20Health-Practice-Improvement-Planning.pdf

Ex: Standardized QA packages

❖ Other Examples

Title	Funding Agency
THE MARIETTA CARES RESEARCH STUDY (REJ)	UNIV OF CINC
EVALUATE THE VALUE OF SCREENING FOR GALC AND GLA ACTIVITY IN PATIENTS WITH PPMS	MT SINAI SCHOOL
FUNGAL ISOLATES (CHATURVEDI)	ZEPTOMETRIX
PROSPECTIVE ANALYSIS OF PBDE & BPA IN BREAST MILK, BLOOD AND URINE	UT SOUTHWESTERN
EVALUATION OF DNA GENOTEK CHEMISTRIES & REAGENT ADDITIVES	DNA GENOTEK
DNA GENOTEK SPORE TESTING	DNA GENOTEK
HUMAN STEM CELL QUALITY ASSURANCE CYTOGENETIC TESTING	REG RF
WESTERN BLOT TESTING FOR DBS FOR JOHN JAY COLLEGE	JJAY COLLEGE
WESTERN BLOT TESTING OF DBS FOR TEXAS A&M UNIVERSITY	TEXAS A&M UNIV
EARLY LEAD EXPOSURE, ADHD AND PERSISTEN CRIMINALITY	CCHMC
BPS IN BREAST MILK & URINE SAMPLES FROM THE NATIONAL CHILDREN'S STUDY	UTHSC AT TYLER
TESTING MOSQUITO POOLS FOR STARK COUNTY OHIO	CPH
EPIDEMIOLOGY OF OTITIS MEDIA PATHOGENS OF THOSE UNDERGOING TYMPANOSTOMY TUBE PLAC	ALB MED COL
BABESIA MICROTI REAL TIME PCR PLASMIDS	MARSHFIELD CLINI
PERFLUOROCEMICALS IN MUSSELS AND SEDIMENTS	TDI BROOKS
ANALYZE TOTAL PHOSPHOROUS SAMPLES FROM NYS PARK LAKES	NYSOPRHP
SALMONELLA SEROTYPING	CORNELL
ANALYSIS OF PHENOLIC COMPOUNDS & PARABENS TO #3: FIXED PRICE/REIMB.	NICHHD
TRANSFER OF EIA FALSE POSITIVE PLASMA SAMPLES TO BIO RAD	BIORAD
CALICINET OUTBREAK SUPPORT CENTER	APHL
HIV WESTERN BLOT TESTING OF DBS FOR GEORGE WASHINGTON UNIVERSITY	GWU
VITAL IV BACTERIAL INACTIVATION STUDY	VITAL VIO
CLINICAL AND MOLECULAR EPIDEMIOLOGY OF HUMAN RHINOVIRUSES	WEILL CORNELL
EVALUATION OF XPERT MTB/RIF ASSAY	CEPHEID
HIV WESTERN BLOT TESTING OF DBS FOR HOUSTON DHHS	CITY OF HOUSTON
ACTIVE IMMUNIZATION AS AN HD THERAPEUTIC	CHDI
PNEUMOCOCCAL SEROTYPE SALE	PANACEA BIOTEC
VIIA7 PHASE II	APHL
APHL HIV NAT REFERRAL DEMONSTRATION PROJECT	APHL
LSD PILOT NEWBORN SCREENING STUDY	MT SINAI SCHOOL
MULTI-CENTER STUDY TO COMPARE POSITIVE CRYPTOSPORIDIUM STOOL SPECIMEN RESULTS	APHL
ENHANCEMENT OF ENVIR PROTECTION & PUBLIC HLTH - LAB	CDC
PERUVIAN/BRAZILIAN AMAZON CENTER OF EXCELLENCE IN MALARIA	UC SAN DIEGO
VIRAL ISOLATES (MUSSER)	ZEPTOMETRIX
THE MARIETTA CARES RESEARCH STUDY (KANNAN)	UNIV OF CINC
AMPLIFY DNA SAMPLES FROM CHROMATIN IMMUNOPRECIPITATION	OAKLAND U
SANITARY SURVEYS - ST.LAWRENCE LAB	EPA
WHOLE GENOME SEQUENCING OF INFLUENZA A AND B VIRUS FROM NEW YORK STATE	JCVI
SALMONELLA GENETIC TYPING	CORNELL
PATHOGENESIS OF FRIEDREICH CARDIOMYOPATHY	ARI

THE IMPACT OF CLIMATE CHANGE ON WNV TRANSMISSION	UCSC
PHL DEVELOPMENT AND EVALUATION OF SPECIMEN POOLING WITH REAL TIME RT-PCR ASSAYS	APHL
ANTIVIRAL RESISTANCE SURVEILLANCE PROJECT	APHL
NBC ADMINISTRATIVE CORE	COLUMBIA
DRUG SUSCEPTIBILITY TESTING OF MYCOBACTERIUM TUBERCULOSIS	CORNELL
XMAP NEOPLEX 4 TEST SYSTEM CLINICAL STUDY	LUMINEX
THE EFFECT OF LAND USE ON THE DISTRIBUTION AND ENZOOTIC CYCLING OF MOSQUITO-BORNE	ASTMH
SANITARY SURVEYS - ONTARIO LAB	EPA
BEACH MONITORING: OPRHP	NYSOPRHP
ANALYSIS OF BISPHENOL A IN MOUSE TISSUES	UMICH
EVALUATION OF THE QIASYMPHONY RGQ SYSTEM	QIAGEN
SANITARY SURVEYS - ERIE LAB	EPA
REU SUPPLEMENT - HISTONE EVICTION MEDIATOR FUNCTION IN YEAST	NSF
PPACA: BUILDING EPIDEMIOLOGY, LABORATORY & IT CAPACITY - LAB SUPPLEMENT	CDC
PBDE & BPA ANALYSIS IN NCS URINE & SERUM SAMPLES	U TEXAS
METHODS FOR FUNCTIONAL CONNECTIVITY ANALYSES	US ARMY RI
VIIA7 RESPIRATORY PATHOGEN MULTICENTER EVALUATION PROJECT-PHASE 1B	APHL
PERFLUOROALKYL CHEMICALS: RISK OF CLINICAL/SUBCLINICAL CVD	WV UNIV
ENVIRONMENTAL DETERMINANTS OF SLE AMONG AFRICAN AMERICANS	MUSC
NRSA-THE GENETICS OF METABOLISM IN MYCOBACTERIUM TB	NIGMS
FERN COOPERATIVE AGREEMENT - MICROBIOLOGY	USDA FSIS
LABORATORY TESTING FOR WILDLIFE VACCINATION	USDA ARS
LABORATORY TESTING FOR HIV INCIDENCE SURVEILLANCE-STARHS - SHIPPING	CDC
THE MARIETTA CARES RESEARCH STUDY (PARSONS)	UNIV OF CINC
FERN COOPERATIVE AGREEMENT - CHEMISTRY	USDA FSIS
ANTIVIRAL EFFECTS OF COMPOUNDS IN VITRO IN VERO CELL CULTURE	NOVARTIS INST FO
PREVALENCE AND PATHOGENESIS OF LUNG DISEASE IN LARGE HIV COHORT	UPITT
FUNGAL BIOCONTROL AGENTS TO CONTROL GEOMYCES DESTRUCTANS	USFWS HADLEY
ENHANCEMENT OF ENVIR PROTECTION & PUBLIC HEALTH - LAB	CDC
PPHF 2012 - EMERGING INFECTIONS PROGRAM - LAB	CDC
STATE-BASED SURVEILLANCE FOR HEMOGLOBINOPATHIES - LAB	CDC
PERFORMANCE EVALUATION OF DIAGNOSTIC TESTS FOR TB	APHL
VACCINE PREVENTABLE DISEASE REFERENCE LABORATORIES	APHL
IMMUNOPROTECTANT FOR CATEGORY B TOXINS	MAPP BIO INC

❖ ***For further examples, see below under Section 6 Resources***

6. Resources: Peer Review Journals & Professional Trade Journals/Publications

Presentation of abstracts in poster or oral presentation at national meetings is a common way to share preliminary scientific data.

Occurrence of antibiotics, pharmaceuticals and sterols at select surface and wastewater sites in Iowa, in Proceedings of the 4th International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water, Minneapolis, Minnesota, October 13-15, 2004: National Ground Water Association, p. 151-157 (CD-ROM). <http://toxics.usgs.gov/bib/bib-ecsource.html>

Determining where to publish results and findings from applied research begins with first developing an understanding of the types of publications available and the breadth of topics covered relative to your areas of interest. One publication may focus more on field application while another may delve deep into theoretical-based research, so consideration should be given to the audience and your topic before submitting a manuscript. Also consider the impact factor- how frequently a particular journal is cited.

PubMed, maintained by the National Institutes of Health, is one of the most popular search engines to locate citations and full text articles. To access:

PubMed <http://www.ncbi.nlm.nih.gov/pubmed>

Tutorial: <http://www.ncbi.nlm.nih.gov/books/NBK3827/#pubmedhelp.FAQs>

Through the use of search engines, joining listservs, and actively participating in professional associations, a researcher can grow depth of knowledge and monitor research outcomes in his/her focus areas. Many professional associations have peer-reviewed journals and should be a main avenue for publishing research findings. Examples of other search engines, peer-reviewed and professional association/trade journals are listed below.

❖ Other Search Engines:

Web of Knowledge <http://wokinfo.com/>

Google Scholar <http://scholar.google.com/>

❖ Examples of Peer-Reviewed Journals

ACS-American Chemical Society (for a complete listing go to: <http://www.acs.org/content/acs/en/publications.html>)

Environmental Science and Technology <http://pubs.acs.org/journal/esthag>

Analytical Chemistry <http://pubs.acs.org/journal/ancham>

APHA- American Public Health Association <http://www.apha.org/>

American Journal of Public Health <http://www.apha.org/publications/journal/>

AOAC <http://www.aoac.org>

Journal of the AOAC

http://www.aoac.org/imis15_prod/AOAC/Publications/Journal_of_AOAC/AOAC_Member/Publications/Journal_of_AOAC/The_Journal_of_AOAC.aspx?hkey=b52ac8a0-fc49-45dd-9bba-1c084f59f600

ASQ- American Society of Quality <http://asq.org/knowledge-center/index.html>

ASCLS- American Society of Clinical Laboratory Science <http://www.ascls.org/>

Journal of the American Society for Clinical Laboratory Science
<http://www.ascls.org/professional-development/publications>

AWWA- American Waterworks Association <http://www.awwa.org/publications.aspx>

Journal AWWA <http://www.awwa.org/publications/journal-awwa.aspx>

ASM- American Society of Microbiology (for a complete listing go to: <http://journals.asm.org/>)

Ex: Journal of Virology <http://jvi.asm.org/>
Journal of Bacteriology <http://jb.asm.org/>
Journal of Clinical Microbiology <http://jcm.asm.org/>

Probability of Negative Mycobacterium tuberculosis Complex Cultures Based on Time to Detection of Positive Cultures: a Multicenter Evaluation of Commercial-Broth-Based Culture Systems
<http://jcm.asm.org/content/50/10/3275.short>

Real-Time Reverse Transcription-PCR Assay for Detection of Mumps Virus RNA in Clinical Specimens
<http://jcm.asm.org/content/45/9/2902.short>

CDC- Centers for Disease Control & Prevention (for a complete listing go to: <http://www.cdc.gov/publications/>)

MMWR- Morbidity and Mortality Weekly Report <http://www.cdc.gov/mmwr/publications/>

Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories
<http://www.cdc.gov/mmwr/preview/mmwrhtml/su6101a1.htm>

Emerging Infectious Disease Journal <http://wwwnc.cdc.gov/eid/>

NEHA- National Environmental Health Association <http://www.neha.org/index.shtml>

Journal of Environmental Health <http://www.neha.org/JEH/>

Sterols as bio-markers for waste impact and source characterization in stream sediment
<http://www.ncbi.nlm.nih.gov/pubmed/16780001>

Oxford Journals <http://www.oxfordjournals.org/>

Ex: Clinical Infectious Diseases <http://cid.oxfordjournals.org/>

The Duration of Mumps Virus Shedding after the Onset of Symptoms
<http://cid.oxfordjournals.org/content/46/9/1447.short>

A Fatal Case of West Nile Virus Infection in a Bone Marrow Transplant Recipient
<http://cid.oxfordjournals.org/content/37/9/e129.short>

Ex: Glycobiology <http://glycob.oxfordjournals.org/>

Inactivation of Mycobacterium tuberculosis mannosyltransferase pimB reduces the cell wall lipoarabinomannan and lipomannan content and increases the rate of bacterial-induced human macrophage cell death
<http://glycob.oxfordjournals.org/content/19/7/743.short>

Ex: American Journal of Epidemiology <http://aje.oxfordjournals.org/>

Optimizing Influenza Sentinel Surveillance at the State Level
<http://aje.oxfordjournals.org/content/170/10/1300.short>

NGWA- National Groundwater Association <http://www.ngwa.org/pubs/Pages/default.aspx>

Groundwater <http://www.ngwa.org/pubs/GW/Pages/default.aspx>

National Institute of Environmental Health Sciences, National Institutes of Health, U.S. Department of Health and Human Services

Environmental Health Perspectives <http://ehp.niehs.nih.gov/>

Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817674/>

U.S. Public Health Service, U.S. Surgeon General, ASPPH- Association of Schools of Public Health
Public Health Reports- <http://www.publichealthreports.org/index.cfm>

SAS- Society of Applied Spectroscopy <https://www.s-a-s.org/>
Applied Spectroscopy <https://www.s-a-s.org/journal/>

WEF- Water Environment Federation <http://www.wef.org/publications/>
Water Environment Research <http://www.wef.org/wer/>

Wiley <http://onlinelibrary.wiley.com/>

Ex: Influenza and other respiratory diseases [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1750-2659](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1750-2659)

A matrix gene-based multiplex real-time RT-PCR for detection and differentiation of 2009 pandemic H1N1 and other influenza A viruses in North America
<http://onlinelibrary.wiley.com/doi/10.1111/j.1750-2659.2010.00153.x/full>

❖ **Professional Trade Journals/Pubs**

APHA- American Public Health Association <http://www.apha.org/publications/>

NEHA- National Environmental Health Association (*see above*)

NGWA- National Groundwater Association <http://www.ngwa.org/Professional-Resources/publications/Pages/default.aspx>

AWWA- American Waterworks Association <http://www.awwa.org/publications.aspx>

WEF- Water Environment Federation <http://www.wef.org/publications/>

ASQ- American Society of Quality <http://asq.org/knowledge-center/index.html>

See also your state and regional affiliated association

APHL (e.g. Lab Matters) <http://www.aphl.org/aboutaphl/publications/pages/default.aspx>

ASM (e.g. Communications, Microbe) <http://journals.asm.org/>

CDC (e.g. Healthcare News Update) <http://www.cdc.gov/publications/>

LCGC <http://www.chromatographyonline.com/>

Spectroscopy <http://www.spectroscopyonline.com/>

R&D <http://www.rdmag.com/>

7. Resources: Joining the Research Community via the Web

❖ *See Section 6 above for search engines and examples of peer-reviewed and professional association/trade journals*

❖ **ResearchGate:** <http://www.researchgate.net/>

Ex: CDC: https://www.researchgate.net/institution/Centers_for_Disease_Control_and_Prevention
NIH: https://www.researchgate.net/institution/National_Institutes_of_Health
Wadsworth: https://www.researchgate.net/institution/Wadsworth_Center_NYS_Department_of_Health
Wisconsin State Lab:
https://www.researchgate.net/institution/University_of_Wisconsin_Madison/department/Wisconsin_State_Laboratory_of_Hygiene
Milwaukee DOH: https://www.researchgate.net/institution/City_of_Milwaukee_Health_Department
Florida DOH: https://www.researchgate.net/institution/Florida_Department_of_Health

❖ Listservs:

Genome Web (e.g. Daily Scan, Clinical Sequencing News, etc) <http://www.genomeweb.com/>
Association for Molecular Pathology (e.g. AMP Open Forum, CHAMP, etc) <http://www.amp.org/>
ASCLS- American Society of Clinical Laboratory Science (e.g. ASCLS Today) <http://www.ascls.org/>
American Society for Microbiology (e.g. Div C, Clinmicronet) <http://www.asm.org/index.php/online-community-groups/listservs>
APHL (e.g. aphltech) <http://aphltech.org/>
APQC <http://www.apqc.org/>
ASPPH (e.g. Friday Letter) <http://fridayletter.aspph.org/about.cfm>
LinkedIn (e.g. Next Generation Diagnostics Group, Molecular Diagnostics Professional Network)
<http://www.linkedin.com/>
NIAID <http://www.niaid.nih.gov/pages/default.aspx?wt.ac=tnHome>

Check specific federal agency web-sites for e-newsletter availability

❖ Twitter

8. Potential Funding Agencies & Searching for Funding Opportunities

If you are with a university community, they will have resources that can help with searches such as a Division of Sponsored Programs. Some funding agencies/organizations have a listserv that you can join to receive up-to-date information of new funding opportunities. Go to their web-site and conduct a site search using key words such as “grants” or “funding”.

Consider searching for opportunities where an agency/organization might cover expenses such as travel to a conference to present findings or preliminary scientific data.

Private organizations may provide reagents, instrument, and/or travel funds for specific projects.

❖ Federal

Grants.gov is a central repository of all 26 federal grant-making agencies with over 1,000 different grant programs. Lists newest funding announcements, and searches by agency, eligibility, or category. (FDA, CDC, NIH, NSF, EPA, USDA) <http://www.grants.gov/web/grants/home.html>

❖ **State Level**

State universities
Professional associations
State government agencies

❖ **Other**

Foundations
Private

9. Link to the 11 Core Functions

While applied research and research-related activities aligns directly with Core Function # 9, outcomes also impact all SPHL core functions through surveillance, information systems, monitoring, state of the art testing, outreach, communications and education, partnerships and collaborations, policy, planning, regulations, and compliance.

1.	Disease prevention, control, and surveillance
2.	Integrated data management
3.	Reference and specialized testing
4.	Environmental health & protection
5.	Food safety
6.	Laboratory improvement and regulation
7.	Policy development
8.	Emergency response
9.	Public health-related research
10.	Training and education
11.	Partnerships and communication