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Manuscript Writing for Publication in Peer-Reviewed Journals

Sponsored by the Association of Public Health Laboratories

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Purposes of This Seminar

- **Goal.** To help you disseminate information to your peers, in a written format
- **Objective.** To help you write successful articles for publication
- **Aims**
  - To identify key features of manuscripts (with an emphasis on research articles): content, layout, organization, language
  - To provide terminology about article writing that you can share with your colleagues
  - To motivate you to groom a trusted colleague or friend who will function as an honest, tactful reviewer
  - To reinforce what you already know about writing in general and about manuscript writing in particular

Definitions of Types of Articles and Scope of Today’s Presentation

- **A manuscript** is an article that is submitted to a journal for consideration. The terms article and manuscript will be used interchangeably, unless noted.
- **Public Health Reports identifies 3 types of articles**
  - **A research article** (a research paper) is a published document that reports on original research and findings to peers.
  - **A practice article** is a published document that describes innovative programs and initiatives, their implementation, current status, and documented outcomes.
  - **A feature article (similar to a review article)** is an invited article that presents the current status of a topic or reports on published research on a topic, in order to synthesize the research and present a major theme, such as: Problematic or beneficial consequences of the research
  - **Implications for policy, practice, or future research**
- **Other types of articles, such as:**
  - **An opinion piece** (viewpoint, commentary, letter to the editor), which gives the writer’s views
  - **A regular or recurring column**, e.g. *From the Schools of Public Health*

Order of Discussion

- Criteria for Review (slides)
  - Readability
  - Authorship
- Steps for Drafting Manuscripts
  - Preparing Manuscripts
  - Drafting Research Articles
  - Drafting Practice Articles
  - Reviewing the Manuscript
    - Clarity
    - Conservative Language
    - Length Constraints

Criteria for Editorial Review

- Editors and reviewers judge your manuscript based on:
  - **Credibility**
  - **Significance**
  - **Scientific Judgments**
  - **Legal, Ethical Considerations**
  - **Validity**
  - **Readability**
  - **Novelty**

Thank You!

- To Dr. Burton W. Wilcke, University of Vermont, Assoc. Professor and Chair of the Dept. of Medical Laboratory and Radiation Sciences
- To Sadira Daher, Senior Specialist – APHL Quality Systems
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- To the many investigators, clinician-investigators, and students who have allowed me to study their manuscripts and to use excerpts in seminars.
  - University of Vermont College of Nursing and Health Science
  - Oregon Health & Science University: Neurological Sciences Institute, School of Science and Engineering, School of Dentistry, Dept. of Biomedical Engineering, Dept. of Obstetrics and Gynecology
  - And others!
- To APHL, which has allowed me to use excerpts from Public Health Reports (Volume 125 Supplement 2, May/June 2010). I have sometimes revised them for instructional purposes.

My research is still in progress.
Criteria for Editorial Review (Con’t)

- **Validity** – Are your facts accurate and derived from sound research and reports? Are your conclusions well-founded?
- **Significance** – How important is your topic from scientific, technical, and societal perspectives?
- **Novelty** – How original or innovative are your ideas and topics compared to previous research?
- **Credibility** – Did you come across as outstanding in all respects? Knowledgeable, educated, smart, believable, honest, organized?
- **Readability** – How much reading effort was required for reviewers to readily understand the article?

Steps for Drafting a Manuscript

1. Choose your targeted journal and the type of article that you want published.
2. Follow all submission specifications from your targeted journal for your chosen type of article.
3. Draft the title.
4. Draft the purpose of the article.
5. Prepare your terminology.
6. Draft your visuals.
7. Draft a heading outline of the entire manuscript, and draft sections of the manuscript.
8. Review the manuscript for content, organization, language clarity, a conservative language style, and length.
9. Ask a “trusted” colleague or friend to review the manuscript.
10. Again review the entire manuscript.

Readability: The Silent Criterion

- **Readability** - The degree to which readers need to exert mental and physical effort to readily understand the text.
  - **High readability:** Not much effort. Our goal as writers to understand
  - **Low readability:** A lot of effort to understand

Authorship (Con’t)

In **Acknowledgements**, recognize those persons who do not meet the criteria for authorship.

(See also Slide 67.)

Some journal specifications do not mention **Acknowledgements**!
Consider adding the section anyway if you need it!

Note: Public Health Reports, which asks that authors be limited to 10, does not mention **Acknowledgements** in its specifications, but within articles, it includes acknowledgements information after the text.

Step 1. Choose Your Targeted Journal and the Type of Article That You Want Published

- For over 6000 journals in the health sciences, see: http://mulford.meduohio.edu/instr/ (3/15/12)
- For Public Health Reports, see: http://www.publichealthreports.org/Authors.cfm (3/7/12)

For Authors/Contributions
Public Health Reports welcomes contributions that help to meet the informational needs of public health professionals and students by describing important scientific and programmatic developments, new technologies, relevant policy issues and current scientific debates. Specific manuscripts for publication can include:

- Letters to the editor
- Feature articles
- Research articles
- Practice articles
- Viewpoints and Commentaries
- Special columns
Step 2. Follow Submission Specifications

- Follow submission specifications, which are writing requirements and guidelines from journals on, for example, length, organization, layout, and font.
- Instructions to Authors, Author Sheets, Instructions for Contributors, and Guides for Authors
- Do not write a "generic" article – one that does not follow any particular journal's submission specs.

Locate online or hardcopy submission specs:
- Locate submission specs at: http://mulford.medohio.edu/instr/ (3/15/12)
- Check out the ICJME: (http://www.icmje.org; 3/7/12)
- For Public Health Reports, read the back cover of a hardcopy issue or go to http://www.publichealthreports.org/Authors.cfm (3/7/12)

Step 3. Draft the Title. (Con't)

A Title Consists of:
1. Main Topic, Phrased in Key Terms
2. Major Methodological Feature (Opt'l)
3. Results (Opt'l)

Examples of Titles from Public Health Reports
The Role, Challenges, and Support of PulseNet Laboratories in Detecting Foodborne Disease Outbreaks (PHR, May/June 2010)
Effectiveness of Pregnancy Check Boxes on Death Certificates in Identifying Pregnancy-Associated Mortality (PHR, March/April 2011)
Developing Laboratory Networks: A Practical Guide and Application (PHR, May/June 2010)

Step 4. For Research Articles: Draft the Purpose of the Research that You Completed.

- Choose the research purpose verb that captures what you intended to achieve in your research.
- Locate your research purpose statement at the end of the introduction.

Examples of Research Purpose Statements
1. We determined the awareness, knowledge level, and perceptions of existing quality control, AQ, and quality management systems by laboratory professionals in Vermont.
2. We characterized the performance of the collaborating laboratories in the use of RTi RT-PCR for influenza types A and B.
Step 4. For Practice Articles and, Optionally, Research Articles: Draft the Communication Purpose.

- Choose a communication verb that captures what you intend to achieve in the manuscript.
- Place your communication purpose at the end of the introduction.

**Examples**
1. This article compares the progress (or lack thereof) made within the 11 sub-objectives from 2006 to 2008.
2. Our article describes the actions and relationships required by state PHLs, which are critical in detecting foodborne outbreaks and ways in which state processes may be improved to increase the effectiveness of foodborne disease surveillance.
3. In this article, we discuss the benefits of a novel public-private partnership in pandemic preparedness.
4. We describe the process used in Wisconsin to initiate a pilot project to routinely screen all newborns for SCID.

Step 5. Prepare Your Terminology. (Con’t)

- Why should you define terms that your audience likely already knows?
  - To help them understand your perspective.
  - To help them assess your credibility.
  - To help you create a cache of vocabulary terms that you can use later in your article.

- Where do definitions occur?
  - Wherever you first use the key term, which is usually in the introduction!

- From Public Health Reports
  - "Please define terms that are not universally understood and avoid the use of jargon."

Step 5. Prepare Your Terminology. (Con’t)

- How are key terms defined? → A sentence definition
  
  A _______ is a _______ that _______.
  
  key term class distinguishing feature: purpose, function, structure

**Examples**
1. The 10 Essential Public Health Services were later defined as those practices or functions that need to be in place to assure a fully operational public health system, whether at the local, state, or national level.
2. Laboratory verification is the important quality-management step that confirms or determines test performance characteristics before the test or system is used for patient testing.
3. Trehalose is a non-reducing disaccharide in which two glucose units are linked in an α,α-1,1-glycosidic linkage.
4. Medical laboratorians perform many different tests of varying complexities using a variety of technologies.

Step 5. Prepare Your Terminology. (Con’t)

- Use synonyms conservatively!
  - After defining a term with a synonym, continue using the original term. original term → synonym → original term

- Avoid slashes for nonsynonymous terms used synonymously
  - These findings suggested that clinical laboratories may have difficulty recognizing emerging/ unusual resistance.

- Consider using synonyms for relational words, such as prepositional phrases, sentence adverbs, and adverbs of time. For example:
  - due to ↔ because of ↔ during ↔ while
  - also ↔ in addition ↔ before ↔ prior to
  - based on ↔ on account of ↔ after ↔ subsequent to
Step 5. Prepare Your Terminology. (Con’t)

- Once again ... before drafting, remember!
  - Repeat nouns, verbs, and adjectives – and their derivatives – especially at the beginnings of sentences.
  - Avoid synonyms and pronouns!

**Examples**

1. Some laboratories were known to have switched instrumentation, resulting in data loss during the transition period. However, instrumentation switching was not apparent from the cumulative antibigrams.

2. General results and findings from the field tests were presented in a scientific session at the 2007 APHL Annual Meeting. The presentation also served as an excellent marketing opportunity for the project.

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Step 6. Draft Visuals before the Text! (Con’t)

- A visual is a display of information using images and physical orientation and dimensions to communicate information about data.

- Why should you include visuals?
  - To save space.
  - To help you write more succinctly – if visuals are drafted before the Results Section.
  - To help readers access collected data.
  - To help readers understand logical relationships and patterns.
  - To cross language barriers.
  - To encourage readers to look more closely at selected content.
  - To create centers of attention so readers pay more attention.
  - To help readers remember.

- Why should you draft visuals first?
  - To make writing easier and to avoid less revision.
  - To help determine which content to integrate into the legend and which to integrate into the text.

- Designing visuals
  - Keep visuals as simple as possible and yet functional.
  - For categories of information on one visual, use panels and assign all panels a letter, such as A, B, and C.
  - Use footnotes for any abbreviations or information that needs additional explanation.
  - Label the information in the visuals. A label is sometimes called a "callout" or a "caption".

- Naming Visuals
  - Give every visual a name that indicates its major content.
  - Phrase the name as a noun.

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Step 7. For Research Articles: Draft a Heading Outline, and Then Draft Sections. (Con’t)

- Title page
  - Follow specifications from your journal.
  - For example, from Public Health Reports: (a) Title (short and descriptive).
  - (b) Full names of all authors, including their graduate degrees (please limit the number of authors to 10).
  - (c) All authors’ institutional affiliations and job titles during the course of the research (and current affiliations and titles if different).
  - (d) Name, street, telephone number, fax number, and e-mail address of corresponding author.
  - (e) Word count of the text (exclusive of synopsis, tables, and references), and the number of charts, tables, and figures.

- The basic organization of a research article is very similar to the organization required by Public Health Reports.

**For Research Articles**

Title Page
Synopsis (Abstract)*
Introduction/Purpose (Introduction)*
Methods
Results
Discussion
Conclusions
Acknowledgments*
References
*(standard name)
Step 7. For Research Articles: Draft the Introduction (Con’t)

ICME: On the Introduction

“Provide a context or background for the study (that is, the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation: the research objective is often more sharply focused when stated as a question. Both the main and secondary objectives should be clear, and any prespecified subgroup analyses should be described. Provide only directly pertinent references, and do not include data or conclusions from the work being reported.” [emphasis added]

[http://www.icmje.org/manuscript_1prepare.html; 3/11/12]

Step 7. For Research Articles: Draft the Introduction (Con’t)

Definitions of key terms
Abbreviations introduced for selected key terms
Create a scientific argument: TRACS

- Topic
- Review background information objectively; that is, report on key related information from organizations and published literature
- Analyze the reviewed background information
- Connect the intro to your research purpose
- Connect the intro to the purpose of the article (optional)
- Significance: Why is the research important?

Scientific Argumentation: TRACS

T ... Topic of the article
- In phrasing the topic, repeat at least one key term from the title!

R ... Review
- Give facts that comprise background information
- Use citations for any background information that was published
- Include definitions
- Use a consistent organization for the reviewed information
  - Chronological order: distant-recent, recent-distant-recent
  - Spatial order: inside-outside, outside-inside, top-bottom, bottom-top
  - Situation – Consequence or Problem
  - Cause - Effect
- Other research: Purpose - Key Methods - Key Results

The Review
- Gives facts about important subjects related to the topic
- Is the largest part of the Introduction by word count
- Consists of 3 types of information:
  - Common knowledge
  - Your previously published research
  - Others’ previously published research

A ... Your Analysis or evaluation of background information
- Analysis usually follows the review
- Analysis is much shorter than the review
- Give your opinion about the reviewed background information (see the next slide)
Step 7. For Research Articles: Draft the Introduction (Con’t)

- Statements of analysis include:
  - Problem statement. A sentence that identifies a shortcoming in the reviewed information.
  - Hypothesis. A sentence that presents a claim or conjecture about the reviewed information or about practices derived from the collected data.
  - Prediction. An educated guess about an outcome.
  - Extension statement. A sentence that identifies how the proposed research builds upon the reviewed study.
  - Conclusions. A sentence that identifies a logical inference based on best evidence.

C ... Connection between the intro and the body of the research article.
- Connect by identifying the research purpose.
- Connect by identifying the purpose of the article (optional).
- Connect by identifying the research design, such as: a prospective randomized clinical trial.

S ... Significance: Why is your research important?
- National security, military
- Education
- Health care (diagnoses, cures, treatments)
- Societal values (doing things better, faster, cheaper, greener)
- Technology
- Science

Step 7. For Research Articles: Draft the Methods (Con’t)

The Methods section should include only information that was available at the time the plan or protocol for the study was being written; all information obtained during the study belongs in the Results section.

Selection and Description of Participants. Describe your selection of the observational or experimental participants (patients or laboratory animals, including controls) clearly, including eligibility and exclusion criteria and a description of the source population. Because the relevance of such variables as age and sex to the object of research is not always clear, authors should explain their use when they are included in a study report. The guiding principle should be clarity about how and why a study was done in a particular way. When authors use such variables as race or ethnicity, they should define how they measured these variables and justify their relevance.

Step 7. For Research Articles: Draft the Introduction (Con’t)

Examples of Analysis Statements from Public Health Reports

1. Testing performed by hospital laboratories may help individual patients by providing high-quality diagnostic testing in a clinically relevant time frame for both diagnosis and administration of antiviral therapy.
2. Recognition of unusual or novel antimicrobial resistance is challenging for a number of reasons.
3. These concerns led to the hypothesis that clinical laboratories need additional guidance in AST practices.

Step 7. For Research Articles: Draft the Methods (Con’t)

Technical Information. Identify the methods, apparatus (give the manufacturer’s name and address in parentheses), and procedures in sufficient detail to allow others to reproduce the results. Give references to established methods, including statistical methods (see below); provide references and brief descriptions for methods that have been published but are not well-known; describe new or substantially modified methods, give the reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, including generic name(s), dose(s), and route(s) of administration...

Statistics. Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results. When possible, quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Avoid relying solely on statistical hypothesis testing, such as P values, which fail to convey important information about effect size. References for the design of the study and statistical methods should be to standard works when possible (with pages stated). Define statistical terms, abbreviations, and most symbols. Specify the computer software used.

http://www.icmje.org/manuscript_1prepare.html (3/11/12); format edited; edits exclude information on review articles and examples.
Step 7. For Research Articles: Draft the Methods (Con’t)

- Read over your overview visuals and results visuals
- Review submission requirements about the Methods Section.
- From Public Health Reports: “Tell readers ‘who, what, when, where, and why,’ and provide a full explanation in the Methods section of how you arrived at each finding reported in the Results section.”
- Use the overview visual to create a heading outline of the Methods.
- Modify standard components of a Methods Section as needed to reflect your research structure

Methods
- Research design
- Subjects, objects of study, specimens (SOS)
- Recruitment
- Inform-consent
- N =
- Inclusion criteria
- Exclusion criteria
- Materials, equipment, tools (MET)
  - Special MET
  - Standard MET: Omit and mention standard MET with the procedures
- Procedures and protocols (How)
  - Subsections for major activities
  - Chronologically organized
- Data analysis

Step 7. For Research Articles: Draft the Methods (Con’t)

- If you use an introduction in the Methods, consider including:
  - Overview of the research design
    - Basic methodological approach
    - Major SOS and MET
    - Names of the primary methodological procedures
    - Time frame, where significant
  - Rationale: Why the research design is the way it is
    - Review of previous methods related to your methods (with citations) that will help justify your methods
  - Statement of compliance
    - A statement that indicates the writers followed certain legal standards of care for humans, vertebrate animals, and hazardous materials

Step 7. For Research Articles: Draft the Methods (Con’t)

- Readers’ Assumption about Chronology:
  - When 2 procedural subsections or actions follow each other, the assumption is that the first started before the second.
  - Exceptions:
    - the first sentence introduces the procedure
    - the last activity was applied to each step in the procedure
    - use of a chronological marker negates the assumption

Example of Inclusion Criteria

- We included patients in our study according to the following criteria: they (1) had untreated or previously treated LPHD; (2) were between 3 and 70 years old; (3) had an ECOG performance status of 0 to 2; (4) had a measurable disease, with at least one lymph node mass measuring 1.0 cm or more in the largest dimension, or quantifiable extranodal disease; and (5) had adequate end-organ function: absolute neutrophil count of more than 1500; platelet count higher than 50,000; serum creatinine level of less than 1.5 times the upper limit of normal; and alkaline phosphatase, bilirubin, aspartate aminotransferase (AST), and alanine aminotransferase (ALT) levels all less than 2 times the upper limit of normal.

Step 7. For Research Articles: Draft the Methods (Con’t)

- Use chronological markers
  - To negate the reader’s assumption
  - To clarify the order in which procedures were performed
  - To emphasize the order in which procedures were performed

Examples of chronological markers:
- prior to
- subsequent to
- previously
- subsequently
- before
- after
- first
- during
- at the end
- while
- finally
- simultaneously
- then
- at the same time
- next
- for 2 min
- when

Consider using lists for methods, such as:

A family of synthetic stimuli that interpolate between the natural whistles and the synthetic tones were generated by: 1) determining the extremal points (peaks of the waveform) of the sound wave by a parabolic fit, 2) calculating the instantaneous frequency and amplitude as the inverse of the interval between 2 neighboring extremal points, 3) reconstructing the sounds by a sinusoidal interpolation of the extremal points; in effect, the instantaneous frequency f(t) and amplitude A(t) measured from these extremal points specify the sound completely, and 4) generating a family of interpolations between the functions that determine the instantaneous amplitude and frequency of the natural whistles and artificial tones, using an algorithm we call extremal point interpolation.
Step 7. For Research Articles: Draft the Methods (Con’t)

- Integrate MET that are:
  - Standard
  - Not central to the procedures
  - Require little if any discussion
- On first mention of MET:
  - Identify the manufacturer
  - Identify the location
- On second mention of the same MET:
  - Identify the manufacturer

### Example

**Real-time PCR using SYBR-Green Chemistry.** Real-time quantitative PCR amplification reactions were carried out in an ABI Prism 7700 sequence detection system (Applied Biosystems, Carlsbad, CA) in a 25 μL volume. The reaction mixture consisted of 1xPCR buffer containing SYBR-Green; 3 mM MgCl₂; 100 nm of each primer; 200 nm each of dATP, dGTP, and dCTP; 400 nm of dUTP; 0.01 U/μl of AmpErase UNG; and 0.08 U/μl of AmpliTaq Gold. 50 nanograms of cDNA template was added to each reaction.

### Step 7. The Research Article. Draft the Results. (Con’t)

- **ICMJE: On the Results Section**
  - Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat all the data in the tables or illustrations in the text; emphasize or summarize only the most important observations. Extra or supplementary materials and technical details can be placed in an appendix where they will be accessible but will not interrupt the flow of the text, or they can be published solely in the electronic version of the journal.
  - When data are summarized in the Results section, give numeric results not only as derivatives (for example, percentages) but also as the absolute number of observations. Use graphs as an alternative to tables with many entries; support each statement of a pattern with data and/or the statistics derived from data analyses.
  - Draft results:
    - Keep procedural tasks simple
    - Describe the first, then move to the second
    - Describe methods in the order in which they were initially begun. For example:
      - Describe subject recruitment before identification of inclusion and exclusion criteria.
      - Describe preparatory methods before data-collection methods
    - Some methods need a rationale — that is, the reason for their use!
      - For new or customized methods
      - Methods modified from a standard
      - For methods that do not seem to match the research objective!

**Typical problems in Methods Sections**

- Procedural descriptions are not clear due to problems in chronology.
  - **Example**
    - “Read over the results visuals that you created!”
  - **Examples**
    1. **As seen in Fig. 9, the threshold elevation from Day 16 to Day 27 for 440-nm test stimuli on the 4.0 log td background was substantial, 1.05 log units, and it was in the range of threshold elevations recorded for the sensitivity data graphed in Figs. 1 and 2.**
    2. **In the cortical specimens from control subjects, very little staining was observed with the polypeptide Htt antibodies (Fig. 6A) while adjacent sections showed diffuse nuclear staining with NAKAP antibodies (Fig. 6B).**
    3. **Western blot analysis with affinity-purified antibodies showed that both NAKAP and HypA are expressed in human embryonic HEK293 cells (Fig. 3A). Fractionation of these cells showed that while some NAKAP was extracted in the soluble cytosolic fraction, both NAKAP and HypA were predominantly associated with the nuclear matrix.**
    These results were confirmed by immunocytochemical experiments, where NAKAP and HypA exhibited similar staining patterns (Fig. 3B).

**Step 7. The Research Article. Draft the Results.**

- **Give specific statements about patterns in the collected data**
  - Do not over-generalize!
  - Support each statement of a pattern with data and/or the statistics derived from data analyses
    - Present supporting data within sentences and visuals
    - Out-reference to sites with additional data
    - Identify supporting patterns, trends, and tendencies
    - Identify exceptions and anomalies
    - Compare data points and results
    - Support subjective terms with objective data!
    - Write up results in subsections, with one major result in a subsection

**Caution! Do not distort or misrepresent your data in any way to support your statements of patterns.**

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Step 7. The Research Article. Draft the Discussion and Conclusion.

- ICMJE: On the Discussion Section
  
  "Emphasize the new and important aspects of the study and the conclusions that follow from them in the context of the totality of the best available evidence. Do not repeat in detail data or other information given in the Introduction or the Results section. For experimental studies, it is useful to begin the discussion by briefly summarizing the main findings, then explore possible mechanisms or explanations for these findings, compare and contrast the results with other relevant studies, state the limitations of the study, and explore the implications of the findings for future research and for clinical practice.
  
  "Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not adequately supported by the data. In particular, avoid making statements on economic benefits and costs unless the manuscript includes the appropriate economic data and analyses. Avoid claiming priority or alluding to work that has not been completed. State new hypotheses when warranted, but label them clearly as such."

[http://www.icmje.org/manuscript_1prepare.html; 12/12/11]

Step 7. The Research Article. Draft the Discussion and Conclusion. (Con't)

- For the Discussion:
  - Identify your results and their supporting data from your research; and
    - Relate this discussion to others' research that supports your results
    - Relate this discussion to others' research that does not support your results
    - Speculate why there are differences
  - For each major result, speculate on its significance and what else it may suggest or imply
  - Consider identifying policy or practice implications

- For the Conclusion:
  - Identify key conclusions that can be derived from all of your results, taken together
  - Given your conclusions, speculate about practices and policies (actual and recommended)
  - Identify major implications for future research, given your results
  - Give recommendations for practices and/or policies based on your conclusions

Step 7. The Practice Article. Outline and Draft the Article.

- Communication purpose: To describe ...
  - Innovative public health programs
  - Outcomes and current status of special or temporary programs
  - Innovative public health initiatives (a special enterprise, activity, or task)
  - Relationship between public health laboratories and current events


- Include a scientific argument (TRACS)
  - Topic: Should reflect key terms in the title
  - Review: Give background on the new or special program, initiative, or current event
    - Identify its purpose
    - Identify when and how it was formed
    - Identify its scope
    - Identify typical participants
    - For a current event
  - Analysis: Identify the problems, results, benefits, or consequences of the program, initiative, or current event
  - Connection: Identify the communication purpose of the article
  - Significance: Importance might not be stated if it is obvious, such as communicable disease surveillance
Step 7: The Practice Article. Draft the Body.

- Body sections and subsections: Present facts
- Headings to sections and subsections are usually nouns and verbs used in the Introduction.
- Organize facts according to categories that emerge from your research, such as:
  - Chronological
  - Structural
  - Functional
  - Tasks or assignments (e.g., Official – Unofficial)
  - Structure-Function
  - Spatial
  - Cause-Effect
  - Situation-Consequence
  - Problem-Solution
  - Problem-Solution-Consequence
  - Task-Results-Solution-Consequence
- If you analyze the information or identify its significance, keep it brief!

Step 7: The Practice Article. Draft the Conclusion.

- Analyze the facts that you have presented
  - Conclusions
  - Speculations
  - Problem statements
  - Predictions
  - Next steps or future research
  (Also see Slide 37.)


- Also known as synopsis, summary, and description.
  - Abstract: A type of summary that represents key information from each major section of the article
    - Usually written last
  - Consider ...:
    - Its use: Published in various indexes
    - Its function: Promote reader interest!
      - Inform particular audiences.
  - Use only key vocabulary and information used in the article
  - Consider not using ...
    - Many abbreviations (>3) or symbols
    - Undefined key terms that readers will not understand

Step 7. Research and Practice Articles. Draft the Abstract. (Con't)

- Format:
  - Unstructured: Text presented in one or more paragraphs, depending on specifications
  - Structured: Section headings with text
  - Public Health Reports requires:
    - Structured synopsis for the Research Article (250 word max)
    - Unstructured synopsis for the Practice Article. (150 word max)

- Thank people who do not rise to the level of authorship.
  - Identify people by first and last names, degree, and affiliation.
  - Identify the contribution.
- Identify funding source for the research.

Examples

1. We thank Fredrik Elinder, PhD and Hans Koch, PhD for comments and suggestions. This study was supported by a grant from NIH (NIH-HL63259) to HPL.

2. This work was supported in part by a grant from the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA) (HRSA grant #1R1CRH03426-01-A1), and from a grant from the College of Nursing and Health Sciences, University of Vermont. The authors thank Robert Ross, PhD, for help in developing the survey and Colleen Thomas, MS, for assistance with the data analysis.

Step 8 and 10. Review the Manuscript for Clarity, Conservative Language Style, and Length.

- Review the text for clarity. For example:
  - Check for consistent use of key terms, check for definitions of key terms, and avoid ambiguous pronouns.
  - Use "this" (a demonstrative pronoun) with a noun after it.
  - We have named each classification and grade levels within each, beginning with PHEL. This serves to limit the use of these classifications.
  - Keep sentence structure tight:
    - Keep subjects close to their verbs ... avoid: Variations in fundamental frequency, timing, pausing, and precision of articulation to convey levels of prominence are used regularly by speakers.
    - Avoid strings of prepositional phrases (>3 in a row)
    - Locate lists at the end of a sentence, not in the middle!
    - Use relatively short nouns:
      - microbe population determination analysis
      - an analysis to determine the population of microbes to determine the population of microbes.
- Who will not use the review as an opportunity to become political?
- Who will be strictly confidential?
- Who is knowledgeable enough to give useful comments?
- Use your instincts ... and always thank the person after they review!

Step 9: Select a Trusted Colleague or Friend to Review Your Manuscript!

- Use your instincts ... and always thank the person after they review!
- Who will be honest and still respect you as a colleague or friend?
- Who is knowledgeable enough to give useful comments?
- Who will not use any incoherency or wrong information against you?
- Who will be strictly confidential?
- Who will not use the review as an opportunity to become political?

Thank you!
Tables of Extended Examples

Manuscript Writing for Publication in Peer-Reviewed Journals

Webinar for the Association of Public Health Laboratories

Presented by Sandra Oster, PhD (osters1@gmail.com)

March 22, 2012

Note: Superscripted numbers preceding sentences have been added for ease of reference.
<table>
<thead>
<tr>
<th>A. Noun with Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age-Related Alterations in Neurons of the Mouse Retina</td>
</tr>
<tr>
<td>2. Sensory Network Dysfunction, Behavioral Impairments, and Their Reversibility in an Alzheimer’s β-Amyloidosis Mouse Model</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>B. Noun: Noun Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. The Relationship between Brain Oscillations and BOLD Signal during Memory Formation: A Combined EEG-fMRI Study</td>
</tr>
<tr>
<td>4. Medial Temporal Lobe Function and Recognition Memory: A Novel Approach to Separating the Contribution of Recollection and Familiarity</td>
</tr>
</tbody>
</table>

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<tr>
<th>C. Sentence</th>
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</table>
Figure 1. CONSORT 2010 Flow Diagram

http://www.consort-statement.org/consort-statement/overview0/#checklist (accessed 3/7/12)
### Table 2. Example of a Title Page

According to *Public Health Reports*, the title page also needs all authors’ job titles during the course of the research; that information is unavailable. Total word count is also unavailable.

**Laboratory Services in Support of Public Health: A Status Report**

Burton W. Wilcke, Jr., PhD\(^a\), Stanley L. Inhorn, MD\(^b\), J. Rex Astles, PhD\(^c\), Bertina Su, MPH\(^d\), Abigail Wright\(^e\), Vanessa A. White, MPH\(^d\)

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Word count: ####
Number of Tables: 1
Number of Figures: 2
<table>
<thead>
<tr>
<th>Topics</th>
<th>Review</th>
<th>Analysis</th>
</tr>
</thead>
</table>


1When Healthy People (HP) 2000 was promulgated by the U.S. Department of Health and Human Services (HHS) in 1991, it contained no focus area on public health infrastructure. As a result, it did not include objectives measuring critical components of public health, such as laboratory services. During the 1990s, there was a collective effort to formally define public health practice in the U.S., culminating in the 10 Essential Public Health Services (hereafter, Essential Services). It became clear that to address the Essential Services, a robust public health infrastructure was required. In 1992, the Association of State and Territorial Public Health Laboratory Directors (now the Association of Public Health Laboratories [APHL]) published Laboratory Initiatives for the year 2000 (LIFT 2000), which demonstrated that all Essential Services required laboratory infrastructure.

As a result of these efforts, HP 2010 included a section (focus area 23) on public health infrastructure. Within focus area 23 was an objective (HP 23-13) to “increase the proportion of tribal, state, and local health agencies that provide or assure comprehensive laboratory services to support essential public health services.” At the outset, this objective was identified as a developmental – rather than measurable – objective, as there was no data source available to measure progress. Among the organizations identified as potentially being able to develop a tool for measuring comprehensive laboratory services were APHL and Centers for Disease Control and Prevention (CDC). In 2002, a committee of APHL, including representation from CDC’s Division of Laboratory Systems (DLS), began to devise a survey that could be used to transform HP 23-13 from a developmental objective to a measurable objective.

In 2002, APHL and CDC co-published a report defining the 11 Core Functions and Capabilities of State Public Health Laboratories (hereafter, Core Functions). The APHL committee, in continued collaboration with CDC DLS, proposed that measuring the extent to which state health agencies were fulfilling those Core Functions would be a reasonable metric for the provision or assurance of comprehensive laboratory services. The committee also determined it would be more appropriate to
measure each of the Core Functions independently. This resulted in a request to HHS, which oversees the HP process, to add 11 sub-objectives under HP 23-13. At that time, it was also clear that no comparable description of the Core Functions had ever been established for the large, diverse population of local public health laboratories (PHLs) in the United States. As a result, a modified HP 23-13 was written, removing the term “local” and adding 11 sub-objectives corresponding to the 11 Core Functions.

In 2004, when HHS had approved the modifications, APHL conducted the first Comprehensive Laboratory Services Survey (CLSS), the results of which have been published. A major finding was that many states did not meet several sub-objective goals, including those for food safety, emergency response, and environmental health and protection. Given there had been no prior survey tool to measure comprehensive laboratory services, the 2004 version of the CLSS served well as a pilot. The planned collection and comparison of data on a biennial basis would allow for the measurement of progress toward HP 23-13 throughout the decade. Results for all HP objectives are available through the CDC Data 2010 website and are updated as new data are made available.

Following a review of CLSS 2004’s results, and in preparation for conducting CLSS 2006, the committee completed a thorough analysis of the survey instrument and feedback from the respondents. The analysis revealed that some survey questions were unclear and needed revisions, some terms used in the survey were not consistently understood, and the process for scoring the responses required changes. In addition, CLSS 2004 did not distinguish between providing or assuring specific laboratory services. The result of this analysis was a significantly improved CLSS 2006. The challenge of trying to reconcile the two surveys proved so formidable that ultimately the data collected for CLSS 2004 were used as a stand-alone format and the data obtained from CLSS 2006 were established as the new baseline data. A third survey conducted in 2008, essentially equivalent to CLSS 2006, allowed for a comparison between the findings of those two years. Our research compared the progress (or lack thereof) made within the 11 sub-objectives from 2006 to 2008, and this article reports on those findings.

**METHODS**

...  

1. Approximately 110 Michigan clinical laboratories perform AST.  
2. MDCH initially asked these laboratories to submit on a voluntary basis cumulative antibiograms from 2000 and 2001 as a baseline to compare with data from 2002.  
3. Assuring laboratories of anonymity, we requested a cumulative antibiogram each year thereafter via the MDCH laboratory quarterly newsletter and direct fax.  
4. In 2004, we added the submission of cumulative antibiogram data to yearly requirements for participation in a sentinel laboratory in the Michigan Laboratory Response Network.  
5. We examined cumulative antibiograms from 2000 through 2005 for this study, using CLSI AST document M100-S12 to develop a standardized checklist of unlikely percent-susceptible results and antimicrobials that should not be reported on certain organisms (Figure 2).

6. For the purposes of analysis, we considered the reporting of improbable or impossible percent-susceptibility results or the reporting of misleading or inappropriate organism-antimicrobial combinations as serious errors.  
7. These errors were of greatest concern because of their potential adverse impact on patient care. We also noted a number of minor errors which, although not included in our checklist, were difficult to ignore.  
8. These included misspelled organism names or antimicrobial agents and obvious math calculation errors.  
9. Minor errors were unlikely to have any adverse impact on individual patient care.

RESULTS

Demographics
1There were 235 survey respondents for a 50% response rate. 2Of the respondents, 52 (22%) identified themselves as working in an academic medical center. 3Seventy-nine percent had an MLT or MT credential; the remaining respondents were not credentialed. 4The majority had a bachelor's degree (n=140, 60%). 5Additionally, the data revealed an experienced laboratory workforce: 56% (24%) had fewer than 20 years of experience, 48 (20%) had worked 11 to 20 years, and 130 (55%) had more than 20 years of experience (Table).

Knowledge of QA measures
6Generally, respondents agreed that their laboratory had a full range of QA measures (94%), had oriented staff in QA measures (85%), used QA measures based on federal regulations (95%), and had additional higher standards (88%) as well as guidance by the parent organization (74%). 7There were a few significant group differences. 8Laboratorians with MLT credentials responded differentially than their colleagues to the statement, “My laboratory has QA measures based on higher performance standards of national or international organizations” (Figure 1A, p=0.03). 9Significant differences were seen when comparing responses to the same statement by laboratorians' years of professional experience (Figure 1B), with those having fewer than 20 years of experience being less likely to agree ($\chi^2 = 5.67, p = 0.02$), compared with their more experienced colleagues.

10The type of organization also had a significant impact on whether laboratorians were subject to higher than minimal QA standards (established for the purpose of this survey as those required by CLIA 1988), as respondents from organizations other than academic medical center laboratories or community hospital laboratories were more likely to disagree (Figure 1C, $\chi^2 = p 7.79, = 0.01$). 11Additionally, bench laboratorians were less likely than supervisors to know that their laboratory had QA measures guided by the quality system of the parent organization (Figure 2, $\chi^2 = 5.21, p = 0.02$).
DISCUSSION

1We conducted this study to assess the perceptions and knowledge of clinical laboratory professions in Vermont regarding QA systems in the clinical laboratory. 2This was the first survey of its kind in Vermont, querying clinical laboratory professionals about their knowledge of QA measures in the laboratory and perceptions of how different variables impact those quality measures. 3A surprising demographic finding was the level of experience (the majority had more than 20 years) in this statewide sample.

4It is interesting to note that education level did not have any impact on either the knowledge or perception of QA measures in the clinical laboratory. 5However, laboratorians holding the MT credential (the credential associated with higher education levels) were more likely to agree that education level, professional credential, and turnover rates were factors that significantly impacted the laboratory’s ability to meet QA objectives. 6These perceptions may be a function of selective perception/self-reinforcement or may be based in fact. 7This warrants further investigation.

8It is important to report that the vast majority of all respondents agreed that their laboratory had a full range of QA measures, which are part of a comprehensive quality plan (94%) and were based on federal (CLIA) regulations (95%). 9Further, 96% of respondents agreed that they were familiar with QA measures used in their laboratory. 10Interestingly, even though most laboratorians responded positively, 51% felt they were not involved in deciding the QA measures used in the laboratory, and more than 20% either disagreed or did not know if they personally had a significant impact on meeting the QA objectives of the laboratory. 11This disconnect is of concern because if laboratorians performing the actual tests on patient samples are not involved in the decision-making process regarding QA measures on the tests in which they are expert, or if one of five laboratorians does not feel part of meeting the QA measures in the laboratory, this could possibly lead to indifference in testing and a feeling of not being fully vested in the profession.
Limitations
Sentences 12-19 omitted

CONCLUSIONS
20Laboratorians were generally knowledgeable about the quality measures in place in their laboratories. 21However, differences in perception of quality in the laboratory were noted, based on years of experience, professional credentials, job title, and the type of organization in which they work. 22It is disturbing that not all laboratorians perceptive that they play a significant role in determining quality measures or are involved in assuring quality in the laboratory. 23All laboratorians, regardless of education, credentials, years of experience, organizational setting, or job position, should take an active role in both assuring laboratory quality and determining appropriate quality measures. 24This may need to be reinforced in the education and/or training processes for all laboratorians.

25The survey used in this study provides a tool to understand laboratorians' perceptions of existing quality systems and quality measures, as well as uncover perceptions of factors that affect quality in the laboratory. 26The survey, either in its present or modified form, could be administered more broadly to assess the degree to which quality systems have been implemented in clinical laboratories. 27Certainly, this information can be used to provide direction when implementing laboratory quality training or in the development of new policies and procedures designed to improve the quality of health care provided by clinical laboratories and positively impact public health on the statewide level. 28The information collected via the survey provides a baseline from which data from subsequent studies can be compared, allowing the tracking of trends and changes that may influence the quality of laboratory testing.

<table>
<thead>
<tr>
<th>Topics</th>
<th>Analysis</th>
<th>Significance</th>
<th>Review</th>
<th>Connection: Communication Purpose</th>
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1The public health laboratory (PHL) is critical to the public health response capability of each state and, by extension, the nation.  
2Traditionally, the PHL has been the sole response laboratory for public health emergencies; however, a new model has emerged, exemplified by the Laboratory Response Network (LRN), a national network of laboratories charged with identifying and characterizing agents of terrorism and other threats to public health.  
3In this new model, the PHL leads a network of clinical and other agency (e.g., food testing, veterinary, and local public health) laboratories to support public health response.  
4The development of a robust national network of laboratories is, however, dependent on the existence of such laboratory networks within each state.  
5The development of these statewide laboratory networks is, in turn, dependent on state-specific leadership and resources.  
6This article describes the process of laboratory network development in Wisconsin and the application of the laboratory network model to specific public health issues.
The public health community was recently challenged to conduct extensive planning in anticipation of the outbreak of pandemic influenza. A primary goal was to develop surge-capacity plans because the inability of laboratories to manage surge was identified as a problem during the anthrax incident and West Nile virus outbreak. A second goal of this effort was to develop continuity-of-operations plans for PHLs – a critical need that received national attention following the destruction of the PHL infrastructure in Louisiana by Hurricane Katrina. In response to these challenges, it was determined that, in most cases, state PHLs would look to a neighboring or distant state PHL to provide backup laboratory testing services – a plan that proved effective for Louisiana in 2005, when the U. of Iowa Hygienic Laboratory answered the call to provide newborn screening assays. The need for interoperability has been well established, and PHLs are developing capabilities to enable laboratories access jurisdictions to provide mutual multidirectional support.
Figure 3 shows how the eight position classifications in Figure 2 can provide career paths in PHELS. The individual classifications serve as stepping stones for an employee who, by meeting each classification’s higher minimum qualifications, can be promoted to the next higher classification. An employee who begins working as a PHEL aid/assistant could, over time and by obtaining the required education and experience, work his or her way up to PHEL director. The bifurcation of the primary career path into supervisory and developmental paths also provides an opportunity to promote and retain scientists with a higher education and expanded technical skills, who lack the interest or ability to become good supervisors or managers.

CONCLUSION
The full set of proposed job classifications and career paths is advantageous even for small PHELS that may not fill every classification or grade level at a given time. It is important that PHEL personnel systems possess sufficient common classifications and career paths not only to competitively recruit and retain individuals who develop professionally but also to ensure the flexibility to hire someone who fits any future routine or special mission need.
SYNOPSIS

Objectives. ¹Public health surveillance is often dependent on sentinel testing performed in clinical microbiology laboratories, and recognition of emerging/unusual antimicrobial resistance is especially challenging. ²We obtained cumulative antibiograms from hospitals to determine whether clinical laboratories recognized unusual resistance or reported antimicrobials inappropriate for various bacterial species, as measured before and after public health laboratory (PHL) educational and technical-support interventions.

Methods. ³We compared cumulative antibiogram data from 81 clinical laboratories serving 86 hospitals in Michigan from 2000 through 2005 with a standardized checklist derived from Clinical and Laboratory Standards Institute (CLSAI) antimicrobial susceptibility testing (AST) documents. ⁴We considered the reporting of unlikely percent-susceptible results and/or inappropriate antimicrobials serious errors, and we calculated error rates for each data year. ⁵We used CLSI-recommendation compliance as a measure to determine whether laboratories were implementing changes.

Results. ⁶Ninety-five of 239 (28%) cumulative antibiograms examined had one or more serious errors. ⁷The annual number of cumulative antibiograms with serious errors did not change radically (range: 10-13); however, when expressed as a percentage of cumulative antibiograms received, the occurrence of these errors declined from 59% in 2000 to 19% in 2005. ⁸The reporting of misleading or dangerous antimicrobial-organism combinations occurred less frequently than the reporting of unlikely percent-susceptible results. ⁹Compliance with news CLSI recommendations did not improve significantly.

Conclusions. ¹⁰AST is complex and nuanced. PHL programs can provide resources, guidance, and technical support to help clinical microbiologists differentiate questionable AST results from true emerging antimicrobial resistance.

What categories of information from each major section of the practice article are identified in this synopsis?

What actual information from each major section of the practice article is given this synopsis?

SYNOPSIS

1Instruments designed to measure the performance of public health systems at state and local levels were supported by the Centers for Disease Control and Prevention (CDC) and implemented in 2002. 2This article describes the process and outcomes of a system and tool designed to measure performance of State public Health Laboratory Systems, accomplished by the Association of Public Health Laboratories (APHL) in partnership with CDC. 3We describe the process used to develop the instrument and its subsequent pilot testing and field testing in 11 states. 4Throughout the field testing and early implementation phases, both CDC and APHL recognized that the core rationale for measuring system performance would be to provide the basis for subsequent system improvement. 5APHL implemented the Laboratory System Improvement Program (L-SIP) in 2007 and conducted an evaluation of the field testing of the instrument and related materials that same year. 6We conclude with a summary of future implications for L-SIP, the program’s recognition as an international standard for laboratory systems, and the critical importance of its continuation.