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COUNCIL OF STATE AND
TERRITORIAL EPIDEMIOLOGISTS

Applied Epidemiology Scientific Writing Trends, Needs, and Recommendations, 2014

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Acronym Listing

AEC – Applied Epidemiology Competencies

APA -- American Psychological Association

CDC – Centers for Disease Control and Prevention

CSTE – Council of State and Territorial Epidemiologists

EAPO – Epidemiology and Analysis Program Office

EID – Emerging Infectious Diseases

ECA – Epidemiology Capacity Assessment

EID – Emerging Infectious Diseases

MCH – Maternal and Child Health

MMWR – Morbidity and Mortality Weekly Report

NACCHO – National Association of County and City Health Officials

PCD – Preventing Chronic Disease

SCT – Social Cognitive Theory

SWA – Scientific Writing Assessment

Executive Summary

Capacity building of an effective applied epidemiology workforce should include the development of scientific writing skills. Applied epidemiologists communicate complex public health information in writing with various audiences (including conference presentations and peer reviewed manuscripts for journals); often with varying degrees of preparation, mentoring, or resources such as time to complete the presentations or manuscripts. To better understand the current practices and needs of applied epidemiologists regarding scientific writing, the Council of State and Territorial Epidemiologists (CSTE) has undertaken a mixed-method assessment of indicators to guide recommendations for how this area of professional development can be improved.

METHODS

During spring 2014, theory-guided focus groups were held with applied epidemiologists by teleconference to determine scientific writing practices currently in use and desired. Facilitators were volunteer members of the CSTE Scientific Writing Assessment Workgroup, a subset of the Epidemiology Methods Subcommittee. Focus group participants included new to very experienced epidemiologists, primarily representing at local and state health departments, and agencies (or organizations) that included much scientific support to those that did not. The rich thematic information suggested the overall desire to increase scientific writing output among applied epidemiologists, identified some practices worth assessing in a representative sample of practicing applied epidemiologists, and suggested some differences between intention and reality (e.g. policy and job descriptions that support applied epidemiologists' desires to put more of their work into writing). Lack of full access to the scientific literature by many participants was noted. Participants were keen to point out that much of their writing was aimed at policy, or public audiences, in addition to the more formalized work of conference abstract writing and manuscripts for Centers for Disease Control and Prevention (CDC) or peer-reviewed scientific journals.

Following the focus group analyses, an assessment on scientific writing was developed, pilot tested, and distributed to members and non-members of CSTE and with National Association of County and City Health Officials' (NACCHO) local epidemiology workgroup. Participants were encouraged to distribute the assessment to other applied epidemiologists. Responses were confidential and participants were asked to respond to the assessment only once. The assessment included 18 multiple choice and short answer questions and was available by SurveyMonkey until a quota of responses was achieved, measured by length of time working in applied epidemiology adjusted from the most recent CSTE Epidemiology Capacity Assessment (ECA) (n = 396). This sample is approximately 25% of the applied epidemiology workforce per the 2013 ECA who completed the individual questionnaire (n=1590).

RESULTS

Respondents almost exclusively had a master's degree or higher level of education (94%) and 62% reported CSTE membership. Seventeen percent of respondents had worked in applied epidemiology less than two years, while 13% of respondents had worked in applied epidemiology for 20 or more

years. More respondents worked at state health departments (64%) than local health departments (23%), with the remainder representing federal and tribal agencies and academia.

Scientific Writing and Publishing Experience

- While almost everyone (89%) reported writing experience, 66% reported 'publishing' experience. Publishing was reported more frequently among those with doctoral degrees (100%) compared to those with a master's degree (57%).
- Job-required scientific writing for internal agency use (94%) was almost universal, followed by writing documents for the public (90%).
- Only 58% of respondents published work in the peer-reviewed literature as a job function.
- Publishing among those with academic appointments (19% of the sample) was statistically more likely than among applied epidemiologists who did not have an academic appointment.
- One in three respondents had published work in a CDC publication (*Morbidity and Mortality Weekly Report* (MMWR), *Emerging Infectious Diseases* (EID), and *Preventing Chronic Disease* (PCD)).
- State health department epidemiologists were nearly twice as likely to report that publishing their work was a requirement of a funding source as local health department epidemiologists.

Barriers to Scientific Writing

- Scientific writing barriers experienced by applied epidemiologists did not include knowledge of or experience with the process: 84% reported 'minimal' or 'no' barrier due to these reasons.
- Organizational structure, resources, and competing demands provide a better understanding of perceived barriers to scientific writing with time to write being the most common barrier expressed by 68% of applied epidemiologists; though, 28% report they receive some protected time for this task.
- A structured review process within the department was both a needed support and sometimes a perceived barrier to scientific writing; though, in general, epidemiologists reported agency lack of encouragement or support to do scientific writing was a barrier.
- While some journals charge fees for publishing, 65% of respondents found the cost of publishing was not a barrier.
- Just over half of the respondents reported having access to peer-reviewed literature (55%); oftentimes through academic appointments.

Facilitators to Scientific Writing

Facilitating factors that influence scientific writing in health departments included supportive organizational culture, technical support including writers, editors and communication specialists, access to peer-reviewed literature, university partnerships, and the option for electronic publishing.

Desired Tools & Resources for Scientific Writing

Tools desired by applied epidemiologists to help them increase scientific writing included dedicated time, training to improve scientific writing and publishing skills, dissemination of best practice models of supportive writing resources within health departments, and best practice examples of supportive organizational culture to foster writing and publishing.

- Templates for general publications were requested by about half of participants.
- Access to a mentoring network of experienced writers from state and local health departments was also similarly desired, and access to editors (46%) and access to technical writers (44%) were also suggested as helpful.
- A journal club to encourage publishing and peer-review was requested by two out of every five respondents.

NEXT STEPS

Scientific writing provides applied epidemiologists with opportunities to grow and share products of their work. Next steps identified from the results of the assessment include 1.) continued professional development in scientific writing for applied epidemiologists; 2.) collaboration with national organizations, such as Association of State and Territorial Health Officials (ASTHO), CSTE, NACCHO, public health leadership networks, and accreditation programs to increase the organizational support for scientific writing products; 3.) Institutionalize the value of development and dissemination of best practices models.

Additionally, agencies can encourage scientific writing among their applied epidemiologists by: offering dedicated time to write, allowing epidemiologists to hold academic appointments, partnering with libraries or universities to ensure access to peer-reviewed literature, encouraging a supportive organizational culture to foster writing and publishing, and providing resources such as manuscript templates, technical writers, editors, and journal clubs.

Applied Epidemiology Scientific Writing Trends, Needs, and Recommendations, 2014

Communication is vital to an epidemiologist's work. The dissemination of applied public health practice occurs through many channels including written communication. In order to better understand the current practices and needs of applied epidemiologists regarding scientific writing, the Council of State and Territorial Epidemiologists (CSTE) conducted an assessment of indicators to guide recommendations for how this skill can be improved. Throughout the report several assessments will be referenced. The data collected specifically for this report is referred to as the Scientific Writing Assessment (SWA).

Background

The Council of State and Territorial Epidemiologists (CSTE) represents over 1,100 member epidemiologists. The CSTE Epidemiology Methods subcommittee focuses on workforce development, institutional capacity, and the intersection of epidemiology and public health. Refining applied epidemiologic practices and increasing the workforce capacity of epidemiologists is at the center of the subcommittee's mission. Under the leadership of the subcommittee chair, Matthew Thomas, CSTE conducted an assessment of scientific writing skills among epidemiologists. The assessment was planned and implemented in collaboration with lead editors for the Centers for Disease Control and Prevention (CDC) *Morbidity and Mortality Weekly Report (*MMWR*)*, *Preventing Chronic Disease* (PCD) and *Emerging Infectious Diseases* (EID).

Previous work informed the SWA including the Applied Epidemiology Competencies and the 2013 Epidemiology Capacity Assessment. The report provides a brief description of each and describes how it contributed to the assessment.

Applied Epidemiology Competencies

The Applied Epidemiology Competencies (AECs) document is a comprehensive list of competencies that defines the applied epidemiology skill set (Centers for Disease Control and Prevention & Council of State and Territorial Epidemiologists, 2008). The AECs can be accessed via the CSTE website: http://www.cste.org/group/CSTECDCAEC. The AECs were developed within the eight skill domains of the Core Competencies for Public Health Professionals, developed by the Council on Linkages, and are consistent with the larger field of public health practice. The eight skill domains include: assessment and analysis, basic public health sciences, communication, community dimensions of practice, cultural competency, financial and operational planning and management, leadership and systems thinking, and policy development. The list describes skills of four different levels of practicing epidemiologists working in governmental public health agencies.

The competency skill domain of communication is a major responsibility of epidemiologists at all levels. Competency-related communication activities include preparing written and oral reports and presentations that communicate necessary information to a broad range of stakeholders, including agency staff, professional audiences, policy makers, and the general public.

Scientific Writing Information from the 2013 CSTE Epidemiology Capacity Assessment

The 2013 CSTE Epidemiology Capacity Assessment (ECA) describes the capacity for comprehensive epidemiology services to support essential public health services. Scientific writing capacity was of particular interest. Capacity is referenced throughout the report and references the described activity, knowledge or resources. The ECA examined several types of publications by program area that were reported by the state epidemiologists (Council of State and Territorial Epidemiologists, 2014a). The volume of publications, regardless of type, was closely associated with staffing capacity in surveillance and epidemiology for that program area (Table 1 and Figure 1). The exception was Bioterrorism/Emergency Response. In this case, despite a large staff, programs tended to produce fewer publications than expected. Peer-reviewed articles were published less often compared to other reports and abstracts accepted for presentation at national conferences. These numbers suggest that often public health work is not submitted to peer-reviewed journals but is shared in other venues.

Table 1. Formal epidemiology-based publications published during 2012, by program area –collected from 49 responding jurisdictions in the 2013 Epidemiology Capacity Assessment

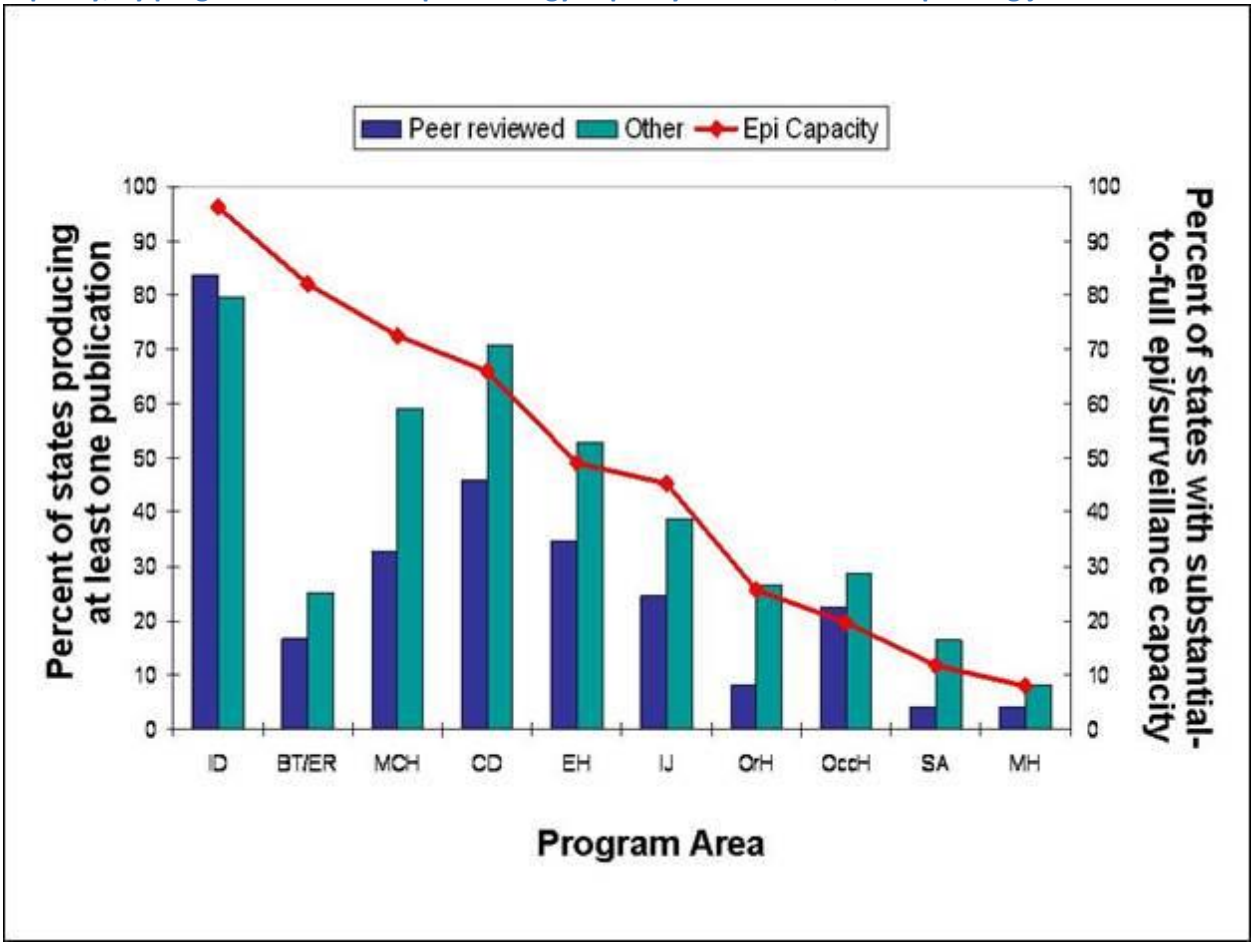
Program Area	No. Responding States	No. Peer-reviewed Published Articles in 2012	No. Abstracts Accepted for Presentation at National Conferences Held in 2012	No. Other[1] Reports in 2012
Infectious Disease	49	279	317	906
Chronic Disease	49	61	142	290
Environmental Health	49	48	89	205
Maternal and Child Health	49	93	204	199
Injury	49	35	58	161
Bioterrorism/Emergency Response	49	16	52	74
Occupational Health	49	14	30	40
Substance Abuse	49	4	21	26
Oral Health	49	9	10	19
Other	14	32	22	115

[1]Reports approved by a state process and published electronically or on paper and/or posted on a website for public consumption.

[2] Other disciplines included: Behavioral Health, Community Epidemiology and Evaluation, Disaster Epidemiology, Disease Burden and Workforce Projections, Immunizations, Public Health Statistics/Vital Records, and Various

The number of publications generally correlated with program area epidemiology capacity so increasing epidemiology capacity is likely to increase the volume of publications. Infectious disease was the only program area that published in the peer-reviewed literature more often than in other publications.

Figure 1. Percentage of states producing formal epidemiology-based publications in 2012, by program area* and type of publication, and percentage of states reporting substantial to full epidemiology capacity, by program area - 2013 Epidemiology Capacity Assessment, 49 responding jurisdictions



*ID: infectious diseases; BT/ER: bioterrorism/emergency response; MCH: maternal and child health; CD: chronic disease; EH: environmental health; IJ: injury; OccH: occupational health; SA: substance abuse; OrH: oral health;MH: mental health; Epi Capacity: percentage reporting substantial to full epidemiology and surveillance capacity.

Ready access to peer-reviewed literature was assessed in the 2013 ECA specifically for chronic disease, maternal and child health (MCH), oral health, and environmental state epidemiologists (Council of State and Territorial Epidemiologists, 2014c). Of the 49 chronic disease reporting jurisdictions, 23 (47%) indicated they have access to current medical, epidemiologic, and public health journals. The remaining responses were split evenly, illustrating limited access (13, 27%) or no access (13, 27%). Among participating states reporting MCH epidemiology capacity, 33 of the 49 (67%) had partial or no access to current medical, epidemiology, and public health full-text articles and journals. Oral health responded similarly, with 30 of the 49 states reporting (61%) partial or no access to medical, epidemiologic, and public health full-text articles and journals. Of the 41 states that provided environmental epidemiology capacity information, 30 (73%) reported access to current medical, epidemiologic, and public health journals through either a conveniently located major science library, or a service that provides full-text electronic or hardcopy articles.

The results of this capacity assessment illustrate an opportunity to improve access to or production of applied epidemiology publications regardless of capacity.

Submission of Scientific Articles for Publication to MMWR

In the 2013 Assessment of Awareness and Use of Epidemiology and Analysis Program Office (EAPO) Products conducted by the Centers for Disease Control and Prevention (CDC) regarding the MMWR, 41 of the 43 (95%) state and territorial epidemiologists reported having written a scientific article for publication (Centers for Disease Control and Prevention, 2013). Of the 41 State Epidemiologists who had written a scientific article for publication, 37 (90%) had submitted to the MMWR.

The results from the 2013 EAPO assessment indicated that MMWR is valued and widely used by state and territorial epidemiologists. A major limitation of this assessment is that it did not include local or junior-level epidemiologists because the assessment was only completed by the state epidemiologists.

Based on these past assessments, CSTE recognized a gap in communicating results from epidemiologists in state, local, territorial, and tribal health departments with a wider audience. A needs assessment focused more narrowly on communication needed to be conducted to help inform what tools and resources were most needed by epidemiologists. CSTE conducted the SWA to address this need of focusing on scientific writing with respect to publishing scientific work, job responsibilities related to communication and writing, familiarity with CDC-specific journals, publishing barriers, and resources within their work environment that supported publishing.

Project Description

The SWA was conducted to gain a better understanding of applied epidemiologists' experiences in preparing and publishing in peer-reviewed journals, abstracts, CDC publications, and other reports for public use.

Purpose

The purpose of this assessment was to understand epidemiologists' scientific writing experience and identify facilitators and barriers of scientific writing. The assessment aimed to identify how epidemiologists communicate and share information on epidemiology and surveillance.

State, local, tribal, and territorial epidemiologists (including but not limited to CSTE members) were the target audience of the assessment.

Goals

The initial assessment goals included:

1. Identify and describe methods to sustain and enhance scientific credibility.
2. Describe methods to increase publication reach and public health influence.
3. Describe how the publications can add value in epidemiology education and capacity building.

The assessment goals were revised after conducting focus groups to inform the development of the assessment. The revised goals specifically explored the individual and agency capacity for scientific writing:

1. Describe the writing and publishing experience of epidemiologists for the general public, peer-reviewed publications, and CDC-specific publications (e.g., MMWR, PCD, and EID).
2. Identify expectations of scientific writing by epidemiologists.
3. Identify barriers and facilitators that epidemiologists experience relevant to scientific writing.

Guiding Project Questions

The assessment focused on exploring the education and training needs of the epidemiology workforce.

1.) What is the writing and publishing experience of applied epidemiologists for the general public, peer-reviewed publications, and CDC-specific publications (e.g., MMWR, PCD, and EID)?
2.) To what extent is scientific writing expected among the job duties of an epidemiologist?
3.) What barriers do epidemiologists experience related to scientific writing?
4.) What facilitates successful scientific writing by epidemiologists?
5.) What tools and resources are needed by epidemiologists to improve scientific writing capacity?

Use of the Assessment

The results will be used to inform trainings, resources, and technical assistance made available to epidemiologists through CSTE and CDC.

The data collected and results generated from this assessment are the property and responsibility of CSTE. Any use of the data must have written permission from CSTE.

Role of CSTE Member Engagement

CSTE members of the Epidemiology Methods Subcommittee had the opportunity to participate in the SWA workgroup. The workgroup implemented and refined the project plan, specifically data collection, data analysis, development of results and report, and dissemination of results.

Assessment Design

The assessment design was two-fold. First, focus groups provided valuable information about the scientific writing experience in the field by practicing epidemiologists. Second, the Social Cognitive Theory provided a framework for SWA data collection to help inform development of training and resources to increase scientific writing capacity among epidemiologists.

Focus Groups

The SWA was informed by initial focus groups conducted in April 2014 with a small group of epidemiologists to gather qualitative feedback on writing and publishing and to inform the development of a written assessment. The focus groups explored specific themes around publishing scientific work, including current job responsibilities, familiarity with CDC-specific journals or publications, barriers to publishing, and resources and support for publishing. There were six focus groups conducted with a total of 26 participants. Analysis of the focus group data involved thematic coding of the transcripts, with major themes informing development of a writing capacity assessment tool to be distributed to a wider sample of epidemiologists nationwide. Major themes were identified relating to influences and challenges of scientific publishing (Council of State and Territorial Epidemiologists, 2014a).

Major themes identified include:

1. Publishing was not explicitly listed in their job description or duties, but it may be expected and can be influential in their evaluations. One participant wrote the following: *If we are in a position to make this a metric that also has some backing in what we are expected to do on a daily basis, I think it would help us benefit and our public health departments and applied epidemiology benefit from our expertise and what we are offering the world.*
2. There is a lack of library and journal access for most health department employees.
3. Junior epidemiologists want to publish but face multiple barriers.
4. The culture of publishing and scientific writing culture is different between public health practitioners and academicians.
5. “Public health practice” is not always well understood by peer reviewers.

The focus groups revealed a disparity between the resources needed by applied epidemiologists for writing and the resources available. The lack of resources ultimately prevents epidemiologists in public health practice from producing as many publications as they desire, limiting the sharing of knowledge and experience from applied epidemiologists to the broader scientific public health community. The focus groups also identified a specific gap in available training in technical writing skills that the subsequent assessment aimed to explore more deeply. There is a strong need to replicate best practices to strengthen the scientific writing capacity of epidemiologists.

Rooted in Theory

The Social Cognitive Theory (SCT) suggests that human behavior can be explained through triadic reciprocal causation between the behavior, environment, and personal factors. Based on the tenets of the SCT, the assessment was designed to explore the participant's knowledge, outcome expectations, outcome expectancies, situational perception, environment, and self-efficacy related to scientific writing.

The SCT key constructs as they relate to the assessment are summarized in Table 2 (Glanz, Rimer, & Viswanath, 2008):

Table 2. Social Cognitive Theory key constructs

Construct	Definition	Example
Knowledge	Learning facts and gaining insights related to an action, idea, object, person, or situation	Do I know how to write about a public health issue for a specific audience?
Outcome Expectations	Anticipation of the probable outcomes that would ensure as a result of engaging in the behavior under discussion	If I write a scientific article, will it actually be published?
Outcome Expectancies	Value a person places on the probable outcomes that result from performing a behavior	Publishing my scientific findings will positively impact the field of public health.
Situational Perception	How one perceives and interprets the environment around oneself	Is my work important to my colleagues?
Environment	Physical or social circumstances or conditions that surround a person	Do I have the time and resources to write and publish my scientific findings?
Self-efficacy	Confidence in one's ability to pursue a behavior	Do I have the ability to successfully write scientific articles?

While some of the SCT's constructs are not particularly relevant to this assessment, the theory is still well selected because of the application of reciprocal determinism. Reciprocal determinism acknowledges an individual's behavior influences and is influenced by personal factors and the environment (Glanz, Rimer, & Viswanath, 2008). It is also worth noting the difficulty of objectively measuring without bias constructs such as self-efficacy and situational perception in a standardized method.

Methods

A sample of epidemiologists, representative of the epidemiology workforce, participated in the written assessment. Assessment questions were developed by CSTE national office staff and the SWA Workgroup. Assessment questions may be found in Appendices A and B.

Pilot Assessment

A structured online pilot assessment of 20 questions was created based on themes identified from the focus groups (Appendix A). The assessment pilot was completed by 50 CSTE members to clarify question wording before broader distribution.

Based on the pilot feedback, a few changes were made to the assessment.

- There was confusion about considering CDC publications as peer-reviewed or not. Clarification was provided by adding the language, "CDC publications include the MMWR, EID, and PCD that may or may not be peer-reviewed."
- For some pilot participants, their place of work and their employer were two different agencies. Clarification was provided by changing "place of employment" to "place of work."
- In the pilot, abstracts were not considered a publication. For the assessment implementation, the definition of the manuscript was revised to include abstracts.
- The pilot feedback emphasized the variety of written publications that epidemiologists regularly produce. Therefore, the definition of report was revised to read, "A report is defined as any document that is developed with the intention of relaying specific information that may include technical writing, such as fact sheets or instruction manuals."

Assessment

Assessments were administered via SurveyMonkey (SurveyMonkey Inc., Palo Alto, CA). The assessment instrument can be found in Appendix B. The assessment link was sent via email to all CSTE members and the National Association of County and City Health Officials' (NACCHO) Epidemiology Workgroup. The email requested participation in the assessment and asked members to send the link to colleagues at their health department involved in epidemiologic projects. Membership in CSTE was not required to complete the assessment. Participation in the assessment was confidential with no questions asking for specific identifiable information. The 18 questions were multiple choice or short answer. The assessment collected demographic information, such as the participant's highest level of education, place of work, and the number of years the participant worked as an epidemiologist.

Epidemiologists from all levels of experience and jurisdiction types were included in the sample. A quota sampling method based on the distribution of experience illustrated in the 2013 Epidemiology Capacity Assessment was used to set a limit of 396 responses based on participants' years of public health experience. The 396 responses numerically represented approximately 25% of the individual responses from the 2013 Epidemiology Capacity Assessment (N=1,590).

Data collection occurred over a two-week period during August 2014. A reminder email was sent the second week reminding recipients to complete the assessment. To ensure accurate implementation of the quota sampling methodology, responses were tracked as they were submitted.

Statistical Analysis

CSTE staff conducted the data analysis and shared the methods and results with the workgroup. Any identifiers, such as place of work, name, or position title, from the free text responses were removed in the results.

All analyses were conducted using SAS (version 9.4, SAS Institute Inc, Cary, NC) at a significance level of $\alpha=0.05$. For the categorical assessment questions, univariate descriptive statistics were calculated, which included frequencies and percentages. Bivariate analyses were conducted using chi-square and Fisher's exact tests.

Additional Assessment Information and Instructions

The instructions included in the assessment provided specific definitions for terminology including the following:

- A **report** is defined as any document that is developed with the intention of relaying specific information and may include technical writing, such as fact sheets or instruction manuals.
- A **manuscript** is defined as a compilation of original scientific findings that is often submitted to a journal and may include abstracts.
- **Public use** refers to a report or manuscript published or distributed through any route that is not a peer-reviewed publication.
- **Peer-reviewed journals** are publications that require submitted content to be reviewed by experts in the field who are not a part of the editorial staff prior to publication. Some examples of peer-reviewed journals include *American Journal of Public Health*, *American Journal of Epidemiology*, and *Journal of Epidemiology and Community Health*.
- **CDC-specific publications** include the *Morbidity and Mortality Weekly Report* (MMWR), *Emerging Infectious Diseases* (EID), and *Preventing Chronic Disease* (PCD) that may or may not be peer-reviewed.

Results

Table 3. Characteristics of Analytic Sample (N=396)		
Demographics	**N**	**%**
Years of Experience		
<2	69	17.4
2 to 4	69	17.4
5 to 9	91	23.0
10 to 14	81	20.5
15 to 19	35	8.8
20+	51	12.9
Highest Degree Obtained		
MD, DO	42	10.6
DDS, DMD	0	0.0
DVM, VMD	15	3.8
PhD, DrPH, other doctoral	62	15.7
MPH, MSPH, other master	251	63.4
RN, any other nursing	2	0.5
BA, BS, BSN, other bachelor	22	5.6
Associate/No post high school degree	2	0.5
Highest Level of Epidemiology Training		
PhD, DrPH, other doctoral degree in Epidemiology	46	11.6
Professional background (e.g. MD) with a dual degree in Epidemiology	11	2.8
MPH, MSPH, other master degree in Epidemiology	235	59.3
BA, BS, other bachelor degree in Epidemiology	1	0.3
Completed formal training program in Epidemiology (e.g. EIS)	20	5.1
Completed some coursework in Epidemiology	57	14.4
Received on the job training in Epidemiology	21	5.3
No formal training in Epidemiology (e.g. epidemiologist does not fit into any of the above categories)	5	1.3
Place of Work		
Local Public Health Agency	93	23.5
State Public Health Agency	252	63.6
Tribal Public Health Agency	3	0.8
Federal Agency	26	6.6
Academia	7	1.8
Non-Governmental Organization	5	1.3
Other	10	2.5
Appointment at university or academic center		
Yes	75	18.9
CSTE Member		
Yes	244	61.6

The quota sampling method yielded a participant pool of approximately 396 respondents, who were reflective of the broader applied epidemiology workforce. Participants represented a variety of public health agencies and had a range of educational and professional backgrounds. The full results can be found in Appendix C.

Approximately 370 respondents (94%) had a master's degree or higher and 292 (73%) had a master's degree or higher, specifically in epidemiology. A state public health agency was the most common place to work with 252 respondents (64%), followed by a local public health agency with 93 respondents (24%). The remainder of the participants' work places included federal agency (26, 7%), other (10, 3%), academia (7, 2%), non-governmental organization (5, 1%), and tribal public health agency (3, 1%). Approximately 75 (19%) participants had an appointment at a university or academic center. CSTE membership was not required to respond, but 244 (62%) participants identified as CSTE members.

Scientific Publishing and Writing Experience

Almost all respondents had previous writing experience, with 353 (89%) indicating they *agree* or *strongly agree* with the statement "I have previous writing experience." Fewer respondents (262, 66%) indicated they had previous publishing experience.

Academic Training

Those with a doctorate degree were significantly more likely to report past publishing experience than respondents with a master's degree ($p<0.0001$). All doctorate-level educated respondents (62, 100%) indicated prior publishing experience while only 143 (57%) of those with master's degrees had previous publishing experience.

Academic Appointment

There were significant differences in previous writing experience ($p<0.0001$) and previous publishing experience ($p<0.0001$) between those who had an academic appointment and those who did not. These differences could reflect the different expectations associated with academia versus public health practice. Almost all respondents with an academic appointment had previous writing experience (74, 99%) or previous publishing (68, 91%) experience. For those without an academic appointment, 279 (87%) respondents had previous writing experience and 194 (60%) respondents had previous publishing experience.

There were significant differences in the type of writing experience between respondents with an academic appointment and those without, as shown in Table 4. Those with an academic appointment were significantly more likely to have experience submitting a manuscript to a peer-reviewed journal than those without an academic position ($p<0.0001$). Publication in a peer-reviewed journal was also significantly more common among academic appointees compared to others with 81% of academic appointees having published and only 54% of other appointees. Additionally, the number who submitted reports or manuscripts in CDC-specific publications differed significantly between those with an academic appointment (49, 65%), and those without (100, 31%) ($p<0.0001$). The number who submitted and published reports or manuscripts in CDC-specific publications also differed significantly between those with an academic appointment (44, 59%) and those without (89, 28%) ($p<0.0001$).

Table 4. Differences in writing experience between those with an academic appointment and those without (N=396)			
	Academic Appointment	**No Academic appointment**	
	N (%)	**N (%)**	**p-value**
Submit reports or manuscripts in peer-reviewed journals	66 (88.0%)	199 (62.0%)	p<0.0001
Publish reports or manuscripts in peer-reviewed journals	61 (81.3%)	172 (53.6%)	p<0.0001
Submit reports or manuscripts in CDC-specific publications	49 (65.3%)	100 (31.2%)	p<0.0001
Publish reports or manuscripts in CDC-specific publications	44 (58.7%)	89 (27.7%)	p<0.0001

Place of Work

There was a significant difference between place of work and previous writing experience. Of those in local public health agencies, 78 (84%) respondents indicated they had previous writing experience compared to the 228 (90%) state public health agency respondents (p=0.0283).

Type of Scientific Writing Experience

Table 5 displays the type of scientific writing products that respondents reported experience with submitting and publishing. Most (90%) respondents had experience in creating reports or manuscripts for public use. About 67% reported submitting a manuscript and 59% reported publishing a manuscript in a peer-reviewed journal. Fewer respondents indicated they had submitted to (38%) or published (34%) in a CDC-specific publication.

Table 5. Analytic Sample Experience in Scientific Writing for Public Use, Peer-Reviewed Journals and CDC-specific publications (N=396)		
	N	**%**
Creating a report or manuscript for public use (not peer-reviewed)	357	90.2
Submit a report or manuscript to peer-reviewed journals	265	66.9
Publish a report or manuscript to peer-reviewed journals	233	58.8
Submit a report or manuscript to CDC-specific publications (MMWR, EID, PCD)	149	37.6
Publish a report or manuscript to CDC-specific publications (MMWR, EID, PCD)	133	33.6

Public Use

Among the 357 (90%) respondents who had experience creating a report or manuscript for public use (not peer-reviewed), respondents indicated intermediate, advanced, or expert expertise writing (341, 96%), editing (336, 94%), submitting (326, 91%), and knowledge to prepare (338, 95%) a report for public use compared to respondents who did not have experience creating a report or manuscript for public use ($p<0.0001$).

Peer-Reviewed Journals

Among the 265 (67%) respondents who had experience creating a report or manuscript for a peer-reviewed journal, the majority respondents indicated expertise at the intermediate, advanced or expert levels for writing (212, 80%), editing (211, 80%), submitting (199, 75%), and knowledge to prepare (214, 81%) a report or manuscript for publication compared to respondents who did not have experience creating a report or manuscript for a peer-reviewed journal ($p<0.0001$).

Among the 233 (59%) respondents who had experience in submitting a report or manuscript to a peer-reviewed journal, a majority indicated experience at the intermediate, advanced or expert levels for writing (200,86%), editing (201, 86%), submitting (187, 80%), and knowledge to prepare (204, 88%)a report or manuscript for publication compared to respondents who did not have experience submitting a report or manuscript to a peer-reviewed journal ($p<0.0001$).

CDC-Specific Publications

Among the 149 (38%) respondents who had experience in submitting a report or manuscript to CDC-specific publications (MMWR, EID, and PCD), approximately four of every five indicated experience at the intermediate, advanced or expert levels for writing (126, 85%), editing (127, 85%), submitting (120, 81%), and knowledge to prepare (125, 84%) a report or manuscript to CDC-specific publications compared to respondents who did not have experience creating a report or manuscript to CDC-specific publications ($p<0.0001$).

Among the 133 (34%) respondents who had experience in publishing a report or manuscript to CDC-specific publications (MMWR, EID, and PCD), most indicated experience at the intermediate, advanced or expert levels for writing (118, 89%), editing (119, 89%), submitting (115, 86%), and knowledge to prepare (118, 89%) a report or manuscript to CDC-specific publications compared to respondents who did not have experience creating a report or manuscript to CDC-specific publications ($p<0.0001$). Twenty-six percent (104) of respondents reported that the MMWR publication process was not easy.

Place of Work Scientific Writing Expectations

Almost all respondents (371, 94%) indicated they were expected to write reports for internal agency use, while 360 (91%) indicated they were expected to write reports for the general public.

Publications for peer-review journals were expected as part of job duties for 178 (45%) respondents, while publications in CDC-specific journals were expected for only 117 (30%) respondents. Only 12 (3%) respondents indicated that they were not expected to write reports of any type as part of their work.

There were no significant differences in job duties between state and local agency responses.

Table 6. Types of Scientific Writing Expected as Part of Job Duties (N=396)

	N	%
Internal agency use: reports, summaries, program documentation, grant writing	371	93.7
General public (external of agency): reports, summaries, media (websites), plain language documents for the general public	360	90.9
Publications for peer review	178	45.0
Publications for CDC (MMWR, Emerging Infectious Diseases, Preventing Chronic Disease)	117	29.6
None	12	3.0
Other	27	6.8

Funding Requirements

While most participants did not report that writing and/or publishing activities were tied to funding requirements, there was still a significant difference across agency types (p=0.0039). State-level participants more commonly reported ties between writing and/or publishing activities and funding requirements (27%) than local-level participants (15%).

Barriers to Scientific Writing

Across all participants, time and agency support were identified as common barriers to scientific writing while knowledge and experience were not. Those who identified a barrier as *not applicable* may indicate that barrier was not relevant to their work or experience.

Individual Experience & Knowledge

Most respondents (331, 84%) reported that a lack or previous writing experience was either *not a barrier* or a *minor barrier*. Knowledge on how to submit to a peer-reviewed publication was indicated as *not a barrier* or a *minor barrier* by 312 (79%) respondents. Similarly, lack of previous publishing experience was not a barrier with 291 (73%) respondents indicating it as either *not a barrier* or a *minor barrier.*

Organizational Culture

Organizational culture and structure for writing was evaluated through questions targeting agency encouragement and support along with reviewing and approval processes required for publication.

Time

Time was identified as the greatest barrier to writing and publishing with 268 (68%) respondents indicating time was either a *moderate barrier* or *major barrier*. Overall, 111 (28%) respondents indicated their workplace provides them dedicated time for writing and publishing activities. There was no significant difference in the proportion of respondents between those who work at state (68, 27%) and local (23, 25%) public health agencies that are given dedicated time for writing and publishing activities.

Agency Support

Across agency types, lack of encouragement or support was indicated as a prominent barrier to scientific writing by 130 (33%) respondents. Agency clearance or approval process was another substantial barrier reported by 127 (32%) respondents.

Structured Review Process

Structured processes for reviewing and approving publications were not standard practice across all public health agencies. Significantly more state-level respondents (137, 54%) reported a structured review process compared to local-level respondents (32, 34%). This sort of review process was also the only barrier that varied significantly between local and state public health agencies ($p=0.0097$). Of the respondents from local public health agencies, 17 (18%) indicated that the agency clearance or approval process is a *moderate* or *major barrier* compared to 97 (38%) respondents at the state level.

There was not a significant relationship between those who identified having a structured process for reviewing and approving publications and those who identified the agency clearance or approval process as a barrier ($p=0.3506$).

Article Submission Costs

The cost associated with submitting an article for publishing was not a *major barrier* to publishing. Across agency types, 255 (64%) respondents reported that cost was either a *minor barrier* to publishing or *not a barrier* at all.

Table 7. Barriers to Scientific Writing of Analytic Sample (N=396)

	N/A	Not a barrier	Minor barrier	Moderate barrier	Major barrier
	N (%)	N (%)	N (%)	N (%)	N (%)
Time	3 (0.8)	41 (10.4)	84 (21.2)	114 (28.8)	154 (38.9)
Access to peer-reviewed literature	5 (1.3)	191 (48.2)	90 (22.7)	61 (15.4)	49 (12.4)
Knowledge on how to submit a peer-reviewed publication	6 (1.5)	181 (45.7)	131 (33.1)	47 (11.9)	31 (7.8)
Lack of previous writing experience	9 (2.3)	232 (58.6)	99 (25.0)	43 (10.9)	13 (3.3)
Lack of previous publishing experience	10 (2.5)	181 (45.7)	110 (27.8)	67 (16.9)	28 (7.1)
Agency clearance or approval process	22 (5.6)	111 (28.0)	136 (34.3)	83 (21.0)	44 (11.1)
Lack of encouragement or agency support	12 (3.0)	155 (39.1)	99 (25.0)	73 (18.4)	57 (14.4)
Costs associated with submitting an article for publishing	41 (10.4)	146 (36.9)	109 (27.5)	67 (16.9)	33 (8.3)

Current Resources to Support Writing and Publishing Activities

Overall, 223 (56%) respondents indicated their agency provides access to peer-reviewed literature to support writing and publishing. The second most common resource agencies provided to support writing activities was dedicated time with 111 (28%) respondents indicating their agency promotes designating time specifically devoted to writing. Access to editors and training opportunities to improve scientific writing skills were identified as resources that approximately 20% of agencies provide. There were no significant differences in how state versus local public health agencies support writing and publishing activities. Ninety seven respondents (24%) indicated that their agency provided no resources to support writing and publishing activities.

Table 8. Current Resources Agencies Provide and What Resources are Needed to Improve Scientific Writing of Analytic Sample (N=396)

	Resources Currently Provided		Desired Resources	
	N	%	N	%
Dedicated time	111	28.0	258	65.2
Access to peer-reviewed literature	223	56.3	148	37.4
Access to technical writers	40	10.1	174	43.9
Access to editors	81	20.5	183	46.2
Training opportunities to improve scientific writing and publishing skills	76	19.2	247	62.4
Journal club to encourage publishing and peer review	45	11.4	160	40.4
Access to a mentoring network of experienced writers from state and local health departments	59	14.9	209	52.8
Templates for general publications	45	11.4	212	53.5
Best practice examples of supportive organizational culture to foster writing and publishing activities	29	7.3	219	55.3
Best practice models of supportive writing resources within health departments	28	7.1	237	59.8
None	97	24.5	23	5.8
Other	14	3.5	22	5.6

Access to Peer-Reviewed Literature

Overall, 283 (71%) respondents *agree* or *strongly agree* that they have access to peer-reviewed literature. There was a significant difference in access to peer-reviewed literature between those who have an appointment at a university or academic center and those who do not have an appointment ($p<0.0001$). Eighty nine percent of those with an appointment at a university or academic center had access to peer-reviewed literature while 67% of those without any academic affiliation reported access to peer-reviewed literature ($p<0.0001$). There was also significant variation in access to peer-review literature dependent on highest level of academic degree ($p=0.0067$). Of those with an MPH, MSPH, or

other masters in epidemiology, 154 (66%) had access to peer-reviewed literature while among those with a PhD, DrPH, or other doctoral degree in epidemiology 38 (83%) had access. There was not a significant difference in access to peer-reviewed literature between local and state public health agencies (p=0.3364).

Available Technical Resources

Fifteen (6%) participants who worked at a state agency reported that their agency provided access to technical writers compared to 10 respondents (11%) at local public health agencies (p=0.1270). Meanwhile, 20% (50) of state agency participants said their agency provided access to editors compared to 18% (17) from local agencies (p=0.7449). There is not a significant difference between state and local agencies providing access technical writers or editors.

Recommended Resources

Participants described resources they currently use to support their writing and publishing activities. Among these were several software programs used to manage references and citations including EndNote, RefWorks, and Mendeley Reference Manager. Some manuals and guidelines were also used commonly by participants, including the American Medical Association Style Manual, The Gregg Reference Manual, The Chicago Manual of Style, and The Elements of Style by E.B. White. Additionally, Google Scholar, PubMed, PlainLanguage.gov, US National Library of Medicine, and National Library of Medicine Catalog Journal in the National Center for Biotechnology Information databases are all publically available resources that were noted by many participants. Additionally, one respondent described the creation of a publication club to promote publications:

> *We created a publication club in [our state] to promote publications. We conducted several training series to teach people how to publish and to have group writing sessions with assigned mentors. We also have a journal club. I think this was only moderately successful because I don't think all people are cut out for scientific writing in our agencies. The epis and lab PhDs are certainly the most successful and so I think these types of activities supported by CSTE, because they would be targeted to epis, would be more successful. But our experience offering to all public health staff did not result in many additional publications. The people who are already comfortable publishing would have published anyway even without the publication club.*

Desired Resources to Improve Scientific Writing Capacity

Participants were asked to describe the sorts of resources that might be most useful in improving not only their ability to publish but also their writing skills. Suggestions ranged from developing more agency support for writing through creation of different writing support groups to improving access to certain external resources.

Most Requested Resources

Dedicated time was the most requested resource with 258 (65%) participants reporting that dedicated time would improve their ability to publish and produce quality scientific writing. Resources that were also highly requested included training opportunities to improve scientific writing and publishing skills (247, 62%), best practice models of supportive writing resources within health departments (237, 60%), and best practice examples of supportive organizational culture to foster writing and publishing (219, 55%). Templates for general publications were requested by 212 respondents (53%). Access to a mentoring network of experienced writers from state and local health departments was desired by 209 respondents (53%). Access to editors was requested by 183 respondents (46%) and access to technical writers was requested by 174 respondents (44%). A journal club to encourage publishing and peer review was requested by 160 respondents (40%).

Least Requested Resources

Access to peer-reviewed literature was one of the least requested resources with 148 (37%) participants indicating that they need access to peer-reviewed literature, although only 223 (56%) respondents indicated they already have access to peer-reviewed literature. Several respondents identified other desired resources not listed in the assessment question, including citation software, such as Endnote, and a “simple, streamlined and consistent approval/clearance process” for publication. There were no significant differences in resources that would improve ability for scientific writing and publishing between state and local public health agencies.

Desired Training to Improve Scientific Writing Capacity

Training in identification of the most appropriate journal to submit a manuscript was the most commonly requested training with 245 (62%) participants indicating their interest. Technical writing was the second most requested training that would improve the ability for scientific writing and publishing with 239 (60%) participants indicating their interest. Navigating the various formats of peer-reviewed journals was also a popular training, requested by 225 (57%) participants. Additional training topics noted in participant responses included online tools for managing references and a how-to training on what and when to publish. There is a significant difference in requested editing training by local and state agencies, 27 (29%) and 117 (46%) respectively (p=0.0036).

Table 9. Trainings that are Needed to Improve Scientific Writing of Analytic Sample (N=396)

	N	%
Technical writing	239	60.4
Grant writing	181	45.7
Plain language writing	104	26.3
Editing	160	40.4
Navigating the various formats of peer-reviewed journals	225	56.8
Knowing what journal to submit to	245	61.9
Responding to reviewers' comments	172	43.4
None	33	8.3
Other	10	2.5

Desired Toolkit Contents to Improve Scientific Writing Capacity

Respondents suggested many different tools that would assist them with writing and publication challenges:

- Templates for different types of publications
    - *Guidelines for structure and perhaps some sample templates for various types of publications. For example, if we all wrote outbreak reports using the same style, they'd be easier to read through. Templates sound boring but they save time, which would be key for me and help the writers not forget important elements.*
- Reference or citation software (i.e. EndNote, RefWorks, and Mendeley Reference Manager)
    - *Software for maintaining references. I have published using APA format, and although I have used other styles, I would love to see a style guide for style(s) that epi journals expect.*
- Formatting guidelines for peer-reviewed journals
    - *Definitely something to help navigate the various formats of peer-reviewed journals. When I was working on my thesis (as a publishable paper), it was craziness to re-format to fit the needs of each journal. Assistance with how to use reference would be helpful too.*
- Step-by-step guide to publishing
    - *An easy-to-follow, step-by-step approach to scientific writing for new writers. I think having the guide laid out in a pithy, bulleted format would be best.*
- List of suggested journals to publish in organized by subject
    - *Info on some of the major journals and what types of articles they accept. I am not familiar with many journals. I am able to request specific articles through the state library, but don't read or browse entire journals to have a feel for their content.*
    - *Recommendations showing which kinds of manuscripts are desired by which journals. The whole submit/revise/resubmit/accept/reject process with multiple journals to find the "right" one gets frustrating.*

Discussion

The discussion triangulates the available data from the 2013 ECA, the scientific writing focus groups, and the SWA. Cross-referencing the data from multiple sources strengthens the overall results to inform public health practice and next steps for supporting writing capacity among epidemiologists.

Writing and Publishing Experience for Different Venues

Findings from the SWA and the focus groups both reveal that epidemiologists have the most experience with publications for general public consumption compared to other mediums. The 2013 ECA also shows that writing of non-peer-reviewed publications may increase with experience: fewer senior epidemiologists (12%) reported interest in additional training in preparing publications for the general public than mid (14%) and entry-level (20%) epidemiologists. Future trainings should be tailored based on the experience of their audience.

While peer-reviewed publications were more valued among participants in the focus groups and were the preferred venue for publication, discussions revealed a number of barriers that help explain why many epidemiologists lack experience and confidence publishing peer-reviewed articles. Over half of participants in the SWA reported experience developing manuscripts intended for peer review, but a portion of these never actually submit. This gap may indicate that submission requirements are complex and additional guidance is needed to increase submission of manuscripts. Perhaps, financial barriers to submitting may prohibit publication in certain journals. Meanwhile, some participants voiced concern that peer reviewers may not understand the limitations of data from public health practice such as the limitations of surveillance data.

While publication in CDC-specific journals was considered a highly valued accomplishment by focus group participants, many felt there were significant barriers to publication, including a lack of positive feedback, concern that national journals are not interested in local data, frustration that available journals may not be relevant to their specific subject area, and frustration with the lack of clarity for the review process and timeline. Additionally, there were some misconceptions revealed, including the beliefs that MMWR only publishes outbreak reports and that there must be a CDC co-author. These barriers and misconceptions indicate the need for additional training or educational materials to assist in the submission and publication process to CDC-specific journals.

Across all CDC-specific publications, individuals with an academic appointment submitted ($p<0.0001$) and published ($p<0.0001$) manuscripts significantly more than those without such an appointment. Access to literature, writing resources, designated writing time, and more experience in writing and publishing may explain why academically-linked epidemiologists more often publish in CDC-specific journals than their non-academic counterparts.

Job Duties and Writing Expectations

Epidemiologists at all levels of seniority and across all agencies agree they feel responsible for disseminating scientific findings both within their agency and to the public. However, participants said their job descriptions lack explicit requirement to produce written reports of any kind. Employers should explicitly state scientific writing as part of job descriptions if required to better communicate expectations. Additionally, appropriate resources should be allocated to support these activities.

Barriers to Writing and Publication

Focus group participants emphasized that individual barriers greatly influence writing and publishing. They noted specifically a lack of technical writing training and experience, lack of confidence in analytic methodology, and poor understanding of journal formatting requirements limit scientific writing at an individual level. The SWA did not reveal that participants felt individual level barriers greatly influenced writing outcomes but rather pointed to the influence of organizational factors.

Organizational barriers were found by both focus group participants and SWA respondents to be a primary barrier to scientific writing. Among barriers identified by both samples were absence of technical writers and editors, lack of designated time for writing, unclear intra-agency approval processes, general lack of workplace encouragement for writing, and an increasing demand for consumable data beyond peer-reviewed publications. Providing resources to overcome these barriers is necessary to increase scientific writing capacity and lessen the burden of publication.

While the SWA identifies that access to peer-reviewed literature may not be as much of a burden as originally thought, the ECA indicates that access to peer-reviewed literature varies significantly by program area. These results indicate that access to peer-reviewed literature is still a barrier to many and providing access to peer-reviewed literature may assist in the scientific writing process.

Facilitators of Scientific Writing

The focus groups identified facilitators of successful writing among participants who previously submitted to peer-reviewed journals. Facilitators included supportive organizational culture, technical writing support, editors and communication specialists, access to peer-reviewed literature, university partnerships, and the option for electronic publishing. Additionally, funding requirements may encourage publication of public health practice data that otherwise might not be widely shared.

While the SWA did not find that a lack of individual knowledge or experience impedes writing outcomes, a wealth of knowledge and experience may contribute to an agency's ability to build scientific writing capacity through peer mentorship programs and establishment of an organizational culture supportive of writing activities.

Desired Writing Resources

SWA participants described a range of resources and training opportunities they believed would help improve scientific writing culture in public health agencies. Dedicated time for writing, text templates for submitting to specific publications, and access to mentoring networks would greatly aid scientific writing practices. Participants also voiced interest in training opportunities targeting the following topics: identifying the appropriate journal to which to submit, technical writing skills, navigating the various formats of peer-reviewed journals, and grant writing. Training opportunities should be competency-based to provide consistent training tailored to applied epidemiologists.

Focus group and SWA participants also felt resources targeted at public health agencies themselves might help improve writing capacity. Best practice models of writing resources and supportive organizational culture are needed to help guide agencies towards designing more writing-supportive environments. Increasing scientific writing capacity at health departments may increase the number of publications produced by public health practitioners that can expand the applied public health practice evidence-base.

Limitations

The SWA has several limitations. The assessment design aimed to have a representative sample of epidemiologists based on years of experience identified from the 2013 ECA. While the quota was obtained, there were 151 additional responses that were not included because they did not fit in the sampling quota structure. Geographic information was not collected and prevented the identification of where the largest disparities of resources are located.

Recommendations

For staff at all local, territorial, tribal, state, and federal public health agencies, the assessment results provide meaningful takeaways that can help improve scientific writing capacity and successful publications from individuals and organizations. Leaders at public health agencies are encouraged to inform their workplace procedures and organizational strategies with these insights. All applied public health epidemiologists are encouraged to take initiative in seeking scientific writing opportunities and raising awareness of their importance among colleagues. Three categories of recommendations encompass key priorities based on insights from the SWA.

Empowering Individuals

- **Additional resources are needed to improve scientific writing** processes at state and local public health agencies. A toolkit of resources to empower epidemiologists to increase their scientific writing capacity and to navigate the scientific writing process would increase the quality and quantity of publications submitted by applied epidemiologists. Ultimately, improvement in writing quality may increase the number of publications accepted by peer-reviewed and CDC-specific journals, and expand the evidence-base of public health beyond the academic setting.
- **Provide competency-based training** in standard scientific writing for all applied epidemiologists. Competency-based training is an ideal method to establish standard knowledge regardless of one's prior education or experience across an agency. A minimum amount of scientific writing training can increase the overall agency capacity for scientific writing activities.
- **Reward and recognize scientific writers.** Successful scientific writing should have agency visibility. Reward those with successful scientific publications through public recognition within the agency and, when appropriate, engage community media. Recognition of success and other incentives provides positive reinforcement and illustrates the organization's commitment to contributing to the public health evidence base.

Organizational Culture

- **Encourage and support scientific writing in the workplace** in order to produce more publications of higher quality. Workplace culture highly influences scientific writing ability. A workplace demonstrates their support for scientific writing endeavors by providing dedicated time for writing, access to peer-reviewed literature, access to editors and technical writers, training opportunities, and templates.
- **Explicitly include scientific writing activities in job descriptions**. Specific duties of creating publications for the general public, peer-review and CDC-specific publications should be outlined. Appropriate resources should be allocated to support these activities, including dedicated hours per week for scientific writing. Scientific writing activities listed as a specific job duty should be rooted in competencies and used as an indicator for performance evaluations.

- **Establish peer networks** to facilitate the sharing of institutional knowledge and experience with regards to writing. Encourage peer-to-peer learning between senior and junior epidemiologists as well as those who have successfully published with those who have minimal scientific writing experience. Leveraging existing employee experience may increase the organizational capacity for scientific writing activities without incurring much expense.
- **Train the workforce on publication requirements and processes.** Increasing the knowledge of submission requirements and the publication process among epidemiologists could yield more journal publications. Additional training should be prioritized for epidemiologists who do not hold an academic position.
- **Increase clarity in the internal review process** in order to manage expectations and act as a mechanism of accountability. A structured review process within a given agency provides a clear structure and expectations for both authors and those providing approval, especially surrounding the ambiguity of timeframes and appropriate parties to involve.

Community Partnerships

- **Collaborate with local, state and national partners** to increase organizational opportunities for scientific writing. Building community partnerships can develop a network of resources, provide access to the peer-reviewed literature, and increase visibility of novel data captured by applied epidemiologists.

Conclusion

Epidemiological analyses and research are a foundational part of public health practice. Sharing this information throughout the public health community is paramount to identifying and improving best practices and informing future work. Establishing effective support structures for epidemiologists to successfully write and publish their findings should be a major priority of public health agencies of all levels of government. While different experiences, training, and environments can have a tremendous influence on a single epidemiologist's writing output, there are common facilitators and barriers to scientific writing success shared by all. Addressing such barriers by providing training opportunities to individuals, writing and publishing resources, and suggestions for agencies to help them support their epidemiologists' writing practices will ensure the ongoing dissemination and use of invaluable public health information.

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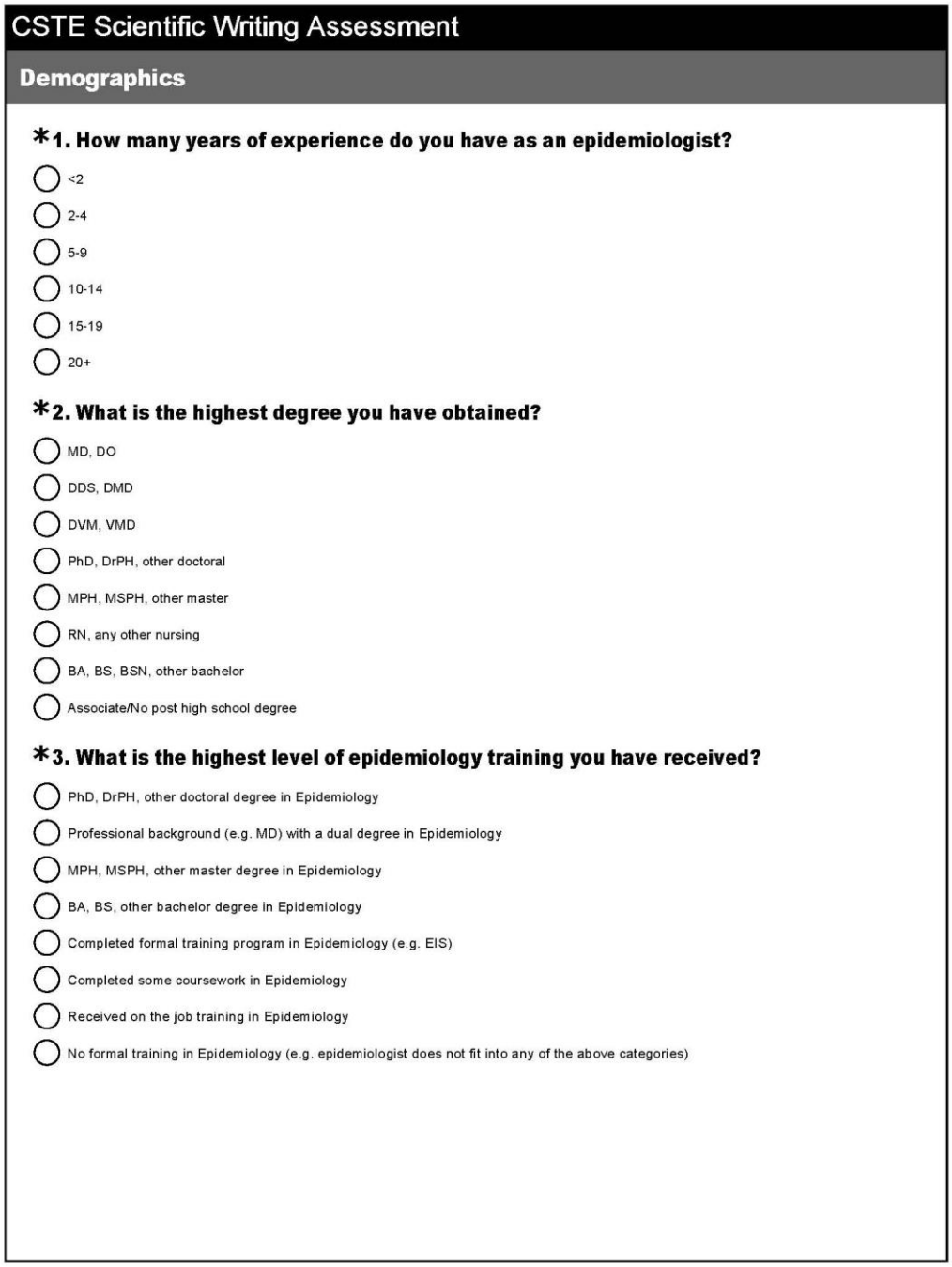
Appendix

Appendix A - Pilot Scientific Writing Assessment



CSTE Scientific Writing Assessment

Demographics

***1. How many years of experience do you have as an epidemiologist?**

- ◯ <2
- ◯ 2-4
- ◯ 5-9
- ◯ 10-14
- ◯ 15-19
- ◯ 20+

***2. What is the highest degree you have obtained?**

- ◯ MD, DO
- ◯ DDS, DMD
- ◯ DVM, VMD
- ◯ PhD, DrPH, other doctoral
- ◯ MPH, MSPH, other master
- ◯ RN, any other nursing
- ◯ BA, BS, BSN, other bachelor
- ◯ Associate/No post high school degree

***3. What is the highest level of epidemiology training you have received?**

- ◯ PhD, DrPH, other doctoral degree in Epidemiology
- ◯ Professional background (e.g. MD) with a dual degree in Epidemiology
- ◯ MPH, MSPH, other master degree in Epidemiology
- ◯ BA, BS, other bachelor degree in Epidemiology
- ◯ Completed formal training program in Epidemiology (e.g. EIS)
- ◯ Completed some coursework in Epidemiology
- ◯ Received on the job training in Epidemiology
- ◯ No formal training in Epidemiology (e.g. epidemiologist does not fit into any of the above categories)

CSTE Scientific Writing Assessment

***4. What best describes your place of employment?**

- ◯ Local Public Health Agency
- ◯ State Public Health Agency
- ◯ Tribal Public Health Agency
- ◯ Federal Agency
- ◯ Academia
- ◯ Non-Governmental Organization
- ◯ Other (please specify)

***5. Do you have an appointment at a university or academic center?**

- ◯ Yes
- ◯ No

***6. Are you a CSTE member?**

- ◯ Yes
- ◯ No

Scientific Writing Experience

Please refer to the definitions below for the following key terms when selecting your responses for this assessment.

- A **report** is defined as any informational language made with the intention of relaying specific information.
- A **manuscript** is defined as a compilation of original scientific findings that is often submitted to a journal.
- **Public use** refers to a report or manuscript published or distributed through any route that is not a peer reviewed publication.
- **Peer reviewed journals** are publications that require submitted content to be reviewed by experts in the field, who are not a part of the editorial staff, prior to publication. Some examples of peer reviewed journals include *American Journal of Public Health*, *American Journal of Epidemiology*, *Journal of Epidemiology* and *Community Health* .
- **CDC publications** include the *Morbidity and Mortality Weekly Report* (MMWR), *Emerging Infectious Diseases* (EID), and *Preventing Chronic Disease* (PCD).

CSTE Scientific Writing Assessment

***7. Please indicate which areas you have had experience in (Check all that apply).**

- ☐ Creating a report or manuscript for public use (not peer reviewed)
- ☐ Submit a report or manuscript to peer reviewed journals
- ☐ Publish a report or manuscript in peer reviewed journals
- ☐ Submit a report or manuscript to CDC publications (MMWR, EID, PCD)
- ☐ Publish a report or manuscript in CDC publications (MMWR, EID, PCD)
- ☐ None

***8. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for <u>public use (not peer reviewed).</u>**

	None	Beginner	Intermediate	Advanced	Expert
Writing a report for public use	◯	◯	◯	◯	◯
Editing a report public use	◯	◯	◯	◯	◯
Submitting a report for public use	◯	◯	◯	◯	◯
Knowledge to prepare a report for public use	◯	◯	◯	◯	◯

***9. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for <u>peer reviewed journals.</u>**

	None	Beginner	Intermediate	Advanced	Expert
Writing a report or manuscript for publication	◯	◯	◯	◯	◯
Editing a report or a manuscript publication	◯	◯	◯	◯	◯
Submitting a report or manuscript for publication	◯	◯	◯	◯	◯
Knowledge to prepare a report or manuscript for publication	◯	◯	◯	◯	◯

***10. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for <u>CDC publications (MMWR, EID, PCD).</u>**

	None	Beginner	Intermediate	Advanced	Expert
Writing a report or manuscript for publication	◯	◯	◯	◯	◯
Editing a report or a manuscript publication	◯	◯	◯	◯	◯
Submitting a report or manuscript for publication	◯	◯	◯	◯	◯
Knowledge to prepare a report or manuscript for publication	◯	◯	◯	◯	◯

CSTE Scientific Writing Assessment

Agency Support of Scientific Writing

***11. What types of scientific writing are expected as part of your job duties? (Select all that apply.)**

- [ ] Internal agency use: reports, summaries, program documentation, grant writing
- [ ] General public (external of agency): Reports, summaries, media (websites), plain language documents for the general public
- [ ] Publications for peer review
- [ ] Publications for CDC (*Morbidity and Mortality Weekly Report* (MMWR), *Emerging Infectious Diseases*, *Preventing Chronic Disease*)
- [ ] None
- [ ] Other (please specify)

CSTE Scientific Writing Assessment

***12. Please rate (on a scale from strongly disagree to strongly agree) to what extent you agree with the below statements.**

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
I desire to pursue writing activities	○	○	○	○	○
I desire to pursue publishing activities	○	○	○	○	○
My place of employment encourages writing and publishing activities	○	○	○	○	○
My place of employment has a structured process for reviewing and approving publications	○	○	○	○	○
I have access to peer reviewed literature	○	○	○	○	○
I have previous writing experience	○	○	○	○	○
I have previous publishing experience	○	○	○	○	○
I am allowed time at work for writing and publishing activities	○	○	○	○	○
My colleagues and I collaborate as peer editors	○	○	○	○	○
The peer review publication process is easy	○	○	○	○	○
The publication process for MMWR is easy	○	○	○	○	○
My writing and/ or publishing activities are tied to funding requirements	○	○	○	○	○
My writing and/ or publishing activities are tied to legislative requirements	○	○	○	○	○
My writing and/ or publishing activities are tied to career development requirements	○	○	○	○	○

CSTE Scientific Writing Assessment

***13. Please rate the following items in terms of how much of a barrier (if any) each is to writing and publishing in your current position on a scale from not a barrier to a major barrier.**

	N/A	Not a barrier	Minor barrier	Moderate barrier	Major barrier
Time	○	○	○	○	○
Access to peer reviewed literature	○	○	○	○	○
Knowledge on how to submit to a peer-reviewed publication	○	○	○	○	○
Lack of previous writing experience	○	○	○	○	○
Lack of previous publishing experience	○	○	○	○	○
Agency clearance or approval process	○	○	○	○	○
Lack of encouragement or agency support	○	○	○	○	○
Costs associated with submitting an article for publishing	○	○	○	○	○

***14. How does your agency currently support your writing and publishing activities? Check all that apply.**

	Resources currently provided
Dedicated time	○
Access to peer reviewed literature	○
Access to technical writers	○
Access to editors	○
Training opportunities to improve scientific writing and publishing skills	○
Journal club to encourage publishing and peer review	○
Access to a mentoring network of experienced writers from state and local health departments	○
Templates for general publications	○
Best practice examples of supportive organizational culture to foster writing and publishing activities	○
Best practice models of supportive writing resources within health departments	○
None	○
Other	○

Other (please specify)

CSTE Scientific Writing Assessment

***15. What resources would improve your ability for scientific writing and publishing? Check all that apply.**

	Desired resources
Dedicated time	◯
Access to peer reviewed literature	◯
Access to technical writers	◯
Access to editors	◯
Training opportunities to improve scientific writing and publishing skills	◯
Journal club to encourage publishing and peer review	◯
Access to a mentoring network of experienced writers from state and local health departments	◯
Templates for general publications	◯
Best practice examples of supportive organizational culture to foster writing and publishing activities	◯
Best practice models of supportive writing resources within health departments	◯
None	◯
Other	◯

Other (please specify)

***16. What training would improve your ability for scientific writing and publishing? (Select all that apply.)**

- ☐ Technical writing
- ☐ Grant writing
- ☐ Plain language writing
- ☐ Editing
- ☐ Navigating the various formats of peer reviewed journals
- ☐ Knowing what journal to submit to
- ☐ Responding to reviewers' comments
- ☐ None
- ☐ Other (please specify)

17. If CSTE created a toolkit to assist epidemiologists with writing and publications challenges, what tool/s would you want to see included?

CSTE Scientific Writing Assessment

18. Please list and describe any resources you use or are available to support writing and publishing activities that would be beneficial for sharing with others.

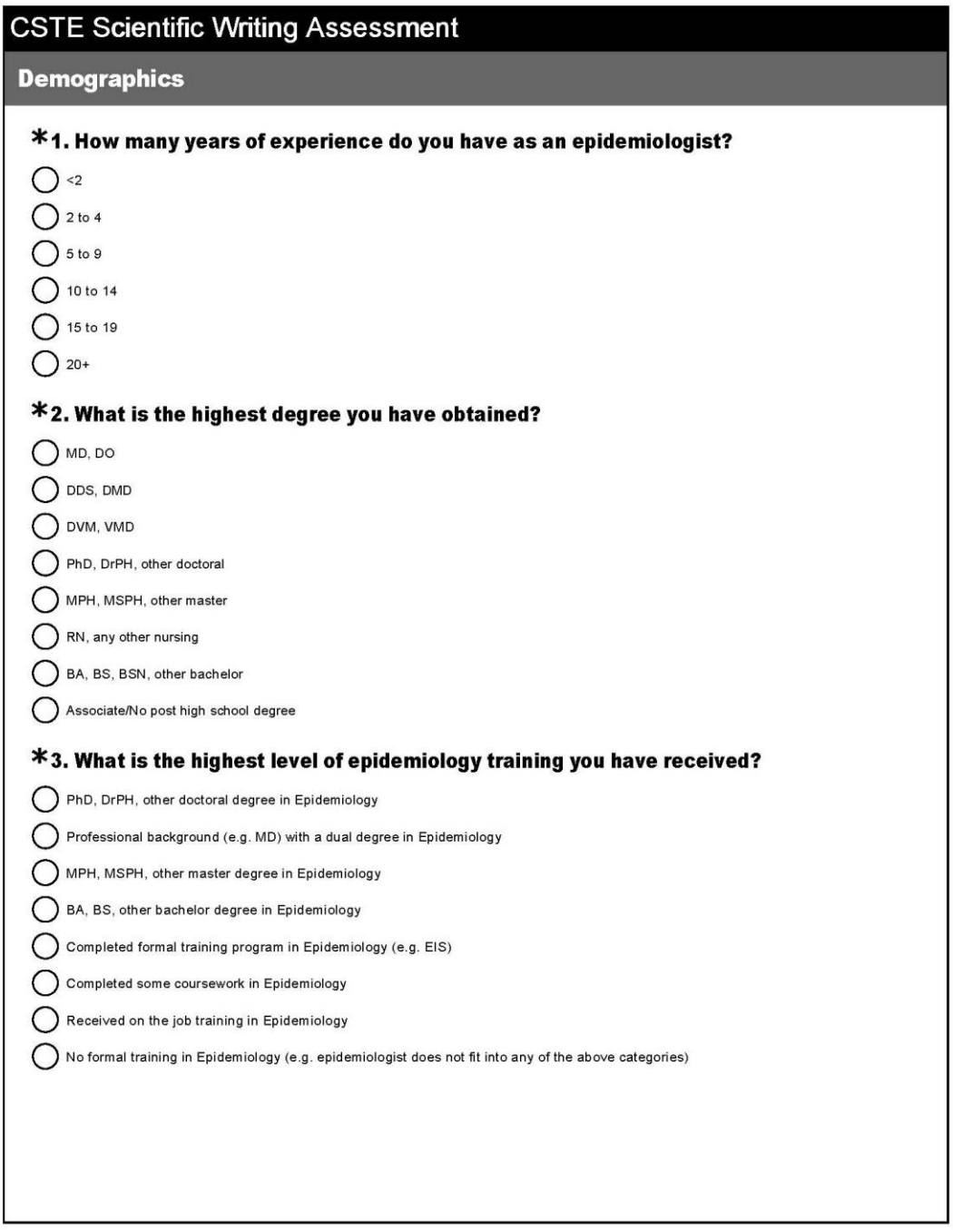
Pilot Questions

19. Were there any questions that you found confusing and think should be reworded? Please specify question number and topic.

20. Would you like to comment on this assessment? What should have been covered but was not? What was covered but not in enough depth? What was covered that could have been omitted? Is there anything else you would add to the assessment?

Thank you for completing our assessment. If you have questions about this assessment, please contact Jessica Pittman (jpittman@cste.org).

Appendix B - Scientific Writing Assessment Instrument



CSTE Scientific Writing Assessment

Demographics

***1. How many years of experience do you have as an epidemiologist?**

- ◯ <2
- ◯ 2 to 4
- ◯ 5 to 9
- ◯ 10 to 14
- ◯ 15 to 19
- ◯ 20+

***2. What is the highest degree you have obtained?**

- ◯ MD, DO
- ◯ DDS, DMD
- ◯ DVM, VMD
- ◯ PhD, DrPH, other doctoral
- ◯ MPH, MSPH, other master
- ◯ RN, any other nursing
- ◯ BA, BS, BSN, other bachelor
- ◯ Associate/No post high school degree

***3. What is the highest level of epidemiology training you have received?**

- ◯ PhD, DrPH, other doctoral degree in Epidemiology
- ◯ Professional background (e.g. MD) with a dual degree in Epidemiology
- ◯ MPH, MSPH, other master degree in Epidemiology
- ◯ BA, BS, other bachelor degree in Epidemiology
- ◯ Completed formal training program in Epidemiology (e.g. EIS)
- ◯ Completed some coursework in Epidemiology
- ◯ Received on the job training in Epidemiology
- ◯ No formal training in Epidemiology (e.g. epidemiologist does not fit into any of the above categories)

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CSTE Scientific Writing Assessment

***4. What best describes your place of work?**

- ◯ Local Public Health Agency
- ◯ State Public Health Agency
- ◯ Tribal Public Health Agency
- ◯ Federal Agency
- ◯ Academia
- ◯ Non-Governmental Organization
- ◯ Other (please specify)

***5. Do you have an appointment at a university or academic center?**

- ◯ Yes
- ◯ No

***6. Are you a CSTE member?**

- ◯ Yes
- ◯ No

CSTE Scientific Writing Assessment

Scientific Writing Experience

Please refer to the definitions below for the following key terms when selecting your responses for this assessment.

- A **report** is defined is defined as any document that is developed with the intention of relaying specific information and may include technical writing such as fact sheets or instruction manuals.
- A **manuscript** is defined as a compilation of original scientific findings that is often submitted to a journal and may include abstracts.
- **Public use** refers to a report or manuscript published or distributed through any route that is not a peer reviewed publication.
- **Peer reviewed journals** are publications that require submitted content to be reviewed by experts in the field, who are not a part of the editorial staff, prior to publication. Some examples of peer reviewed journals include *American Journal of Public Health*, *American Journal of Epidemiology*, *Journal of Epidemiology* and *Community Health* .
- **CDC specific publications** include the *Morbidity and Mortality Weekly Report* (MMWR), *Emerging Infectious Diseases* (EID), and *Preventing Chronic Disease* (PCD) that may or may not be peer reviewed.

***7. Please indicate which areas you have had experience in (Check all that apply).**

- ☐ Creating a report or manuscript for public use (not peer reviewed)
- ☐ Submit a report or manuscript to peer reviewed journals
- ☐ Publish a report or manuscript in peer reviewed journals
- ☐ Submit a report or manuscript to CDC specific publications (MMWR, EID, PCD)
- ☐ Publish a report or manuscript in CDC specific publications (MMWR, EID, PCD)
- ☐ None

***8. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for <u>public use (not peer reviewed).</u>**

	None	Beginner	Intermediate	Advanced	Expert
Writing a report for public use	○	○	○	○	○
Editing a report for public use	○	○	○	○	○
Submitting a report for public use	○	○	○	○	○
Knowledge to prepare a report for public use	○	○	○	○	○

CSTE Scientific Writing Assessment

***9. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for peer reviewed journals.**

	None	Beginner	Intermediate	Advanced	Expert
Writing a report or manuscript for publication	○	○	○	○	○
Editing a report or a manuscript for publication	○	○	○	○	○
Submitting a report or manuscript for publication	○	○	○	○	○
Knowledge to prepare a report or manuscript for publication	○	○	○	○	○

***10. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for CDC specific publications (MMWR, EID, PCD).**

	None	Beginner	Intermediate	Advanced	Expert
Writing a report or manuscript for publication	○	○	○	○	○
Editing a report or a manuscript publication	○	○	○	○	○
Submitting a report or manuscript for publication	○	○	○	○	○
Knowledge to prepare a report or manuscript for publication	○	○	○	○	○

CSTE Scientific Writing Assessment

Agency Support of Scientific Writing

***11. What types of scientific writing are expected as part of your job duties? (Select all that apply.)**

- [ ] Internal agency use: reports, summaries, program documentation, grant writing
- [ ] General public (external of agency): Reports, summaries, media (websites), plain language documents for the general public
- [ ] Publications for peer review
- [ ] Publications for CDC (*Morbidity and Mortality Weekly Report* (MMWR), *Emerging Infectious Diseases*, *Preventing Chronic Disease*)
- [ ] None
- [ ] Other (please specify)

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CSTE Scientific Writing Assessment

***12. Please rate (on a scale from strongly disagree to strongly agree) to what extent you agree with the below statements.**

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
I desire to pursue writing activities	○	○	○	○	○
I desire to pursue publishing activities	○	○	○	○	○
My place of work encourages writing and publishing activities	○	○	○	○	○
My place of work has a structured process for reviewing and approving publications	○	○	○	○	○
I have access to peer reviewed literature	○	○	○	○	○
I have previous writing experience	○	○	○	○	○
I have previous publishing experience	○	○	○	○	○
I am allowed time at work for writing and publishing activities	○	○	○	○	○
My colleagues and I collaborate as peer editors	○	○	○	○	○
The peer review publication process is easy	○	○	○	○	○
The publication process for MMWR is easy	○	○	○	○	○
My writing and/ or publishing activities are tied to funding requirements	○	○	○	○	○
My writing and/ or publishing activities are tied to legislative requirements	○	○	○	○	○
My writing and/ or publishing activities are tied to career development requirements	○	○	○	○	○

CSTE Scientific Writing Assessment

***13. Please rate the following items in terms of how much of a barrier (if any) each is to writing and publishing in your current position on a scale from not a barrier to a major barrier.**

	N/A	Not a barrier	Minor barrier	Moderate barrier	Major barrier
Time	○	○	○	○	○
Access to peer reviewed literature	○	○	○	○	○
Knowledge on how to submit to a peer-reviewed publication	○	○	○	○	○
Lack of previous writing experience	○	○	○	○	○
Lack of previous publishing experience	○	○	○	○	○
Agency clearance or approval process	○	○	○	○	○
Lack of encouragement or agency support	○	○	○	○	○
Costs associated with submitting an article for publishing	○	○	○	○	○

***14. How does your agency currently support your writing and publishing activities? Check all that apply.**

	Resources currently provided
Dedicated time	○
Access to peer reviewed literature	○
Access to technical writers	○
Access to editors	○
Training opportunities to improve scientific writing and publishing skills	○
Journal club to encourage publishing and peer review	○
Access to a mentoring network of experienced writers from state and local health departments	○
Templates for general publications	○
Best practice examples of supportive organizational culture to foster writing and publishing activities	○
Best practice models of supportive writing resources within health departments	○
None	○
Other	○

Other (please specify)

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CSTE Scientific Writing Assessment

***15. What resources would improve your ability for scientific writing and publishing? Check all that apply.**

	Desired resources
Dedicated time	◯
Access to peer reviewed literature	◯
Access to technical writers	◯
Access to editors	◯
Training opportunities to improve scientific writing and publishing skills	◯
Journal club to encourage publishing and peer review	◯
Access to a mentoring network of experienced writers from state and local health departments	◯
Templates for general publications	◯
Best practice examples of supportive organizational culture to foster writing and publishing activities	◯
Best practice models of supportive writing resources within health departments	◯
None	◯
Other	◯

Other (please specify)

***16. What training would improve your ability for scientific writing and publishing? (Select all that apply.)**

- ☐ Technical writing
- ☐ Grant writing
- ☐ Plain language writing
- ☐ Editing
- ☐ Navigating the various formats of peer reviewed journals
- ☐ Knowing what journal to submit to
- ☐ Responding to reviewers' comments
- ☐ None
- ☐ Other (please specify)

CSTE Scientific Writing Assessment

17. If CSTE created a toolkit to assist epidemiologists with writing and publications challenges, what tool/s would you want to see included?

18. Please list and describe any resources you use or are available to support writing and publishing activities that would be beneficial for sharing with others.

CSTE Scientific Writing Assessment

Thank you for completing our assessment. If you have questions about this assessment, please contact Jessica Pittman (jpittman@cste.org).

Appendix C - Scientific Writing Assessment Data Frequency Tables

Q1. How many years of experience do you have as an epidemiologist?		
	N	%
<2	69	17.42
2 to 4	69	17.42
5 to 9	91	22.98
10 to 14	81	20.45
15 to 19	35	8.84
20+	51	12.88
TOTAL	396	100.00

Q2 . What is the highest degree you have obtained?		
	N	%
MD, DO	42	10.61
DDS, DMD	0	0.00
DVM, VMD	15	3.79
PhD, DrPH, other doctoral	62	15.66
MPH, MSPH, other master	251	63.38
RN, any other nursing	2	0.51
BA, BS, BSN, other bachelor	22	5.56
Associate/No post high school degree	2	0.51

Q3. What is the highest level of epidemiology training you have received?		
	N	%
PhD, DrPH, other doctoral degree in Epidemiology	46	11.62
Professional background (e.g. MD) with a dual degree in Epidemiology	11	2.78
MPH, MSPH, other master degree in Epidemiology	235	59.34
BA, BS, other bachelor degree in Epidemiology	1	0.25
Completed formal training program in Epidemiology (e.g. EIS)	20	5.05
Completed some coursework in Epidemiology	57	14.39
Received on the job training in Epidemiology	21	5.30
No formal training in Epidemiology (e.g. epidemiologist does not fit into any of the above categories)	5	1.26

Q4. What best describes your place of work?		
	N	%
Local Public Health Agency	93	23.48
State Public Health Agency	252	63.64
Tribal Public Health Agency	3	0.76
Federal Agency	26	6.57
Academia	7	1.77
Non-Governmental Organization	5	1.26
Other (please specify)	10	2.53

. Q4. Other (please specify)
Comment:
Corps officer with IHS and regional tribal health board
Federal assignee to State Health Department
Hospital
Occupational health clinic
Private
Private consulting firm
Self-employed
State Public Health Laboratory
State non-Public Health Agency
this is a new position

Q5. Do you have an appointment at a university or academic center?		
	N	%
Yes	75	18.94
No	321	81.06

Q6. Are you a CSTE member?		
	N	%
Yes	244	61.62
No	152	38.38

Q7. Please indicate which areas you have had experience in (Check all that apply).		
	N	%
Creating a report or manuscript for public use (not peer reviewed)	357	90.15
Submit a report or manuscript to peer-reviewed journals	265	66.92
Publish a report or manuscript to peer-reviewed journals	233	58.84
Submit a report or manuscript to CDC-specific publications (MMWR, EID, PCD)	149	37.63
Publish a report or manuscript to CDC-specific publications (MMWR, EID, PCD)	133	33.59
None	18	4.55

Q8. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for public use (not peer reviewed).					
	None	Beginner	Intermediate	Advanced	Expert
	N (%)	N (%)	N (%)	N (%)	N (%)
Writing a report for public use	17 (4.29)	25 (6.31)	125 (31.57)	175 (44.19)	54 (13.64)
Editing a report for public use	18 (4.55)	29 (7.32)	123 (31.06)	161 (40.66)	65 (16.41)
Submitting a report for public use	24 (6.06)	33 (8.33)	119 (30.05)	164 (41.41)	56 (14.14)
Knowledge to prepare a report for public use	13 (3.28)	29 (7.32)	115 (29.04)	177 (44.70)	62 (15.66)

Q9. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for peer reviewed journals.					
	None	Beginner	Intermediate	Advanced	Expert
	N (%)	N (%)	N (%)	N (%)	N (%)
Writing a report or manuscript for publication	51 (12.88)	105 (26.52)	118 (29.80)	94 (23.74)	28 (7.07)
Editing a report or a manuscript for publication	54 (13.64)	102 (25.76)	118 (29.80)	87 (21.97)	35 (8.84)
Submitting a report or manuscript for publication	74 (18.69)	106 (26.77)	103 (26.01)	83 (20.96)	30 (7.58)
Knowledge to prepare a report or manuscript for publication	45 (11.36)	102 (25.76)	120 (30.30)	98 (24.75)	31 (7.83)

Q10. Please rate (on a scale from none to expert) your experience in each area below related to scientific writing for CDC-specific publications (MMWR, EID, PCD).					
	None	Beginner	Intermediate	Advanced	Expert
	N (%)	N (%)	N (%)	N (%)	N (%)
Writing a report or manuscript for publication	170 (42.93)	73 (18.43)	70 (17.68)	70 (17.68)	13 (3.28)
Editing a report or a manuscript for publication	167 (42.17)	75 (18.94)	72 (18.18)	67 (16.92)	15 (3.79)
Submitting a report or manuscript for publication	186 (46.97)	71 (17.93)	63 (15.91)	64 (16.16)	12 (3.03)
Knowledge to prepare a report or manuscript for publication	154 (38.89)	83 (20.96)	68 (17.17)	77 (19.44)	14 (3.54)

Q11. What types of scientific writing are expected as part of your job duties? (Select all that apply.)		
	N	%
Internal Agency Use: reports, summaries, program documentation, grant writing	371	93.69
General public (external of agency): Reports, summaries, media (websites), plain language documents for the general public	360	90.91
Publications for peer review	178	44.95
Publications for CDC (Morbidity and Mortality Weekly Report (MMWR), Emerging Infectious Diseases, Preventing Chronic Disease)	117	29.55
None	12	3.03
Other (please specify)	27	6.82

Q11. Other please specify:
Comment
Guidance documents for local health departments, healthcare providers, healthcare facilities
training manuals, presentations, planning documents
NA
PSA Audio recordings
not explicitly specified; however I feel all of these are part of my responsibilities
Scientific technical documents, protocols, manuals
Technical guidance for public health partners, including healthcare and laboratory entities
Grant applications
I am continuing to collaborate with my former agency and [local university] on manuscripts.
Regional editor & editorial board member for international journals
publications for CD Briefs ([state] dept public health's equivalent to MMWR)
Grant writing/preparation
health education materials
Guidance for use by public health professionals and healthcare workers
publications for State Epidemiology Newsletter
Book Chapters, online training modules for university centers
weekly e-newsletter
My supervisor is a control freak and will not let anyone do the tasks listed in their work plan. We are over-qualified data entry persons.
Outreach Publications
Fact sheets for public & providers, other state agencies
Writing for health care professionals (health alerts, etc)
Abstracts for submission to conferences
Reports for external agencies; e.g., Advisory Councils and Boards, healthcare associations, professional associations,
fact sheets, industry alerts, presentations, guidances, technical manuals
State Public Health Bulletins, Health Alerts to Providers
Newsletters, Provider Information with analytics
Policy briefs; White Papers

Q12. Please rate (on a scale from strongly disagree to strongly agree) to what extent to agree with the below statements.					
	Strongly Disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
	N (%)	N (%)	N (%)	N (%)	N (%)
I desire to pursue writing activities.	5 (1.26)	8 (2.02)	47 (11.87)	179 (45.20)	157 (39.65)
I desire to pursue publishing activities.	5 (1.26)	12 (3.03)	62 (15.66)	154 (38.89)	163 (41.16)
My place of work encourages writing and publishing activities.	17 (4.29)	45 (11.36)	87 (21.97)	151 (38.13)	96 (24.24)
My place of work has a structured process for reviewing and approving publications.	26 (6.57)	88 (22.22)	75 (18.94)	136 (34.34)	71 (17.93)
I have access to peer-reviewed literature.	25 (6.31)	51 (12.88)	37 (9.34)	151 (38.13)	132 (33.33)
I have previous writing experience.	3 (0.76)	12 (3.03)	28 (7.07)	197 (49.75)	156 (39.39)
I have previous publishing experience.	25 (6.31)	67 (16.92)	42 (10.61)	142 (35.86)	120 (30.30)
I am allowed time at work for writing and publishing activities.	21 (5.30)	70 (17.68)	106 (26.77)	132 (33.33)	67 (16.92)
My colleagues and I collaborate as peer editors.	26 (6.57)	71 (17.93)	86 (21.72)	147 (37.12)	66 (16.67)
The peer review publication process is easy.	30 (7.58)	150 (37.88)	173 (43.69)	37 (9.34)	6 (1.52)
The publication process for MMWR is easy.	29 (7.32)	75 (18.94)	264 (66.67)	22 (5.56)	6 (1.52)
My writing and/ or publishing activities are tied to funding requirements.	64 (16.16)	124 (31.31)	113 (28.54)	81 (20.45)	14 (3.54)
My writing and/ or publishing activities are tied to legislative requirements.	72 (18.18)	140 (35.35)	121 (30.56)	56 (14.14)	7 (1.77)
My writing and/ or publishing activities are tied to career development requirements.	35 (8.84)	105 (26.52)	114 (28.79)	110 (27.78)	32 (8.08)

Q13. Please rate the following items in terms of how much a barrier (if any) each is to writing and publishing in your current position on a scale from not a barrier to a major barrier.					
	N/A	Not a barrier	Minor barrier	Moderate barrier	Major barrier
	N (%)	N (%)	N (%)	N (%)	N (%)
Time	3 (0.76)	41 (10.35)	84 (21.21)	114 (28.79)	154 (38.89)
Access to peer-reviewed literature	5 (1.26)	191 (48.23)	90 (22.73)	61 (15.40)	49 (12.37)
Knowledge on how to submit a peer-reviewed publication	6 (1.52)	181 (45.71)	131 (33.08)	47 (11.87)	31 (7.83)
Lack of previous writing experience	9 (2.27)	232 (58.59)	99 (25.00)	43 (10.86)	13 (3.28)
Lack of previous publishing experience	10 (2.53)	181 (45.71)	110 (27.78)	67 (16.92)	28 (7.07)
Agency clearance or approval process	22 (5.56)	111 (28.03)	136 (34.34)	83 (20.96)	44 (11.11)
Lack of encouragement or agency support	12 (3.03)	155 (39.14)	99 (25.00)	73 (18.43)	57 (14.39)
Costs associated with submitting an article for publishing	41 (10.35)	146 (36.87)	109 (27.53)	67 (16.92)	33 (8.33)

Q14. How does your agency currently support your writing and publishing activities? Check all that apply.		
Resources currently provided	**N**	**%**
Dedicated time	111	28.03
Access to peer-reviewed literature	223	56.31
Access to technical writers	40	10.10
Access to editors	81	20.45
Training opportunities to improve scientific writing and publishing skills	76	19.19
Journal club to encourage publishing and peer review	45	11.36
Access to a mentoring network of experienced writers from state and local health departments	59	14.90
Templates for general publications	45	11.36
Best practice examples of supportive organizational culture to foster writing and publishing activities	29	7.32
Best practice models of supportive writing resources within health departments	28	7.07
None	97	24.49
Other	14	3.54

Q14. Other please specify (of those who checked Other):
Dedicated time not provided to write manuscripts, but I can use any time remaining after completing other job requirements. This doesn't leave much time for writing/submitting/editing manuscripts.
Responsibilities for composing written reports are not an aspect of my current responsibilities where I work.
Publications standards manual for format of our agency publications
partnership with public health school
Encouragement from supervisor to write reports (not peer-reviewed articles)
Access to data, free reign to choose many topics of research
Our Health Department has created an "Epi-Club" for sharing among epidemiologists. This forum could serve has a journal club.
If I submit any work for publication in peer-reviewed journals, it's on my own time & own dime.
Informal Federal Agency Co-worker mentors
Am now self-employed with complete resources; previously worked for state health where my writing was valued but not specifically supported.
access to experienced publishers
I started my own journal club for my team.

Q15. What resources would improve your ability for scientific writing and publishing? Check all that apply.		
Desired Resources	**N**	**%**
Dedicated time	258	65.15
Access to peer-reviewed literature	148	37.37
Access to technical writers	174	43.94
Access to editors	183	46.21
Training opportunities to improve scientific writing and publishing skills	247	62.37
Journal club to encourage publishing and peer review	160	40.40
Access to a mentoring network of experienced writers from state and local health departments	209	52.78
Templates for general publications	212	53.54
Best practice examples of supportive organizational culture to foster writing and publishing activities	219	55.30
Best practice models of supportive writing resources within health departments	237	59.85
None	23	5.81
Other	22	5.56

Q15. Other please specify (of those who checked Other):
It is not considered to be important for trauma system development
Just general support for writing
Citation software (e.g., Endnote)
A second me. My program is short-staffed
Tips on how to choose a journal for publication in order to increase chances of publication
A more transparent clearance process
access to administrative staff who can competently assemble the final product
Biostatistician within health department
Management support
I like writing my own papers but I appreciate having other epidemiologists read my work and critique it
Streamlined review and approval processes
university collaboration; culture change in state government; relief from administrative barriers and responsibilities that take away from time to work on science
Ability to attend national meetings at employer's expense; funding for submitting manuscript to open access journals
online tools for managing reference (e.g. endnote)
Culture of higher-level staff automatically getting authorship at expense of those who actually do the work
Supporting agency staff in being lead authors on manuscripts, instead of handing them over to EIS officers or CSTE fellows
Simple, streamlined and consistent approval/clearance process
Basically we are underfunded for our routine, basic public health surveillance activities, so my time for writing is therefore limited.
Being allowed to do my job, think, learn, and take on responsibility. My supervisor does not allow it.

Q16. What training would improve your ability for scientific writing and publishing? (Select all that apply.)		
	N	%
Technical writing	239	60.35
Grant writing	181	45.71
Plain language writing	104	26.26
Editing	160	40.40
Navigating the various formats of peer-reviewed journals	225	56.82
Knowing what journal to submit to	245	61.87
Responding to reviewers' comments	172	43.43
None	33	8.33
Other	10	2.53

Q16. Other please specify:
How to write and edit efficiently
identifying work that would be a good topic for publication
Remedial grammar
peer mentoring / experience from states that have been successful in building a better environment for writing
online tools for managing references (e.g. endnote)
My role as North America Regional Editor for one of Emerald's journals includes helping less experienced authors.
What and when to publish, how-to
Training my boss on how to appropriately manage staff and delegate.
I don't really need training in these areas but would like to have more opportunities to write.
how to make publication ready graphics

Q17. If CSTE created a toolkit to assist epidemiologists with writing and publications challenges, what tool/s would you want to see included?
recommended/suggested navigation through process, examples
Format for the document; Guidelines for what should be included; Samples
How to organize and deliver subject matter Promoting your work through nay-sayers
templates, samples of writings that are often accepted, where to get funding to publish in journals
A list of epi journals that would include scope of interest, cost of publishing, impact factor, instructions to author link, & average duration of time from submission to publication.
Definitely something to help navigate the various formats of peer-reviewed journals. When I was working on my thesis (as a publishable paper), it was craziness to re-format to fit the needs of each journal. Assistance with how to use reference would be helpful too.
Information regarding what constitutes research and requires IRB approval. A general overview of the process of publication. Information regarding who should be included as authors and author placement. What should be considered if an outbreak, case-report, or analytic study is to be submitted (necessary methods to improve the chance of publication in a peer-reviewed journal)
Editing skills, outline of articles and what to include in each section, how to develop an idea for a paper, types of journal for different areas of epidemiology (not just those areas funded by CDC)
Resources including best practices, templates, do's and don'ts lists, etc. Anything that will make the process easier.
1. Best ways to start writing peer-reviewed manuscripts 2. Info on general public, plain language writing. Not many people do this right. 3. How to decide if my project is publication worthy
journal manuscript and MMWR (CDC) templates for general epi topics
reference material
Primarily pointers or step by step recommendations for how to publish/write a manuscript. List of recommended quality peered-reviewed journals to submit manuscripts.
Guidelines for structure and perhaps some sample templates for various types of publications. For example, if we all wrote outbreak reports using the same style they'd be easier to read through. Templates sound boring but they save time, which would be key for me, and help the writers not forget important elements.
List of epidemiology journals with the highest impact factors
Typical steps in creating and submitting a manuscript to a journal; how to effectively work with

coauthors; how to select coauthors; how to track references
templates
A document showing the requirements of commonly used journals pertaining to chronic disease surveillance; Translation of technical statistical phrases into plain language for public use
Templates, lists of suggested journals to publish in organized by subject, links to submission guidelines i.e. CDC.
Might be helpful if CSTE created a resource bank of members interested in collaborating on publications related to specific topics.
Information regarding citing references, obtaining funding for publication, grants to obtain journal access, technical writing guide
templates and checklists. editing guidelines
Templates and guides for the various journals.
I would like to see more technical writing tools and tools from content areas listed in #15 in order to build capacity among junior level staff. At the moment, the majority of the technical and/or peer-review writing is done solely by me due to lack of experience among MPH-level staff.
Specific journal information - what they publish, procedures to get published.
info on some of the major journals and what types of articles they accept. I am not familiar with many journals. I am able to request specific articles through the state library ,but don't read or browse entire journals to have a feel for their content. Also a link to that journals info for submittes
Reference management software training
Guidance on: selecting an appropriate journal for submission, how to start up and maintain a journal club, and foster a work environment supportive writing/publishing
Templates would be useful.
Software for maintaining references. I have published using APA format, and although I have used other styles, I would love to see a style guide for style(s) that epi journals expect.
Templates, a variety of tips, encouragement - we should publish more!
Yes
not sure
How to get access to journals for free, where to submit articles
I come from a pure research background. I would be very interested in knowing what a epi from a LHD could publish if we don't conduct pure research.
Templates
Website
Tips on writing discussion section
Editing guides, technical writing guides, suggestions for effective manuscript format and writing techniques
How to carve out time; how to evaluate what's worth writing about.
First the idea of a toolkit is a great idea! Some good examples of publications, throughout the planning, data collection, writing, editing, and publishing steps. A listing of journals with information about their mission, scientific focus plus information on what they are looking for in a submission.
Insider guide to CDC communications - for example specific style or grammar points How to work across departments / agencies How to set aside time and build interest in your agency for paper writing
Templates; guidance on navigating the submission process
The ones listed above.

Tools specific for revising documents and materials for various audiences would be helpful (ex grant to technical/peer review to plain language).
Conducting research; Understanding what is marketable; Editing work; Building Collaborations.
Templates, resources, classes.
Recognition that each journal/agency is very different (formatting and citing documents will vary). NO monoliths!!!
Usage Guide, Examples, etc
Basic review of grammar and style.
example templates, any help would be appreciated
training opportunities, free access to a wide range of journals
From my experience, I see junior epidemiologists struggle with organization of text, best ways of presenting results, tying conclusions to stated results of study, and presentation of data (tables, figures). A checklist on how to prepare a manuscript for for submission and locating the best journal for the paper content would also be helpful.
basic formatting and grammar references; guide to development of a 'academic health department;' guides specifically designed for leadership, including epi leadership and administrative leadership
Templates
templates how to submit materials for publications where to submit materials for publications
Scientific literature access
Examples of peer-reviewed articles (both good and bad examples), access to editors and mentors, online training sessions,
Listing of various journals with description of types of publications accepted.
Reference list of journals/publications which are most likely to be interested in preventive medicine, public health, and epidemiology topics. Reference list should include a summary of the focus areas for the journal.
Guidelines, templates,
Links to authorship guidelines from CDC publications such as MMWR and EID that are read by many epidemiologists and public health experts, and do not charge for publication.
Toolkit on formatting references to each journal specific requirements
How to identify publication-worthy features of our program and our work.
I am not an experienced writer, so I'm not sure what I would need.
templates for things like submission cover letters, responses to peer review (including responding when you don't agree or to difficult questions),
The inclusion of how to submit an article, how to determine its relevance to a specific journal; and how to create a collaborative team within the state/region to accomplish publishing peer-reviewed articles.
FAQs, best practices, list of resources and available training programs
Need ideas about how to use surveillance data to create a publication.
Elliott Churchill at CDC has great overviews of the publishing process, and summary materials. You might want to consult with her. Overview of the process How to choose a journal Structure of a journal article How to respond to reviewer comments General writing resources (for clarity, conciseness, grammar)
A network of experienced/mentors who would be willing to co-author/collaborate on writing papers/reports/etc. There are many opportunities to co-publish on similar topics across states and in collaboration with the CDC.
A toolkit that includes writing and publishing for all types of journals and reports.

Recorded webinar course on technical writing; listing of major epidemiology publications and general guidance on the types of articles to submit to each; written tips for plain language writing and editing; templates for the various formats of peer-reviewed journals; written tips for grant writing.
Not sure due to varied journal's requirements
Technical writing tools; format of a published paper; templates
Various challenges for editing, plain language writing, grant writing and technical writing. Knowing what journals to submit to based on content Portal or list of editors or experts to ask questions while I am writing.
Noted above in the survey; maybe a toolkit on line, how to have citations listed in the proper format; it is confusing how to write footnotes and references and bibliographies.
Information about the publication process (i.e. how to get started, how and who to submit publications to, etc.), the editing process, CDC rules for writing a MMWR article
Formatting templates, guideline for reviewers' comments
Tools on technical writing
The biggest challenge is meeting the article length requirements which are usually extremely concise.
Pearls of advice on writing articles
Work with those who already have created resources for guiding science writing (e.g. ASM, Emerald, etc.) rather than reinvent the wheel. Add help regarding what makes a story attractive to various audiences, not just help on writing skills per se.
Templates for use, technical assistance, best practices (success stories from other state and local health departments).
Knowing what journal to submit to; example time frames for the process of creating an article, which parts of the article to write first
All of the resources listed above! I think the main barrier though is lack of agency support/encouragement for staff to pursue writing & publication opportunities.
list of peer-reviewed journals and open access venues for publishing with info on what articles the journals accept; publication timelines by journal (some are quite slow) formats and editing tips; how to format tables, graphs and illustrations for manuscript submission
I have personally received some valuable mentorship on responding to reviewers; comments, but it is not part of many formal programs, so I think others would likely benefit from some tips on appropriate responses. I would also like some formal training on grant writing.
strengths and weaknesses of impact scores, how to be concise in communications, guide to common table formatting
examples of journal articles vs. other peer/editorial reviewed documents
Templates/guidance for writing cover letters and responses to editor comments Access to a software for Works Cited/Bibliography formats A forum for people to share questions and suggestions about publishing
Best practices for stages of manuscript development including submission. Resources for ethical collaborations. Journal selection.
how to encourage leadership in a local health department to recognize value and importance to writing and publishing ...even at local level
Writing and publishing are not an important functions of my current position, any tool would be useful to me.
Navigating journal formats and choosing a journal
Not sure I would use it.
Templates would be tremendously useful, as would extra trainings (or links to good trainings that can

be followed).
I am familiar with it, but I think from above understanding and navigating various formats of peer-reviewed journals, and responding to reviewers' comments. I've seen poor examples of the latter which may have negative affects on manuscript acceptance.
Best practices for setting up manuscript sections. Do's and don'ts. Guidance for publishing.
Additional templates for scientific writing.
CDC publication templates/outlines, suggested manuscript outlines, suggested timelines, estimates of time needed to complete each type of publication, document describing value added through dissemination of findings (reports, manuscripts, etc.) to encourage support from agency leadership
peer and professional assistance
1. Proportion of submitted manuscripts accepted for publication by journal 2. EndNote (commercial citation/bibliographic software) styles for common public health journals (many existing EndNote styles for specific journals are not actually accurate) 3. Word templates for common journal formats for submission 4. How to create publication-quality figures/graphs in Excel, SAS, DeltaGraph, etc.
Journals to publish to; Specifications for technical writing
templates
template with suggested format for specific journals; best practice examples; courses to teach basic principles or scientific writing
access to journals
Templates for writing articles
Checklist of key steps in the process of writing and submitting a manuscript for publication and samples or templates of reviewer criteria and of acceptable manuscript formats.
templates for publications, writing resources, development of a mentoring program
Recommendations showing which kinds of manuscripts are desired by which journals. The whole submit/revise/resubmit/accept/reject process with multiple journals to find the "right" one gets frustrating.
A list of agencies, including state departments of health, who endorse and commit to using the toolkit.
Everything in both of Elliott Churchill's courses. The basic stuff from Tufte (not more recent/esoteric topics) focusing on the ratio of ink to information in figures and tables.
Probably should start at a beginning level, so basic scientific writing, with examples and specific info on MMWR etc.
A guide to commonly published-in journals and what articles they look for, audience, and time frame from submission to publications
Not familiar enough to know
basic requirements as to what should be included in a well written report or manuscript
-Plain language writing, communicating health information to the general public, creating fact sheets and reports to the general public & media, etc.
Templates, resource websites, do's and don'ts of submitting to journals
Presentation of data (in graphs and tables) and interpretation of statistical analyses.
Templates used by other agencies. List of do's/don'ts re: writing reports. Using APA to cite statistics, e.g. independent t-test. Do you include the mean, SD, and count or just the mean and SD? Do you include df and p-value or not?
areas in #16, technical stds widely accepted in PH writing (ie, I often go to an MMWR to see how something is handled, but is that the right std?)
Information, ideas, and examples on what we can do. How to work with in a system (state govt) that

punishes or fires you for making progress or thinking independently. How to navigate absolutely atrocious, inaccurate, and incomplete data (home rule makes this impossible). What to do when you know your data is 100% inaccurate but you cannot force others to provide the data in the first place and your funding depends on you reformatting and regurgitating the (inaccurate) data to the CDC.
What key elements should be included in an abstract and article for best chances of publication
Templates are always helpful FAQs Resource lists (online resources)
Formats required for various peer-reviewed journals and steps needed to take
A reference table which summarizes submission requirements and content layout for various journals.
-sample cover letters to editors -tips on reviewing articles for publication
tips for improving chances of publication what do reviewers look for? what do they hate
1. Review of the most appropriate peer-reviewed journals for ID related topics; 2. Compare and contrast the requirements by above journals
Specific information on journals to decide which journal to submit to and how.
Methods for systematic review/approval of reports and publications Guidelines how to determine authorship Guidelines on what should be included in the conclusion and discussion sections of a scientific report, especially for outbreaks.
Any and all -- possibly tools related to question 16
Guidance and templates. It would also be helpful to have some training on peer reviewing articles. I do this all the time, but have never been taught anything about it.
Instruction in regard to format and journal scope (ie the common journals that epidemiologists would seek publication in and the types of articles typically accepted in those journals)
Trainings on scientific writing and the brevity required in publishing. CSTE links to peer-reviewed journals
Technical writing tips, resources for cover letter writing, understanding where an article should be submitted, navigating the peer review process
Include best practices for writing abstracts, posters, and scientific presentations (similar to EIS course type of information.)
Examples Mentors Training on reference management (e.g., End Note), literature searching Tips from Editors of publications like MMWR, EID, PCD
How-to for writing for peer-reviewed pubs Plain language tools/links Flow chart for getting epi work disseminated - what's the right end-product, or should it be a suite of end-products - what's good for reaching different audiences - infographics, fact sheets, reports, peer-reviewed pubs
Templates are helpful. Some of the guidance that is offered above for training, such as how to select a journal. Things like examples of how to waive page charges, etc.
Access to peer-reviewed journal articles, templates for publications
Tools to incorporate writing in performance plans or into the organizational culture. How to best prepare a research proposal for IRB review, some of the nuances of using surveillance data in research that is conducted by health departments. For those staff who are grant funded, there may be limited opportunities to publish, so examples of trying to link publications with grant deliverables would be useful for some health departments, Tools on where to find free access journals, etc.
Benefits of being published (how it looks for the state)
Writing, editing and technical support resources and/or groups that one can join to gain experience in manuscript writing and publishing of relevant information.
Maybe something on plain language writing for audiences at different grade levels or something related to different grant requirements/formats for different agencies (e.g., NIH, CDC, NASA, NSF).
A guide for choosing which journal publish in

How to take real world topics and get them published, opportunities for publishing, call for papers
formats for the various journals
How to encourage my LHD to devote time to writing training and why this is important. How to decide if a project is worthy of writing up and what journal to send it to. An email address to request a mentor when writing up a project. I have no one to help
formatting, standards for reporting data
Best practices for submitting manuscripts to CDC and non-CDC journals; how do I decide which journal(s) may be best to submit to;
Quick reference/FAQs on formatting, key points to remember, suggested journals, resources by topic, etc.
Step-by-step guide to publishing, includes a guide for agency leaders to understand importance and process of allowing epi staff to submit articles.
Examples of well-developed and appropriated illustrated technical manuals. List of journals, impact factors, ease of "getting in", and suggestions for manuscript preparation for each of these journals.
I would like to know more what is involved in submitting for publication for MMWR, Emerging Infectious Disease, Preventing Chronic Disease. How to best display graphs and tables would be wonderful as well.
An easy to follow, step-by-step approach to scientific writing for new writers. I think having the guide laid out in a pithy, bulleted format would be best.
Best practices for visual display of information; how to write concisely, yet clearly; scientific nomenclature standards for publication; grammar (e.g., when to use "less" vs. "fewer")
I always find examples to be very helpful, so examples of different types of publications. I always getting started writing is the hardest part. If there are helpful tips on the best way to approach scientific writing, I would find that helpful. Templates would be awesome too.
Best practices, templates, examples, helpful hints/tips
Template for general publication. Also, research versus evaluation publication.
The process of publication, both technical and plain writing skill development, a network of peers/mentors, trainings on scientific writing, journal club is also a great idea.

Q18. Please list and describe any resources you use or are available to support writing and publishing activities that would be beneficial for sharing with others.
All from my academic appointment: courses in grant writing, the peer-review process
ATSDR Public Health Assessment Manual EPA resources
This is probably too much for ask but if CSTE had a truly professional-quality editing service I'd use it. Because I am one of the better writers and have high standards for what is published by our program, I end up spending way too much time editing others' work. Any suggestions for or help in time-saving would be appreciated!
Academic appointment gives me access to free peer-reviewed literature and other scientists/writers - we need to foster academic-practice partnerships more.
AMA resource manual
virtual editor
I am willing to serve as a peer-mentor for scientific manuscript writing.
End Notes
I have a print copy of The Gregg Reference Manual, which is also available in an online version for ease of searching for a specific topic or question. But different journals use different reference manuals, and they sometimes conflict. It would help to have one accepted standard. The DOH even has its own standards instead of using a nationally respected writing authority.
I do not have any
Using Endnote software for citations (in-text and creating the reference list). I have found this software invaluable because one can change from AMA to APA with a click of a button. In addition, with Endnote X7, some features can be customized for example abbreviations of journal names or full names of journal names on the reference list. The only downside is that the free version (Endnote Web) is not as robust as the desktop version I have not used other freeware like such as Mendeley or Zotero, therefore, it would be nice to hear from others who have used them.
EndNote software
References: National Institutes of Health, U.S. National Library of Medicine http://www.nlm.nih.gov/bsd/uniform_requirements.html NLM Catalog Journal referenced in the NCBI databases http://www.ncbi.nlm.nih.gov/nlmcatalog/journals Key Words: Medical Subject Headings http://www.nlm.nih.gov/mesh/meshhome.html
National Library of Medicine digital library program.
Not fully engaged in the activity at this time.
Pictoral, images and audio software programs
Manuals of style; Strunk and White
We are currently compiling a library of resources on an internal internet site for use by staff.
refworks
Writing mentors
The Chicago Manual of Style; AMA Style Manual; The Elements of Style by E. B. White
I would be happy to support or mentor others.
[Our state] participates in the Public Health Information Access Project of the National Library of Medicine/New England Region which provides staff free access to over 150 journals and other library databases. The project provides us with wonderful resources, all for free.
Access to experienced mentors that could give those with little experience guidance.
MEDLINE with full text; access to journals specific to my field of work; TA assistance in grant opportunities
Show what's not acceptable as to avoid inputting that into the reports/manuscripts.

online software for managing references (such as endnote)
colleagues
Collaborating with others
we post our publications on our agency's website [website URL]. I find CDC MMWR extremely difficult to publish in; they appear to be interested only on infectious disease focus area, which is a narrow view of public health in the 21st century for that publication. Their notes in the field is narrowly focused as well. Because of this we do not even consider submitting our manuscripts to CDC/ MMWR anymore; we go to other journals/publications that are more inviting.
Editing
Seasoned staff available to mentor junior employees
I am happy to support others by reviewing their publications as long as it's not a huge time commitment. It would be outside work hours.
STROBE guidelines
Too numerous to list (includes Robert Day's books (from ASM publishing program), Emerald's on-line resources, various style guide books from University of Chicago Press & elsewhere, dictionaries, thesaurus, various on-line search engines, etc...
I have none available at my agency.
Journal/Author Name Estimator: http://www.biosemantics.org/jane/index.php
Access to literature. Internal Publication Committee.
None. I am just starting.
CSTE webinar on manuscript writing
[local] Dept. of Health: Data communication guidelines. Writing conventions. For guiding journal selection: http://www.biosemantics.org/jane/
time
End Note
Access to full journal articles via a university's electronic library system that would otherwise have to be purchased or requested through interlibrary services has been a huge time saver.
Working with state partners on publishing activities for events that happen locally
"Successful Scientific Writing: Step by Step" by Paul Z. Siegel, MD, MPH
please see Q 17
National Journal clubs within topic areas organized and staffed by CSTE
Weekly (reviewed and edited) newsletter.
After you get out of school there aren't any.
Federal Plain Language Guidelines, Rev. 1, May 2011. plainlanguage.gov AMA Manual of Style or The Chicago Manual of Style
1. Access to university resources 2. Subscribe some critical journals relevant with your work 3. Frequently review peer-reviewed journals, MMWR 4. Practice writing for local newsletter for professional groups by selecting appropriate topics.
Once again the NLM digital library has been very helpful.
I use RefWorks for citations. I can access it for free through my graduate university. It creates citations directly from PubMed pages and stores all your references for each different project in a different folder on their website. Then you install the RefWorks Write Cite toolbar in Microsoft Word (which is very simple and free) and you can insert citations stored on the web into your paper, and it will automatically renumber them as you add new references in, and it instantly creates your bibliography in whatever format you want (they have American Journal of Epidemiology) with the touch of one button. I've saved countless hours with this website/toolbar.

Mendeley or article organizing software
This may be an over generalization, but I think that many younger people do not have good writing skills because they've never been taught them. In my view, you can only become a good writer by reading a lot and writing a lot. Having more experienced people around to edit and offer suggestions is critical.
google scholar, pubmed, consult with SMEs
CDC Library has courses on reference management software, literature searching MMWR will give presentations at CSTE meeting and could do periodic "roadshows" or "webinars" for State and Local Health Departments to facilitate publication.
CSTE webinar done by Sam Posner in 2013 on submitting to peer-reviewed journal.
We created a publication club in [our state] to promote publications. We conducted several training series to teach people how to publish and to have group writing sessions with assigned mentors. We also have a journal club. I think this was only moderately successful because I don't think all people are cut out for scientific writing in our agencies. The epis and lab PhD's are certainly the most successful and so I think these types of activities supported by CSTE, because they would be targeted to epis, would be more successful. But our experience offering to all public health staff did not result in many additional publications. The people who are already comfortable publishing would have published anyway even without the publication club.
Google Scholar (I access this site because we don't have comprehensive access to library services at my local health department.) I also use the NACCHO toolbox.
http://www.biosemantics.org/jane/
I used to refer to the following publications and books for guidance: Bourne PE. Ten simple rules for getting published. PLoS Computational Biology 2005; 1(5): e57. Bourne PE and Chalupa LM. Ten simple rules for getting grants. PLoS Computational Biology 2006; 2(2): e12. Day, RA. "How to Write and Publish a Scientific Paper." 5th Edition. NIH grants website used to have a whole series of articles for young investigators on grant writing and also provided grant examples on their website.
Mendeley reference manager
Mimi Zeiger's book: Essentials of writing Biomedical Research Papers, 2nd Edition. It is a fabulous resource.
EndNote helps a lot by making it easy to switch formats throughout the writing process, helps to keep literature and citations organized for introduction and discussion.
Applicable style sheets - e.g., APA; MLS; AMA; etc.
There is a very good Coursera course on scientific writing (by a Stanford U professor). JAMA Manual of Style CDC's Style Guide
Many of our grants provide funds and resources for writing/publication.

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