Chapter 8: New Ways of Reading: Making Sense of Complex Biomedical Writing Using Existing Guidelines

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Abstract: Technical communication scholarship often seeks to critique or intervene in powerful medical and scientific discourses. Yet differences in what Carolyn Miller referred to as the communal rationality of scholarly fields may require new ways of reading to make such work possible. This chapter examines guidelines for regulatory documentation that make visible the intellectual framing of biomedical research. Regulatory documentation includes an array of materials that health authorities and government agencies use to authorize and evaluate biomedical research as well as the technical aspects of developing and manufacturing medicinal products. Publicly available guidelines illustrate how those who compose and evaluate regulatory documentation constitute communal rationality within their various specialty areas. Technical communication scholars can use such guidelines to examine the strengths and limitations of the discourses prescribed therein. The author outlines the current place of regulatory documentation relative to technical communication scholarship and offers methods for interpreting these complex discourses using theoretical framing from rhetorics of science, health, and medicine.

Keywords: scientific writing, medical writing, regulatory documentation, rhetoric of science

A Discursive Disjunction

A recent exchange in *Technical Communication Quarterly* highlights a disjunction between technical communication scholarship and regulatory documentation, a legally mandated and complex biomedical discourse. Cathleen O'Connell (2020), a pharmacist and pharmaceutical product labelling expert, corrected Molly Kessler and S. Scott Graham (2018) regarding a newly minted acronym, PDL (prescription drug labels), that conflated multiple discrete documents intended for distinct expert and nonexpert audiences, as legally mandated worldwide. O'Connell sees Kessler and Graham (2018) as failing to identify accurately how prescription drug labelling documentation creates material danger for patients who diverge from prescribed practice, missing sites for authentic rhetorical intervention. O'Connell notes that many dangers to patients from the labelling that accompanies prescriptions arise from product naming conventions (p. 92), but she does not articulate the rhetorical stakes of her corrections in detail. Kessler

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and Graham's (2020) somewhat nonplussed response to O'Connell reiterates the value of their initial argument, which hints that the very fact that "PDL" looked like a logical category to two highly educated adults is likely a problem requiring some rhetorical intervention. The authors "applaud" (O'Connell, 2020 p. 92) and "thank" (Kessler & Graham, 2020 p. 2) each other, yet seem unable to engage in a genuine exchange. This type of well-meaning but stalled communication is one impetus for the current chapter.

Technical communication studies have paid relatively little attention to biomedical regulatory documentation like the product labelling in the above example. Regulatory documentation generally refers to the many different materials that must be submitted to government agencies for review to authorize medical research studies or to market drug products. My essay "Principles of Technical Communication and Design Can Enrich Writing Practice in Regulated Contexts" (2018) outlines how technical communication knowledge can be brought to bear on two specific regulatory genres: lay summaries of clinical study results and integrated discussions of benefits and risks identified across clinical studies. One shortfall of that paper is a lack of grounding in the then-existing technical communication scholarship, such as Gregory Cuppan and Stephen Bernhardt's (2012) work on reviewer practices for clinical study reports. A subsequent entry, co-authored with Michael J. Klein (2019), situates a brief but complex element of the clinical study report, the patient safety narrative, as a form of intercultural communication. We suggest that recognizing our own limits and identifying the scope of potential interventions can help technical communicators better understand how to communicate across these discourses. I expand on that idea here and call on technical communication and rhetoric scholars to consider biomedical regulatory documentation as representing a series of different intellectual cultures, each of which constitutes itself rationally, as described in its accepted guidelines.

Beliefs among technical communications scholars about positivist discourses in the sciences may impede true exchange with practitioners of regulatory discourses in biomedicine, the term used to describe the various scientific fields that ultimately contribute to drug development and medical practice. Since Carolyn Miller (1979) presented the humanistic rationale for technical communication, questions lingered regarding the "communal rationality" (p. 617) of scientific discourses, which may appear to present only "contextless logic" (p. 617). Charles Bazerman (1988) critiqued as irresponsible a structured scientific format—introduction, methods, results, discussion—that leaves readers to piece information together themselves. Bazerman values the sort of genre conventions Alan Gross (2019) later linked to a scientific sublime, exhibiting elegant writerly characteristics largely absent from structured scientific prose, which makes specific demands on readers. In an essay on layered literacies in technical communication pedagogy (DeTora, 2020a), I cite Allen Renear and Carole Palmer (2009), who describe scientific reading as "simultaneously to search, filter, scan, link, annotate, and analyze fragments of content" (p. 828) from many different texts. Sam

Hamilton (2014), a biomedical writing expert, also describes this type of reading as routine for regulatory reviewers. O'Connell (2020), too, writes in this register, organizing information about multiple documents into tables to identify their distinct audiences and contents. A further point of note, as I argued in the *International Journal of Clinical Practice* (2017), is that biomedical discourses routinely use the same word (like *safety* or *labelling*) to mean different things, even within a single sentence, which further compounds reading demands. I contend that these differences do not signal a lack of communal rationality and that technical communication scholars may need new ways of reading to effect real change in, or even comprehend, these complex discourses.

What technical communication scholars might understand as the rhetorical stakes of regulatory documentation are made visible in guidance documents prepared by and for biomedical writers and reviewers. I see these guidelines as forming a metadiscourse—a way of writing about writing—that can provide useful information to technical communication scholars, not the least of which is an insight into the communal rationality of biomedical discourses. For instance, these guidelines are a means of differentiating the audiences and conditions of production that O'Connell (2020) saw Kessler and Graham (2018) mistakenly conflating. Increased knowledge about structured documentation and its production and reception, including settings like the Food and Drug Administration (FDA) advisory committees that Graham and coauthors (2018) examine, may be gained by reading these existing guidelines. In fact, the metadiscourses of biomedical experts, their thinking and writing about what makes good documentation, ultimately reveal multiple sites for technical communication and rhetorical interrogation.

Regulatory Documentation of Clinical Studies

Much biomedical research is regulated by law (in the US, Title 21 of the Code of Federal Regulations [C.F.R.] applies to the FDA), and permission must be obtained to begin a clinical study or to market a medicinal product, which is a broad term used to describe drugs, vaccines, and biologicals used to prevent or treat diseases or other physical conditions. In this context, regulatory documentation must be submitted to a health authority for review before, during, and after each clinical study and when seeking to market a medicinal product (see Table 8.1). Health authorities are groups like the FDA in the United States or the European Medicines Agency, which are charged by governments to help protect public health by regulating medicinal products. Clinical studies generally test an investigational medicinal product in human volunteers and contribute to an overall clinical program designed to support specific claims made (or intended to be made) on a product's labelling. Scientific evidence collected via laboratory and animal research, which also must be documented, is used to justify the initial clinical studies of any product (see Benau, 2020; DeTora, 2020b; Hamilton, 2014; O'Connell, 2020). As observed by groups like the International Committee of

Medical Journal Editors (ICMJE; 2019), results of clinical studies should also be published in a peer-reviewed biomedical journal.

Biomedical research generates all the scientific information needed to evaluate a medicinal product, and regulatory documentation extends to into various intellectual domains, including chemistry, cell culture and other laboratory research studies, clinical studies, and statistical meta-analyses (Benau, 2020; DeTora, 2020b; Wood & Foote, 2009). Scientific subject matter experts in these fields often have only a passing familiarity with regulatory documentation or publication requirements, which creates a need for experts to educate authors and reviewers (see Battisti et al, 2015; Clemow et al, 2018; Cuppan & Bernhardt, 2012; Hamilton, 2014; Winchester, 2017). Regulatory and medical writers are called on to fill this need, and the intellectual demands of their work has continually increased over time (see Benau, 2020; Clemow et al, 2018; Gillow, 2015; Hamilton, 2014; Winchester, 2017). In fact, the complexity of individual regulatory documents, like those listed in Table 8.1, means that medical and regulatory writing professionals may specialize in one specific documentation type, scientific discipline, and/or therapeutic specialty area (see Benau, 2020; Clemow et al, 2018; DeTora, 2020b; Hamilton, 2014).

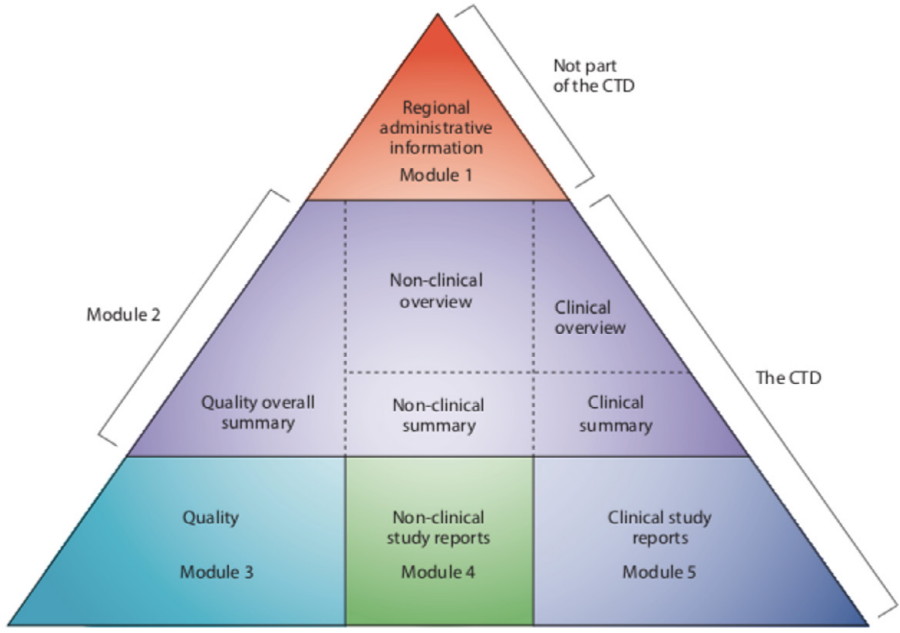
Each of the documents listed in Table 8.1 must meet specific legal requirements, some of which apply worldwide. However, regulations explain what must be done, not how to do it. Hence, guidelines are published by groups such as the International Council on Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH)[1], the International Committee of Medical Journal Editors (ICMJE), the Regulatory Affairs Professional Society (RAPS), and other experts (Benau, 2020; DeTora, 2020b; Hamilton, 2014; ICMJE, 2019; Wood & Foote, 2009). These guidelines are a rich source of information about how biomedical audiences view and understand not only documentation but also the biomedical research endeavor more generally. Health authorities also require complex submissions, like the Investigational New Drug application (IND) in the US or the Investigational Medicinal Product Dossier (IMPD) in the EU, which mandate a certain organization so that reviewers can find the information they need. The most common format for these filings is described in ICH M4 (R4) Organisation of the Common Technical Document for the Registration of Pharmaceuticals for Human Use (2016; see Figure 8.1, Table 8.2). The Common Technical Document (CTD) is organized hierarchically so that critical discussions are supported by reference documents of increasing granularity. Although, on occasion, a dossier will be built around a single pivotal study to meet a specific medical need (see DeTora, 2020b), usually each study report is a more minor element of a dossier. Next, I will discuss the disjunction between technical communication scholarship on clinical study reports and how these reports are understood within regulatory discourses.

1. The ICH guidelines are reproduced verbatim in various national guidance documents with different effective dates; thus, citations tend to include the ICH alphanumeric designation, a convention hereafter followed in this chapter.

Table 8.1. Clinical studies: An overview of some key documentation steps

Document	Function
Study protocol	Outlines the rationale and details the methods for conducting a clinical study
Investigator's brochure	Reviews known information about an experimental medicinal product, such as chemistry, as well as effectiveness and safety in animals and humans
Background packages and meeting outcomes or minutes	Set out the goals (or outcomes) of meetings with health authorities, key questions, and any background information needed to allow regulatory evaluation
Investigational new drug application (IND)/Investigational medicinal product dossier (IMPD)	Supports a request to investigate or continue investigating a product for a specific indication in part by organizing the documentation that reports and explains all known information about a product into defined formats so that health authorities can approve or deny permission to start or continue clinical studies.
Trial and results registries	Publicly provide information about the design of clinical studies seeking participants, their locations, and eligibility criteria for participants and/or the results of completed trials
Annual reports and periodic updates	Provide required safety or other information to a health authority during a specified period
Expedited safety report	Notifies health authorities of certain adverse events, deaths, and hospitalizations, within a specified period (e.g., 24 or 72 hours)
Amendments	Describe changes to a study protocol, investigator's brochure, or other previously completed document
Statistical analysis plans	Specifies planned statistical analyses and their methods
Study report	Briefly reviews the study methods and rationale and presents the results
Lay summary	Presents a high-level overview of study design and results in plain language intended for the general public
Product labelling	Characterizes a product, its approved conditions of use and storage, and presents key clinical data in a complete context for specific audiences of prescribers, regulators, and patients. Comprises patient package inserts and other types of documents.
Marketing application	Requests permission to market a medicinal product for a specific use. These dossiers collect and organize the documentation that reports and explains all known information about a product into a defined format so that health authorities can approve or deny permission to market the product.
Publications	Communicate study designs or findings in peer-reviewed journals or professional meetings

References: US 21 CFR § 314.50; Benau, 2020; Consultation, 2018; DeTora, 2020b; EU 536/2014; Gillow, 2015; ICH E3, 1995; ICH E6 (R2), 2016; ICH E9, 1998; 1CMJE, 2019; O'Connell, 2020; Wood & Foote, 2009



The CTD triangle. The Common Technical Document is organized into five modules. Module 1 is region specific and modules 2, 3, 4 and 5 are intended to be common for all regions.

Figure 8.1. The Common Technical Document triangle as shown in ICH M4 (R4). Image is in the public domain.

Table 8.2. Specific Common Technical Document components that present clinical study results

Document name (Guideline)	Source documents	Functions
Clinical Overview (ICH M4E [R2])	▪ Clinical Summary ▪ Nonclinical Overview ▪ Quality Overall Summary ▪ Clinical study reports Published literature	Provides an overall critical analysis and interpretation that justifies the proposed label indications and explains whether the benefits of the investigational product outweigh the anticipated and known risks in the intended setting, based on the expert opinion of the authors
Clinical Summary (ICH M4E [R2])	▪ Clinical study reports ▪ Supplemental statistical analyses Integrated summaries ▪ Data tables of combined analyses across studies ▪ Published literature	Summarizes all studies and analyses done in the clinical development program, which may include combined statistical analyses across multiple studies but not opinion or interpretation

Document name (Guideline)	Source documents	Functions
Integrated summaries (US 21 C.F.R. § 314.50 (d)(5)(v))	▪ Clinical study data ▪ Statistical analysis plan	Summarize statistical analyses and other examinations of data across different studies or a clinical program based on U.S. Food and Drug Administration requirements
Clinical study reports (ICH E3)	▪ Clinical study data ▪ Study protocol(s ▪ Statistical analysis plan ▪ Investigator and site information ▪ Published literature ▪ Investigator brochure	Briefly review the rationale and methods for a clinical study and then present its results

Definitions of acronyms: C.F.R.: Code of Federal Regulations; ICH: International Council on Harmonisation of Technical Requirements for Pharmaceuticals for Human Use; E: efficacy (refers to clinical studies); M: multidisciplinary

Clinical Study Reports and Technical Communication Scholarship

George Lakoff and Mark Johnson (2003) describe how cognitive frames help people understand new information in the light of their existing habits of thinking, while incompatible framing impedes understanding. The opening example I used is an apt example of conflicting frames that also may be seen in technical communication views of clinical study reports, which have tended to follow Miller's (1984) interpretation of reports as a call to action. Elizabeth Angeli's (2019) overview of technical communication scholarship also suggests that all reporting is intended to persuade others to act. The most sustained attention to clinical study reports in technical communication scholarship has been by Stephen Bernhardt, Gregory Cuppan (both respected medical writing consultants; see 2012), and various coauthors. These authors describe clinical study reports as making various arguments, a claim that is not consistent with guidelines for writing these reports in part because the word *report* does not always mean the same thing in regulatory documentation contexts as it might in technical communication scholarship. In fact, a study *report* is most likely to present or restate information.

In the CTD format, the clinical study report appears in Module 5, where it should function as a reference for the Clinical Summary, which factually summarizes, but does not critically interpret, data across multiple studies. The Clinical Summary should support the Clinical Overview, which provides a critical analysis and interpretation of available clinical data and the benefit-to-risk assessment needed to justify using a product in medical practice (see Table 8.2 and Figure

8.1). Thus, study reports are a supporting reference for the arguments intended to support actions, like approving a product for marketing (Benau, 2020; DeTora, 2020b; ICH M4E [R2], 2016; Wood & Foote, 2009). As Hamilton (2014) observes, regulators read across multiple documents *and* multiple dossiers, making it critical that clinical study reports be consistent and concise. In this context, study reports serve essentially as vehicles for data rather than arguments or calls for action.

The most widely used guidance for clinical study reports, ICH E3 Content and Structure of Clinical Study Reports (completed in 1995), requires a brief recap of the study protocol and statistical analysis plan, any changes to the plan that occurred during the study (like changing study formats due to COVID-19), and the study results, highlighting any novel or unforeseen findings, especially unanticipated safety outcomes (see Table 8.2). Crucially, ICH E3 allows authors to omit an overall critical analysis because an effective scientific discussion, such as that in a Clinical Overview, generally requires results of multiple studies to justify claims about benefits and risks (see ICH M4E [R2], 2016). Bringing additional regulatory guidance documents into the mix reveals more differences between a clinical study report and the idea of a report as a call to action. These subtleties do not impact the value of Bernhardt and colleagues' work (see Cuppan & Bernhardt, 2012), which educates reviewers to attend to audience needs rather than personal preference; the differences I describe become more important when considering regulatory documents and dossiers as rhetorical entities.

Cuppan and Bernhardt (2012) and Bernhardt (2003) describe statistical analysis as a way of extrapolating general findings from individual results. Yet, regulatory guidelines like ICH E9 Statistical Principles for Clinical Trials (1998) explicitly advise against extrapolating the general from the particular, instead recommending that statistical analyses be made on a population basis to limit variability. Planned sample size and statistical power, hence the relationship between the individual and the general, are determined before a study begins to prevent errors or bias from skewing results. Cuppan and Bernhardt (2012) also describe study reports as presenting a case for whether a clinical study is adequate and well controlled. Yet both the ICH E6 (R2) update to Good Clinical Practice (2016) and ICH E10 Selection of Control Groups (2000) guidelines specify that clinical studies must be demonstrably adequate and well controlled *before* they begin. For instance, as described in the Declaration of Helsinki (2018) and ICH E10 (2000), any new product must be compared with any existing standard treatments and not just placebo. Hence, the clinical study report described in ICH E3 (1995) only reiterates earlier reasoning and does not make new persuasive or critical claims, which must be located elsewhere. The reading culture within regulatory settings, as noted earlier, is highly tolerant of fragmented narratives and simultaneous reading across different documents, which makes balancing multiple guidance documents appear natural to insiders even as it appears alien to those who share Bazerman's (1988) or Gross's (2019) textual sensibilities.

Rhetorical Models for Understanding Regulatory Documents

Nathan Stormer's discussions of *taxis* (2004) and *mnesis* (2013) offer means for understanding how argument and persuasion might operate in regulatory documentation. In an essay on articulation and *taxis*, Stormer (2004) describes how the gaps between words and things that might appear to be a natural consequence of the relationship between language and the material world are actually historically and culturally constructed performances. Seeing rhetorical articulation as a performance may be helpful when considering the construction of regulatory documents and dossiers because this understanding calls on readers to attend to the arrangement of words and things in different intellectual cultures. Rhetorical *taxis*, or the arrangement of elements within a text, creates pathways through scientific documents (and, in the setting of regulatory documentation, larger dossiers of documents and groups of guidelines) that invite specific types of readings, in this case, across multiple texts rather than through a single work. Seeing the arrangement of documents in regulatory dossiers as a mode of rhetorical *taxis* can allow for new cross-disciplinary strategies and theoretical frameworks for analyzing texts. Expanding the idea of articulation to include the guidelines that explain requirements for documents and studies could also help address the metadiscursive concerns of technical communication (for example, the need to understand how texts operate to address user needs or occupy a space within an intellectual culture).

Recognizing regulatory documentation as a representation of intellectual cultures in biomedicine may help rhetorical scholars come to terms with what might otherwise appear to be flawed discourses. A potential added benefit might be seen in Jennifer D. Slack and colleagues (1993) interpretation of articulation in the context of social and cultural theories, such as Stuart Hall's (1973) concept that communication occurs through successful decoding of encoded information. In regulatory discourse, readers may be assumed to have found the "key" to specific documents by familiarizing themselves with guidelines. Slack and coauthor's model of articulation also considers how power relations inherent in different subject positions impact communication. Since power structures like government or corporate hierarchies constrain regulatory discourses, technical communicators might identify areas for interpretation and invention, as Cuppan and Bernhardt (2012) do, by examining relationships within organizations. While the technical communicator might have little power or influence in regulatory documentation, they may exert considerable influence in creating adaptations for general use, a role likely to become more important with a current move toward data transparency (see ICMJE, 2019; Regulation EU 536/2014; Tomlin, 2008). Technical communication scholarship is also well situated to examine the differences between peer-reviewed publications and regulatory documentation of the same study.

Stormer (2004) also examines how bodies of knowledge can be brought to bear on one another through the idea of prosthesis, or the augmentation of textual or material entities. Prosthesis can be helpful in understanding individual regulatory documents and the dossiers in which they appear, as well as the relationships between documents and audiences that O'Connell (2020) elucidated. Guidelines, for instance, can be seen as augmenting individual documents and dossiers. Regulatory documents also rely on the presence of figures and tables, some of which are legally mandated and prescribed, to impart information. These visually dense textual augmentations might be framed for humanities and social science readers via Thierry Groensteen's (1999/2011) who explains how meaning may exist outside argument (or even language) and shows readers how to construct pathways through visually complex texts, like graphic narratives. His semiotic analysis of images, text, and spaces on a page shows how seemingly disparate elements may operate simultaneously to impart greater meaning than any element alone. This mode of reading parallels the scientific reading practices Renear and Palmer (2009) and Hamilton (2014) describe as routine in the sciences, but may be more readily understood by readers trained in social sciences or the humanities. By recognizing the prosthetic function of various types of unspoken knowledge in regulatory documentation, technical communicators might, as suggested by Lisa Melonçon's (2017) discussion of user experience design, more easily situate themselves in the space of the reviewer or other end user. Such skill could be critical when adapting regulatory materials (or other biomedical research data) for new audiences or when examining the role of published literature that may be referenced within regulatory documents.

Recursivity, as discussed by Stormer (2013), is also a useful model for understanding regulatory documents and guidelines. Stormer suggests that the functions of memory and forgetting (*mnesis*) are inextricably linked in many rhetorical activities because an understanding of the prior state is essential to the value of the current reality. On a pragmatic level, regulatory dossiers and guidelines are intended to be updated as new information comes to light, which makes regulatory documentation necessarily recursive (see Benau 2020; Clemow et al, 2018; DeTora 2020b; Wood & Foote, 2009). In biomedical discourses, Stormer's rendering of rhetorical recursivity and its connection to *mnesis* provides a model for replacing outdated or incorrect information with new, more reliable data or for medical inquiry that seeks to limit undesirable signs and symptoms. An essential recursive function could, for example, link undesirable disease symptoms before and after treatment, which is a core aim of both clinical study reports and peer-reviewed manuscripts. Recursivity is also helpful for understanding the continually shifting landscape of guidelines, which are routinely updated to address new discoveries or unmet medical needs.

The rhetorical models just discussed provide a vantage point for unpacking the fragmentation of scientific argument Bazerman (1988) sees as problematic but scientific like Hamilton (2014) view less critically. The arrangement of textual

elements in regulatory documents may rely on an interplay between language and other elements (like figures and tables) that work together to communicate information about a current state simultaneously with past knowledge. Or, these elements may be expected to work across multiple texts, allowing reviewers to find information by providing consistent visual and textual cues. Crucially, the combination of visual elements and language can convey meaning even in the absence of argument. Rhetorical theory, thus, can help explain the contexts and functions of regulatory and other complex biomedical discourses by considering the arrangement of objects within these texts (or texts within compilations or dossiers) as a sort of performance that varies by a document's type and broader context, such as the way it is intended to serve its readers. Layering considerations, such as power relations and guidelines or visual rhetoric, into this milieu offers new sites for interpretation, integration, and theorization.

Regulatory Metadiscourses and Textual Production

One obstacle to understanding any biomedical discourse is the sheer volume of available guidance documents. While ICH guidelines are widely accepted, all regulatory agencies provide additional guidance to explain their expectations. Other groups like professional societies and research centers attempt to interpret this wealth of information in targeted ways for authors; some examples are shown in Table 8.3. Guidelines help educate authors about technical requirements for research conduct and reporting as well as how to write documents, like informed consent forms, protocols, publications, or even advertising to recruit study participants. Documentation guidelines function much like how-to books, identifying the basic needs of a highly educated core readership, such as minimum content requirements, in a prescribed order of presentation, while presuming that their users and readers are familiar with scientific and regulatory requirements. Innovation and creativity are discouraged in this context. Although, as Hamilton (2014) notes, minor adjustments may be made to some regulatory documents, the reasons for these changes must arise from scientific logic rather than textual preferences.

Regulatory documentation requirements are backed by the force of law, which can make writerly innovation not only unwelcome but dangerous. One effect of scientific reading practices and the genre conventions of regulatory reports is that many documents, including clinical study reports, are compiled by combining elements that either existed previously, like study methods, or are understood as "generated" rather than written in a humanistic sense (Benau, 2020; Clemow et al, 2018). Hamilton's (2014) discussion of study report authorship concentrates on combining elements following a logical progression and does not mention concepts like persuasion or argument. Similarly, even in noting a move away from a mechanistic model of medical regulatory writing, Rita Tomlin (2008) signals a need for added scientific knowledge to manage increasingly complex content

rather than skills in persuasion or argument. The demand for scientific expertise obviates discussions about whether this knowledge carries intellectual value, even as it elides argument (Benau, 2020; Clemow et al, 2018; DeTora, 2020b, Hamilton, 2014; Winchester, 2017).[2]

Table 8.3. Guidance documents for biomedical writing

Document type	**Definition**	**Applicable examples for clinical studies**
International Council on Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH) guidelines	Consensus documents developed by an international group of regulators, academics, and industry experts to determine appropriate standards and reporting	*ICH E3 Content and Format of Clinical Study Reports* *ICH E6 (R2) Good Clinical Practice* *ICH E8 Clinical Trials* *ICH E9 (R1) Statistical Analysis Plans* *ICH M4E (R2) Common Technical Document*
Ethical guidelines	International and country-specific guidelines for the appropriate treatment of human beings enrolled in research studies	*Declaration of Helsinki* *Belmont Report*
Regulations	Rules of law established by governments in order to regulate health authorities and manufacturers	*Food and Drugs Title 21 Code of Federal Regulations* *Regulation (EU) No 536/2014*
Professional society guidelines	Guidelines and requirements for different professional groups such as medical writers, medical publications professionals, and regulatory affairs professionals	*Regulatory Affairs Professional Society Fundamentals* *Good Publication Practice Guidelines*
Journal guidelines Standards established by medical journal editors for the quality and integrity of publishable work as well as ethical practices of authorship, peer review, and editorial responsibilities *International Council of Medical Journal Editors Recommendations* *Committee on Publication Ethics Guidelines*		
EQUATOR Network	Guidelines for the minimum appropriate information to report for various types of studies	*Consolidated Standards for Reporting the Results of Randomized Trials (CONSORT) Guidelines*

2. A huge body of research in biomedicine examines the meaning of authorship in biomedicine and is outside the general scope of this paper.

The rhetorical articulation of regulatory documentation is further complicated by requirements for conciseness. ICH guidelines for all documents state that information should not be repeated between text, tables, and figures: text should provide a high-level characterization of data, highlight noteworthy observations, or present a concise discussion and analysis (Hamilton, 2014; ICH E3, 1995; ICM M4 (R2), 2016). This ethos creates reading burdens as well as obstacles for authors. Since structured scientific formats require the reader to successfully decode hybrid visual and textual elements, the initial arrangement of these elements can be challenging, even for experts. Although reviewers are expected to have enough scientific acumen to actively decipher these documents, some sites for rhetorical intervention still exist. Hamilton (2014), for example, asks medical writers to consider the balance between necessary data to support regulatory review, visual clarity, and the possibility that electronic conveniences, like linking, can present obstacles to reviewer experiences, suggesting another space where Melonçon's (2017) work on user experience design might be brought to bear. Making interventions will require a deeper understanding of the material conditions under which regulatory documentation is produced as well as its rhetorical limitations.

Calls to Action and Discursive Contexts

Although clinical study reports do not convey the type of call to action that technical communication scholarship has tended to seek in them, it does not follow that such calls to action do not exist in regulatory discourses. The sites for such calls may be located using guidance documents. For instance, pharmacovigilance, a specialized discipline, monitors safety and side effects associated with medicinal products and may lead to specific actions, as described in the constellation of guidelines under ICH E2A-E2F Pharmacovigilance (1994-2014). During clinical studies, safety problems may require that researchers stop or pause a study or remove a product from the market. These problems may be too urgent to delay until a study report can be written; hence rapid or expedited networks use short reporting forms (see ICH E2A Clinical Safety Data Management: Definitions and Standards for Expedited Reporting, 1994). Although these forms may be considered a report of sorts, they generally lack the type of narrative information that would provide a meaningful context for readers operating outside of regulatory discourses. Michael Klein and I (2019) discuss the brief safety narratives that appear in these short reporting forms and are later adapted for clinical study reports as listing specific information in a defined order and hence existing outside humanistic or social science principles of narrative. Readers of pharmacovigilance calls to action are expected to understand the complex web of regulatory requirements and medical ethics that would ground decision-making—these reports present information for expert interpretation and judgement rather than making an argument.

Clinical study reports also refer to a broader matrix of documents and guidelines that suggest sites for argument and action. ICH E6 (R2) (2016) details the

appropriate contents of a clinical protocol, or methods used to conduct a clinical trial, and the other documents and activities that must be completed before starting a study. These documents call investigators to actions described later in study reports. Although not technically regulations, ethical codes of conduct for clinical trials, such as the Declaration of Helsinki (2018), also make calls to action that are recounted in clinical study reports. Hamilton (2014), for instance, begins with the linkage of clinical study reporting and ethics (see Benau 2020, Wood & Foote, 2009). As study reports recount prior actions, the reader must trace those actions back to the original call or other rhetorical activity. Increased transparency among health authorities means that more clinical study reports and protocols will be publicly available (see Tomlin, 2008). These documents provide greater context compared with clinical trial results posted on government-mandated registries such as EudraCT or clinicaltrials.gov or even the clinical trial summaries for laypersons required in the European Union, providing a greater opportunity for technical communication interpretation and use (Gillow, 2015; Schindler, 2020; ICMJE, 2019 Regulation EU 536/2014).

Many studies presented in regulatory documents are later published, and publications may use clinical study data to make arguments or calls to action. That regulatory documents also require adequate references to the published biomedical and scientific literature (see ICH E3, 1995) creates a clear linkage between these discourses. Unsurprisingly, the standard scientific format described by Bazerman (1988) or Scott L Montgomery (2017) is broken down further in biomedical research contexts. The CONSORT guidance (2010) provides a consistent structure and format for publishing clinical trial results in peer-reviewed journals, which parallels ICH E3 (1995). CONSORT (2010) is intended to facilitate meta-analyses and other uses of data, especially those from randomized, controlled clinical studies and, unlike ICH E3, requests a benefit-to-risk assessment or statement based on the study data and existing published literature. The ICMJE Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (2019) go a step further, suggesting that authors "explore the implications of your findings for future research and for clinical practice or policy" (p. 17). ICMJE (2019), thus, encourages a call for specific, reasonable actions supported by the presented data.

The ICMJE Recommendations (2019) provide further insights into biomedical research values by describing the ethics of study conduct, authorship, peer review, and editing. The current ICMJE Recommendations (2019) refer to regulatory activities that support data transparency, such as data posting in trial registries, as a measure of the publishability of clinical studies. These circumstances link regulatory and publication functions and also support the assertion I made earlier that people documenting clinical trial results tend to understand their work as deeply related to content and clinical ethics. As with ICH E3 (1995) and CONSORT (2010), the ICMJE Recommendations (2019) specify that authors should use prose only for discussion and analysis or to highlight items of

interest and ought not to repeat data across tables, figures, and text. Finally, the ICMJE (2019) refers readers to the specific guidelines and checklists, like CONSORT (2010), for quality publications developed by the EQUATOR network for various types of studies. ICMJE (2019) and Montgomery (2017) also note that biomedical journals publish expert opinion pieces, treatment guidelines, and editorials. These genres require explicit arguments or calls to action and therefore hew much more closely to the types of narratives Bazerman (1988) calls for. Overall, then, publications are likely to offer the type of rhetoric valued in technical communications scholarship; nevertheless, guidelines are important in deciphering the relationships between publication genres and other sources (like study reports) for the same data.

Clinical trial results can also be combined into large meta-analyses of data across studies, such as those performed by the Cochrane Collaboration, to identify trends that might not be evident within individual studies or clinical programs. Such analyses can be reported to regulatory bodies or published, where they can form an object of study. Christa Teston (2017), in *Bodies in Flux* offers an extended analysis of the Cochrane systematic review genre, beginning with the idea that these reviews function as a "stabilized-for-now set of guidelines" (p. 24) intended to aid in practical decision-making for healthcare professionals. Teston conducts an Toulmin analysis to examine Cochrane reviews about cancer therapies, locating sites where different claims originate and characterizing the outcomes of various interim medical and data handling decisions. Of particular interest to Teston is what she terms "evidential cutting" (2017, p. 24), or the selection of information that is suitable to include or exclude from a systematic review. The idea of work as *stabilized for now* that Teston suggests is a helpful way of understanding not only Cochrane reviews, but also regulatory dossiers, works that codify a current state of knowledge. Teston's analysis reveals some important features of the Cochrane review, which, like regulatory documents and biomedical publications, is judged by specific guidelines that limit rhetorical action.

Teston's work (2017), however, much like Kessler and Graham's (2018), betrays a lack of transferability to the source context under examination. For instance, Teston coins an acronym (CSR for Cochrane systematic review) which in biomedical research, including the Cochrane Collaboration, already refers to the clinical study report, and hence may be obfuscating for Cochrane's core expert audiences. Since the Cochrane Collaboration often relies on clinical study reports to do its work, their systematic reviews tend to be referred to as "Cochrane reviews" (Cochrane, 2020-2021). This might seem like a minor semantic point given the obvious merit of Teston's book, but it is a material barrier to accessing audiences familiar with either regulatory discourses or the Cochrane Collaboration. In other words, this semantic activity, as with Kessler and Graham's (2018) acronym for product labels, might lead an expert to assume that the author's conclusions are flawed. The notion of "evidential cutting" (p. 24) is also problematic because systematic reviews require the inclusion of all relevant evidence—what

Teston refers to as cutting is a means discerning information and data that can be combined responsibly (or not) to form an evidence base. By characterizing this as "cutting" (p. 24) "evidential" (p. 24) material, Teston might be seen as misunderstanding how scientific evidence functions. Here once again, Stormer's models of articulation (2004) and recursivity (2013) might be helpful in interpreting Cochrane reviews against other types of biomedical documentation and in understanding how the rhetorical performances inherent in producing these works might intersect. Recourse to guidelines for activities like weighing and categorizing types of evidence might also have been helpful not only for building an understanding but also for seeing how these discourse communities use language. Thus, while Teston reviews the PRISMA guideline for publications of systematic meta-analyses and considers how evidence-based medicine experts do their work, her language use creates a distinct type of rhetorical performance.

I noted previously that Bazerman (1988) criticizes publications, like those described by ICMJE (2019), as ignoring the needs of readers accustomed to following linear arguments. However, by reading broadly across guidance documents, it becomes evident that structured formats such as CONSORT (2010) and ICH-mandated documentation are essential frameworks for biomedical epistemology, particularly for regulated activities such as drug development. If we further consider the aims of the CONSORT guidance (2010), ICMJE Recommendations (2019), or ICH E3 (1995), such as promoting meta-analyses (Cochrane, 2020-2021) to help protect public health by identifying trends across studies and general use, then a picture emerges of discourse communities built on an expectation of exchange that is strongly benefitted by format consistency, and specific modes of *taxis,* that allow reading across rather than within documents. These modes of reading also promote recursivity by clearly identifying current understanding as continually subject to future revision. Montgomery (2017) comments on the value of these structures, especially for international exchanges in English and also in allowing researchers to discard invalid work or data without dislodging larger frames of reference. Together, ICMJE, CONSORT, and ICH build a picture of individual clinical study reports and publications as the building blocks of both current and future knowledge, and while these documents are not rhetorically null, they do, in fact, demonstrate the presence of a large body of written genres that *intentionally* do not comply with humanistic sensibilities for argument, claim-making, and explanation because of the nature (and intended sites) of persuasion and calls to action in biomedical inquiry and practice, especially in regulated contexts.

Making Sense of Biomedical Inquiry

So, where does this discussion leave technical communication scholarship? The value of technical communication insights into regulatory documentation may be expanding as the role of professional regulatory writers becomes more intel-

lectual. Tomlin (2008) surveyed regulatory medical writers, who linked increased transparency of clinical data over the preceding decade with more intellectual job demands. Increased transparency also created a need to address new audiences. The intellectual role of the medical writer has therefore continued to expand into new areas, as Danny Benau (2020) and Clemow and colleagues (2018) report, and these new areas include increasing numbers of laypersons. When considering technical communication insights, Slack and colleagues' (1993) discussion of power relations is a useful way of understanding the tension between the writer as thinking subject and intellectual contributor rather than a so-called extra pair of hands. Furthermore, technical communicators are already experts at addressing complex information to general audiences and likely will have valuable insights to offer regulatory writers seeking to address laypersons.

I previously suggested that technical communication expertise could enhance the design of regulatory forms like the patient lay summary of clinical study results (Consultation, 2018; DeTora, 2018; Gillow, 2015; Schindler, 2020). Early examples of lay summaries looked very much like clinical study report synopses. Yet lay summaries should combine text and visual elements, like infographics, to present clinical study data effectively for a general readership (Consultation, 2018; EU Regulation 536/2014; Gillow, 2015; Schindler, 2020). In his discussion of lay summaries, Thomas Schindler (2016), an industry expert, notes that plain language cannot fully capture the subtleties of complex scientific content. His subsequent work (2020) situates the comic book as an essential mode of communicating clinical data with certain lay audiences, like children. The theoretical concept of simultaneous mobilization (through Groensteen [1999/2011]), I suggested earlier then, might provide a very direct theoretical framework for the practical work of managing lay summary contents. This framework could then be adapted, by recourse to rhetorical articulation and recursivity to other settings in which information must be derived from a complex scientific format and then presented to general readers. Hybrid, prosthetic modes of thinking are a strength of technical and professional communication; thus, technical communicators are in a unique position to manage these activities, particularly when as medical writer Claire Gillow (2015) indicates, firm regulatory guidance is lacking and creative thinking is needed. Technical communication also offers models for framing explanations, like the link between statistical analyses and individual data offered by Cuppan and Bernhardt (2012) that may be helpful to individuals making medical decisions, even if regulatory audiences would question some particulars.

This is not to say that the field of technical communication has nothing to learn. Expert practices and guidelines in biomedicine remain an underexamined discourse for technical communicators, and one that offers many possibilities outside the direct regulatory context Bernhardt and Cuppan (2012) describe. The existing highly structured and prescribed formats in biomedicine can offer technical and professional communicators an opportunity to concentrate on creative thinking and problem-solving in the articulation of data to broad audiences. The

vast array of guidelines, which has only been treated here in a superficial manner, also presents a challenge for technical communication and a new area of inquiry with the potential for real-world impacts. A few earlier examples hint that existing work, while promising, could benefit from a deeper dive into the vast meta-discourse of biomedical writing, a body of knowledge that renders visible many insider discourses. The special strengths of humanistic modes of thinking and rhetorical approaches to textual evidence should enable technical communicators to add real value to these discussions even as they expand their own knowledge and experience.

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