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Tesis de Maestría

**LOS ARTÍCULOS DE REVISIÓN EN INGLÉS EN EL ÁMBITO DE
LAS CIENCIAS DE LA SALUD: UN ESQUEMA RETÓRICO
EJEMPLAR**

María Belén Gallardo

Directora: Mgtr. Daniela Moyetta (UNC)

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Abstract

Since the appearance of Swales' (1981, 1990) CARS model of analysis, there has been a great interest in untangling the way in which information is organized in research-process papers. In the latest years, a great number of researchers have been concerned with analyzing the rhetorical structure and the linguistic features of the canonical sections of the research article. However, little attention has been paid to analyzing the rhetorical structure of other emerging genres, as it is the case of the review article. The present study, thus, examines the rhetorical organization of information in the different sections of medical review articles written in English and proposes a template of move analysis for the three sections identified: *Introduction*, *Development* and *Conclusion*.

The analysis was based on a corpus of thirty medical review articles published in a prestigious online journal, following conventional sampling procedures. Then, a move analysis was conducted applying the method proposed by Morales (2010).

Finally, a template consisting of thirteen moves is suggested for the analysis of medical review articles written in English. The results of this study have pedagogical implications for ESP students, novice researchers, and ESP teachers.

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Abbreviations and Acronyms

CARS	Create a Research Space
CC	Current Concepts
EAP	English for Academic Purposes
EFL	English as a Foreign Language
EPC	English for Professional Communication
ESP	English for Specific Purposes
GH	Global Health
GM	Genomic Medicine
IMRD	Introduction Method Result Discussion
NR	New Rhetoric
RA	Review Article
SFL	Systemic Functional Linguistics

Chapter I: Introduction

1.1. Introduction

Since the early 80's, linguists and teachers of English for Specific Purposes have shown a great interest in genre studies for the analysis of oral and written discourse. According to Holmes (1997), this interest has mainly had pedagogical motivations, since adequate models and descriptions need to be proposed in order to facilitate the comprehension and production of academic and scientific texts for both students whose native language is English and students of English as a Foreign Language (EFL).

Among the most frequently used genres in the field of medicine is the review article (RA). Some authors consider it as research work carried out in a library instead of a laboratory and whose originality lies in its unit of analysis (Cué Brugueras, Díaz Alonso, Díaz & Valdés Abreu, 1996). For this reason, it is interesting and innovating to focus on the analysis of the rhetorical structure of the RA, as there are very few studies which have provided a detailed description of this emerging genre.

The Medical Sciences have a vast tradition in the publishing of research papers and do not seem to offer great structural flexibility. As regards the RA, most authors are familiarized with the established format for the presentation of information; however, they may not be aware of the internal order of the information included in the different sections of the RA. This lack of awareness can partially explain the difficulty most inexperienced authors face when writing RAs (Morales *et al.*, 2007; Morales, 2010).

In the last few years, this emerging genre has been widely used in the field of Medicine; it is expected that other fields adopt it as a means to consolidate scientific and technical knowledge. It is worth mentioning that RAs are generally written by specialists in the field. Nevertheless, competent authors of RAs not only need to have vast experience and knowledge of a certain topic but also be familiarized with the most effective methods of information collection; they should be able to write a paper following the conventions of the genre (Cué Brugueras, Díaz Alonso, Díaz & Valdés Abreu, 1996).

It is well known that English has established itself as the international language of science and technology (Grabe & Kaplan, 1996). Hence, native and non-native

researchers who want to actively participate in the creation of knowledge must be able to read and write RAs in English, among other genres. Scientists are expected to share their research work with other members of the community in various forms. Probably, one of the most demanding of these forms is the RA published in a scientific journal. Such review has high standards of quality; therefore, it constitutes a valuable, lasting reference for other scientists. In fact, writing high-quality scientific RAs requires knowing the generic conventions and only members of the discourse community can publish them.

As the published literature proliferates, the RA is becoming more and more important, since the genre provides the writer with an opportunity to give a synoptic vision of an area of expertise, contributing, thus, to an understanding of that area and how its achievements might relate to those in other areas. Despite its major role in the construction of scientific knowledge, disentangling the rhetorical structure of the RA has received less attention on the part of the linguists.

Therefore, the present study was designed to examine the rhetorical structure of medical RAs written in English. It constitutes a descriptive-exploratory study aimed at offering orientations in the pedagogical practice of ESP courses.

1.2. Motivation for Research

In order to identify the rhetorical characteristics of a genre, a number of studies have focused on the analysis of the rhetorical structure and discursive functions of the genres most commonly used by the academic-scientific community (Flowerdew & Dudley-Evans, 2002: 463). Most of these studies, however, have analyzed the overall rhetorical structure of the research article or some of its sections. The RA constitutes an emerging genre which is becoming more and more common in the field of Medicine. Hence, the main motivation for the present research has come from a pedagogically driven concern: raising medical researchers' consciousness of the importance of mastering the ways of processing and producing specialized discourse, as it is the case of the RA, to be accepted by the international scientific discourse community. In addition, being communicatively competent in this genre may empower non-native researchers who

need to do both: a) read and understand what is happening in the text in terms of discourse, and b) write RAs conforming to the conventions of the scientific community with whom they intend to establish a dialogue.

As an ESP teacher at the Autonomous Popular University of the State of Puebla, Mexico, I have noticed that although RAs written in English are usually part of the students' reading materials in different courses, the socio-rhetorical conventions underlying the genre are not explicitly presented to the students. However, such situation can be reverted if discipline specific and genre-specific rhetorical patterns are presented in the language classroom. By making students aware of the conventionalized disciplinary practices, they can become more proficient readers and more efficient writers. Therefore, the template proposed in this study can aid readers and writers at recognizing, understanding and using the conventions that govern the rhetorical patterns preferred by scholars who publish in English in the field of Medicine.

1.3. Research Question

The following research question is addressed in the present study:

What is the rhetorical structure of medical RAs written in English?

1.4. Objectives

1.4.1. General Objective

1. To describe the rhetorical structure of medical RAs written in English in order to inform the pedagogical practice in ESP courses.

1.4.2. Specific Objectives

2. To analyze the rhetorical structure of medical RAs written in English and published in the years 2010, 2011, 2012, and 2013.
3. To identify the communicative functions of the different sections of the medical RAs written in English as reflected in their rhetorical moves.

4. To propose a rhetorical schema for the complete medical RAs written in English.

1.5. Thesis Outline

The present study is organized as follows: Chapter I presents the reasons why the review article has been selected as the object of study as well as the research question and the objectives set out for the present study. Chapter II reviews studies which have focused on the organization of information in the review article and studies which have explored the different sections of this genre in different disciplines. Chapter III presents the theoretical foundation of this study; i.e. genre theory. The chapter also provides a recount of the review article as an emerging genre; it also introduces the most salient frameworks of move identification of the different sections of the review article. Finally, it describes the categories of analysis used in the present study regarding move identification in the different sections of the genre herein analyzed. Chapter IV gives an account of the materials and method selected for this research. It further specifies the data collection procedure. Chapter V presents the results obtained from the data analysis. Lastly, Chapter VI interprets and discusses the findings in relation to the research question and existing knowledge. The chapter finishes by indicating the limitations and the implications of the present study.

Chapter II: Review of the Literature

2.1. Introduction

Vast research has been done to identify the rhetorical structure that characterizes different established genres. Most of this research has focused on the research article, one of the most studied established genres. In this section, it is interesting to compare some of these studies to see if their outcomes could be applied to the review article, object of the present study. Doing so might be useful for this thesis due to the fact that only a few studies have made attempts at discovering the rhetorical organization of information in emerging genres, such as the review article. Therefore, there is an overview of studies which have focused on the rhetorical organization of research papers in different disciplines followed by a recount of the studies which have analyzed the rhetorical organization of information in the review article.

2.2. Studies which Analyze the Overall Rhetorical Organization of the Research Article

A number of authors have shown their concern for the overall macrostructure of the research article in different disciplines taking Swales' (1990) CARS model as a point of departure. His three-move schema for the Introduction section shows the recurrent moves and steps writers make use of for different purposes.

Nwogu (1997) examined fifteen research articles from five high quality journals using Swales' (1990) model of analysis to account for the schematic structure of information in all sections of the medical research article. Like Swales' work, his investigation adopted functional labels to characterize moves and their constituent elements in each section; this resulted in an eleven-move pattern, eight of which were found to be "normally required" (*reviewing related research, presenting new research, describing data collection procedure, describing experimental procedure, indicating consistent observations, highlighting overall research outcome, explaining specific research outcomes, and stating research conclusions*) and three "optional" (*presenting background information, describing data-analysis procedure, and indicating non-*

consistent observations). This study portrays the way in which discourse is organized in medical research papers.

Posteguillo (1998) analyzed forty research articles from three academic journals to describe the schematic organization of the research article in the field of computer science using Swales' (1990) CARS model for the *Introduction*, Brett's (1994) model for the *Results* section and Swales' (1990) list of moves for the *Discussion/Conclusion* section. The organizational pattern Posteguillo (1998) proposes deviates from Swales' (1990) in both the *Introduction* and *Discussion* sections. As regards the *Introduction* section, relevant variations from the CARS model have been detected, which can be attributed to the fact that computer science is a discipline without well-established conventions because of its relative youth. As regards the *Discussion/Conclusion* section, Posteguillo depicts it as having eight moves, two of which are the most salient ones: *statement of results* and *recommendation for further research*, the latter of which conforms an independent section at the end of the research article due to the absence of explicit conventions in academic journals in this field. There are also some variations from Brett's patterns in the *Results* section, which can be explained by the lack of a specific *Methods* section in computing research papers.

Li and Ge (2009) analyzed the structural evolution of medical research articles written in English using the eleven-move scheme proposed by Nwogu (1997). They had two corpora, representing two different time periods. The results obtained were compared by means of Chi-square test or Mann-Whitney *U* test. Their findings showed statistically significant differences between the frequency of occurrence of moves 1, 6 and 9 (*presenting background information*, *describing data-analysis procedure*, and *highlighting overall research outcome*). Moves 1 and 6 have changed from "optional" to "obligatory", indicating that today's medical writers tend to provide more background information and are more aware of describing data-analysis procedures in reporting their research. On the other hand, move 9 has changed from "obligatory" to "optional", indicating that present-day medical writers tend to adopt a more direct approach to presenting their results. Their study suggests that genre has an evolutionary nature.

Kanoksilapatham (2005) examined sixty biochemistry research articles from five core journals to identify the complete rhetorical organization of the texts using Swales' (1990) model of analysis. Her model departs from the CARS schema for the

Introduction section, since she detected different moves from the ones Swales found in his analysis. The schema this author proposed consists of three moves for the *Introduction: announcing the importance of the field, preparing for the present study, and introducing the present study*; four moves for the *Methods: describing materials, describing experimental procedures, detailing equipment, and detailing statistical procedures*; four moves for the *Results: stating procedures, justifying procedures or methodology, stating results, and stating comments on the results*, and four moves for the *Discussion: contextualizing the study, consolidating results, stating limitations of the study, and suggesting further research*. This model gives support to the existence of disciplinary variation, since it demonstrates that the CARS model cannot account for all the occurrences in all disciplines.

So far in this section, I have referred to studies which describe the overall rhetorical organization of the research article. In the following section, some studies focusing on linguistic devices as well as the rhetorical organization of information in the review article are discussed.

2.3. Studies which Focus on Linguistic Devices and the Rhetorical Organization of the Review Article

According to Swales (2004: 208), “discursive studies of review articles are rare”. In a similar vein, Noguchi (2006) claims that there are few studies which focus on the rhetorical organization of information of the review article (RA) from a discourse analysis perspective.

Murlow (1987) analyzed 50 RAs published in four major American medical journals between 1985 and 1986, taking into account 8 criteria adapted from published guidelines for information syntheses. Of the 50 articles, 17 satisfied three of the eight criteria; 32 satisfied four or five criteria; and 1 satisfied six criteria. Most reviews had clearly specified purposes and conclusions. Only one had clearly specified methods of identifying, selecting, and validating included information. Qualitative synthesis was often used to integrate information included in the review; quantitative synthesis was rarely used. Future research directives were mentioned in 21 samples. His results showed that medical reviews do not routinely use scientific methods to identify, assess,

and synthesize information. He proposed the methods used in his study to improve the quality of future RAs.

Myers (1991) analyzed the rhetorical features of two RAs of Molecular Biology and attempted to describe their rhetorical structure. He found out that the narrative sequence is a distinctive feature of this genre.

McAlister *et al.* (1999) analyzed 158 RAs published in six general medical journals in 1996, taking into account 10 methodological criteria. Their aim was to determine the methodological quality of published medical reviews. Of the total number of samples, only 2 satisfied all 10 methodological criteria; less than a quarter of the articles described how evidence was identified, evaluated or integrated; 34% addressed a focused clinical question; 39% identified gaps in existing knowledge; and 111 samples included treatment recommendations. The authors concluded that the methodological quality of clinical RAs is highly variable, and many of these articles do not specify systematic methods.

Pérez-Llantada (2003) analyzed 10 RAs in English published in a specialized journal of Computing. She focused on both the rhetorical moves of the *Introduction* section and discourse markers signaling rhetorical moves and author's stance, among other features, in both the *Introduction* and the *Conclusion* sections. Her results showed that the rhetorical structure of the *Introduction* coincides with Swales' CARS model for the research article and the *Conclusion* section has the most ideological load, signaled by the use of attenuation, persuasion and argumentation strategies.

Ruiying and Allison (2004) analyzed two corpora of research articles and review articles. As regards the rhetorical structure of the RA, their study showed that it follows the *introduction–argumentation–conclusion* pattern. Moreover, differences in communicative functions of each section were pointed out.

Morales (2010) analyzed the rhetorical structure of 40 RAs written in Spanish published in prestigious journals in the field of Dentistry. His study showed that most of the RAs follow the *introduction-development-conclusion* pattern typical of traditional narrative RAs. He proposes the following 10-move schema for analyzing the different sections of the RA:

<i>Introduction</i>	Move 1	Topic Definition
	Move 2	Review Justification
	Move 3	Objectives
	Move 4	Methodology (optional)
	Move 5	Article Development Structure (optional)
<i>Development</i>	Move 6	Information Presentation
	Move 7	Information Elaboration/Expansion
	Move 8	Summary
<i>Conclusion</i>	Move 9	Summary of Main Findings
	Move 10	Recommendations for Future Research or Practice

To conclude, the studies reviewed in this section have thrown light on how information in the different sections of the RA is organized. Moreover, some of these studies have contributed to the characterization of the RA as a whole. The importance of these studies may lie in the fact that they represent attempts at understanding the schematic structure of an emerging genre.

2.4. Summary of the Chapter

In this chapter, I have examined a number of influential contributions to move analysis. Some studies have contributed to identifying the rhetorical conventions that govern the macrostructure of the research article, and to a lesser extent, some other studies have made an attempt at describing the rhetorical organization of review articles. To summarize, the studies reviewed here provide insights which form the basis for the following chapters. Next, I present and describe the theoretical framework in which this study is grounded.

Chapter III: Theoretical Framework

3.1. Introduction

The present study focuses on the rhetorical organization of medical review articles written in English and Genre Theory is the theoretical construct that gives support to it. In order to have a comprehensive overview of how this scholarly tradition gives support to the present research, I examine the major concepts and developments in three linguistic approaches that have shaped the way in which genre is understood: New Rhetoric (NR), Systemic Functional Linguistics (SFL), and English for Specific Purposes (ESP). Then, I concentrate on the usefulness and appropriateness of the ESP genre perspective for the present study. I also make reference to Swales' (1990) influential work and to some relevant notions in his genre analytical method, pertinent to this study. Finally, I describe the review article (RA) as an emerging genre and provide a short account of its rhetorical overview.

3.2. Genre in Three Research Traditions

Within the last four decades, genre has been considered a tool for developing L1 and L2 instruction. However, there have been differences in the way both genre and genre-based pedagogy have been conceived of by different scholars and in different parts of the world. As reviewed by Hyon (1996), a close examination of the approaches to genre in three research traditions – North American New Rhetoric studies, Australian Systemic Functional Linguistics, and English for Specific Purposes (ESP) – is needed in order to understand these differences and their implications for L1 and L2 teaching.

3.2.1. The New Rhetoric Approach to Genre

As reviewed by Hyon (1996: 696), “New Rhetoric research describes a body of North American scholarship from a variety of disciplines concerned with L1 teaching,

including rhetoric, composition studies, and professional writing”. Scholars in this tradition have focused on the situational contexts in which genres occur and have emphasized the social purposes, or actions, that these genres fulfill within these situations (Bazerman, 1988, 1994; Coe, 1994; Miller, 1984, 1994; as cited in Hyon, 1996). In order to offer descriptions of academic and professional contexts and the actions texts perform in such contexts, a number of New Rhetoricians have used ethnographic methods for analyzing texts (Bazerman, 1988; Devitt, 1991; Schryer, 1993, 1994; Smart, 1992, 1993; as cited in Hyon, 1996).

3.2.2. The Systemic-Functional Approach to Genre

SFL describes “language in use” rather than “a set of generalized rules detached from any particular context of use” (Thompson, 1994: 1). This tradition draws heavily on Halliday’s work. Scholars in this tradition consider that key features of the surrounding social context - *field* (the activity going on), *tenor* (the relationships between participants) and *mode* (the channel of communication) - shape the forms of language (Halliday, 1978; Halliday and Hasan, 1989; Hammond, Burns, Joyce, Brosnan, and Gerot, 1992; as cited in Hyon, 1996). These three elements, in turn, determine the *register* of language (Halliday, 1978; Halliday and Hasan, 1989; as cited in Hyon 1996). Within a systemic functional framework, Martin and his colleagues have developed theories of genre and consider this construct as “a staged, goal-oriented social process” (Martin, 1992: 505). In other words, genres are seen as structural forms that cultures use in certain contexts to achieve various purposes (Hyon, 1996). The motivation behind SFL has been the desire to empower learners and disadvantaged citizens with linguistic tools for social success (Hyon, 1996; Swales, 2009); therefore, the focus of this tradition is mainly pedagogical.

3.2.3. The ESP Approach to Genre

In this tradition, which draws heavily on Swales' work (1990, 2004), genre is conceived of "as a tool for analyzing and teaching the spoken and written language required by non-native speakers in academic and professional settings" (Hyon, 1996: 695). Oral and written text types are defined by both their formal properties and their communicative purposes within social contexts. ESP scholars consider that genre analysis provides useful information for novice writers by exposing them to the conventions of a particular genre and also the reasons assumed to underlie such conventions in the social practice of a community (Bathia, 1997). With this awareness of genre practices, novice writers, in turn, should be able to explore and produce more complex genres independently and creatively.

3.2.4. Similarities and Differences of Genre-based Pedagogy

Although the focus of genre-based pedagogy has been to help students become successful readers and writers of the texts, they need to master in their academic and work environments (Hyon, 1996; Hyland, 2002), the focus of interest and the audience vary among the three traditions. New Rhetoricians have directed their efforts to assisting university students and novice professionals understand the social functions of genres and the contexts in which these genres are used. Systemic Functional Linguists, in contrast, have been concerned with helping primary and secondary students, and adult migrants understand school genres such as reports, procedures, expositions, and explanations. ESP scholars, in turn, have been committed to assisting non-native speakers of English master the functions and linguistic conventions of texts that they need to read and write in English for Academic Purposes (EAP) and English for Professional Communication (EPC) classrooms. Thus, they focus on those genres which members of the scientific community recognize as their means of communication. For this reason, the ESP framework of research seems appropriate for the present study. From this perspective, then, the next section explores the central aspects of Genre Theory within the ESP tradition.

3.3. Genre from the ESP Perspective

Scholars in the ESP tradition are mainly concerned with describing and determining syntactic and lexical choices which help realize rhetorical structures within specific genres. Swales (1990:58), one of the most influential proponents of Genre Theory, defines “genre” as

(...) a class of communicative events, the members of which share some communicative purposes. These purposes are recognized by the expert members of the parent discourse community and thereby constitute a rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains choice of content and style. Communicative purpose is both a privileged criterion and one that operates to keep the scope of a genre as here conceived narrowly focused on comparable rhetorical action. In addition to purpose, exemplars of a genre exhibit various patterns of similarity in terms of structure, style, content and intended audience. If all high probability expectations are realized, the exemplar will be viewed as prototypical by the parent discourse community. The genre names inherited and produced by discourse communities and imported by others constitute valuable ethnographic communication, but typically need further validation.

This definition comprises the core aspects of genre: communicative event, communicative purposes, prototypicality, conventions and discourse community’s nomenclature. First, a genre is a class of communicative events in which the use of verbal language and paralinguistic plays a significant and an indispensable role. It comprises “not only the discourse itself and its participants, but also the role of that discourse, and the environment of its production and reception, including its historical and cultural associations” (Swales, 1990: 46). Second, a shared set of communicative purposes is what turns a collection of communicative events into a genre. In other words, genres are communicative vehicles to achieve goals. Third, exemplars of genre vary in their prototypicality. Properties such as form, structure and audience expectations work together to identify the extent to which an exemplar is prototypical of a particular genre. Fourth, recognizing purposes provides the rationale which creates constraining conventions in terms of content, positioning and form. As Bhatia (1993: 14) puts it “although the writer has a lot of freedom to use linguistic resources in any way s/he likes, s/he must conform to certain standard practices within the boundaries of a particular genre”. That is, in order to determine the rhetorical structure of a genre and restrict the choices at the lexical and syntactical level it is essential to know the underlying logic behind a communicative event. In turn, this knowledge makes the

reception and the production of a particular genre easier. Finally, a discourse community's nomenclature created by those who have great genre-specific expertise is an important source of insight since these members give genre names to classes of communicative events which, in turn, are adopted by novice members.

Although Bathia (1993: 13) draws on Swales' definition of genre, he elaborates further on some aspects of Swales' definition and adds the psychological factors, which have a significant role in the concept of genre as a dynamic social process. He defines genre as

...a recognizable communicative event characterized by a set of communicative purpose(s) identified and understood by the members of a professional or academic community in which it regularly occurs. Most often it is highly structured and conventionalized with constraints on allowable contributions in terms of their intent, positioning, form and functional value.

Finally, Holmes (1997: 322) defines genre as "a class of texts characterized by a specific communicative function that tends to produce distinctive structural patterns". As it can be seen in these definitions, communicative purpose is central for the definition of genre in the ESP school.

Not only does communicative purpose play an essential role in determining genre categories but also discourse community needs to be paid special attention. In fact, Swales (1990) points out that genre belongs to discourse communities, not to individuals. The author addresses this notion as sociorhetorical networks that are formed in order to work towards sets of common goals, whose members are familiar with the genres used to achieve communicative purposes. In sociorhetorical networks, the primary determinants of linguistic behavior are functional. This means that the communicative needs of the goals tend to be determinant in the development and maintenance of its discursive characteristics. In order for a group of individuals to become a discourse community, some characteristics need to be present (Swales, 1990). First, there should be a broadly agreed set of common, public goals, which may be formally inscribed in documents or tacit. Moreover, what is critical is commonality of goal, not shared object of study. Second, mechanisms of intercommunication among its members should be present. These mechanisms vary according to the community. Third, participatory mechanisms to provide information and feedback should be used.

Belonging to a discourse community implies uptake of the informational opportunities. Moreover, communities use written discourses that enable members to keep in touch with each other, carry on discussions, explore controversies, and advance their aims; the genres are their vehicles for communication (Johns, 1997). Fourth, utilization and possession of one or more genres to communicate aims is also necessary. Discourse communities develop discursal expectations which are created by the genres that articulate the operations of the discourse community. Fifth, some specific lexis should be used; that is, for communication to be efficiently exchanged, discipline-related terms, such as the development of community-specific abbreviations and acronyms should be incorporated. Finally, a threshold level of expertise with a suitable degree of relevant content and discursal expertise is necessary. Discourse communities have changing memberships, but the survival of these communities depend on a sustainable balance between novices and experts. As it can be inferred, the notion of discourse community highlights the social nature of genre and, consequently, the significance of the relationship between its members.

3.4. The Field of Medicine: a Discourse Community

Professionals in the field focus of the present study can be said to constitute a discourse community, since they share both: disciplinary information and discursal resources, necessary to interact with peers and to advance scientific knowledge. Moreover, Hyland (1997: 19) considers that

Texts are written to be understood within certain cultural contexts and so reveal shared group values and beliefs through their routine rhetorical operations. In academic contexts these beliefs embody basic assumptions concerning the nature of the discipline and its subject matter, the professional conduct of its members, the promotion of its political interests and the character of the academic enterprise itself. Analysis of features in key genres can therefore provide insights into what is implicit in academic cultures and indicate how social structures are reproduced through language.

Thus, Hyland (2002) highly recommends analyzing the genres that are produced in the different disciplines, specially the emerging ones, in order to identify the features that characterize a particular community.

Taking into consideration Swales' discourse community conceptualization, we believe the discipline of Medicine constitutes an independent discourse community for the following reasons:

- It is organized in academic entities, and it offers graduate and postgraduate studies to give its members academic formation;
- It has academic and scientific organizations;
- It has its own mechanisms of intercommunication among its members (meetings, newsletters, journals, congresses);
- It owns genres such as research articles, case studies, and review articles;
- It uses highly specialized terminology;
- Its members have different degrees of content and discursal expertise.

Since Medicine constitutes a discourse community, those who are interested in joining this scientific discourse community have to get acquainted with the conventions that regulate the production and publication of academic and scientific texts within this discipline.

3.5. The Review Article as an Emerging Genre

According to Swales (2004), the review article has become an “increasingly common phenomenon” which derives from increasing specialization, the chronological lengthening of various research strands in the field, the proliferation of publishing outlets, the pressure to publish, and the increasing numbers of active participants in the discourse community.

This genre has been named with variable terminology (Noguchi, 2006). Some of the common names that have been used are “review”, “review article”, “review essay”, “general article”, “report article”, and “state of the art survey”. Morales *et al.* (2007) agree to say that although there are different types of reviews, the journals interested in publishing this genre do not prescribe different rhetorical structures.

In general terms, the RA not only examines and analyzes previously published bibliography on a specific topic but also includes the author's perspective (Day, 1990). Myers (1991: 45) considers that RAs "collect, select, order, and interpret the huge outpouring of scientific reports, putting relevant findings and generalizations in a form useful to researchers outside the immediate group working on a problem"; that is, these texts are to be read by an audience broader than that of research articles. Myers (1991: 45) regards that the originality of the RA "lies in the discriminating selection of material for comment and in the author's assessment of the current state of research on the topic under review". This implies a certain degree of expertise on the part of authors since their point of view, their perspectives, and their experience are equally important to decide what to include in a RA. This is why these texts are usually solicited from prominent experts.

Summing up, Noguchi (2006) considers the RA a "bridge" genre, introducing medical students to work that might not otherwise have been considered as relevant. As the published literature proliferates, the RA is becoming more and more important since the genre provides the writer with an opportunity to give a synoptic vision of an area of expertise, contributing, thus, to an understanding of that area and how its achievements might relate to those in other areas.

3.5.1. The Review Article as a Research-Process Genre

According to Mungra (2006) and Piqué and Posteguillo (2006), RAs can be classified into three categories: systematic reviews, meta-analytic reviews, and non-systematic reviews. To begin with, systematic reviews make use of explicit methods to summarize the information related to a topic or health condition. Systematic methods are used, and the criteria for selection and evaluation of articles are highlighted. Meta-analytical reviews, on the other hand, are studies based on the systematic integration of the information obtained from different clinical studies, on a particular health condition. These reviews consist in systematically identifying, selecting, examining and processing controlled studies on a health condition in order to provide a synthetic and quantitative estimation of the results. Finally, non-systematic reviews (traditional narratives) include narrative RAs which are not subject to previous criteria for the selection of documents.

Noguchi (2006), who analyzed 25 science RAs, divided them into four categories: history, status quo, theory/model, and issue. First, in the history category authors present a historical view of a facet of the field. Second, in the status quo category authors describe the current situation in a field. Third, in the theory/model category authors propose a theory or model to resolve some issue in the field; and last, in the issue category authors call attention to some issue in the field. Swales (2004: 209) considers that Noguchi's four-way categorization tends to reflect a primary focus and considers it "a flexible frame whereby any given RA would draw to a greater or lesser extent on each of the four focal quadrants".

3.5.2. The Review Article: an Overview of its Rhetorical Structure

In this section we proceed to describe the rhetorical structure of the three types of RAs proposed by Mungra (2006), and Piqué and Posteguillo (2006).

a) Traditional narrative RAs are considered to have no standard conventional format (Huth, 1987). Similarly, Day (1990) believes that there is not an established format for this genre. In fact, traditional narrative RAs do not seem to follow the IMRD pattern (Swales, 2004). The expository format is usually identified; this includes three parts: the *introduction*, the *development*, and the *conclusion* (Murlow, 1995; Peticrew, 2001; Gisbert and Bonfill, 2004; and Noguchi, 2006):

- *Introduction*: this section includes the thematic delimitation of the study. It also includes the purpose, justification and relevance of the review, and the development structure. Some authors consider that some relevant data about the methodology should also be included such as the consulted periods, data bases, specialized journals, and web search engines to give the review more reliability.
- *Development*: this section expands on the topic of the review. It includes the author's point of view, which is realized through the analysis and discussion of the cited references. It is usually subdivided into parts whose sub-headings are content-based.
- *Conclusion*: this section summarizes the results of the review, its implications and recommendations for future research or practice.

b) Both **systematic reviews** and **meta-analytic reviews** generally follow the IMRD pattern typical of the research article (Gisbert & Bonfill, 2004; Mungra, 2006).

3.6. Move Analysis

Most of the studies using genre analysis are based on Swales' (1981) work on research article introductions. This approach to genre analysis has been revised and expanded by several ESP researchers, including Swales himself (1990, 2004). The schematic structure of a genre is characterized by rhetorical moves, the unit of analysis used to describe the rhetorical structure of the different sections of research-process texts and of other genres.

To Swales (2004: 228), "a move in genre analysis is a discursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse". He recommends seeing it as flexible as regards its linguistic realization. This means that a move can sometimes be realized by a clause or by several sentences since it is a functional unit, not a formal one. In some cases, grammatical features as well as lexical signals can indicate the type of move. In other cases, the placement of a discourse chunk can be used to interpret its status.

According to Nwogu (1997: 114), a move is "a text segment made up of a bundle of linguistic features (lexical meanings, propositional meanings, illocutionary forces, etc.) which give the segment a uniform orientation and signal the content of discourse in it". He considers that a text section can indicate a move if there is association between a function and the linguistic clues that realize it.

To conclude, moves can vary in length and in frequency of occurrence; certain moves are considered obligatory whereas some others are regarded as optional (Connor & Mauranen, 1999; Kanoksilapatham, 2007). Each move, then, constitutes a text section with a specific communicative function; this communicative function, in turn, contributes to the general purpose of the genre. As Parodi (2010: 146) puts it, "the unique organization of the moves of a specific genre is what provides its identity and

distinguishes it from the other genres”. This organization comes to light when rhetorical moves are identified.

3.6.1. Swales’ Models of Move Analysis

Swales’ (1981) earliest model for the analysis of introductions, presented in Table 1, was a “4-move” model. The original aim of this work was to describe the rhetorical organization of research article introductions in order to assist advanced non-native English students when reading and writing scientific papers, as well as, non-native English professionals to publish their research production in English (Kanoksilapatham, 2007).

Table 1: *Swales’ 1981 Model*

<p>Move 1: Establishing the Field</p> <ul style="list-style-type: none"> A- Showing centrality <ul style="list-style-type: none"> i- by interest ii- by importance iii- by topic-prominence iv- by standard procedure B- Stating current knowledge C- Ascribing key characteristics <p>Move 2: Summarizing Previous Research</p> <ul style="list-style-type: none"> A- Strong Author-Orientations B- Weak Author-Orientations C- Subject Orientations <p>Move 3: Preparing for Present Research</p> <ul style="list-style-type: none"> A- Indicating a Gap B- Question Raising C- Extending a Finding <p>Move 4: Introducing Present Research</p> <ul style="list-style-type: none"> A- Giving the Purpose B- Describing Present Research <ul style="list-style-type: none"> i- by this/the present research ii- by Move 3 take up iii- by switching to the first person pronoun
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Although the “4-move” model offered a detailed account of research article introductions several analysts found it difficult to separate Move 1 and Move 2. In the light of criticisms received, Swales (1990) revised his Create a Research Space (CARS) model and developed a three-move schema for research article introductions (shown in Table 2).

Table 2: *Swales' 1990 Model*

Move 1	Establishing a territory
Step 1	Claiming centrality and/or
Step 2	Making topic generalizations and/or
Step 3	Reviewing items of previous research
Move 2	Establishing a niche
Step 1A	Counter-claiming or
Step 1B	Indicating a gap or
Step 1C	Question raising or
Step 1D	Continuing a tradition
Move 3	Occupying the niche
Step 1A	Outlining purposes or
Step 1B	Announcing present research
Step 2	Announcing principal findings
Step 3	Indicating research article structure

Although this model has been widely used by other authors in subsequent research into the different sections of the research article in varied disciplines (Kanoksilapatham, 2005; Lim, 2006; Nwogu, 1997; Ozturk, 2007; Posteguillo, 1998; Samraj, 2002), among others), it has been challenged, mainly due to disciplinary variation. So, Swales (2004) proposes revising the model and introduces certain changes.

Table 3: *Swales' 2004 Revised Model*

Move 1	Establishing a territory (citations required) via Topic generalizations of increasing specificity
Move 2	Establishing a niche (citations possible) via
Step 1A	Indicating a gap or
Step 1B	Adding to what is known
Step 2	Presenting positive justification (optional)
Move 3	Presenting the present work (citations possible) Via
Step 1	Announcing present research descriptively and/or purposively (obligatory)
Step 2	Presenting research questions or hypotheses (optional)
Step 3	Definitional clarifications (optional)
Step 4	Summarizing methods (optional)
Step 5	Announcing principal outcomes (possible in some fields, but unlikely in others)
Step 6	Stating the value of the present research (possible in some fields, but unlikely in others)
Step 7	Outlining the structure of the paper (possible in some fields, but unlikely in others)

This approach to genre analysis –from identifying purpose to examining rhetorical moves and how these moves are realized linguistically– has contributed significantly to our knowledge of how different disciplines organize the information in research-process genres. In fact, as reviewed in the previous chapter, a number of move-based studies have specifically focused on the different canonical sections of scientific papers; and only a few studies have explored the different sections of the review article in particular disciplines.

3.6.2. Moves Identified in the Rhetorical Structure of Research Articles

The following studies are included in this section, since they have been relevant to determine the model that has been used in the present study to analyze the rhetorical structure of RAs.

Nwogu (1997) studied the structure of information in all the sections of the medical research paper using Swales’ (1981, 1990) CARS model for the Introduction section as point of departure. He proposes an eleven-move schema, eight of which were found to be “normally required” and three “optional” (see Table 4).

Table 4: *Nwogu’s 1997 Eleven-Move Schema*

<i>Introduction</i>	
Move 1 by	Presenting Background Information: (optional) (1) Reference to established knowledge in the field. (2) Reference to main research problems.
Move 2 by	Reviewing Related Research: (normally required) (1) Reference to previous research. (2) Reference to limitations of previous research.
Move 3 by	Presenting New Research: (normally required) (1) Reference to research purpose. (2) Reference to main research procedure.
<i>Methods</i>	
Move 4 by	Describing Data-Collection Procedure: (normally required) (1) Indicating source of data. (2) Indicating data size.
Move 5 by	Describing Experimental Procedures: (normally required) (1) Identification of main research apparatus. (2) Recounting experimental process. (3) Indicating criteria for success.
Move 6 by	Describing Data-Analysis Procedures: (optional) (1) Defining terminologies. (2) Indicating process of data classification.

	(3) Identifying analytical instrument/procedure.
	(4) Indicating modification to instrument/procedure.
<i>Results</i>	
Move 7	Indicating Consistent Observation: (normally required)
by	(1) Highlighting overall observation.
	(2) Indicating specific observations.
	(3) Accounting for observations made.
Move 8	Indicating Non-Consistent Observations: (optional)
<i>Discussion</i>	
Move 9	Highlighting Overall Research Outcome: (normally required)
Move 10	Explaining Specific Research Outcomes: (normally required)
by	(1) Stating a specific outcome.
	(2) Interpreting the outcome.
	(3) Indicating significance of the outcome.
	(4) Contrasting present and previous outcomes.
	(5) Indicating limitations of outcomes.
Move 11	Stating Research Conclusions: (normally required)
by	(1) Indicating research implications.
	(2) Promoting further research.

Kanoksilapatham (2005) analyzed the structure of biochemistry research articles and proposes the following two-level rhetorical structure (moves and steps). This structure consists of 15 distinct moves, twelve of which were found to be “obligatory” and three “optional” (See Table 5).

Table 5: *Kanoksilapatham’s 2005 Fifteen-Move Schema*

<i>Introduction</i>
Move 1: Announcing the importance of the field
By Step 1: Claiming the centrality of the topic
By Step 2: Making topic generalizations
By Step 3: Reviewing previous research
Move 2: Preparing for the present study
By Step 1: Indicating a gap
By Step 2: Raising a question
Move 3: Introducing the present study
By Step 1: Stating purpose(s)
By Step 2: Describing procedures
By Step 3: Presenting findings
<i>Methods</i>
Move 4: Describing materials
By Step 1: Listing materials
By Step 2: Detailing the source of the materials
By Step 3: Providing the background of the materials
Move 5: Describing experimental procedures
By Step 1: Documenting established procedures
By Step 2: Detailing procedures
By Step 3: Providing the background of the procedures

Move 6: Detailing equipment (optional)
Move 7: Describing statistical procedures (optional)

Results

Move 8: Stating procedures
By Step 1: Describing aims and purposes
By Step 2: Stating research questions
By Step 3: Making hypotheses
By Step 4: Listing procedures or methodological techniques
Move 9: Justifying procedures or methodology
By Step 1: Citing established knowledge of the procedure
By Step 2: Referring to previous research
Move 10: Stating results
By Step 1: Substantiating results
By Step 2: Invalidating results
Move 11: Stating comments on the results
By Step 1: Explaining the results
By Step 2: Making generalizations or interpretations of the results
By Step 3: Evaluating the current findings
By Step 4: Stating limitations
By Step 5: Summarizing

Discussion

Move 12: Contextualizing the study
By Step 1: Describing established knowledge
By Step 2: Presenting generalizations, claims, deductions, or research gaps
Move 13: Consolidating results
By Step 1: Restating methodology (purposes, research questions, hypotheses restated, and procedures)
By Step 2: Stating selected findings
By Step 3: Referring to previous literature
By Step 4: Explaining differences in findings
By Step 5: Making overt claims or generalizations
By Step 6: Exemplifying
Move 14: Stating limitations of the study
By Step 1: Limitations about the findings
By Step 2: Limitations about the methodology
By Step 3: Limitations about the claims made
Move 15: Suggesting further research (optional)

These templates seem useful particularly to native and non-native scientists because these schemata not only allow scientists to better understand published research papers but also facilitate the process of writing research articles for publication.

3.6.3. Moves Identified in the Rhetorical Structure of Review Articles

Morales (2010) analyzed the rhetorical structure of RAs written in Spanish in the field of Dentistry. He proposes the following schema of ten moves for analyzing the different sections of RAs, eight of which were found to be “obligatory” whereas two were considered “optional” (See Table 6).

Table 6: *Morales’ 2010 Ten-Move Schema*

<i>Introduction</i>	Move 1	Topic Definition
	Move 2	Review Justification
	Move 3	Objectives
	Move 4	Methodology (optional)
	Move 5	Article Development Structure (optional)
<i>Development</i>	Move 6	Information Presentation
	Move 7	Information Elaboration/Expansion
	Move 8	Summary
<i>Conclusion</i>	Move 9	Summary of Main Findings
	Move 10	Recommendations for Future Research or Practice

According to Morales (2010) each move, each selection has a purpose and tries to manifest the author’s intentions. For this reason, it seems very useful to name the moves with functional labels in accordance with the function they fulfill in the text.

3.6.4. Moves Used in the Present Study

For the present study, a classification based on Nwogu’s (1997), Kanoksilapatham’s (2005), and Morales’ (2010) models was built. This new taxonomy includes not only most of the moves proposed by Morales but also other moves from the previously mentioned models in order to best suit the purpose of this research. The selected moves and their corresponding definitions are described as follows:

Introduction Section

Move 1: Presenting the Topic: This move is used to present a brief definition of the topic, and to limit the area of study, highlighting theoretical information. According to Morales (2010), this may coincide with Swales' (1990) "establishing the territory".

Move 2: Justifying the Topic: This move is used to justify the importance of the present research study. Sometimes, authors make reference to the need of further research in the area as well (Morales, 2010).

Move 3: Establishing the Objective(s): Some writers choose to include this move to explicitly state what they plan to do in the review. This move is characterized by a statement of purpose(s) of the study (Kanoksilapatham, 2005).

Move 4: Presenting the Article Development Structure: This move is used to anticipate the contents of the *Development* section. According to Morales (2010), this move may coincide with one of the steps found in Swales' occupying the niche.

Move 5: Making Recommendations for the Reader: Writers make use of this move to make the text reader-friendly.

Development Section

Move 6: Presenting the Information: This move is used to present the topic which will be elaborated in the following move. It works as an introductory move which is characterized by impersonal constructions (Morales, 2010).

Move 7: Elaborating/ Expanding the Information: Writers use this move to give details of the topic being developed. Relevant studies are mentioned here by using citations. Descriptions, explanations, exemplifications, and recommendations are used in this move (Morales, 2010).

Move 8: Stating the Author's Opinion/ Point of View: Writers make use of this move to analyze the topic under discussion from their own perspective. This move presents the scientists' subjective comments, which are not absolutely established by the data (Kanoksilapatham, 2005).

Move 9: Summarizing: This move is used to highlight relevant findings before a new topic is introduced or before the *Conclusion* section (Morales, 2010).

Conclusion Section

Move 10: Summarizing the Main Findings: In this move, writers recapitulate the salient findings of the research (Morales, 2010).

Move 11: Making Recommendations for Future Research or Practice: Writers make suggestions for future lines of research in the topic (Dudley-Evans, 1994) and/or recommendations for changes in future practice.

Move 12: Indicating Implications: In this move, writers summarize their views on the contributions which their study has made to the field (Nwogu, 1997) or to raise themes and questions for future research.

Move 13: Making Predictions: Writers make use of this move to anticipate possible results in the future in relation to the topic under discussion. This move allows the scientists to go beyond the results (Kanoksilapatham, 2005).

3.7. Summary of the Chapter

This chapter has analyzed the theoretical construct that provides the rationale for the present research: Genre Analysis. This section has also presented an overview of the underpinning concepts underlying this theory and, in doing so, it has given theoretical support to the methodological choices in the study. Next, I present and describe the materials and methods of the present research.

Chapter IV: Materials and Methods

4.1. Introduction

This section describes the materials and research method chosen for the present study. The chapter begins by including specifications about the data collection method employed. It presents a description of the research design in terms of the phases implemented as well.

4.2. Data Collection Procedure and Corpus Design Procedure

The present descriptive-exploratory study focused on a corpus made up of thirty medical review articles written in English published in a prestigious¹ journal: the *New England Journal of Medicine*. We have chosen this journal because it is considered the most widely read, cited, and influential general medical periodical in the world. It also employs a highly rigorous peer-review and editing process to evaluate manuscripts for scientific accuracy, novelty, and importance. Moreover, according to the ScienceWatch's annual survey of the most-cited research papers, the *New England Journal of Medicine* published the greatest number of highly cited papers. Among the 51 individual research papers receiving the highest number of citations in 2012, 13 were published in this journal, the highest number of papers among all journals tracked in the report.

To control for possible sub-discipline variation, texts belonging to three representative sub-disciplines were collected: Global Health, Genomic Medicine, and Current Concepts. These sub-disciplines were chosen because they represent different scenarios

¹ By "prestigious journals" it is meant those included and ranked in the indexes compiled by the Journal Citations Report, a database which offers an objective means to critically evaluate leading journals, with quantifiable, statistical information (Retrieved April 5, 2015, from http://thomsonreuters.com/products_services/science/science_products/a-z/journal_citation_reports/).

that may shed light on the challenges physicians have to face throughout their professional career. Global Health addresses the challenges to population health around the world. Genomic Medicine was considered to be the primary field of study in 2012 according to the ScienceWatch's annual survey of the most-cited research papers. Current Concepts addresses challenges that are relevant for physicians at a particular time. The texts were selected following conventional sampling procedures: *representativeness* (the chosen texts are considered to be a representative sample of the language of the members of the medical profession; Leech, 1991), *reputation* (the esteem with which members of an assumed readership hold for a particular publication; Nwogu, 1997), and *accessibility* (the ease with which texts that constitute the corpus can be obtained; Nwogu, 1997).

Leech (1991: 27) maintains that a corpus is representative if “findings can be generalized to a larger hypothetical corpus”. In other words, a corpus can be considered *representative* when findings obtained from its analysis yield insights into the whole population it claims to represent. Central aspects need to be considered when designing a maximally representative corpus and these are *sample*, *population* and *size*. Biber (1993), as a first step in corpus sampling, emphasizes the need to clearly define the limits of the population to be studied. In addition to defining population, the hierarchical structure of the population needs to be determined; that is, the genres and channels it is made up of should be established. Once population has been defined, the size of the sample needs to be determined in terms of length and number of texts to be included in the corpus. Thus, to ensure a *representative sample* in the corpus of the present study, the texts had to have been produced by authors working in English speaking universities. This also ensured that the exemplars fulfilled the standards of academic English language. Native speaker status was not taken as a variable. In the present study, the size of the sample was 30 RAs with a total of 99,114 words. So as to control for rapid changes within the discipline, the period of selection of the texts was restricted to three years (only RAs from 2010 to 2013 were selected).

Finally, to qualify as accessible for selection, the texts had to appear online and had to be of free access, which guaranteed that the articles were readily available.

The articles in the corpus were coded for ease of identification (Appendix A). Each RA was identified by a number, as shown in the example:

RA 1: Ezzati, M. and Riboli E. (2013). Behavioral and dietary risk factors for noncommunicable diseases. *The New England Journal of Medicine*, 369 (10), 954-964.

4.3. Data Analysis Procedure

The following research question was addressed in the present study:

What is the rhetorical structure of medical RAs written in English?

The method used to answer this question involved applying the procedures proposed by Dudley-Evans (1994) and Holmes (1997): (a) identify the sections of the RA, (b) identify the moves in each section of the RA using a combination of linguistic evidence and text comprehension, (c) analyze each sentence of each section, (d) assign the sentences to a move, (e) analyze the frequency of appearance of each move, (f) determine the possible occurrence of categories not found in previous studies and (g) validate the classification by testing inter-rater agreement. In other words, the analysis was restricted to the organization of moves. In most cases, the sentence as a unit of coding was successful. Following Ozturk (2007), in a very limited number of cases in which a sentence contained two moves, it was assigned to the move that appeared to be salient. To minimize the risk of arbitrariness, a subset of seven RAs was analyzed by two raters.

4.3.1. Move Classification Taxonomy for the Study and Sentence Analysis

For this study, a taxonomy of moves was created *ad hoc* based on the model discussed in the theoretical framework. Following Noguchi's (2006) and Morales' (2010) findings, in the first phase, two randomly chosen RAs were examined to identify the sections of the RA. Then, a more thorough analysis was carried out using the rhetorical taxonomy proposed by Morales (2010) in previous research.

In order to show what the authors were trying to do with the discourse, -ing phrases were used to name the *moves* (Yang & Allison, 2003). That is, the researcher's purpose in using -ing forms was to highlight the function of the discourse segment.

4.3.2. Sentence Analysis and Move Classification

The sentence was the unit of analysis for the three sections of the RA – *Introduction*, *Development* and *Conclusion*. Each of the sentences was assigned to one of the *moves* in the taxonomy created *ad hoc*. In the *introduction* section, the following moves were considered: 1) Presenting the topic, 2) Justifying the topic, 3) Establishing the objectives, 4) Presenting the article development structure, and 5) Making recommendations for the reader. In the *development* section, the following moves were considered: 6) Presenting the information, 7) Elaborating or expanding the information, 8) Stating the author's opinion/ point of view, and 9) Summarizing. In the *conclusion* section, the following moves were considered: 10) Summarizing the main findings, 11) Making recommendations for future research or practice, 12) Indicating implications, and 13) Making predictions.

4.3.3. Frequency Analysis

The frequency of the moves in each section of the RA was recorded. The objective was to determine if a particular move occurred frequently enough to be considered conventional. Following Nwogu (1997) and Li and Ge (2009), the cut-off frequency of 50% of occurrence was established as a measure of move stability (or regularity). If the *move* occurred in 50% of the texts in the corpus, it was considered as “conventional”. If the frequency of the *move* was below 50%, it was considered “optional”. Within the “conventional” moves, a sub-categorization was established: “obligatory” and “quasi-obligatory”. Those occurring in every single text in each corpus (100%) were classified as “obligatory”, and those with a frequency of occurrence between 51% and 99% were classified as “quasi-obligatory”.

4.3.4. Validation

In order to validate the preliminary findings, an inter-coder reliability analysis was conducted. To ensure that the coders had an understanding of genre analysis, and more specifically, of move identification, two well-versed colleagues, who are acquainted with move-based studies, were asked to code one quarter of the corpus (Crookes, 1986) following the thirteen-move structure adopted for analysis. A statistical analyst recorded and then compared the results obtained by the raters and the ones obtained by the researcher. To assess inter-rater reliability of move classification, the Kappa coefficient was used. The κ value obtained from the inter-coder analysis is shown in the following chapter.

4.4. Summary of the Chapter

This chapter contextualized the study by describing the data collection, the corpus design and the data analysis procedure. The next chapter contains the results obtained from the analysis of the data.

Chapter V: Results

5.1. Introduction

This chapter presents and describes the data obtained from the rhetorical move analysis of medical RAs in English. The findings are organized in different sections. First, I present the results of the inter-rater reliability tests. Second, I compare the length of the RAs under study and make reference to the constitutive elements of medical RAs. Next, I refer to the predominant textual sequences which characterize this genre. Finally, I present the results regarding the moves found in the different sections of the RAs. These results are discussed in the following chapter.

5.2. Inter-Rater Reliability

There is often some degree of subjectivity when analyzing pieces of writing. Consequently, researchers should attend to inter-observer agreement to ensure reliable and valid measurement. Cohen's Kappa has been proposed as statistically sound to calculate the degree and significance of agreement between observers in their assignment of objects to nominal categories (Watkins and Pacheco, 2000). In this study, the reliability index for inter-rater (see tables below) was found to be around .75.

Table 7: *Inter-Reliability Coefficient Researcher- Rater 1*

<i>Kappa .759</i>

Table 8: *Inter-Reliability Coefficient Researcher- Rater 2*

<i>Kappa .763</i>

Taking into consideration that Kappa values of less than .40 show poor agreement, values of .40 to .60 suggest fair agreement, values of .60 to .75 represent good agreement, and values greater than .75 indicate excellent agreement (Watkins and Pacheco, 2000), the results for the inter-rater test can be judged as reliable.

5.3. Article Length

A first look at Table 9 reveals that the 30 RAs selected for this study related to three different topics – Global Health (GH), Genomic Medicine (GM), and Current Concepts (CC). More specifically, 12 RAs related to GH, 13 RAs related to GM, and 5 RAs related to CC. The idea was to include general topics as well as specialized ones to be able to make generalizations concerning the rhetorical organization of information of the RA, independently of the speciality or topic addressed.

Table 9: *Units of Analysis in the Corpus*

Corpus	Topic	Number of Sentences	Number of Words
RA 1	GH	97	3,011
RA 2	GH	131	3,115
RA 3	GH	100	3,398
RA 4	GH	105	3,063
RA 5	GH	90	2,375
RA 6	GH	106	3,277
RA 7	GH	90	3,100
RA 8	GH	92	3,039
RA 9	GH	119	3,474
RA 10	GH	101	3,018
RA 11	GH	114	3,202
RA 12	GH	107	3,042
RA 13	GM	140	3,698
RA 14	GM	158	3,975
RA 15	GM	121	3,267
RA 16	GM	122	3,357
RA 17	GM	131	3,318
RA 18	GM	105	3,223
RA 19	GM	118	3,495
RA 20	GM	117	3,346
RA 21	GM	137	4,051
RA 22	GM	135	3,614
RA 23	GM	149	3,770
RA 24	GM	125	3,504
RA 25	GM	116	3,861
RA 26	CC	117	3,278
RA 27	CC	127	3,450
RA 28	CC	85	2,588
RA 29	CC	137	3,265
RA 30	CC	119	2,940

Table 10 shows that although the RAs vary in the number of sentences (the unit of analysis) and in the number of words, there is little difference as regards the average number of both. These are important variables to control, which will allow us to propose a general rhetorical model for the analysis of the medical RA.

Table 10: *Average Number of Sentences and Words per Article According to the Sub-discipline*

Topic	Average Number of Sentences	Average Number of Words
Global Health	117	3,304
Genomic Medicine	120	3,575
Current Concepts	117	3,104

5.4. Constitutive Elements of Review Articles

As it is observed in Table 11, all the RAs follow the same format as regards the title, author, profession, contact address and institutional affiliation. None of them include an abstract and/ or keywords. This suggests a regulation of the journal to standardize the presentation of RAs.

Table 11: *Constitutive Elements of RAs*

Section	Element	Frequency %
Introduction	Title	100
	Author, profession and institutional affiliation	100
	Contact address	100
	Introduction	100
Development	Development	100
	Figures	80
	Diagrams	76.6
	Tables	80
	Glossary	46.6
Conclusion	Conclusion	96.6
	Acknowledgements	26.6
	References	100

As it can be seen, most RAs include non-verbal information, mainly figures, tables and diagrams. This may respond to editorial policies of the *New England Journal of*

*Medicine*², which are committed to presenting the information in an understandable and clinically useful format. Furthermore, this journal is aimed at general physicians, which may be the reason why glossaries are included when the featured topic is too specific as it is the case of Genomic Medicine.

A few RAs include acknowledgements. This may be explained by the fact that RAs, in general, are not part of research projects. Those authors that do include acknowledgements may be driven by the fact that acknowledgements are considered a universal feature of academic writing (Hyland, 2003; 2004).

5.5. Predominant Textual Sequences in Review Articles

According to Swales (2004) and Noguchi (2006), RAs are not considered a homogeneous genre from the discursive point of view. Different textual sequences work together throughout the text. Such sequences can be classified into expository, narrative and descriptive.

To begin with, expository sequences include three components –introduction, development and conclusion (Noguchi, 2006). These components have been associated with the rhetorical structure of the RA (Myers, 1991; Noguchi, 2006, Morales *et al.*, 2007; Petticrew, 2001). Moreover, narrative and descriptive sequences have been used in different rhetorical sections of the RA. This has been mentioned by Atkinson (1999), Huth (1999) and Horton-Salway (2002). In their view, biomedical reasoning is characterized by narrations and descriptions. In other words, patients' observations and clinical records are fundamental components of biomedical knowledge.

On the one hand, narrative sequences are mainly used to present antecedents and previous studies related to the object of study, as the following examples show:

- (1) *Vaccines are among the most effective interventions in modern medicine. Ever since Edward Jenner's first use of a vaccine against smallpox in 1796 (see text box), the use of vaccines has become indispensable to the eradication of disease. In the 20th century alone, smallpox claimed an estimated 375 million lives, but since 1978, after the completion of a*

² Retrieved from <http://www.nejm.org/page/about-nejm/history-and-mission>

successful eradication campaign, not a single person has died from smallpox. Today, more than 70 vaccines have been licensed for use against approximately 30 microbes, sparing countless lives (Fig. 1A and 1B).^{1,2} Diseases including poliomyelitis, measles, mumps, rubella, and others caused an estimated 39 million infections in the 20th century in the United States, but vaccines have since rendered them uncommon. (RA 2)

- (2) *The pace of technical advancement in microbial genomics has been breathtaking. Since 1995, when the first complete genome sequence of a free-living organism, Haemophilus influenzae, was published,¹ 1554 complete bacterial genome sequences (the majority of which are from pathogens) and 112 complete archaeal genome sequences have been determined, and more than 4800 and 90, respectively, are in progress.² A total of 41 complete eukaryotic genome sequences have been determined (19 from fungi), and more than 1100 are in progress. Complete reference genome sequences are available for 2675 viral species, and for some of these species, a large number of strains have been completely sequenced.* (RA 13)

Descriptive sequences, on the other hand, are mainly used to define and characterize pathologies, therapies, diagnosis, medical procedures, as the following examples show:

- (3) *Several mendelian disorders directly illustrate the importance of these mechanisms. For example, mutations affecting the transcription factor autoimmune regulator lead to a relaxing of selection against self-reactivity by T cells in the thymus, giving rise to a rare, aggressive autoimmune disease, autoimmune polyendocrine syndrome 1.30 The autoimmune regulator controls the ectopic expression of self-antigens within the thymus³¹ and thus is critical to the negative selection of T cells reactive with these antigens.* (RA 15)
- (4) *Gene chips consist of a highly ordered microscopic matrix of sequence-specific oligonucleotides tethered to a solid surface, known as a microarray (Fig. 3). To perform a genomewide SNP scan such as the type purchased by Cathy, DNA is isolated from a sample obtained from a patient, cut into small fragments, labeled with a fluorescent dye, and then incubated with the silicon chip. The fragments bind to the tethered oligonucleotides in a sequence-specific manner, and sophisticated scanning hardware and signal-processing software analyze the pattern and intensity of the fluorescence signal to determine the sequences present in the sample.* (RA 17)

5.6. Sections of the RA

All the RAs analyzed but one (RA 29) present the following structure: *Introduction, Development, Conclusion, and References*. This coincides with Huth (1999), Myers (1991), Morales *et al.* (2007), and Noguchi (2006). According to Petticrew (2001) and Gisbert and Bonfill (2004), this pattern corresponds to the traditional narrative structure

of the RA. It is called so because the narrative structure does not follow the IMRD pattern (Swales, 1990), as it is case of systematic revisions and meta-analyses.

Of the four sections of the RA, only the *Conclusion* and the *References* were signaled by sub-headings. It is worth mentioning that different sub-headings were used to signal the *Conclusion* section. Some authors used *Conclusion* (RA 25) or *Conclusions* (RA 2), others used *Summary* (RA 20), while a few preferred headings such as *Challenges* (RA 5), *Challenges and the Way Ahead* (RA 3), *Implications* (RA 4), *The Way Forward* (RA 7), *Future Development* (RA 9), *Future Directions* (RA 13), or *The Urgent Need for Action* (RA 27). These sub-headings seem to provide a summary of the content of the paragraphs that follow.

5.7. Rhetorical Structure of the RA

Following Morales (2010), we consider that the rhetorical structure of medical RAs can be explored using the following model of analysis:

RHETORICAL MOVES OF REVIEW ARTICLES: MODEL OF ANALYSIS

A. INTRODUCTION

1. Topic presentation
2. Topic justification
3. Objectives
4. Article development structure
5. Recommendations for the reader

B. DEVELOPMENT

6. Information presentation
7. Information expansion/elaboration
8. Author's opinion/point of view
9. Summary

C. CONCLUSION

10. Summary of main findings
11. Recommendations
12. Implications
13. Predictions

D. REFERENCES

In order to answer the research question posed for this study (what is the rhetorical structure of medical RAs in English?), the frequency of occurrence of each individual move in the corpus was recorded. The purpose was to determine whether the moves in the taxonomy were present in the texts and whether the ones present occurred frequently enough to be considered “conventional” or “obligatory” (Nwogu, 1997).

In general, the thirteen moves were found to occur with varying degrees of regularity in the corpus (see Table 12). This allowed us to classify them as “obligatory”, “quasi-obligatory” or “optional” (see Materials and Methods Section). As it can be seen in Table 12, the frequency of occurrence of three of the thirteen moves (moves 1, 6, and 7) was 100%; therefore, they were classified as “obligatory”. The frequencies of occurrence of moves 2, 10, 8 and 11 were 96.66%, 63.33%, 93.33% and 56.66% respectively; consequently, these four moves were classified as “quasi-obligatory”. As for moves 3 and 9, their frequencies of occurrence were 40% and 33.33% respectively; moves 4 and 5 occurred in 3.33% of the texts whereas moves 8 and 11 had a frequency of occurrence of 46.66%; therefore, these six moves were classified as “optional”.

As regards the sections of the RA, one “obligatory” (**presenting the topic**) and one “quasi-obligatory” move (**justifying the topic**) belong to the *introduction*, two “obligatory” moves (**presenting the information**, and **expanding the information**) and “one quasi-obligatory” move (**giving the author’s opinion**) belong to the *development*, and two “quasi-obligatory” moves (**summarizing the main findings**, and **recommending**) belong to the *conclusion*.

Table 12: *Distribution of Moves per Text in the Corpus*

	Move 1	Move 2	Move 3	Move 4	Move 5	Move 6	Move 7	Move 8	Move 9	Move 10	Move 11	Move 12	Move 13	TOTAL
RA 1	+	+	+	-	-	+	+	-	+	+	+	-	-	8
RA 2	+	+	-	-	-	+	+	+	-	+	-	-	-	6
RA 3	+	+	-	-	-	+	+	+	-	+	+	-	-	7
RA 4	+	+	+	-	-	+	+	+	-	+	+	+	+	10
RA 5	+	+	-	-	-	+	+	-	-	+	+	+	-	7
RA 6	+	+	+	-	-	+	+	-	-	-	-	+	+	7
RA 7	+	+	-	-	-	+	+	+	+	+	+	+	+	10
RA 8	+	+	-	-	-	+	+	+	-	+	-	-	-	6
RA 9	+	+	-	-	-	+	+	-	-	+	+	-	+	7
RA 10	+	+	-	+	-	+	+	-	-	+	+	-	+	8
RA 11	+	+	-	-	-	+	+	+	+	+	-	+	-	8
RA 12	+	+	-	-	-	+	+	+	-	+	+	+	-	8
RA 13	+	+	-	-	-	+	+	+	+	+	+	-	+	9
RA 14	+	+	+	-	-	+	+	+	-	+	-	-	-	7
RA 15	+	+	-	-	-	+	+	+	+	+	-	+	+	9
RA 16	+	+	+	-	-	+	+	-	+	+	+	+	-	9
RA 17	+	+	+	-	+	+	+	+	-	+	+	+	+	11
RA 18	+	+	-	-	-	+	+	+	-	+	+	+	-	8
RA 19	+	-	-	-	-	+	+	-	-	+	-	-	+	5
RA 20	+	+	+	-	-	+	+	+	-	+	+	-	+	9
RA 21	+	+	+	-	-	+	+	+	-	+	+	-	+	9
RA 22	+	+	-	-	-	+	+	+	+	+	+	-	-	8
RA 23	+	+	+	-	-	+	+	-	+	+	-	-	-	7
RA 24	+	+	+	-	-	+	+	-	+	+	+	-	+	9
RA 25	+	+	+	-	-	+	+	+	-	+	-	+	+	9
RA 26	+	+	-	-	-	+	+	+	-	+	+	+	-	8
RA 27	+	+	+	-	-	+	+	-	+	+	-	+	-	8
RA 28	+	+	-	-	-	+	+	-	-	+	-	+	-	6
RA 29	+	+	-	-	-	+	+	+	-	-	-	-	-	5
RA 30	+	+	-	-	-	+	+	-	-	+	-	-	+	6
TOTAL	30	29	12	1	1	30	30	19	10	28	17	14	14	
%	100%	96.66%	40%	3.33%	3.33%	100%	100%	63.33%	33.33%	93.33%	56.66%	46.66%	46.66%	

In general terms, the overall analysis of the texts in the corpus reveals that authors of RAs in English are likely to:

- 1- Present the topic
- 2- Justify the topic
- 3- Present information related to the topic

- 4- Elaborate and expand the information
- 5- State their opinion about the topic
- 6- Summarize the main findings
- 7- Recommend

5.8. Rhetorical Moves found in the *Introduction* Section

As it can be seen in the rhetorical analyses of the texts, all the RAs have an *Introduction* section. This coincides with Kwan (1996), Day (1990), and Caldeiro *et al.* (1993), who suggest that all RAs should have an introduction. Following Swales (1990), the introduction does not contain sub-headings; therefore, we focused on the section between the title and the first sub-heading. Five moves have been identified in this section: **presenting the topic, justifying the topic, establishing the objectives, presenting the article development structure, and making recommendations for the reader.** Table 13 summarizes the combination of rhetorical moves found in this section.

Table 13: *Rhetorical Move Combinations Found in the Introduction Section*

INTRODUCTION		
Rhetorical Structure	Number of Instances/ Number of Texts	Frequency of Occurrence
Topic presentation Topic justification	16	53.33%
Topic presentation Topic justification Objectives	11	36.66%
Topic presentation Topic justification Objectives Recommendations for the reader	1	3.33%
Topic presentation Topic justification Article development structure	1	3.33%
Topic presentation	1	3.33%

Table 13 shows the most common combination of moves in the *introductions* of our corpus: **topic presentation** and **article justification**. In eleven instances, we identified the combination of three moves: **topic presentation**, **article justification** and **objectives**. In one instance (RA 17), the previous combination included a different move – **recommendations for the reader**. In only one instance, (RA 10) we identified the following sequence: **topic presentation**, **article justification**, and **article development structure**; and one text (RA 19) did not include any combinations of moves; we found only one move – **topic presentation**.

Each of the moves found in the *Introduction* section was analyzed from the point of view of the function they fulfill in the text, taking into account specific linguistic cues.

5.8.1. Move 1: Presenting the Topic

This move is present in all the texts analyzed, which makes it “obligatory”. It seems to be used to present a brief definition of the topic, and to limit the area of study, highlighting theoretical information. According to Morales (2010), this may coincide with Swales’ (1990) “establishing the territory”. This move is usually signaled by the use of copulative verbs, impersonal constructions and generalizations.

- (5) *Vaccines are among the most effective interventions in modern medicine. Ever since Edward Jenner’s first use of a vaccine against smallpox in 1796 (see text box), the use of vaccines has become indispensable to the eradication of disease.* (RA 2)
- (6) *It is difficult to deliver effective and high-quality care to patients without knowing their diagnoses; likewise, for health systems to be effective, it is necessary to understand the key challenges in efforts to improve population health and how these challenges are changing. Before the early 1990s, there was no comprehensive and internally consistent source of information on the global burden of diseases, injuries, and risk factors.* (RA 9)

5.8.2. Move 2: Justifying the Topic

All the texts but one (RA 19) contain this move, which makes it “quasi-obligatory”. This move is to be used to justify the importance of the research. The realization of this

move is exemplified below; its most salient linguistic features, which are usually explicit lexical items, are highlighted.

- (7) *As a result of genomic discoveries, increasing numbers of clinical guidelines now suggest incorporating genomic tests or therapeutics into routine care. In some cases, the rapidity of translation has sparked debate regarding the level of evidence of clinical benefit needed to introduce new, and potentially costly, medical technologies.*^{5,6} (...) *Regardless of where medicine is practiced, genomics is inexorably changing our understanding of the biology of nearly all medical conditions. How can any clinician understand the diagnosis and treatment of breast cancer, much less explain it to a patient such as Cathy, without a rudimentary understanding of genomic medicine?* (RA 17)
- (8) *Pharmacogenomics facilitates the identification of biomarkers that can help physicians optimize drug selection, dose, and treatment duration and avert adverse drug reactions. In addition, pharmacogenomics can provide new insights into mechanisms of drug action and as a result can contribute to the development of new therapeutic agents.* (RA 24)

Some authors choose to include the need for further research in this area of study as well.

- (9) *Despite this progress, mechanisms that underlie individual differences in the presentation and pathophysiological features of cardiovascular disease are poorly understood.* (RA 16)
- (10) *However, the mechanisms that underlie individual differences in the predisposition to obesity remain obscure. Failure to understand the pathophysiology of diseases such as type 2 diabetes and obesity frustrates efforts to develop improved therapeutic and preventive strategies.* (RA 20)

Narration sequences have been identified in this move to refer to what has been relevant to the research.

- (11) *Whereas staging laparotomy was once used to define the extent of the disease in patients with earlystage (i.e., stage I or stage II) Hodgkin's lymphoma, currently available imaging techniques and effective systemic therapies have relegated staging laparotomy to a historical footnote.*
Studies of the use of mechlorethamine in the 1940s showed that the rate of response to systemically administered anticancer agents in patients with Hodgkin's lymphoma could be high. After the discovery of several other active agents, investigators at the National Cancer Institute combined four of these drugs for use in the initial treatment of patients with disseminated Hodgkin's lymphoma. The resulting report, released in 1970, made it clear that a cure was possible with chemotherapy alone.⁵ Studies of chemotherapy administered as adjuvant treatment after radiotherapy in patients with high-risk, early-stage disease

*showed a reduction in the risk of relapse*⁶; *subsequent studies investigated the effects of the initial use of chemotherapy followed by the application of adjuvant radiotherapy to smaller treatment fields.*^{7,8} (RA 26)

As it has been mentioned in Morales (2010), none of the RAs include Swales' (1990) "establishing the niche". This is congruent with the idea that the RA consists mainly in an analytical revision of previous research. In other words, authors of RAs do not pretend to "occupy the niche" by making reference to new findings; they try to organize, evaluate, and select relevant research to keep the audience informed of a selected topic.

5.8.3. Move 3: Establishing the Objective

Only 36.66% of the analyzed texts included this move; that is why it is considered "optional". The realization of this move is illustrated in the examples that follow; its most salient features (explicit lexemes, only) are highlighted.

- (12) *In this article, we summarize the available data on trends in selected behavioral and dietary risk factors for noncommunicable diseases and examine the effects they have had, or may have in the future, on the health of populations around the world.* (RA 1)
- (13) *In this article, we define and discuss the importance of good global governance for health, outline major challenges to such governance, and describe the necessary functions of a global health system.* (RA 4)
- (14) *We review the burden of noncommunicable diseases and issues in prevention, detection, and treatment that must be addressed in order to meet this goal.* (RA 6)

5.8.4. Move 4: Presenting the Article Development Structure

This move was identified in only one instance, which makes it "optional". It is used to anticipate what will be discussed in the *Development* section. The realization of this move, signaled by explicit lexical items, is illustrated in the examples below.

- (15) *A brief review of five diseases selected for eradication or elimination will illustrate the potential benefits of such efforts and some of the challenges they pose (see the interactive graphic, available with the full text of this article at NEJM.org). Although dracunculiasis and poliomyelitis are now the only officially sanctioned targets of eradication campaigns, the WHO has designated the campaign against lymphatic filariasis as the Global Program to Eliminate Lymphatic Filariasis. These three programs represent different levels of international commitment to disease eradication. The program to eliminate onchocerciasis (river blindness) from the Americas is an example of a highly successful regional initiative, whereas the effort to eliminate malaria and lymphatic filariasis from Hispaniola is an example of a compelling, binational initiative that might suggest the feasibility of a global eradication effort. (RA 10)*

5.8.5. Move 5: Making Recommendations for the Reader

This move was found in one text (RA 17); therefore, we consider it “optional”. It seems to be used to make the text reader-friendly and to meet the reader’s needs. The realization of this move and its most typical linguistic features can be observed in the following example:

- (16) *Readers who wish to review core principles of genetics and genomics are encouraged to revisit that first primer.¹A glossary of key terms appears in this article and will be updated throughout the course of the Genomic Medicine series. (RA 17)*

5.9. Rhetorical Moves found in the *Development* Section

As it can be seen in our corpus, all the texts have a *Development* section. At first sight, it can be said it is the longest section of the RA. All the section is divided by sub-headings, all of which relate to the topic under discussion. This coincides with Huth (1999), who argues that sub-headings aid comprehension. Moreover, it is in the *development* where tables, diagrams, figures, and glossaries can be found.

As regards the rhetorical structure of this section, four moves have been identified: **presenting the information, elaborating or expanding the information, stating the author’s opinion/ point of view, and summarizing.** Most of the moves coincide with Morales’ (2010) findings.

Table 14 summarizes the combination of rhetorical moves found in this section.

Table 14: *Rhetorical Move Combinations Found in the Development Section*

DEVELOPMENT		
Rhetorical Structure	Number of Instances/ Number of Texts	Frequency of Occurrence
Info presentation Info elaboration/ expansion	347	86.50%
Info presentation Info elaboration/ expansion Summary	11	2.70%
Info presentation Info elaboration/ expansion Author's opinion	43	10.70%

As it can be seen in Table 14, the most common combination of moves in the *Development* section of our corpus is **info presentation** and **info elaboration/ expansion**. Moreover, this predominant move pattern was identified in cycles. In forty-three instances, we identified these two moves in combination with a different move – **stating the author’s opinion/ point of view**. In eleven instances, the sequence **info presentation – info elaboration/ expansion** was followed by the move **summarizing**.

Each of the moves found in the *Development* section was analyzed from the point of view of the function they fulfill in the text, taking into account specific linguistic cues.

5.9.1. Move 6: Presenting the Information

This move is present in all the texts analyzed, which makes it “obligatory”. It is used to present the topic, which will be elaborated in the following move. In most of the cases, it comprises one or two sentences. The realization of this move is exemplified below; its most salient linguistic features, which are usually impersonal constructions, the use of passive voice, and the use of present forms are highlighted.

- (17) *In addition to shifting patterns of smoking prevalence, there have been changes in the type of cigarettes available, including the introduction of “low-tar” and “light” cigarettes.*
(RA 1)

- (18) *It has long been recognized that nucleated fetal cells reach the maternal circulation, but attempts to isolate these rare cells from maternal blood (which typically number 1 to 6 cells per milliliter of maternal blood) and use them for genetic testing have been disappointing because of low sensitivity. Cellfree fetal RNA and DNA, released from apoptotic placental trophoblast cells (and not from the fetus per se), hold greater promise for genetic testing as a result of advances in DNA sequencing methods and informatics (Table 2).^{33,34} (RA 22)*
- (19) *A copy-number change is defined as a deletion or duplication of a stretch of DNA as compared with the reference human genome. (RA 23)*
- (20) *The hazardous effects of smoking on mortality from cancers and cardiovascular and respiratory diseases have been known for decades. (RA 1)*

5.9.2. Move 7: Elaborating / Expanding the Information

This move is also present in all the RAs of our corpus; therefore, it is considered “obligatory” in our taxonomy. It is used to give details of the topic being developed. Relevant studies related to the topic are mentioned here. Descriptions, examples, and recommendations have also been identified in this move. The realization of this move is exemplified below.

- (21) *Lozano et al.³ compared the rates of decline from 1990 through 2000 with the rates of decline from 2000 through 2011 and found that the majority of countries (106 of 193 countries) had accelerated declines in child mortality in the period from 2000 through 2011. Much of the decline was related to a reduction in postneonatal mortality, whereas the reduction in neonatal mortality was much lower. Lozano et al. also reported an estimated decline in maternal mortality, from 409,100 deaths worldwide in 1990 (uncertainty range, 382,900 to 437,900) to 273,500 deaths in 2011 (uncertainty range, 256,300 to 291,700), which was broadly consistent with the estimate calculated by a United Nations interagency group.⁵ (RA 3)*
- (22) *The life cycle of the parasite *Dracunculus medinensis* is shown in Figure 1A. When exposed to water, the adult worms discharge thousands of larvae, which are ingested by tiny crustaceans (cyclops). About a year after a person has drunk water from ponds or open wells contaminated with these crustaceans, adult worms measuring about 1 m in length slowly begin to emerge through the infected person’s skin. (RA 10)*
- (23) *Traditional phenotypic testing (measuring the ability of the virus to replicate in the presence of the antiviral drug) is still recommended for patients in whom viruses are suspected of having complex drug-resistance mutation patterns. (RA 13)*
- (24) *For example, analysis of the HIV-1 envelope has revealed at least four discrete sites that represent potential targets for the designs of immunogens (i.e., agents capable of inducing an immune response). These include the CD4-binding site, a glycosylated site in*

variable regions 1 and 2 (VIV2), glycans on the outer domain, and the membrane proximal external region. (RA 2)

5.9.3. Move 8: Stating the Author's Opinion/ Point of View

This move is present in 19 RAs of our corpus; therefore, it is considered “quasi-obligatory”. The realization of this move is exemplified below; its most salient linguistic features, which are usually explicit lexical items, are highlighted.

- (25) *Yet all these factors can be undermined when mechanisms for accountability are weak or when sovereign states put narrowly conceived self-interests before global health. (RA 4)*
- (26) *This may be the most difficult barrier to quantify and yet the most important to address. (RA 8)*

5.9.4. Move 9: Summarizing

This is the last move identified in the *Development* section. It is present in 10 RAs of our corpus; therefore, it is considered “optional”. This move is mainly used to present a summary of relevant findings before a new topic is presented or before the *conclusion* section. The realization of this move is illustrated in the following examples.

- (27) *Thus far, the epidemiologic transition has been viewed as a process through which the share of noncommunicable diseases as causes of death increases with declining mortality and rising longevity. As population-based data on medical causes of death and, more recently, on risk factors have become available, a more complete picture of the epidemiologic transition is emerging — one in which the interplay among risk factors and medical care leads to distinct disease patterns in different populations, with variations even among noncommunicable diseases.² Despite this diversity, an increasingly salient feature of risk-factor transitions is that any behavioral and dietary risks, and their metabolic and physiological mediators, that have been prominent in high-income countries are now at the same or higher levels in low- and middle-income countries.⁴⁴ This pattern parallels the higher prevalence of most risk factors and higher mortality from noncommunicable diseases in lower socioeconomic groups than in higher socioeconomic groups within high-income countries.⁵² (RA1)*
- (28) *Meanwhile, an important research task is to identify ongoing changes in health risks and outcomes that can be reasonably attributed to recent climate change. Given the multivariate causation of most human health outcomes, attribution is rarely simple.⁴⁵*

Nevertheless, over the past decade, observed changes in some health outcomes, viewed collectively, suggest a climate signal (Table 2).^{18,38,46} (RA 11)

5.10. Rhetorical Moves found in the *Conclusion* Section

The analysis of our corpus suggest that all the texts but one (RA 29) have a *Conclusion* section. This coincides with Huth (1999), Myers (1991), and Murlow (1994), who suggest that this type of texts should necessarily have a section with the conclusions of the review. At first sight, it can be said this section is mainly labeled by a sub-heading that anticipates the content of the paragraphs that follow.

As regards the rhetorical structure of this section, four moves have been identified: **summarizing the main findings, making recommendations for future research or practice, indicating implications, and making predictions**. The first two moves coincide with Morales' (2010) findings.

Table 15 summarizes the combination of rhetorical moves found in this section. As it can be seen, the most common combination of moves in the *Conclusion* sections of our corpus is **summary of main findings and recommendations for future research or practice**. In six instances, we identified these two moves in combination with a different move –**indicating implications**. In other six instances, the sequence **summary of main findings - recommendations** was followed by the move **making predictions**. In four instances, we found only one move –**summary**. In two instances, the four moves were seen in combination.

Table 15: *Rhetorical Move Combinations Found in the Conclusion Section*

CONCLUSION		
Rhetorical Structure	Number of Instances/ Number of Texts	Frequency of Occurrence
Summary	4	13.80%
Summary Recommendations	3	10.34%
Summary Implications	3	10.34%
Summary Predictions	2	6.90%
Implications Predictions	1	3.45%
Summary Recommendations Implications	6	20.69%
Summary Recommendations Predictions	6	20.69%
Summary Implications Predictions	2	6.90%
Summary Recommendations Implications Predictions	2	6.90%

Each of the moves found in the *Conclusion* section was analyzed from the point of view of the function they fulfill in the text, taking into account specific linguistic cues.

5.10.1. Move 10: Summarizing the Main Findings

Twenty eight RAs in our corpus include this move, which makes it “quasi-obligatory”. This move is used to summarize salient results of the research. The realization of this move is illustrated in the following examples.

- (29) *Traditional vaccines have shown unprecedented success in preventing human infectious diseases and preserving public health by alleviating death and suffering from numerous microbial threats. The success of such therapies has heralded the arrival of a new era for vaccines. Increased understanding of human immunity and microbes has catalyzed unprecedented advances that can be adopted to improve public health. Despite continuing challenges, the collective effort of governments and nonprofit organizations to expand the*

utilization of effective vaccines throughout the world has grown. Scientific, medical, and biotechnologic advances promise to improve the utilization of existing vaccines and expand the horizons for tomorrow's vaccines. (RA 2)

- (30) *Rapid globalization has brought new, large-scale influences to bear on patterns of human health. Various global-scale changes — economic, social, demographic, and environmental (particularly climatic) — are linked, for example, to the increased prevalence of obesity, changes in regional food yields, the emergence of infectious diseases, the spread of cigarette smoking, and the persistence of health disparities. Undertaking primary prevention at the source to reduce health risks resulting from these global influences is a formidable challenge. It requires conceptual insights beyond the conventional understanding of causation and prevention, as well as political will, trust, and resources. The complexities of policies to mitigate human-induced climate change are clear. (RA 11)*

5.10.2. Move 11: Making Recommendations for Future Research or Practice

In this move the importance of the results stated in the RA is highlighted by mentioning what needs to be done in the future. The quantitative analysis showed that this move is “quasi-obligatory”. The realization of this move is illustrated below; its most typical linguistic exponents, which in most cases are explicit lexical items, are highlighted.

- (31) *Successful policies, such as tobacco and alcohol taxes and restrictions, should be replicated in all populations. There is also a need for bold and creative policies that address harmful alcohol consumption, improve diet, and increase physical activity. (RA 1)*
- (32) *Although the focus during the past decade has been on the saving of lives, it is also important to look beyond survival to issues of reducing morbidity and disability and improving longterm outcomes of relevance to human development. (RA 3)*

5.10.3. Move 12: Indicating Implications

This text segment may be used to summarize the writer's views on the contributions which the study has made to the field (Nwogu, 1997) or to raise themes and questions for future research. The analysis of the data showed that this move is “optional”. The realization of this move is illustrated in the examples that follow; its most salient linguistic features are highlighted.

- (33) *Strengthening the global health system will require managing persistent governance challenges to ensure that key functions are performed. It will also require increased clarity regarding which actors should carry out which functions to avoid a situation in which there is inefficient overlap on some functions while others are overlooked. Consensus regarding the core functions of each major actor should determine institutional arrangements: form should follow function. This endeavor has become even more urgent given the slowdown in funding for global health.⁴⁹ In current debates about WHO reform, attention should be paid to the functions this institution performs within the larger global health system and the governance challenges that must be addressed for it to perform them successfully. (RA 4)*
- (34) *Attempts to use data from genomewide association studies to determine drug response also have so far been disappointing.⁷⁵ Thus, it is likely that genetic data will need to be combined with other biomarkers to identify clinically meaningful subgroups of patients to guide the treatment of patients. Such an approach may be particularly useful for early detection of persons at risk for autoimmune disease, because serologic autoimmunity may be present for many years,⁷⁶ even though overt clinical disease develops in only a subgroup of such persons. (RA 15)*

5.10.4. Move 13: Making Predictions

This move may be used to state the author's predictions for the future in relation to the topic under discussion. This move was identified in 14 RAs, which makes it "optional". The realization of this move is illustrated in the examples below.

- (35) *Noncommunicable diseases will be the predominant global public health challenge of the 21st century. Prevention of premature deaths due to noncommunicable diseases and reduction of related health care costs will be the main goals of health policy. Improving the detection and treatment of noncommunicable diseases and preventing complications and catastrophic events will be the major goals of clinical medicine. A multilevel approach that integrates policy actions, regulations, health education, and efficient health systems to achieve these goals will be the mission of public health. (RA 6)*
- (36) *With each revision, the entire time series from 1990 forward will be reassessed so that meaningful comparisons over time will be possible. Everyone — consumers, health professionals, researchers, and decision makers — will have access to assessments based on the latest available evidence. Continuous revisions will also facilitate the incorporation of scientific feedback on how to improve the estimation for any particular disease, injury, or risk factor in countries. With time, we hope that the definitions, methods, and estimation techniques from the GBD study effort will also be widely used to understand patterns of health within countries that are differentiated according to geographic region, social class, or race or ethnic group. (RA 9)*

5.11. Summary of the Chapter

This chapter presented the main results obtained from the analysis of the corpus. The quantitative analysis enabled us to demonstrate that the rhetorical structure of medical RAs in English consists of three “obligatory” moves, four “quasi-obligatory” moves, and six “optional” ones (see Table 16). The following chapter discusses the significance of these outcomes.

Table 16: *Rhetorical Moves of Medical RAs*

Section	Rhetorical Moves
Introduction	Topic presentation (obligatory) Topic justification (quasi-obligatory) Objectives (optional) Article development structure (optional) Recommendations for the reader (optional)
Development	Info presentation (obligatory) Info elaboration/ expansion (obligatory) Author's opinion/ point of view (quasi-obligatory) Summary (optional)
Conclusion	Summary of main findings (quasi-obligatory) Recommendations for future research or practice (quasi-obligatory) Implications (optional) Predictions (optional)

Chapter VI: Discussion

6.1. Introduction

This study sought to examine the different sections of the medical RA written in English in terms of its rhetorical structure and its move frequency. The analysis of the corpus was carried out following the move approach initiated by Swales (1981, 1990). Based on the findings, a descriptive analysis of the rhetorical structure of the different sections of the RA is first discussed and a thirteen-move template is proposed. The chapter concludes by setting out the limitations and implications of the present research.

6.2. Discussion

The RA is one of the emerging genres in the field of Medicine, among others. In fact, Swales (2004: 208) refers to it as “an increasingly common phenomenon” which derives from increasing specialization, the chronological lengthening of various research strands in the field, the proliferation of publishing outlets, the pressure to publish, and the increasing numbers of active participants in the discourse community.

It can be said that the characteristics of the RA, its communicative function in the field of Medicine, and the authors’ position in the discourse community shape and condition this genre. Moreover, each section and each rhetorical move seem to reveal the authors’ intentions.

Swales (2004) and Noguchi (2006) coincide in their views of the RA as not being a homogeneous genre from the discursive point of view. Different textual sequences work together throughout the text -expository, narrative and descriptive (Noguchi, 2006). In this study, expository sequences (introduction, development, and conclusion) have been associated with the rhetorical sections of the RA. This coincides with Noguchi, 2006, and Morales *et al.*, 2007. Moreover, narrative and descriptive sequences have been used in different rhetorical sections of the RA. Narrative sequences are mainly used to present antecedents and previous studies related to the object of study whereas descriptive sequences are mainly used to define and characterize pathologies, therapies, diagnosis, and medical procedures. This coincides with Atkinson (1999), Huth (1999),

and Horton-Salway (2002), who consider that patients' observations and clinical records are fundamental components of biomedical knowledge.

Although argumentative sequences do not predominate in RAs, some instances were also found in this analysis. They seem to be included to signal the author's stance in relation to the topic under discussion. Samples of argumentative sequences were found in both the *Development* and the *Conclusion* section. Such sequences might be used to relate the present RA with the successive studies by indicating an analytic, evaluative and projective vision, which is the result of the actual revision.

In this study, samples of the traditional review article predominate. In other words, the narrative structure does not follow the IMRD pattern (Swales, 1990) as it is case of systematic revisions and meta-analyses. Although specialized journals do not prescribe a particular format for the organization of the RA, as it is case of the research article, traditional narrative RAs have three sections: introduction, development, and conclusion.

The results obtained in this study suggest that, within this macro-structure, RAs in the field of Medicine consist of thirteen moves, namely: *presenting the topic, justifying the topic, establishing the objectives, presenting the article development structure, and making recommendations for the reader* in the *Introduction* section; *presenting the information, elaborating or expanding the information, stating the author's opinion/point of view, and summarizing* in the *Development* section; and *summarizing the main findings, making recommendations for future research or practice, indicating implications, and making predictions* in the *Conclusion* section. Even when most of these moves are present in the corpus, they show variability in their frequency of appearance.

Of the five moves identified in the *Introduction* section – (1) *presenting the topic*, (2) *justifying the topic*, (3) *establishing the objectives*, (4) *presenting the article development structure*, and (5) *making recommendations for the reader* – move 1 was found to be “obligatory” whereas move 2 is considered “quasi-obligatory”. Moves 3, 4, and 5 are “optional” ones.

It seems that all the authors are likely to *present the topic* by giving a brief definition of the topic, and limiting the area of study, highlighting theoretical information. According to Morales (2010), this may coincide with Swales' (1990) "establishing the territory". Moreover, in most of the texts analyzed, authors are likely to *justify the topic* by highlighting the importance of the research. In this move, some authors choose to include the need for further research in this area of study as well. It is worth mentioning that none of the RAs include Swales' (1990) "establishing the niche". This seems to characterize the genre in the field of Medicine, among others, since the RA consists mainly in an analytical revision of previous research. This is congruent with Morales' (2010) assertion that authors of RAs in the field of science do not pretend to "occupy the niche" by making reference to new findings; they try to organize, evaluate, and select relevant research to keep the audience informed of a selected topic. Although *establishing the objective* is considered an "obligatory" move in research articles, this does not seem to be the case in medical RAs. It seems interesting to mention that authors exceptionally choose to *present the article development structure* and to *make recommendations for the reader*. This could indicate that authors do not explicitly tend to orient the readers by making overt comments of how the following section is organized neither are they likely to address the readers directly by making suggestions of what they should read first.

As regards the *Development* section, expository sequences predominate. This is congruent with the idea that it is in this section where the topic under study is developed in depth. Therefore, definitions, descriptions and classifications are likely to be found in this section. To aid comprehension, all the section is divided by sub-headings and diagrams, tables, figures, and glossaries are included. This could indicate that the authors want to make the text reader-friendly.

Of the four moves identified in the *Development* section – (6) *presenting the information*, (7) *elaborating/ expanding the information*, (8) *stating the author's opinion/ point of view*, and (9) *summarizing* – moves 6 and 7 were found to be "obligatory". This finding is in agreement with Morales' (2010). Move 8, however, has been proposed for the present study and is considered "quasi-obligatory", and move 9, in turn, is regarded as "optional", finding which differs from Morales' (2010) work.

It seems that authors are likely to present the topic, which will be elaborated in the following move by presenting arguments and evidence structured in content-oriented categories. Most of the times, the authors choose to state their opinion about the topic under discussion. This is done in a subtle way and is evidenced by the authors' choice of words, which reflects a critical stance towards the topic being discussed. Sometimes, authors present a summary of relevant findings before a new topic is presented or before the *Conclusion* section. This seems to indicate that some authors are likely to round off the topic under discussion before moving on to a different one.

As regards the *Conclusion* section, the analysis of our corpus suggests that all the texts but one (RA 29) contain this section. This finding is in agreement with Huth (1999), Myers (1991), and Murlow (1987, 1994), who suggest that this type of texts should necessarily have a section with the conclusions of the review. It is interesting to mention that this is the only section labeled as such, anticipating the content of the paragraphs that follow.

Of the four moves identified in the Conclusion section – (10) *summarizing the main findings*, (11) *making recommendations for future research or practice*, (12) *indicating implications*, and (13) *making predictions* – moves 10 and 11 were found to be “quasi-obligatory” whereas moves 12 and 13 were classified as “optional” ones. The first two moves coincide with Morales' (2010) findings.

It seems that authors are likely to begin this section by summarizing the salient results of the research. Moreover, most authors seem to highlight the importance of the results stated in the RA by mentioning what needs to be done in the future. In fact, Sternberg (2003: 61) suggests that if conclusions different from the original hypotheses have been drawn, ways in which those conclusions could be verified in future research should be recommended. It is worth mentioning that authors sometimes tend to summarize their views on the contributions which the study has made to the field (Nwogu, 1997) or to raise themes and questions for future research. In fact, *indicating implications* is usually the closing move. It seems that some writers are more inclined to suggest what conclusions can be drawn from their results and to offer explanations of what those results may mean in the context of their study. The present results suggest that some researchers are more likely to “look at ways in which results might be implemented or

lead to applications in the future” (Glasman-Deal, 2010: 177). Finally, some authors tend to close this section by *making predictions*. It seems that authors tend to state their predictions for the future in relation to the topic under discussion.

Swales (2004) agrees to say that authors of RAs are invited to bring their chosen subfield to a wider audience, offering them a chance to reflect on the past, and to bring into focus some earlier work that might have been neglected, allowing them not only to reflect on some future trends but also to “showboat” their own contributions to the field. Hence, the RA is a literary review which closes with some overall evaluation on the part of the author. This genre offers the writer an opportunity to project a synoptic vision of an area of expertise, contributing to an understanding of such area and suggesting what can be done next.

6.3. Proposed Template

The second goal of this study was to capture the rhetorical structure most frequently used in medical RAs written in English. All the above mentioned moves do occur in the corpus analyzed; however, they do not occur in a linear fashion. Nor do they occur with the same degree of frequency since the results showed quantitative differences. Despite these differences, it may be reasonable to assume that the following sequence conforms to what can be considered a logical rhetorical structure for medical RAs:

A. INTRODUCTION

1. Presenting the topic
2. Justifying the topic
3. Establishing the objectives
4. Presenting the article development structure
5. Making recommendations for the reader

B. DEVELOPMENT

6. Presenting the information
7. Elaborating/expanding the information
8. Stating the author’s opinion/point of view
9. Summarizing

C. CONCLUSION

10. Summarizing the main findings
11. Making recommendations for future research or practice
12. Indicating implications
13. Making predictions

Despite certain differences, the thirteen-move framework put forward in the present study may be considered to be consonant with the ten-move structure proposed by Morales (2010) for RAs written in Spanish in the field of Dentistry:

A. INTRODUCCIÓN

1. Definición y delimitación del tema
2. Justificación del artículo
3. Objetivos
4. Descripción de la metodología
5. Estructura del desarrollo del artículo

B. DESARROLLO

6. Presentación de la información/sección/apartado
7. Elaboración/expansión de la información
8. Resumen

C. CONCLUSIÓN

9. Resumen de los principales resultados del artículo
10. Recomendaciones para la práctica clínica y para futuras investigaciones

6.4. Limitations of the Study

Whereas the findings of the current study are interesting from an applied perspective, some limitations must be addressed. Probably, the main limitation is that this research

was mainly descriptive, and consisted of a relatively small sample if compared to studies in which a bigger sample was used (Kanoksilapatham, 2005; Peacock, 2002). Therefore, the findings should be corroborated with larger corpus in order to be able to make generalizations. Moreover, the RAs that make up the corpus of the present study were downloaded from only one journal. We suggest replicating this study with texts taken from different journals to be able to make generalizations about the rhetorical structure of RAs. Also, it would be interesting to make a contrastive study of medical RAs written in English and in Spanish to be able to establish similarities and differences between their rhetorical patterns. Finally, more research is needed on the lexical choices that signal the presence of the different moves in the different sections of the RA. An important next step would be to thoroughly examine these linguistic features.

6.5. Implications of the Study

The rhetorical structure proposed in the present study should be regarded as tentative. Much remains to be analyzed before the whole picture of the rhetorical structure of RAs written in English can be described in detail. Nevertheless, this study may have significant pedagogical implications. The proposed template can empower learners, novice researchers and teachers in their practices. First, by being aware of the preferred rhetorical moves of this emerging genre, students can be aided in the process of reading and writing scientific RAs. Second, by understanding the rhetorical conventions agreed upon in particular academic communities, novice researchers can be assisted in finding a niche in the international publishing arena. The generic features of RAs should therefore be incorporated into academic writing courses for both undergraduate and postgraduate students. Third, this type of descriptive studies can also provide teachers with an insight of the distribution of information across RAs. This knowledge, in turn, may enhance the design of ESP course materials, since teachers can design tasks to help students capture and disentangle the rhetorical structure of the different sections of RAs. Finally, by further exploring the rhetorical schema of RAs, we can advance the cause of gaining new insights into the phenomenon of a newly-emergent genre.

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APPENDICES

APPENDIX A

Review Articles Analyzed

RA 1: Ezzati, M. and Riboli, E. (2013). Behavioral and Dietary Risk Factors for Noncommunicable Diseases. *The New England Journal of Medicine*. 369, 10, 954-964. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1203528>

RA 2: Nabel, G. (2013). Designing Tomorrow's Vaccines. *The New England Journal of Medicine*. 368, 6, 551-560. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1204186>

RA 3: Bhutta, Z. and Black, R. (2013). Global Maternal, Newborn, and Child Health — So Near and Yet So Far. *The New England Journal of Medicine*. 369, 23, 2226-2235. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1111853>

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APPENDIX B

Rhetorical Analysis of the Corpus

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Info elaboration/expansion	14,15,16,17
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Info elaboration/expansion	19,20,21,22
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CONCLUSION	
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APPENDIX C

Samples for Raters

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SAMPLE 2 - RA 6: Hunter, D. and Srinath Reddy, K. (2013). Noncommunicable Diseases. *The New England Journal of Medicine*. 369, 14, 1336-1343. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1109345>

SAMPLE 3 - RA 12: Piott, P. and Quinn, T. (2013). Response to the AIDS Pandemic — A Global Health Model. *The New England Journal of Medicine*. 368, 23, 2210-2218. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1201533>

SAMPLE 4 - RA 13: Relman, D. (2011). Microbial Genomics and Infectious Diseases. *The New England Journal of Medicine*. 365, 4, 347-357. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1003071>

SAMPLE 5 - RA 18: Manolio, T. (2010). Genomewide Association Studies and Assessment of the Risk of Disease. *The New England Journal of Medicine*. 363, 2, 166-176. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra0905980>

SAMPLE 6 - RA 25: Sheffield, V. and Stone, E. (2011). Genomics and the Eye. *The New England Journal of Medicine*. 364, 20, 1932-1942. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1012354>

SAMPLE 7 - RA 28: Lambert, L. and Fauci, A. (2010). Influenza Vaccines for the Future. *The New England Journal of Medicine*. 363, 21, 2036-2044. Available at <http://www.nejm.org/doi/full/10.1056/NEJMra1002842>

APPENDIX D

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