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***Analysis of the use of acronyms
and initialisms as cultural referents in medical
texts***

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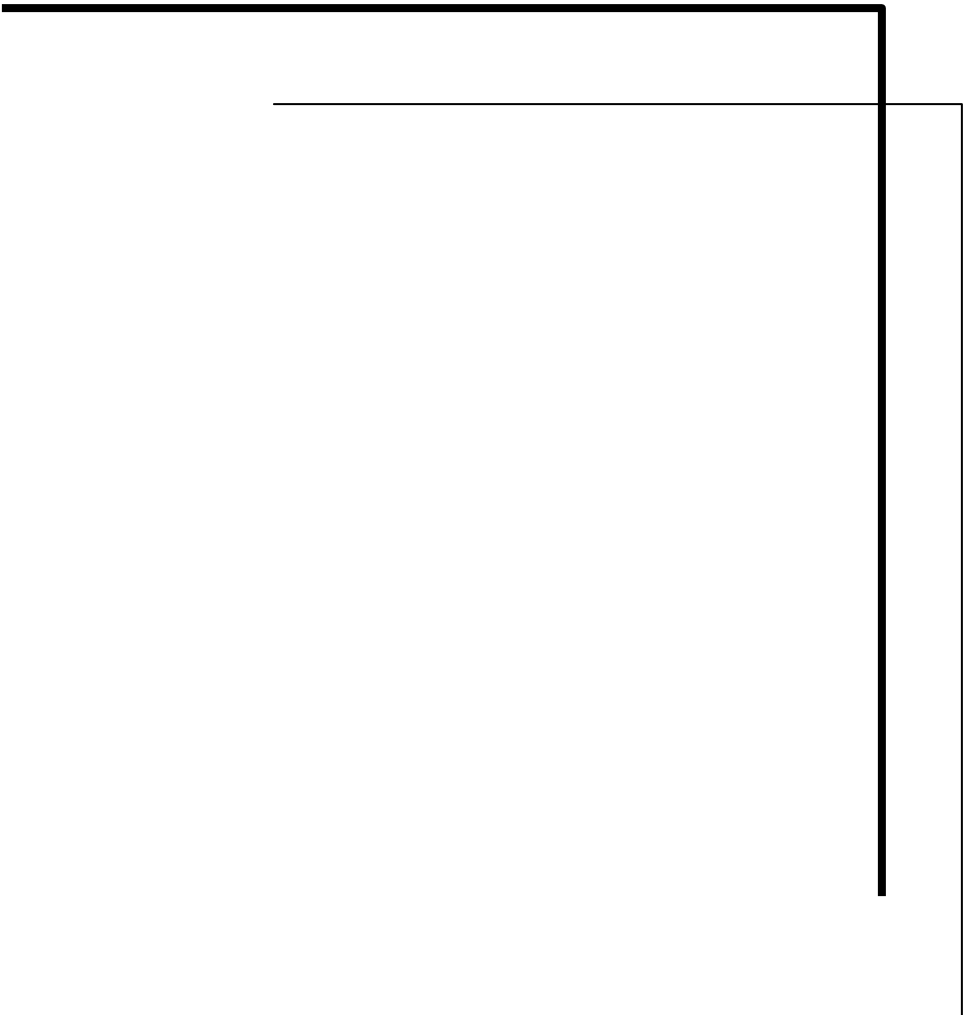
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*Translation is the paradigm, the exemplar of all writing. It is
translation that demonstrates most vividly the yearning for
transformation that underlies every act involving speech, that
supremely human gift.*

Harry Mathews

Dedication

To our parents for devoting their lives to ours

*To our grandparents for their tenderness has eased our way
through life*

*To my brother for being my inspiration, my driving force,
my path to follow*

To Noslen and Abdel for so much love and dedication

*To Dana for being the best sister I will ever have and for
rescuing me into my studies when I was about to give up*

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being one of a kind, and because she has undoubtedly earned
the title of co-author of this research*

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Our classmates, for six years of incredible fun.

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ABSTRACT

Taking into account that the translation of acronyms and initialisms is not only language-dependent, but also culture-bound, the aim of this study is to analyze the translation procedures used to translate into Spanish acronyms and initialisms used in English medical texts on Cardiology.

This study attempts to present a theoretical and practical stand on the issue under research. It is a qualitative, interpretive, descriptive, synchronic study based on the lexical analysis of acronyms and initialisms in the English ST and the Spanish TT, within the framework of descriptive translation studies.

This is the first time the issue of translating acronyms and initialisms as cultural referents in specialized texts is tackled in the English Language Department. Thus, this study will deepen existing knowledge on how to deal with acronyms and initialisms, as forms of cultural referents, in medical texts.

The study will hopefully contribute to the ongoing efforts aiming at improving translation in general, and translation of medical texts in particular.

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Introduction

Translation is not just a regular transposing of words from one language into another or substituting a text in one language for a text in another (Spence, 2004). The process of translation is understood as the process of establishing linguistic as well as extra linguistic equivalence between a source text and its target text. This process reveals a constant movement of ideas and cultures, which are constantly absorbing new influences because of the work of translators.

Translation is a kind of activity that inevitably involves at least two languages and two cultural traditions (Toury, 1978). As this statement implies, translators are permanently faced with the problem of how to deal with the cultural aspects implicit in a source text (ST) and of finding the most appropriate technique of successfully conveying these aspects in the target language (TL). These problems may vary in scope depending on the cultural and linguistic gap between the two (or more) languages concerned (Nida, 1964), being an important issue to determine how much missing background information should be provided by the translator. Thus, it is necessary for translators to develop high linguistic and extralinguistic competences. Extralinguistic competence is developed by mastering the extralinguistic elements (culture, context and thematic knowledge). Nowadays, these elements have been given a special interest, mainly in the translation of literary texts. However, it is also important to take them into account while translating specialized texts, as in the case of medical articles. In this sense, the translator has to decide on the importance given to certain cultural aspects and to what extent it is necessary or desirable to translate them into the TL. The aims of the ST will also have implications for translation as well as the intended readership for both the ST and the target text (TT).

Translators of specialized texts have a professional responsibility in relation to text producers and their audiences, as well as a social responsibility which requires from the part of the translators a special sensibility when translating words and cultural references that are not marked in their mother tongue. In this sense, translators are

intermediaries between source and target languages and cultures but especially between the ST producers and the TT audiences.

A specialized text is a product of a Language for Specific Purposes (LSP), which is an autonomous semiotic system that performs mainly an instrumental function. It is often a vehicle of research, instruction, clarification, or dissemination of information (Grygoruk, 2009). It usually contains terminology and concepts particular to the field and often follows conventional formats. The purpose of the specialized text is primarily informative.

Translation of specialized texts is mainly about transfer of knowledge, which is conveyed from a source language (SL) to a TL as accurate as possible. During such an operation the translator must take into consideration substantive linguistic and extralinguistic issues, ranging from stylistic and lexical issues to cultural and specialized content issues.

Specialized translation is always directed to a minority that uses, in function of its professional activity, a language or specialized jargon that can only be fully understood by this reduced group. The precision and quality of this type of translation is only possible if a previous content and terminological research have been done.

The translation of specialized texts is a very complex process, and specialized translators should take into consideration not only the presence of linguistic problems, but also content problems, and cultural problems as well. According to Martínez (2008), cultural traces in specialized texts can appear in the form of metaphors, Latinisms, Spanglish, the treatment of commercial marks and linguistic variations. In this type of texts elements such as the combination of technical and non-technical words, English preference for using commercial brands for drugs instead of the chemicals they are composed of, and variations regarding the spelling of some proper names are abundant. They can also appear as abbreviations, especially acronyms and initialisms that are considered as examples of cultural referents in specialized texts.

Belda Medina (2004) states that abbreviations are those lexical items formed by taking just the initial or any other letter from a group of words. According to Kasprowicz (2010), an abbreviation is understood as a shortened form of a word or

phrase, spelled according to the rules of a particular language. According to the *Diccionario de la Lengua Española* (DRAE) (2010), they are words formed by a group of initial letters from a complex expression. In general, an abbreviation is the shortened form of a lexical item, word or phrase that is formed by one or several constituent letters.

Abbreviations are one of the most noticeable features of present day English according to Crystal (1995), and Belda Medina (2004) states that they have been on the increase in all fields of the English vocabulary in recent times, though authors, like Pérez Peña (1994), say that there has been an increasing and alarming deterioration of the medical language since doctors exaggeratedly use them, and sometimes abbreviations hinder communication in this field.

There are different forms of abbreviations. They can appear as clipping, blends, awkward cases, acronyms and initialisms. In this research we will deal with acronyms and initialisms specifically. Their use comes and goes in waves, though it is never totally absent. They are used in some fields such as sports, technology and sciences (Crystal, 1995). The armed forces and government agencies frequently employ initialisms (and occasionally, acronyms) and also business and industry use them. Since Medicine is a field of knowledge in accelerated scientific and technological development that each year incorporates a large number of new terms into the medical lexicon, abbreviations are commonly used in all branches of Medicine, mainly in Cardiology, where since 1975 physicians whose mother tongue is not English tend to publish their articles in this language and to use English increasingly as well, and they are not aware of the fact that this language is modifying the way they express in their mother tongue. (Navarro, 2011).

Internationally, linguists from different countries have been dealing with the issues of abbreviations as cultural referents by making descriptive researches in areas such as medical, humor and advertising translation.

In Cuba, acronyms and initialisms are mostly used in fields such as sports and business, among others, and lately they have also been used extensively in the field of Medicine to name institutions and organizations, medical procedures and

treatments, etc. In spite of their wide use, we found that there is not enough bibliography or research concerning the use of abbreviations as cultural referents in medical texts in Cuba.

The use of acronyms and initialisms represent a problem for translators of medical texts since they can create ambiguity, they can obscure the meaning and they are not used correctly. Also other problems posed by them are that they maintain the same form in English as in Spanish, they change when translated into Spanish because they have an accepted, or standardized equivalent, and lastly when there are no known equivalents in Spanish for certain English acronyms and initialisms.

The translation solutions proposed by Calvo Basarán (1992) and Belda Medina (2005), as well as those of Kasproicz (2010) and Pakhomov (2005) are to give an explanation between parentheses the first time the acronym or initialism appears for the reader to fully understand them when they are accompanied by no explanations. Besides they propose that when they have a standardized equivalent in Spanish it would be better to use these equivalents, but if there is not a standardized equivalent they propose to leave the acronym or the initialism as the way they appear in the ST. These authors make their proposals on the basis of medical texts.

Given the context of the problem, it is possible now to formulate the research problem addressed in this study.

Statement of the problem

Because translation involves dealing with languages and cultures, translators are inevitably faced with the problem of dealing with cultural elements that are present in the ST, and of finding the most appropriate way of conveying these elements in the TT.

This problem is not alien to specialized translation, where cultural elements are divided into five groups according to Nida (1969, 1999) and the Ministère de l'Éducation, du Loisir et du Sport, (2011). They appear in the form of material elements: related to everyday objects, e.g., food and drink, games, units of measure, etc., ecological elements : related to similarities and differences in places, e.g.,

geography, flora and fauna; social elements: related to social organization and its manifestations in the arts, politics, history, and leisure; religious elements: which include ritualized and ideological manifestations, and linguistic elements: understood as the means to express all the previous and which refers to attitudinal and conversational cues.

Abbreviations in the form of acronyms and initialisms are very common in specialized texts, and the last decades have witnessed their increased use. Medical texts are no exception, acronyms and initialisms are used in this field to refer to a wide range of specialized medical phenomena from names of diseases to health-related organizations.

Specialized medical translation from English into Spanish has become a common feature in medical science, since a large number of publications in this field are written in English, and Spanish speaking health care professionals need constant updating on new developments. According to López Espinosa (1995), the medical translator has a professional and humane responsibility to fulfill: conveying information from a SL to a TL means not only providing information to health care professionals, but also means health promotion, conservation and development, and even saving, recovering or prolonging a human life.

Cardiology, a branch of Medicine, has been plagued by the use of acronyms and initialisms, and their sometimes wrong and indiscriminate use is prevalent as a result of adequate and not so adequate translations. Professional translators and translation students often find it difficult to deal with them, especially because finding a solution depends not only on linguistic (terminological) criteria but it is also culture-bound.

This leads to the **central research question** addressed by this study, namely:

What translation procedures are commonly used in order to convey acronyms and initialisms used in English medical texts on Cardiology in Spanish?

Aim and objectives

Thus, on the assumption that the translation of acronyms and initialisms is not only language-dependent, but also culture-bound, the **aim** of this study is to analyze the translation procedures used to translate into Spanish acronyms and initialisms used in English medical texts on Cardiology.

The **specific objectives** of this study are the following:

- To define and characterize specialized texts, especially medical texts, and the elements involved in the translation of this type of texts.
- To define and characterize cultural references in specialized texts, especially medical texts.
- To define and characterize abbreviations in the form of acronyms and initialisms, as forms of cultural referents.
- To describe how acronyms and initialisms are used in medical texts, and the problems they pose to the translator.
- To identify and describe the procedures used in the translation of acronyms and initialisms used in English medical texts on Cardiology into Spanish.

Methodology

This study attempts to present a theoretical and practical stand on the issue under research. It is a qualitative, interpretive, descriptive, synchronic study based on the lexical analysis of acronyms and initialisms in the English ST and the Spanish TT, within the framework of descriptive translation studies.

For the purposes of the study, an empirical textual sample was used. A **corpus** of 9 medical texts on Cardiology and their translations were analyzed. The STs were written in English, and the TTs in Spanish. The STs were published in medical journals: *Bioorganic and Medicinal Chemistry*, *Annals of Thoracic Surgery*, *American Heart Journal*, *NEUROLOGY*, *Boletín Asociación Médica de Puerto Rico*, *JAMA* (Journal of American Medical Association), *Iranian Journal of Medical Sciences* and *Epidemiology*, from 1996 to 2006. The TTs were produced by translators from the

Translation Department in the “Agustín Ruiz de Zárate Ruiz” Medical University (Santa Clara, Cuba).

Scientific Novelty

In examining degree dissertations and term papers produced by the English Language Department and the Language and Literature Department from the Faculty of Humanities at the Universidad Central “Marta Abreu” de Las Villas, as well as papers, articles and other bibliographical sources collected at the University Information Center, it is noted that very little has been written on this specific subject in the past.

This is the first time the issue of translating acronyms and initialisms as cultural referents in specialized texts is tackled in the English Language Department.

Thus, this study will deepen existing knowledge on how to deal with acronyms and initialisms, as forms of cultural referents, in medical texts.

Contribution

The study will hopefully contribute to the ongoing efforts aiming at improving translation in general, and translation of medical texts in particular.

This research provides empirical and theoretical support for the teaching and learning of English-Spanish translation, particularly concerning the translation of acronyms and initialisms in the field of Medicine, especially in the branch of Cardiology.

Therefore, it is a theoretical and a practical contribution to translation studies, translation teaching and translation research. This dissertation will be future reference for translation teachers and students, as well as researchers.

Structure of the dissertation

Following this introduction, the rest of this dissertation is organized as follows:

Chapter I. Theoretical overview. This chapter aims to review the theoretical foundations upon which this research is based by reviewing the available relevant literature.

Chapter II. Methodological framework and analysis. The second chapter is divided into two main parts. First, the methodology used to solve the research question is described. Then, the main findings are presented.

Conclusions. This chapter summarizes the aim and objectives of this study, by providing conclusions about the main findings.

Recommendations. In this chapter, recommendations for future research are presented.

Chapter I. Theoretical Overview

1.1 Considerations on culture, language and translation

Many humanistic anthropologists would agree that culture is a people's unique possession. It is learned, not biologically inherited, and involves arbitrarily assigned, symbolic meanings. The human ability to assign arbitrary meaning to any object, behavior or condition makes people enormously creative and readily distinguishes culture from animal behavior. Culture involves at least three components: what people think, what they do, and the material products they produce. Thus, mental processes, beliefs, knowledge, and values are part of culture. It is an integrated pattern of human behavior that includes thoughts, communication, languages, practices, beliefs, values, customs, courtesies, rituals, manners of interacting and the ability to transmit the above to succeeding generations.

Some anthropologists would define culture entirely as mental rules, guiding behavior, although often wide divergence exists between the acknowledged rules for correct behavior and what people actually do. The definition of "culture" as given in the *Concise Oxford Dictionary (1995)* ranges from descriptions of the arts to plant and bacteria cultivation, and includes a wide range of intermediary aspects. The word 'culture' has many different meanings, among them we can find references to the appreciation of good literature, music, art and food. Del Corral (2003) also defines culture as distinctive spiritual, material, intellectual and affective features that characterize a society or social group. It comprises not only the arts and letters, but also ways of living, fundamental human rights, systems of values, traditions and beliefs. It also provides the capacity of self-reflection and self-consciousness and turns people into rational, ethically, committed human beings.

The symbolic element of human language, especially speech, is a qualitative expansion over animal communication systems. Speech is infinitely more productive and allows people to communicate about things that are remote in time and space. Specifically concerned with language and translation, Newmark states that culture is

the way of life and its manifestations that are peculiar to a community that uses a particular language as its means of expression (Newmark, 1988), thus acknowledging that each language group has its own culturally specific features. He further clearly states that operationally he does "not regard language as a component or feature of culture" (Newmark, 1988), in direct opposition to the view taken by Vermeer who states that "language is part of a culture" (quoted by Hoffmann, 1996). According to Newmark, Vermeer's stance would imply the impossibility to translate whereas for the latter, translating the SL into a suitable form of TL is part of the translator's role in transcultural communication.

From our point of view, language is part of culture, which can be material or spiritual, and includes all human practices which have peculiarities in the different forms of organization of the human communities, for example, a cultural trait can be common at a national level but it may have peculiarities in some specific areas of a given nation.

The notion of culture is essential to considering the implications for translation and, despite the differences in opinion as to whether language is part of culture or not, the two notions appear to be inseparable. Discussing the problems of correspondence in translation, Nida confers equal importance to both linguistic and cultural differences between the SL and the TL and concludes that "differences between cultures may cause more severe complications for the translator than do differences in language structure" (Nida, 1964). It is further explained that parallels in culture often provide a common understanding despite significant formal shifts in the translation. The cultural implications for translation are thus of significant importance as well as lexical concerns.

Lotman's theory states that "no language can exist unless it is steeped in the context of culture; and no culture can exist which does not have at its centre, the structure of natural language" (Pankratjeva, 2007). Bassnett (1991) underlines the importance of this double consideration when translating by stating that language is "the heart within the body of culture," the survival of both aspects being interdependent.

Though there are different concepts concerning language and culture and the relationship among them, we agree with Vermeer (1989) who states that language and culture are closely related, and with Bassnett (1991) and Nida (1964), who state that they must be taken into account when translating from one language into another since cultural aspects may cause even more complications than language structures.

Linguistic notions of rendering meaning are seen as being only part of the translation process; a whole set of extralinguistic criteria must also be considered. As Bassnett further points out, "the translator must tackle the SL text in such a way that the TL version will correspond to the SL version, to attempt to impose the value system of the SL culture into the TL culture is dangerous ground" (Bassnett, 1980). Thus, when translating, it is important to consider not only the lexical impact on the TL reader, but also the manner in which cultural aspects may be perceived and make translating decisions accordingly.

Language and culture may thus be seen as being closely related and both aspects must be considered for translation. When considering the translation of cultural words and notions, Newmark proposes two opposing methods: transference and componential analysis (Newmark, 1988). As Newmark mentions, transference gives "local color," keeping cultural names and concepts. Although placing the emphasis on culture, meaningful to initiated readers, he claims this method may cause problems for the general readership and limit the comprehension of certain aspects.

The importance of the translation process in communication leads Newmark to propose componential analysis which he describes as being "the most accurate translation procedure, which excludes the culture and highlights the message" (Newmark, 1988).

Nida's definitions of formal and dynamic equivalence (Nida, 1964) may also be seen to apply when considering cultural implications for translation. According to Nida, a "gloss translation" mostly typifies formal equivalence where form and content are reproduced as faithfully as possible and the TL reader is able to "understand as much as he can of the customs, manner of thought, and means of expression" of the SL

context (Nida, 1964). Contrasting with this idea, dynamic equivalence "tries to relate the receptor to modes of behavior relevant within the context of his own culture" without insisting that he "understands the cultural patterns of the source-language context".

These considerations have led translators all over the world to shift emphasis to cultural references as a way of improving the knowledge of these translators and providing the best translations possible. The identification and transfer of cultural references is not often dealt with in translation training and vague generalizations can be replaced by a more systematic and explicit approach which may help to enhance awareness and acquire a more self-confident approach to the problem. Moreover, cultural awareness enhanced by reflection and decision-making may bring to the forefront the whole issue of otherness and of the subjectivity of the translator when identifying and rendering cultural references.

"Cultural references are focuses of learning that are culturally significant. They may take various forms, such as events, media productions or objects from everyday life, provided that they make it possible to look at significant social phenomena or cultural trends. They may also be heritage objects, territorial references, artistic works, scientific discoveries, ways of thinking, values that influence behavior or personalities, provided that they have cultural significance" according to the Ministère de l'Éducation, du Loisir et du Sport (2011), and Nida (1969, 1999) states that a cultural referent is any kind of expression (textual, verbal, non-verbal or audiovisual) denoting any material, ecological, social, religious, linguistic or emotional manifestation that can be attributed to a particular community (geographic, socio-economic, professional, linguistic, religious, bilingual, etc.), and would be admitted as a trait of that community by those who consider themselves to be members of it. Such an expression may, on occasions, create a comprehension or a translation problem. He divides cultural referents into five groups:

1. Material referents: related to everyday objects, e.g., food and drink, games, units of measure, etc.

2. Ecological referents: related to similarities and differences in places, e.g., geography, flora and fauna.
3. Social referents: related to social organization and its manifestations in the arts, politics, history, leisure.
4. Religious referents: which include ritualized and ideological manifestations.
5. Linguistic referents: understood as the means to express all the previous and which refers to attitudinal and conversational cues.

So, we can conclude that language is part of culture, and that they are both related to the translation process. While translating, the professional translator should take into account not only grammatical and stylistic issues, but also cultural references that can be a problem if the idea is not correctly conveyed into the TT.

1.2 Specialized texts. Translation of specialized texts

After defining what a cultural referent is, it is important to focus on its relation with specialized texts, the form it can adopt in this kind of text, and the way it affects the translation process. To start with, it is necessary to know what a specialized text is and the elements involved in its translation.

A specialized text is a product of a Language for Specific Purposes (LSP), which is an autonomous semiotic system that performs mainly an instrumental function. It is often a vehicle of research, instruction, clarification, or dissemination of information (Grygoruk, 2009). It usually contains terminology and concepts particular to the field and often follows conventional formats. The purpose of the specialized text is primarily informative, and the producer's as well as the translator's concern is for clarity, precision and effectiveness in the transmission of information. Such texts are, therefore, a basic element in the process of inter-linguistic communication, which aims at the transfer of specialized knowledge. However, we should highlight that, taking into account the anthropocentric theory of human language, specialized texts are just a representation of specialized knowledge.

In the last decade the translation of scientific and technical texts has increased

enormously since they have acquired a special recognition in modern society. Only in Europe it is estimated that 50 % of the 366 million pages translated during the year 2000 were scientific and technical texts, in comparison to 1% of literary texts, according to Faber (2005).

Translation of specialized texts is mainly about transfer of knowledge that is represented by means of one language, into another language as accurate as possible. During such an operation the translator must take into consideration substantive linguistic and extralinguistic issues. Therefore, a professional specialized translator should possess, not only a high level of linguistic competence (general and specific) in both the SL and the TL, but also knowledge of the subject matter and the context. In the functional approach, translation is not just a regular transposition of words from one language into another or the substitution of a text in one language for a text in another (Spence, 2004). In all cases the translator must interpret the ST. A functional model of translation should start from an analysis of the target situation, because it sees translation as an action or a sequence of actions with a specific purpose. The translator should define the intended text function, the TT addressees, the level of knowledge of these addressees concerning the topic being referred to, and compare cultural phenomena. For to the *Skopos* theory, in order to achieve a “good” translation the translator should have knowledge concerning the aim of the translational action and the mode of translating (Munday, 1970).

The translation of specialized texts is a task performed by experts that are competent in the SL and the TL, as well as translators. According to Resinger (2009), the translation of scientific texts is an activity to which scientists and experts with enough knowledge of other languages as well as specialized translators are devoted to. Both communities need to know the features of the original text written in the TL, to adjust them, as much as possible, to its patterns. Some of these features can be defined in the instructions for authors of scientific articles and books, while others are inherent to the cultural background and, therefore, do not need to be specified.

Specialized translation is always directed to a TL minority that uses, in function of its

professional activity, a specialized language or jargon that they are only fully enabled to understand. The precision and quality of this type of translation is only possible if there is previous research and terminological work, if there are some resources the specialized translator can have access to and if he/she has knowledge of the context and audience, as well as access to auxiliary resources. Such resources are those that allow the translator to eliminate unjustified synonymies, to avoid ambiguities that lead to false interpretations, as well as foreign expressions, and to use appropriate terminology.

According to Faber (2005), the translation of scientific texts, far from being a direct and almost automatic transference of specialized contents, is also a transmission of meaning at all the levels of the text. Despite its lexical specialized units, scientific language is neither fully standardized nor invariable because is susceptible to the same mechanisms of evolution and change of language in general. This turns the translation process into a very complex activity, in which content and form must be taken into account, without losing sight of the various extralinguistic factors that are involved in the production of the ST and the TT.

1.3 Cultural references in specialized texts

Every text as an individual entity is different, and the translator needs a relevant factual and procedural knowledge base in order to recognize its characteristics. As any translator will only represent what he or she has understood from the text beforehand, translation as a dynamic process is a hermeneutical problem (Stolze, 2009). The translator needs points of orientation to become sensitive about the content of a text, and at the same time to activate the knowledge base. When the translator becomes aware of a lack of technical knowledge, he or she will start research activities, analyze parallel texts, ask specialists, or search the Internet. But the awareness must first be created. Just like finding one's way in unknown territory, the translator will use a cognitive map for guidance.

When translating a specialized text, that has terminology particular to a field, translators have to take into account issues related to language and cultural elements

too. Cultural elements in specialized texts might be deemed superfluous, but they are always there, and in many occasions, implicitly.

According to Resinger (2009) when translating, linguistic and cultural elements must be taken into account, as well as the external circumstances. For example, one element that is present in scientific texts is author's gender, which can be neutral, feminine or masculine, depending on the SL and TL. Another cultural element which stands out in this type of texts is the use of the bibliographical references: English-speaking authors tend to use bibliography in their own language, while Spanish-speaking authors refer to bibliography in Spanish as well as in English, and sometimes they have to translate the information, that is why the translator has to be aware of any possible conceptual or structural loan translation. For this author, the article's macrostructure is another textual element that varies from one language to another. The author's presence has also to be taken into account, since texts are written impersonally in Spanish, while the English language prefers to use the passive voice. The terminology has to be carefully checked too, because the terminological knowledge of an expert in a given specific field does not necessarily match that of a translator.

Cultural traces in specialized texts certainly have specific linguistic forms. According to Molina Martinez (2001), linguistic manifestations of culture in specialized texts range from the word level and syntactical structures to the style on the text level, and its pragmatic social function.

Culture in terminological concepts: In a specialized translation the terminology must be checked conscientiously. Terminology is intelligible within a scientific or technical domain, as terms in a text presuppose memorized contexts and practical situations both for their usage and for their comprehension. Understanding of terminology – which is essential for correct translation – is not fully guaranteed by the consultation of dictionaries and databases, because new terms are constantly being created that partly even carry inherent conceptual differences. This leads to what is known as inter-cultural incongruence of concepts, where comparable terms are not equivalent

because the concepts they designate are different for cultural reasons.

Sometimes, new technical terms are created by means of metaphorical terminology, and problems in translation can arise when the metaphors are not identical between languages and translators are not aware of this possibility, for example, the tendency to name diseases after the name of the researcher or the physician who first described it. This is the case of 'Graafian follicle' as opposed to the Spanish 'folículo de De Graff', 'Habsburg lip' compared to 'labio de los Habsburgo', or 'cradle cap' with its Spanish equivalent 'costra láctea'.

Culture in the language form: Languages are the main expression of cultural differences developed in history. Terminology in nouns and adjectives combined with a few tenses are characteristics of the functional style of communication for specific purposes. But there are language-specific forms of word compounding, to be recognized and applied in a specialized translation, for instance, English terms are mostly formed by a combination of several nouns, or of an adjective with a noun, in a similar sequence, while in Romance languages the word compounding goes in the reverse order and is realized by particles. That would be the case of 'heart failure', where a noun performs as an adjective, and the Spanish equivalent is 'insuficiencia cardíaca' and the case of 'helium therapy', whose Spanish equivalent is 'helioterapia', or 'Menkes kinky hair syndrome', with its Spanish equivalent 'síndrome del pelo ensortijado de Menkes'.

Culture in the syntax: Syntactic forms concern the way in which the elements in a sentence are combined idiomatically. Whereas the languages in literature demonstrate a great variety of creative linguistic forms, specialized communication uses a purposeful reduction of stylistic forms where the content-oriented nature of technical communication means that short assertive sentences, a linear theme-rheme organization, and a dense syntactic compression are prevalent. However, there are differences between languages, beyond technical and scientific writing styles. They are considered cultural phenomena because they are inherent to the idiomatic usage of language. The use of passive voice is more productive in English than in Spanish, for example: 'The experiment was performed by a group of scientists from Roslin

Institute in 1995'. In Spanish the form used would be the active voice, then it would be: 'Un grupo de científicos del Instituto de Roslin realizó el experimento en 1995'.

Culture in the text structure: The culture-specific use of language is closely linked with the communicative situation, and frequently recurring situations lead to the creation of specific text types. A fixed structure of texts enhances intelligibility for the communication partners within their culture. Linguistic research has grouped text types in various text genres, both for literary and for specialized communication. The text structure as a reflection of cultural norms is most clearly visible in texts which are totally standardized for their situation rooted in a culture, i.e. medical certificates, weather reports, tax declarations, school certificates and employment references court sentences, bills, business letters, balance sheets, obituaries, menus, crossword puzzles, cooking recipes, tourist information, etc. Such texts are each time standardized within their cultural background, and a possible translation may either focus on a literal and formal representation or on a target-specific transformation, depending on the purpose. Texts as language usage within a cultural situation are never a mere response to external conditions or technical objects but, rather, a result of individual language usage. Cultural aspects are mainly visible in the global text structure. It is not always easy to distinguish between cultural text structures and characteristics of a text type. However, macrostructures of texts may be culturally different, even if the extra-lingual function as such is comparable. There seems to be culturally different styles of writing but the importance of cultural styles in academic presentations is often underestimated by academicians when giving presentations abroad. Everybody intuitively starts with one's own idea of structuring texts, and this may cause understanding problems. What usually goes down well in one's home country may receive an entirely different reception elsewhere. For example, according to Resinger (2009) a scientific text in English is structured like the following: Introduction, Methods and Materials, Results, Discussion and eventually Conclusions. In this type of texts there are small variations, while in a scientific text in German a wider variety in the titles of its sub-divisions can be found (titles can be wider, and recommendations can be found at the end).

Culture in pragmatics: Pragmatics refers to senders and receivers of a text message and, therefore, is also part of the text itself. It is particularly in this respect that we find traces of the cultural background which is implicitly mentioned. There are different social procedures for organizing social life, especially in law. This is reflected, for instance, in legal texts and personal documents. Different legal structures too can have an impact on the text level. To the unwitting translator with insufficient background knowledge this may lead to an inadequate translation hardly comprehensible. Cultural differences include varying ideas of politeness, stereotypes of foreign people, and special images of a society in another area. Such features tend to reflect on the text level and any literal translation will sound strange in the target culture. Pragmatic aspects of user's preferences have to be observed in translation. Communication in certain discourse fields using a special sociolect, e.g. in groups such as teenagers, a political party, unions, churches, management with corporate identity, and others, is visible in their texts. The translator will need to have a clear knowledge of the cultural specificities and should be able to explain them in the translation. There are various possibilities for compensating cultural incongruence between texts: explication, paraphrasing, adaptation, and modification. Cultural keywords and certain expressions and allusions trigger specific associations. Translators will need to know such aspects, in order to prevent misunderstanding or unintended comic. Values of a society are almost always different from one another, and this again will have traces in texts. For example, the use of '¿Cómo nos sentimos hoy?' in Spanish, a variant of '¿Cómo se siente hoy?', as opposed to 'How do you feel today?' in English; the use of the English term 'circle of Willis' with its Spanish equivalent 'polígono de Willis', for Spanish-speaking physicians the expression 'cáncer de cuello' is easily understood as 'cáncer de cuello uterino', or the sound imitating word in English 'lubb-dupp', with its Spanish equivalent 'lab-dap'.

The above mentioned examples illustrate the numerous ways in which culture is reflected in specialized texts, as these may vary from the more simple level (the word) to more complex structures. This is an evidence of how the cultural phenomenon, with all its manifestations, may affect a kind of text nourished by technical terms, thus posing an extra effort from the part of the translator.

1.4 Medical texts and medical translation

Medicine is a field of knowledge in accelerated scientific and technological development that each year incorporates a large number of new terms into the medical lexicon. It is a branch of sciences and it is related to a wide amount of human knowledge, which is why it is divided into numerous specialties, and to take knowledge to practice, rigorous procedures of investigation and verification must be followed. No physician can know all of these specialties, neither a translator with a previous medical knowledge.

The main objective of scientific communication is to deliver a message that can be understood by specialized readers. Neologisms are being constantly incorporated to medical language and English terms are increasing in medical texts in Spanish. This current supremacy of the English language in specialized texts seems to be an accepted and recognized phenomenon among the scientific community and in society. The translation or adaptation of the new terms that come from another language and the proliferation of the English language in texts originally written in Spanish are affecting this objective.

It is obvious that the way in which physicians worldwide use their mother tongue is changing due to their habit of constantly reading medical articles in English and due to the accessibility to the main scientific and technical developments through books and specialized magazines published in English as well. Spanish-speaking physicians seem to be aware of this situation, but they are not aware of the intensity of this influence and of how advanced it is.

A medical text is a good example of a specialized text. According to Acimed (2005), a medical text generally uses a formal language, most of the times the third person in the singular is used, and in the case of texts written in English the passive voice is predominant. They also include a distinctive terminology related to the subject being referred to. According to Sevilla and Sevilla (2004), a variety of codes are used in medical texts, including signs, language and graphs, that is why Bachman (1995) states that we can have access to them through different channels that can be the

visual, the auditive or the tactile.

Medical texts are produced within a large number of medical specialties, which have common traits, but also distinct features. Audiences are also quite varied; they range from specialized audiences (including medical students, for example) to non-specialized readers. Medical texts have different functions. They are produced to educate and inform the public about health matters, to influence on the thought or behavior of people, to increase knowledge through teaching and learning, and they are also created with certain expressions and words to have an aesthetic function. According to Gamero Pérez (1998), the genres of medical texts are those related to the expositive or instructive function of language.

When dealing with medical language, it is important to bear in mind that a unique scientific speech does not exist, not even at the most specialized level. In this environment different types of speech coexist in function of the scientific community of reference, the addressees of the medical text, the purpose of this text (specialized communication, semi-specialized communication or divulgative communication) and even the participants at the moment of the communication (specialist-specialist, specialists-specialists in formation, doctor-patient, etc.).

A medical text, like any other scientific or technical text, is characterized by the presence of terms, but also cultural references appear because this type of text is produced in a large variety of contexts and communicative situations. That is why they can also be used to illustrate how cultural references are reflected in specialized texts.

The professional translator that deals with medical translations must be very well prepared, he/she has to look for information in specialized or non-specialized dictionaries, and to consult parallel texts as well as to analyze both the ST and the TT and to give his/her final version of the translated text to a specialist on the topic being translated for him/her to check it.

There are numerous areas in Medicine as well as a long list which forms the typology

of medical texts and need to be taken into account if we are to translate correctly. These may vary from media announcements, medical reports, textbooks, specialized books, prescriptions, articles for magazines, certifications, etc. So, when translating these types of texts many problems appear because it is not easy to find suitable equivalent terms in the TL for a lot of lexical items, thus making translation difficult, and this is aggravated when cultural references are present.

Nowadays, medical translation is often carried out by medical practitioners who have no translating experience and little knowledge of the SL, or especially of the TL. It can also be carried out by professional translators who are often not familiar with the associated vocabulary or medical practice, resulting in seriously distorted meanings.

In a 2009 article, Txabarriaga states that amateur translators seldom perform in-depth research into terms that have already been translated in medical literature, which results in highly heterogeneous translations from one publication to another. All these difficulties can explain doctors' resistance to the adoption of translated terms and their consensual and definitive incorporation into the profession's jargon. Consistent translations make the text easier to understand and facilitate the incorporation of new words into the jargon, but this basic translation concept is often neglected by amateur translators.

Translating medical texts accurately requires a native or near-native, formal level of language proficiency, analytical capabilities, and deep cultural knowledge in the SL and TL. A medical translator needs formal education in the SL and TL at least at college level, and ideally should receive instruction in translation theory and practice, as stated by Txabarriaga (2009).

He also noted that the real indicators of proficiency in translation are knowledge of the subject matter, knowledge of relevant terminology, the ability to discern meaning in context and transfer it within the target language constraints, i.e., accurately (all meaning has been transferred), precisely (all nuances of the language, tone, intent, style have been preserved in the target language), correctly (grammar, syntax, orthography rules have been observed), completely (no part of the original was

omitted and nothing has been added to the target text), and consistently (specific terms, stylistic elements and language-specific norms have been consistently used throughout).

The work of a competent medical translator evidences accuracy, precision, correctness, completeness, consistency, the knowledge of accepted linguistic norms applied to translation, and rigor of methodology. Likewise, the style and register of the original should be preserved. There are, however, exceptions to the latter, especially when a document written in English is not always adequate for new health literacy guidelines and requires lowering the reading level and cultural adaptation prior to translation.

Medical translation is part of what is known as specialized translation and therefore the materials it works with are specialized languages. In addition to the accepted features of this type of functional diatopic varieties (denotation, universality, predominant referential function, precision, conciseness, and so forth), from the linguistic point of view, we must also take into account the large amount of specialized terminology used ("terminological density"), which can be a serious problem for the translator. In fact, it has been claimed that the lexical and textual levels are the ones that most significantly condition the characterization of texts that use what are known as specialized languages (Cabré, 1993).

That is why when translating a medical text, especially from English into Spanish, some problems arise; they are not only related to the terminology used, but also to the cultural references present in the text. As stated by Martinez, (2008), these problems "are not only language-based but also culture bound". He identified some of these problems which are shown below:

1. Metaphors in the scientific Anglo-Saxon and Spanish-speaking cultures. The importance of the figures of speech (metaphors in particular) for a "cultural characterization" of the medical speech at different levels (specialized, semi-specialized, vulgar, etc.) is very well known. In most of the cases it is about the phenomenon of cultural anisomorfism and the following examples are very

illustrative:

English term	'bishop's cap'	'Adam's apple'
Literal translation	'gorro de Obispo'	'manzana de Adán'
Spanish term	'bulbo duodenal'	'prominencia laríngea/ nuez de Adán'

2. The treatment of commercial marks and the use of Spanglish. Another issue that one must be careful about in the translation of medical texts from English into Spanish is the inclusion of commercial marks, which should not be translated. As a result, the symbiosis between Spanish and English (Spanglish), although not correct from a linguistic point of view, can be very common.

English term	'BirdBeak instrument'
Spanish term	'Instrumento BirdBeak'

3. The use of Latinisms in medical English and their use in Spanish. In spite of the survival of some Latin in medical language, the use of these cultisms in Spanish is not as frequent as in English. There is a series of frequently used Latin words in medical English, related in most of the cases to the daily practice of medicine (treatments) that reproduce the use of abbreviated ways to indicate the frequency with which you must follow a treatment (every morning, every night, twice a day, etc.) or on what the treatment consists of (therapeutic indications). For example, 'bid' (Lat. *bis in die*), while in Spanish the expression used is 'dos veces al día', and 'npo' (Lat. *Nil per you*), whose common equivalent in Spanish is 'dieta absoluta'.
4. The linguistic (diastratic, diafasic and diatopic) variation that characterizes medical speech (in English and in Spanish). According to Bernardo (1995), a historical language is not only a linguistic system, but a diasystem, a more or less complex group that consists of "dialects", "levels", language styles, etc. Each one of these systems is usually homogeneous from a single point of view: in each dialect,

diastatic and diafasic differences can be proven (and, therefore, even levels and language styles); in each level, diatopic and diafasic differences (dialects and styles), and in each style it is possible to recognize diatopic and diastatic differences (dialects and levels).

Caudet (2001) outlines these varieties:

Diatopic varieties or dialects: The speech of the individuals of a given geographical area has a series of linguistic (phonetic, syntactical, lexical, etc.) features that allows making distinctions from speakers of other geographical areas. For example, in Cuba it is common to use the word 'ñáñara' to refer to a 'skin ulceration', a word that would no be easily understood by Spanish-speakers from other Spanish-speaking countries, where 'llaga' or 'ulceración' would be preferred. The same happens with 'güito', a colloquial word used in Cuba to refer to a kind of 'pityriasis'.

Diafasic varieties or registers: A speaker can use a variety of different registers depending on the social situation in which he/she is. So, it is possible to distinguish: extra-high, high, standard, colloquial. For example, the colloquial term 'empacho' as opposed to the standard 'indigestión, or dispepsia', belonging to a higher register, with their corresponding equivalents in English: 'upset stomach', 'indigestion' and 'dyspepsia', or the colloquial 'período' and the standard 'menstruación', with their English equivalents 'period' and 'menstruation'.

Diastratic varieties: It is about varieties of language that are used in certain social environments. They are, for example, jargons and sociolects. The main characteristic of jargon is that the members of that social group seek to create a distance in front of those individuals that do not belong to their group (for example, 'students jargon', or the 'medical jargon'). Sociolects are varieties of language determined by the stratification of the society in different groups that can be more or less rigid according to the case. For example, 'specialized medical terms' as opposed to 'non-specialized medical terms'.

English term	'heart disease'	'bone disease'
Spanish term	'cardiopatía'	'osteopatía'
Spanish colloquial term	'enfermedad del corazón'	'enfermedad de los huesos'

5. The combination of technical and non-technical words. For example: the term in English 'alcohol bath' that in Spanish stands for 'baño de alcohol', 'cloud baby' with its Spanish equivalent 'niño nube', or 'coffee-ground vomitus' and its Spanish equivalent 'vómito de posos de café'.
6. The English preference for using commercial brands for drugs, instead of the chemicals they are composed of. For example: 'Advil', as opposed to 'Ibuprofeno', and 'Aspirin', as opposed to 'Acetyl salicylic acid'.
7. Variations regarding the spelling of some proper names. For example: 'Marseilles fever' in English, compared to the Spanish 'fiebre de Marsella', or 'Frankfort-mandibular incisor angle' and 'ángulo incisivo mandibular de Frankfurt'.
8. Conventions when expressing measurement units of some tests. For example, when giving test results, it is a convention to use a dot to separate decimal places '(CI=56.86)' in English, while Spanish uses a comma '(CI=56,86)'
9. The presence of cultural references of the Anglo-Saxon culture which interfere with the Spanish-speaking culture, e.g.:
 - The use of some symbols and acronyms, given the great variability in communication, e.g., 'DNA-ADN' (Deoxyribonucleic Acid - 'Ácido Desoxirribonucleico').
 - The names of national and international institutions and organizations, for example, 'WHO-OMS' (World Health Organization-Organización Mundial de la Salud), 'NHIs' (National Health Institutes - 'Institutos Nacionales de Salud, en Estados Unidos')
 - The differences in naming some diseases, symptoms, procedures, etc., because of the different opinions regarding the creators of their names, e.g.,

'cardiopulmonary resuscitation' vs. 'cardiopulmonary reanimation', or 'Winslow's pancreas' vs. 'apófisis unciforme del pancreas'.

- The use of the international symbols for the elements in the periodic table, e.g., 'Na (sodium) ', 'Fe (iron) '.

Thus, it can be said that problems concerning cultural references in medical texts are mostly represented by metaphors, Latinisms, Spanglish, the treatment of commercial marks and linguistic (diastratic, diafasic and diatopic) variations. The combination of technical and non-technical words, the English preference for using commercial brands for drugs instead of the chemicals they are composed of, and variations regarding the spelling of some proper names are also abundant.

1.5 Abbreviations: acronyms and initialisms

As shown in the previous section, abbreviations, in the form of acronyms and initialisms, are cultural referents that appear in medical texts. It can be said that they are one of the most noticeable and abundant type.

According to Crystal (1995), abbreviations are one of the most noticeable features of present day English. Belda Medina (2004), states that abbreviations have been on the increase in all fields of the English vocabulary in recent times, and they are formed by taking just the initial or any other letter from a group of words. They are also present in the scientific and technical language and Puente Fonseca (1999) agrees that they are frequently used among professionals and technicians that work in the medical field.

According to Kasprovicz (2010), an abbreviation is understood as a shortened form of a word or phrase, spelled variously according to the rules of a particular language.

According to Seco (2007) an abbreviation is the graphic and reduced representation of a word or of a group of words that is obtained by the elimination of some of its letters or syllabus from its full writing.

According to Belda Medina (2004) there are different types of abbreviations, among them we can find clipping, blends, awkward cases, acronyms and initialisms.

Although there are some differences when defining acronyms and initialisms, most authors coincide, including Kasprowicz (2010) and by Crystal (1995) that both terms 'acronym' and 'initialism' are used to describe a lexical entity formed from one to several capitalized initial letters. The difference between them is that acronyms are pronounced as one word, and form a new word, while initialisms are articulated as separate sounds. Similarly, Crystal (1995) states that an 'initialism' is an item that is spoken as individual letters, whereas an 'acronym' is an initialism which is pronounced as a single word. This is the standpoint taken in this study.

Some examples of acronyms are: 'NOW (National Organization for Women) ', 'OASIS (Organization for the Advancement of Structured Information Standards) ' and 'NATO (North Atlantic Treaty Organization) '. Some examples of initialisms are 'WHO (World Health Organization) ', 'CBS (Columbia Broadcasting System) ', 'CNN (Cable News Network) ', 'IBM (International Business Machines) ', 'FBI (Federal Bureau of Investigation) ' and 'HTML (HyperText Markup Language) '.

Summing up, an abbreviation is a shortening of a word or a phrase. Both acronyms and initialisms are forms of abbreviations. An acronym is an abbreviation that forms a new word, and an initialism is an abbreviation that uses the first letter of each word in the phrase

1.6 Usage of abbreviations: initialisms and acronyms

As Crystal (1995) states abbreviations are used in fields such as sports, technology and sciences. The armed forces and government agencies frequently employ initialisms (and occasionally, acronyms) and also business and industry are users of acronyms and initialisms. They may also appear in different areas such as industry, writing, and academia.

One of the reasons for using abbreviated forms is the desire for linguistic economy. According to Crystal (1995), Kasprowicz (2010) and Belda Medina (2004), among others, abbreviations are used in places where space for writing is limited, for example, in ticker tape and newspaper column inches. They can contribute to a concise style, helping to convey a sense of social identity. They are also used most

commonly to abbreviate names of organizations and long or frequently referenced terms. The use of initialisms has been further popularized with the emergence of Short Message Systems (SMS). They can be useful when the goal is protecting the message receivers but it is scientifically groundless when it is seen for preserving the "purity" or "legitimacy" of language.

It is not uncommon for acronyms to be cited in a kind of false etymology, called a folk etymology, for a word. Such etymologies persist in popular culture but have no factual basis in historical linguistics, and are examples of language-related urban legends. For example, 'cop' is commonly cited as being supposedly derived from 'constable on patrol', 'posh' from 'port out, starboard hom', and 'golf' from 'gentlemen only, ladies forbidden'. Taboo words in particular commonly have such false etymologies: 'shit' from 'ship/store high in transit' or 'special high-intensity training' and 'fuck' from 'for unlawful carnal knowledge', or 'fornication under carnal knowledge'.

Abbreviations exclude the initials of short function words (such as 'and', 'or', 'of', or 'to'), they are sometimes included in acronyms to make them pronounceable. Sometimes the letters representing these words are written in lower case, such as in the cases of 'TfL (Transport for London) ' and 'LotR (Lord of the Rings) '. This usually occurs when the acronym represents a multi-word proper noun.

Numbers (both cardinal and ordinal) in names are often represented by digits rather than initial letters: as in '4GL (Fourth generation language) ' or 'G77 (Group of 77) '. Large numbers may use metric prefixes, as with 'Y2K' for 'Year 2000'. Abbreviations using numbers for other purposes include repetitions, such as 'W3C ("World Wide Web Consortium) '; pronunciation, such as 'B2B (business to business) '; and numeronyms, such as 'i18n (internationalization; 18 represents the 18 letters between the initial i and the final n) '.

Nowadays it is not common to find full terms in most medical texts. According to Kasprovicz (2010), abbreviations provide economy in space and time, so much needed in many medical emergency situations. This also means convenience and

security for specialists since abbreviations allow them to communicate without being understood directly by patients.

Acronyms and initialisms are elements commonly used in written and oral medical language. Many terms, such as names of disease entities, names of chemical compounds, organizations or therapies, hardly ever appear in their full form as it would simply hinder efficient communication. The widespread popularity of abbreviations is doubtless due to the historical tradition of the language of medicine, but also the economy in space and time they provide, so much needed in many medical emergency situations. Additionally, abridging enables medical professionals to code the true meaning of their utterances, making the content inaccessible to the patient, which at times is advisable for ethical reasons.

Insufficient cultural knowledge leads to factually incorrect cultural knowledge solutions; this statement also applies when a medical text is translated because as acronyms and initialisms are always present in medical texts as cultural referents they always represent a problem for translators. Most of the time they are used excessively and some other times they can have more than one meaning, which may lead to confusion among health professionals.

In this sense it is obvious that medical literature has been struggling to control the proliferation of acronyms as their use has evolved from aiding communication to hindering it. This has become such a problem that it is even evaluated at the level of medical academies such as the American Academy of Dermatology (Belda Medina, 2004).

1.7 Translation problems posed by the use of acronyms and initialisms

As a wide variety of shortened forms has arisen, the usage of full terms is less common now, and the problem is that these shortened forms are often accompanied by no explanations, which, in many occasions obscure the meaning, being the source of obscurity or ambiguity, for even within one specialty several different terms may stand for one acronym (Pakhomov, 2005).

When translating acronyms and initialisms there are three problems that are quite evident to the translator: some acronyms and initialisms maintain the same form in English as in Spanish and in most of the cases they constitute a borrowing from English; some acronyms and initialisms change when translated into Spanish because they have an accepted or standardized equivalent, and lastly there are no known equivalents in Spanish for certain English acronyms and initialisms.

Another problem when translating these types of abbreviation is choosing the appropriate Spanish prepositions that may clarify the connection between the different nouns combined in each structure.

The gender of the acronyms and initialisms is another problem translators have to deal with. Gender in English is neutral since most words offer no signs to know if the word is masculine or feminine and the article gives no information either. This represents a problem when translating any text from English into Spanish because sometimes when translated, the use of the Spanish article marks whether the acronym or initialism is feminine or masculine in gender.

Translators can also find problems when translating the names of national institutions and organizations, which may be specific to a given culture or country in particular, for example, 'NIH (National Institutes of Health', which are specific to the United States), and with the use of the international symbols of the elements in the periodic table.

Another common problem which translators have to face when dealing with acronyms and initialisms is the fact that abbreviations in English can take a plural form, like in 'ECGs (Electroencephalograms) ' or 'ORs (Operating Rooms) ', while Spanish abbreviations in general cannot be pluralized, so they retain the original form and the plural mark is given by the article ('los ECG').

Translator from English into Spanish have to deal with the fact that in English it is common to use multiple modification of a noun without using connectors, like in 'PDU (parenteral drug user) ', whose Spanish equivalent would be 'CDVP (consumidor de drogas por vía parenteral) ' or 'ADVP (adicto a las drogas por vía parenteral) ', where

the full form in Spanish uses prepositions as connecting elements.

Benavent and Iscla (2003) also described some other problems. One of these problems arises when dealing with artificial terms that have no etymological derivation, thus making difficult to remember the original meaning of the words they are composed by and at the same time making hard to remember the meaning of the acronym or the initialism. This problem has worsened because most of them have not been accepted by the world community and they have not been standardized. This is the case of 'UKWPDCAD' that in English stands for 'United Kingdom Working Party's Diagnostic Criteria for Atopic Dermatitis' while its Spanish equivalent is 'participantes del grupo de trabajo del Reino Unido para establecer criterios de diagnóstico en la dermatitis atópica' ' (UKWPDCAD) '

Another problem emerges when an acronym or an abbreviation has different meanings which may lead to wrong interpretations by translators, readers or physicians as well. 'DEM' in Spanish can stand for 'dosis eritematogena mínima', but also for 'dosis eficaz mínima' or 'disociación electromecánica'; 'UP' can refer to 'urticaria pigmentosa', but also to 'úlceras pépticas' or to 'uroporfirinas'.

Thus, the main translation problems associated to the use of acronyms and initialisms are related to the ambiguity caused by their use without clarification, the lack of equivalents in the target language and the use of a given acronym or initialism as it appears in the source language (borrowing). Some acronyms and initialisms change when translated into Spanish because of the use of the standardized or commonly accepted equivalent, this is another problem as well as the use of the adequate prepositions in the TL and the use of the names of national institutions and organizations. Some other problems translators have to deal with are the use of gender, the use of plural marks and the use of acronyms or initialisms that stand for nominal groups with multiple modification, also acronyms and initialisms hinder the translator's work when they have no etymological derivation and when they have more than one meaning.

1.8 Translation solutions to the use of acronyms and initialisms

The translation solutions that will be proposed in this paper are based on the suggestions given by Calvo Basarán (1992), (Pakhomov, 2005), Belda Medina (2005), and Kasprowicz (2010).

The following solutions were the ones they proposed:

1- *To give first an explanation in English and then in Spanish between parentheses the first time the acronyms or the initialisms appears for the readers to fully understand them, and not cause misunderstandings or misinterpretations, (and then, once clarified the meaning of the acronyms or initialisms, they can be used without the explanation throughout the text).*

e. g. ST: The doctor told him it was CREST Syndrome.

TT: El doctor le dijo que padecía del Síndrome de CREST (Calcinosis Cutis, Raynaud's Phenomenon, Esophageal Dysfunction, Sclerodactyly and Telangiectasia 'Calcinosis, fenómeno de Raynaud, disfunción esofágica, esclerodactilia y telangiectasias')

It would be even better to invert the order and write first the meaning in Spanish and then, enclosed in simple quotations marks what the acronym or initialism stands for in English. This is especially advisable in the case of the titles of documents, institutions, organizations, etc.

This is the solution given when the acronym or initialism is accompanied by no explanations, when they have no accepted or standardized Spanish equivalent, when they maintain the same form in English as in Spanish and in most of the cases they constitute a borrowing from English, when they have no etymological derivation, when translating the names of national institutions and organizations and when using the elements of the periodic table.

2- *It is a common procedure to leave the English acronym in the translated text the way it is in the source text.*

This solution is related to the problem that the acronym or initialism may get naturalized in target languages leading to misunderstandings, like in the following case:

e.g., ST: The PCR was proven during the experiment.

TT: Durante el experimento se probó la PCR (reacción en cadena de la polimerasa 'polymerase chain reaction').

In this example the Spanish version would be “RCP” and the confusion can be generated if it is translated because medically speaking it commonly stands for 'reanimación cardiopulmonar' in Spanish.

This solution is also applied when the medical acronyms or initialisms are simply borrowed and adopted from English and also when they have no standardized equivalents in Spanish like in the following case, but here there should be included a note or the explanation of the acronym or initialism enclosed between parentheses).

e. g. ST: The ABCDEFGHI procedure was applied to the patient.

TT: Al paciente se le aplicó el procedimiento ABCDEFGHI (vía respiratoria permeable, respiración, compresión torácica a 60/minuto, fármacos y fluidoterapia, electrocardiograma, desfibrilación, monitorización de la respuesta, prevención de la hipotermia y cuidados intensivos 'airway, breathing, circulation, drugs, EKG, fibrillation treatment, gauging, hypothermia, and intensive care').

This is a special case of an acronym that is used by doctors as a mnemotechnic device to remember the main measures to be taken for cardiopulmonary resuscitation.

The decision whether to keep to the original acronym or alter it to adapt it to the target culture will depend upon the translator's competence, experience, specialized knowledge and persistence in investigating which terms are the established equivalents in literature of a particular discipline.

3- To use the standardized equivalent in Spanish.

e. g. ST: AIDS is affecting millions of children worldwide.

TT: El SIDA está afectando a millones de niños en todo el mundo.

This case is related to the problem that appears when acronyms and initialisms change because there is a standardized equivalent in Spanish.

4- The gender of acronyms and initialisms is that of the semantic nucleus of the phrase (anyway translators have to verify the gender that applies in each case in the target language).

e.g., ST: Symptoms of COPD in smokers include chronic cough, shortness of breath, and frequent respiratory infections.

TT: Los síntomas de la EPOC (enfermedad pulmonar obstructiva crónica) en los fumadores incluyen la tos, falta de aire e infecciones respiratorias agudas.

4a- It is a useful procedure to precede an acronym with its head word which can either be an element included in the acronym, its hypernym, or hyponym. Then, in this case it would be:

e. g. ST: Symptoms of COPD in smokers include chronic cough, shortness of breath, and frequent respiratory infections.

TT: Los síntomas de la enfermedad EPOC en los fumadores incluyen la tos, falta de aire e infecciones respiratorias agudas.

4b-It is important to clarify that sometimes when it is necessary to give the full explanation of the acronym or initialisms the gender of the semantic nucleus of the phrase does not correspond with that of the acronym or initialisms, like in the following case:

e. g. ST: The UNICEF

ST: la UNICEF, el Fondo de las Naciones Unidas para la Infancia.

This solution is related to the problem of the gender of acronym and initialisms in both, the ST and the TT.

5- To add an –s to the article or to the main words of the phrase.

e. g. ST: The ICUs of Washington were awarded last week for their outstanding work throughout the year.

TT: Las UCI de Washington fueron galardonadas la semana pasada por su destacado trabajo durante todo el año.

This is the case in relation to acronyms or initialisms with plural marks.

6- *To have information about the prepositions used in the source and the target language and to apply the most accurate one in the translated text.* (The most common prepositions used in Spanish are “de”, “por” and “a”).

e.g., ST: PDU (parenteral drug user),

TT: CDVP (consumidor de drogas por vía parenteral) or ADVP (adicto a las drogas por vía parenteral),

This solution is given by the problem of choosing the correct Spanish prepositions and in the case of multiple modification of a noun without using connectors.

A special care about acronyms and initialisms is essential in Spanish as it may determine the accuracy of the final translated version if the translator wants to maintain the original meaning of the English abbreviation. This special care from translators would help to avoid the two most common mistakes when translating abbreviations, which are, on the one hand, misinterpreting in Spanish the syntactic connection existing between the different elements combined in the English abbreviation and, on the other hand, using indiscriminately certain Spanish prepositions to represent all kind of meanings and, therefore, losing a certain amount of specificity.

All the examples presented above seem to lead to the conclusion that most problems associated with translating acronyms stem from their inclination to cause ambiguity. The main obstacle in handling them is to find their unabridged form which is very often obscure and not easily findable in many cases. The use of acronyms and initialisms is very closely related to the culture of those who use them. In the case of medical acronyms and initialisms they are not only culture-specific, but they are also linked to particular uses in the field of study that are frequently determined by particular ways of doing things, specific organizations and institutions, particular therapies, etc.

Chapter II. Methodological Framework and Analysis

2.1 Methodological Framework

Thus, on the assumption that the translation of acronyms and initialisms is not only language-dependent, but also culture-bound, the **aim** of this study is to analyze the translation procedures used to translate into Spanish acronyms and initialisms used in English medical texts on Cardiology.

This study attempts to present a theoretical and practical stand on the issue under research. It is a qualitative, interpretive, descriptive, synchronic study based on the lexical analysis of acronyms and initialisms in the English ST and the Spanish TT, within the framework of descriptive translation studies.

2.1.1 Sample

For the purposes of the study, an empirical textual sample was used.

The corpus under study comprises 8 medical texts on Cardiology and the translations of these texts. The source language (SL) is English and the target language (TL) is Spanish.

The source texts (ST) were selected from articles published from 1996 to 2006. They appeared in the following medical journals: *Bioorganic and Medicinal Chemistry*, *Annals of Thoracic Surgery*, *American Heart Journal*, *NEUROLOGY*, *Boletín Asociación Médica de Puerto Rico*, *JAMA (Journal of American Medical Association)*, *Iranian Journal of Medical Sciences* and *Epidemiology*. (For a complete list of the analyzed articles see Appendix I)

The target texts (TT) were produced by translators from the Translation Department in the “Agustín Ruiz de Zárate Ruiz” Medical University (Santa Clara, Cuba). The translated texts are used as reference material by doctors, nurses, and medical students in this institution.

This corpus was selected based on the fact that acronyms and initialisms are abundant in medical texts and even more so in texts related to Cardiology, that is why the corpus chosen is related to this branch of Medicine.

First, acronyms and initialisms were identified in the source texts. Then, the target texts were analyzed in order to determine how the translators dealt with this translation problem, and later conclusions are drawn as to the correct or incorrect use of acronyms and initialisms.

2.1.2 Research methodology

This study was carried out within the framework of descriptive translation studies (DTS), which aims to describe how translation is done. This approach is functional and target-oriented: this means that translated texts are accepted as long as they function in the target culture.

The DTS approach "takes translation as it comes rather than as we might have wished it" (Hermans, 1985), it developed in reaction to the prescriptive aspects of earlier work on translation, in a kind of "invisible college".

Descriptive translation theorists start with a practical examination of a corpus of texts and their translations in order to determine the norms and constraints that operate on these texts in the source language and culture, as well as in the target language and culture.

Another important element of DTS is the focus on translated writing as a TT, as work deliberately initiated and produced for a specific audience. The translator's intentionality that includes his /her choices, judgments and motivations, needed to be included in the research, as well as the relationship between source and target cultures required investigation.

The present study is target-oriented because it deals with the translation procedures used in order to deal with acronyms and initialisms in medical texts, so that the TT fulfills its function and follows conventions in the target culture.

Another feature of the descriptive translation approach is that it requires a *tertium comparationis* that will serve as the basis of comparison for the description of the ST and the TT. In the case of the present study, the *tertium comparationis* comprises abbreviations and initialisms in medical articles, considered as cultural referents, based on the fact that their use is not only language-determined, but also culture-bound.

Acronyms and initialisms were drawn from STs and TTs and grouped according to the criteria provided by SNOMED clinical terminology. Afterwards, acronyms and initialisms were analyzed and classified taking into account the number of elements they are composed of, their grammatical category and the correspondence between them and their developed forms. Gender, plural marks, synonymy and homonymy were taken into account as well. As for syntax, acronyms and initialisms can be divided into total, partial or nil correspondence with the developed form of these types of abbreviations. Other classifications were based on the presence or absence of the acronym or initialism along with their full explanation, their formation by combining letters and numbers and also their combination with other grammatical categories. One last classification considered their grammatical function. Finally, an analysis of the problems they represent for translators of specialized texts was made and solutions to those problems were proposed.

2.2 Analysis of the acronyms and initialisms in the corpus of medical texts on Cardiology

Based on the criteria of Kasprowicz (2010) and Crystal (1995), acronyms and initialisms were identified in the TT. In the analyzed corpus 83 examples of acronyms and initialisms were found.

Since the identification of acronyms is mostly based on their syllabic pronunciation, that is on phonetic criteria, most authors do not make a distinction between acronyms and initialisms, and dictionaries of acronyms and initialisms present lists but no indication for differentiating ones from the others. Thus, it was decided that the identification of acronyms would be done on the criteria contributed by medical experts and the following physicians were consulted Dr. Bexy Rodríguez Ynfiesta, Dr.

Eva Martínez Seisdedos and Dr. Yamila Muga Baluja. Based on their criteria and the experience, 15 acronyms were identified. (See Appendix II)

Then, they were grouped according to SNOMED (Systematized Nomenclature of Medicine), which is a systematically organized computer processable collection of medical terminology. It allows a consistent way to index, store, retrieve, and aggregate clinical data across specialties and sites of care. It also helps organizing the content of medical records, reducing the variability in the way data is captured, encoded and used for clinical care of patients and research (Ruch et al. 2008). This grouping was done in order to determine the pragmatic function of each analyzed item in the field of Cardiology.

SNOMED covers most areas of clinical information and offers 13 concept groups:

1. Diseases
2. Clinical findings
3. Procedures
4. Normal and abnormal body structures
5. Pharmaceutical/biologic products and pharmaceutical components
6. Physical objects, equipment and devices
7. Living organisms
8. Physical forces and causes of injury
9. Environments or geographical locations
10. Social context
11. Qualifiers
12. Events
13. Specimen

In the corpus analyzed 12 examples were found under the Diseases grouping. The following are examples under this classification:

e. g., ST: **CHD**: congenital heart disease

In congenital heart disease (**CHD**), neurological abnormalities suggestive of hypoxia-ischemia are often apparent before cardiac surgery.

TT: **ECC**: enfermedades congénitas del corazón

En las enfermedades congénitas del corazón (**ECC**) y antes de la cirugía cardiaca aparecen anormalidades.

e.g., ST: **DHCA**: deep hypothermia, and/or total circulatory arrest

Many of these problems have been attributed to deep hypothermia, and for total circulatory arrest (**DHCA**).

TT: **HPPC**: hipotermia profunda y/o paros circulatorios totales

Muchos de estos problemas han sido atribuidos a las hipotermias profundas y/o paros circulatorios totales (**HPPC**).

e. g., ST: **HLHS**

Two subjects (**HLHS**, pulmonary atresia) received a fentanyl infusion.

TT: **SCIH**: Síndrome Cardíaco Izquierdo Hipoplásico

Dos sujetos (con Síndrome Cardíaco Izquierdo Hipoplásico, (**SCIH**), y Atresia Pulmonar) recibieron una infusión de fentanil.

The second classification given by SNOMED is Clinical findings (signs and symptoms) and no examples of this group were found in the corpus.

Thirteen examples of Procedures were found in the corpus. They can be illustrated with the following examples:

e.g., ST: **CABG**: coronary artery bypass graft

Atrial fibrillation is a common, but potentially preventable, complication following coronary artery bypass graft (**CABG**) surgery.

TT: **IDAC**: cirugía de injerto en la arteria coronaria

La fibrilación arterial es una complicación común, pero potencialmente prevenible, que sigue a la cirugía de injerto en derivación de la arteria coronaria (**IDAC**).

e.g., ST: **CPB**: Cardiopulmonary bypass

Many of these problems have been attributed to cardiopulmonary by-pass (**CPB**)...

TT: **DCP**: derivación cardiopulmonar

Muchos de estos problemas han sido atribuidos a la derivación cardiopulmonar (**DCP**)...

e.g., ST: **MRI**: magnetic resonance imaging

Neurologic examination and magnetic resonance imaging (**MRI**) are nonspecific tests.

TT: **IRM**: imagen de resonancia magnética

La examinación neurológica y la imagen de resonancia magnética (**IRM**) son pruebas inespecíficas.

The fourth classification is Normal and abnormal body structures. The three following examples were found:

e.g., ST: **VSMC**: vascular smooth muscle cells

ROS are produced in the cardiovascular system by endothelial cells, vascular smooth muscle cells (**VSMC**)...

TT: **CVML**: células vasculares del músculo liso

Los EOR se producen en el sistema cardiovascular por denominadas células endoteliales, células vasculares del músculo liso (**CVML**)...

e.g., ST: **CNS**

The potential value of pindolol in pathologies affecting **CNS** was also previously reported.

TT: **SNC**

El valor potencial del pindolol en patologías que afectan el **SNC** fue informado previamente también.

e.g., ST: **LV**: left ventricular

Left ventricular (**LV**) mass, using echocardiography of all participants was obtained.

TT: **LV**: ventrículo izquierdo

Se obtuvo en todos los participantes la masa del ventrículo izquierdo (**LV**) utilizando la ecocardiografía.

The fifth classification is Pharmaceutical/biologic products and pharmaceutical components. In the corpus 29 examples were found, some of them are:

e.g., ST: **RNS**: reactive nitrogen species

In other studies pindolol was shown to be a potent scavenger of the peroxy radical and of reactive nitrogen species (**RNS**).

TT: **ENR**: especies de nitrógeno reactivo

En otras investigaciones, el pindolol demostró ser un potente depurador del radical peroxil y de las especies de reactivo (**ENR**).

e.g., ST: **ROS**: reactive oxygen species

A number of studies have shown that some β -blockers are scavengers of reactive oxygen species (**ROS**).

TT: **EOR**: especies de oxígeno reactivo

Un número de investigaciones han demostrado que algunos β -bloqueadores son depuradores de especies de oxígeno reactivo (**EOR**).

e.g., ST: **PMS**: phenazine methosulfate

Metoprolol, timolol, sotalol, were shown to protect red blood cells against phenazine methosulfate (**PMS**).

TT: **MSF**: metosulfato de fenazina

El metoprolol, timolol, sotalol, protegen a los glóbulos rojos del metasulfato de fenazina (**MSF**).

Concerning the sixth classification, that is Physical objects, equipment and devices, two examples were found, they are:

e.g., ST: Synergy-**HT**, BIO-TEK

A microplate reader (Synergy-**HT**, BIO-TEK) was used for all the scavenging assays.

TT: Sinergia **HT**, BIO-TEK

Un lector del microplato (Sinergia **HT**, BIO-TEK) se utilizó para todos los ensayos.

e.g., ST: **SAS** statistical software

All analyses were performed using **SAS** statistical software.

TT: un software estadístico **SAS**

Todos los análisis se realizaron con la utilización de un software estadístico **SAS**.

Living organisms (bacteria, virus, animals, and plants) is the seventh classification and no examples were found.

The eighth classification is Physical forces and causes of injury. The two following examples were found:

e.g., ST: right inferior **QRS** axis

The electrocardiogram revealed right ventricular enlargement, right inferior **QRS** axis.

TT: **QRS** axial inferior derecho

El electrocardiograma revela alargamiento ventricular derecho, **QRS** axial inferior derecho.

e.g., ST: **ST-T** changes

The electrocardiogram revealed secondary **ST-T** changes.

TT: cambios **ST-T** secundarios

El electrocardiograma reveló cambios **ST-T** secundarios.

The ninth group concept is Environments or geographical locations. Three examples were retrieved and they are:

e.g., ST: St. Louis, **USA**.

Catalase from bovine liver was obtained from Sigma-Aldrich (Saint Louis, **USA**).

TT: St. Louis, **USA**.

La catalasa del hígado de bovino se obtuvo del Sigma-Aldrich (Saint Louis, **USA**).

e.g., ST: **ICU**

With further work, cerebral oximetry might be used to guide (**ICU**) care.

TT: **UCI**: unidades de cuidados intensivos

En trabajos posteriores, la oximetría cerebral se podría utilizar para guiar las unidades de cuidados intensivos (**UCI**).

e.g., ST: **MN**

In Rochester, MN, however stroke incidence was stable in the 1970s.

TT: (not given)

Sin embargo en Rochester, la incidencia de accidente cerebrovascular era estable en los años de 1970.

Social context (family, religion, ethnic groups) is the tenth element for classification and 13 examples are present in this corpus. Some of them are:

e.g., ST: **NIM** Incorporated Philadelphia, PA.

In this study, it was measured with a prototype frequency domain cerebral oximeter (**NIM** Incorporated Philadelphia, PA.).

TT: **NIM** Incorporated Philadelphia, PA.

En este estudio esta se midió con un oxímetro cerebral de prototipo de dominio frecuencial (**NIM** Incorporated Philadelphia, PA.).

e.g., ST: **KPMCP**: Kaiser Permanente Medical Care Program

...37,047 men who were members of the northern California Kaiser Permanent Medical Care Program (**KPMCP**) during 1971...

TT: **KPMCP**: Programa de Atención Médica Permanente Kaiser

...37,047 hombres que eran miembros del Programa de Atención Médica Permanente Kaiser, California del Norte (**KPMCP**) durante 1971.

e. g., ST: **NHANES**: National Health and Nutrition Examination Survey

Using data from the National Health and Nutrition Examination Survey (**NHANES**)...

TT: **NHANES**: Revisión de Exámen de Salud Nacional y Nutrición

Utilizando los datos de la Revisión de Exámenes de Salud Nacional y Nutrición (**NHANES**)...

Qualifiers (values, modifiers) is the eleventh classification given by SNOMED and 7 examples were found. Some of them are:

e. g., ST: **LVEF**: left ventricular ejection fraction

There was found no difference in the primary study of resting left ventricular ejection fraction (**LVEF**) at 30 days.

TT: **LVEF**: la fracción de expulsión del ventrículo izquierdo

No se encontró diferencia en el estudio primario de la fracción de expulsión del ventrículo izquierdo (**LVEF**) a los 30 días.

e. g., ST-**ORAC** values

The **ORAC** values for pindolol and propranolol were 0.62 respectively.

TT: valores **ORAC**

Los valores **ORAC** para el pindolol y el propranolol fueron 0,62 respectivamente.

e. g., ST: **BMI**: body mass index

...weight measurements used to calculate body mass index (**BMI** = weight in kg/ (height in meters)).

TT: **IMC**: índice de masa corporal

...el peso utilizado para calcular el índice de masa corporal (**IMC**=peso en Kg. /altura en metros).

The twelfth classification is Events (adverse events, accidents) and no examples were found.

Specimen is the last classification given by SNOMED, and in the analyzed corpus there were no elements in correspondence to this classification. (For the complete list of acronyms and initialisms and their SNOMED classification, refer to Appendix II).

According to Giraldo (2008), acronyms and initialisms can also be classified as proper or mixed. The proper acronyms and initialisms are formed exclusively by the initial letters of the words they are derived from, and the mixed acronyms and initialisms are formed by figures, by symbols, by the omission of the main parts of the words they are derived from or by any letter of the words they are derived from, but the initials. Based on this criteria, 58 acronyms and initialisms were classified as proper, and 25 as mixed. There were 44 proper initialisms, 13 proper acronyms, 23 mixed initialisms, 3 mixed acronyms.

Some examples of proper initialisms are:

e.g., ST: **NO**: nitric oxide

Nitric oxide (**NO**) is the most relevant reactive nitrogen species in the vasculature.

TT: **NO**: óxido nítrico

El óxido nítrico (**NO**) es la especie de nitrógeno reactivo más relevante en la vasculatura.

e. g., ST: **LDL**: low-density lipoproteins

The low-density lipoproteins (**LDL**) present in the vasculature can be a target for lipid peroxidation.

TT: **LBD**: lipoproteínas de baja densidad

Las lipoproteínas de baja densidad (**LBD**) que están presentes en la vasculatura pueden ser un blanco para la peroxidación de lípidos.

e. g., ST: **TIA**: transient ischemic attacks

The validity of the subtype classification, especially transient ischemic attacks (**TIA**) was lower, however.

TT: **AIT**: ataques isquémicos transitorios

Sin embargo, la validez de la clasificación del subtipo, especialmente los ataques isquémicos transitorios (**AIT**) era inferior.

Some examples of proper acronyms are:

e. g., ST: **TIMI**: Thrombolysis In Myocardial Infarction

Background Prompt restoration of Thrombolysis In Myocardial Infarction (**TIMI**) grade 3 flows improves survival in patients with myocardial myocardial infarction.

TT: **TIMI**: trombólisis en el infarto del miocardio

Una rápida restauración del flujo de la trombólisis en el infarto del miocardio (**TIMI**) de grado 3 aumenta la supervivencia.

e. g., ST: **ICU** intensive care unit

With further work, cerebral oximetry might be used to guide (**ICU**) care.

TT: **UCI**: unidades de cuidados intensivos

En trabajos posteriores, la oximetría cerebral se podría utilizar para guiar las unidades de cuidados intensivos (**UCI**).

e. g., ST: **NIM** Incorporated Philadelphia, PA.

In this study, it was measured with a prototype frequency domain cerebral oximeter (**NIM** Incorporated Philadelphia, PA.).

TT: **NIM** Incorporated Philadelphia, PA.

En este estudio esta se midió con un oxímetro cerebral de prototipo de dominio frecuencial (**NIM** Incorporated Philadelphia, PA.).

Some examples of mixed initialisms are:

e. g., ST: **MPO**: myeloperoxidase

Myeloperoxidase (**MPO**), a hydrogen peroxide oxidoreductase contributes to the bactericidal capabilities of the cells.

TT: **MPO**: mieloperoxidasa

La mieloperoxidasa (**MPO**), una oxidoreductosa del peróxido de hidrógeno contribuye con la capacidad bactericida de estas células.

e. g., ST: **AD**: antidepressant

Scavenging activities of pindolol may contribute for enhancing and/or accelerating selective serotonin specific reuptake inhibitors (SSRI)-induced antidepressant (**AD**) effect.

TT: **AD**: antidepresivo

Las actividades de depuración del pindolol pudieran contribuir a incrementar los inhibidores específicos en la reabsorción de la serotonina selectiva (IERSS), el efecto del antidepresivo (**AD**) inducido.

e. g., ST: **EDTA**: ethylenediamine-tetraacetic acid

Ethylenediamine-tetraacetic acid (**EDTA**) was obtained from Sigma-Aldrich (Saint Louis, USA).

TT: **EDAT**: la etilenodiamina del ácido tetracético

La etilenodiamina del ácido tetracético, (**EDAT**) se obtuvo del Sigma-Aldrich (Saint Louis, USA).

Some examples of mixed acronyms are:

e. g., ST: **NSAIDs**: nonsteroidal anti-inflammatory drugs

However, administering nonsteroidal anti-inflammatory drugs (**NSAIDs**) was associated with the reduction in the atrial fibrillation.

TT: **MAINEs**: medicamentos antiinflamatorios no esteroideos

Sin embargo la administración de medicamentos antiinflamatorios no esteroideos (**MAINEs**) se asociaba con una reducción de la fibrilación arterial.

e. g., ST: **ANOVA**: analysis of variance

Comparisons were made by analysis of variance (**ANOVA**).

TT: **ANOVA**: análisis de variación

Las comparaciones se hicieron por análisis de variación (**ANOVA**).

Three examples of acronyms or initialisms formed by the combination of letters and numbers. (To see more refer to Appendix II)

e.g., ST: **NaNO₂**

It was mixed with **NaNO₂** in a Y junction.

TT: **NaNO₂**

Este se mezcló con **NaNO₂** en una unión Y.

e.g., ST: **NaH₂PO₄**

Working solutions of DAF-2 diluted with the buffer (**NaH₂PO₄**) ...

TT: **NaH₂PO₄**

Las soluciones de DAF-2 con las que se trabajó, diluídas con el neutralizador (**NaH₂PO₄**)...

Based on the number of characters they consist of, there were no acronyms or initialisms formed by one character, but 12 were formed by two characters, e.g., **NO**, 37 were formed by three characters, e.g., **LDL**, and 20 acronyms or initialisms were formed by four characters, e.g., **TIMI**. Moreover, ten examples had five characters in their formation, e.g., **KPMCP**, one example was formed by six characters, e.g., **ADMIRAL**, and three by seven characters, e.g., **RAPPORT**.

According to Seco (2007) accronyms and initialisms can be formed by the union of elements of two or more words, for example, by the three initial letters of three nouns or those of one adjective and two nouns. They are also made up by the four initial letters of one adjective and three nouns, or those of two adjectives and two nouns. Other acronyms and initialisms are composed by combining one noun and two adjectives, one noun and one adjective, one noun and three adjectives, three nouns and two adjectives, as well as the combination of three adjectives and three nouns, three adjectives and six nouns and one adjective and four nouns. Some acronyms and initialisms were not formed by the combination of nouns and adjectives but just by one noun, two nouns, four consecutive nouns or three adjectives.

Some examples of these combinations are:

Three nouns

e. g., ST: insured **HMO** population

It may be more difficult to detect an association that actually exists, particularly in an insured **HMO** population.

TT: población **HMO** asegurada

Puede ser más difícil detectar una asociación que realmente existe, particularmente en una población **HMO**.

This initialism stands for 'Health Maintenance Organization'.

One adjective-two nouns

e. g., ST: **ICD**: International Classification of Diseases

The diagnosis in both registers was based on International Classification of Diseases.

TT: **CIE**: Clasificación Internacional de Enfermedades

Los diagnósticos en ambos registros se basaban en la Clasificación Internacional de Enfermedades.

One adjective-three nouns

e. g., ST: **GUSTO III**

A report from the **GUSTO III** study suggests a potential 30-day mortality benefit.

TT: **GUSTO III**

Un reporte proveniente del estudio **GUSTO III** sugiere un beneficio potencial de la mortalidad a los 30 días.

In this case GUSTO III stands for 'Growing Up in Singapore Towards Healthy Outcomes'.

Two adjectives-two nouns

e. g., ST: **CABG**: coronary artery bypass graft

Atrial fibrillation is a common, but potentially preventable, complication following coronary artery bypass graft (**CABG**) surgery.

TT: **IDAC**: cirugía de injerto en la arteria coronaria

La fibrilación arterial es una complicación común, pero potencialmente prevenible, que sigue a la cirugía de injerto en derivación de la arteria coronaria (**IDAC**).

One noun-two adjectives

e. g., ST: **RCTs**: randomized controlled trials

In the lab randomized controlled trials (**RCTs**) have critically analyzed...

TT: **RCTs**: pruebas controladas y aleatorias

En el laboratorio **RCTs** han analizado rigurosamente...

One noun-one adjective

e. g., ST: **CPB**: Cardiopulmonary bypass

Many of these problems have been attributed to cardiopulmonary by-pass (**CPB**)...

TT: **DCP**: derivación cardiopulmonar

Muchos de estos problemas han sido atribuidos a la derivación cardiopulmonar (**DCP**)...

One noun-three adjectives

e. g., ST: **PTCA**: percutaneous transluminal coronary angioplasty

Methods and Results Data from controlled trials of rescue percutaneous transluminal coronary angioplasty (**PTCA**).

TT: **PTCA**: angioplastia coronaria transluminal percutánea

Se realiza una revisión de datos de pruebas controladas de angioplastia coronaria transluminal percutánea (**PTCA**).

Three nouns-two adjectives

e. g., ST: **KPMCP**: Kaiser Permanente Medical Care Program

...37,047 men who were members of the northern California Kaiser Permanent Medical Care Program (**KPMCP**) during 1971...

TT: **KPMCP**: Programa de Atención Médica Permanente Kaiser

...37,047 hombres que eran miembros del Programa de Atención Médica Permanente Kaiser, California del Norte (**KPMCP**) durante 1971...

Three adjectives-three nouns

e. g., ST: **RAPPORT**

Data from **RAPPORT** suggest significant benefit.

TT: **RAPPORT**

Datos provenientes de **RAPPORT** sugieren beneficios significativos.

This acronym stands for 'Reopro And Primary PTCA Organiz and Randomized Trial'.

Three adjectives-six nouns

e. g., ST: **ADMIRAL**

Data from **ADMIRAL** suggests significant benefit.

TT: **ADMIRAL**

Datos provenientes de **ADMIRAL** sugieren beneficios.

The meaning of this acronym is 'Abciximab before direct angioplasty and senting in myocardial infarction regarding acute and long term follow up'.

One adjective-four nouns

e. g., ST: **NHANES**: Nacional Health and Nutrition Examination Survey

Using data from the National Health and Nutrition Examination Survey
(**NHANES**)...

TT: **NHANES**: Revisión de Exámen de Salud Nacional y Nutrición

Utilizando los datos de la Revisión de Exámenes de Salud Nacional y Nutrición
(**NHANES**)...

One noun

e. g., ST: **TG**: triglycerides

LDL- cholesterol levels were calculated for samples containing triglycerides
(**TG**).

TT: **TG**: triglicéridos

Se calcularon los niveles de colesterol LDL a partir de las muestras que
contenían los triglicéridos (**TG**).

Two nouns

e. g., ST: **OR**: odds ratio

Risk factors associated with atrial frillation were advanced age (odds ratio (**OR**))
for ten years increase, 1.75.

TT: **RP**: razón de probabilidad

Los factores de riesgos asociados con fibrilación arterial eran la avanzada edad
(razón de probabilidad (**RP**)), para un aumento de diez años 1,75.

Four consecutive nouns

e. g., ST: **TAMI**: Thrombolysis And Angioplasty in Myocardial Infarction

The first of these was the Thrombolysis and Angioplasty in Myocardial Infarction
(**TAMI**).

TT: **TAMI**: Trombolisis y angioplastia en el Infarto del Miocardio

La primera de estas pruebas fue la Trombolisis y angioplastia en el Infarto del
Miocardio (**TAMI**).

Three adjectives

e. g., ST: right inferior **QRS** axis

The electrocardiogram revealed right ventricular enlargement, right inferior **QRS** axis.

TT: **QRS** axial inferior derecho

El electrocardiograma revela alargamiento ventricular derecho, **QRS** axial inferior derecho.

Q, R and S are types of electromagnetic waves.

Another classification is concerned with parts of speech, and as stated by Rodriguez (1981), quoted by Giraldo (2008), according to this classification acronyms and initialisms can be nouns, adjectives or verbs. In the corpus of the present study all the analyzed examples were classified as nouns. (See Appendix II).

Assuming that acronyms and initialisms stem from a nominal syntagm whose nucleus is a noun, it can be assumed that these types of abbreviations have gender and plural marks (Martínez de Sousa (1980), quoted by Giraldo (2008)) Gender in English is neutral and in Spanish it is represented by the morphemes 'a' for feminine or 'o' for masculine. In this study 36 feminine and 47 masculine acronyms and initialisms were found in the TTs. The plural mark in English is represented by a low-case 's' after the acronym or the initialism, and in Spanish the article preceding the acronym or initialism is the one that carries this mark, and in some cases, it can be inferred from a conjugated verb or the accompanying modifier. In the analyzed corpus only four examples had plural marks. (See Appendix III).

The following acronyms and initialisms are examples of the use of gender and plural marks:

e.g., ST: **LDL**: low-density lipoproteins

The low-density lipoproteins (**LDL**) present in the vasculature can be a target for lipid peroxidation.

TT: **LBD**: lipoproteínas de baja densidad

Las lipoproteínas de baja densidad (**LBD**) que están presentes en la vasculatura pueden ser un blanco para la peroxidación de lípidos.

e.g., ST: **EEGs**

It is associated with decreased (**EEGs**) activity.

TT: **EEGs**: electroencefalograma

Esto está asociado con la actividad disminuída de los electroencefalogramas (**EEGs**).

Giraldo (2008) also proposes to classify acronyms and initialisms based on their syntax. Thus, acronyms and initialisms can be divided into total, partial or nil correspondence with the developed form of the abbreviation. Total correspondence exists when each of the initial letters of the developed form is present in the acronym or initialism. Partial correspondence occurs when one of the initial letters or any other letter of the developed form is not present in the acronym or initialism, and the nil correspondence is given by the absence of the initial or any other letter of the developed form. In the present study 54 and 25 acronyms and initialisms were classified as of total and partial correspondence, and four of these abbreviations were of nil correspondence. (See Appendix II).

e. g., ST: **RR**: relative risk

Cohort and age group-specific relative risks (**RR**) were calculated.

TT: **RR**: riesgos relativos

El cohorte y los riesgos relativos (**RR**) específicos del grupo fueron calculados.

e. g., ST: **SSRI**: selective serotonin specific reuptake inhibitors

Scavenging activities of pindolol may contribute for enhancing and/or accelerating selective serotoninine specific reuptake inhibitors (**SSRI**).

TT: **IERSS**: inhibidores específicos en la reabsorción de la serotonina selectiva

Las actividades de depuración del pindolol pudieran contribuir a incrementar los inhibidores específicos en la reabsorción de la serotonina selectiva (**IERSS**).

e. g., ST: **NaNO₂**

It was mixed with **NaNO₂** in a Y junction.

TT: **NaNO₂**

Este se mezcló con **NaNO₂** en una unión Y.

When using acronyms and initialisms, it is advisable to include their developed form when they appear for the first time in a given text, so as to avoid confusion or ambiguity. However, many authors chose to ignore this precept, based on the fact

that there are acronyms and initialisms that are widely and commonly used and shared by experts in a given field of expertise. In the corpus comprising 83 acronyms and initialisms, only 50 acronyms and initialisms appeared in the STs together with their developed form, while in the TTs, 54 acronyms and initialisms were accompanied by their developed form. (See Appendix III).

e. g., ST: **TAMI**: Thrombolysis And Angioplasty in Myocardial Infarction

The first of these was the Thrombolysis and Angioplasty in Myocardial Infarction (**TAMI**).

TT: **TAMI**: Trombólisis y angioplastia en el Infarto del Miocardio

La primera de estas pruebas fue la Trombolisis y angioplastia en el Infarto del Miocardio (**TAMI**).

e. g., ST: program package **GLIM**

The models were estimated by the maximum likelihood method by means of the program package **GLIM**.

TT: programa de empaquetamiento **GLIM**

Se estimaron los modelos por el método de probabilidad máxima por medio del programa de empaquetamiento **GLIM**.

According to Rodríguez (1987), quoted by Giraldo (2008), it is also possible to analyze their relation to other parts of speech. In the case of this study all identified acronyms and initialisms are nouns, but in English nouns do not necessarily perform all the time as nouns, they can also be modifiers of other nouns and nominal groups, or even act as verbs. In the sample under study, out of the 83 acronyms and initialisms that were identified, 19 appeared as modifiers of other nouns, thus performing as adjectives.

Acronym as noun

e. g., ST: **ONOO**: peroxyinitrite

Peroxyinitrite (**ONOO**) is the most relevant reactive nitrogen species in the vasculature.

TT: **ONOO**: peroxinitrito

El peroxinitrito (**ONOO**) es la especie de nitrógeno reactivo más relevante en la vasculatura.

Acronym as modifier

e. g., ST: **SAS** statistical software

All analyses were performed using **SAS** statistical software.

TT: un software estadístico **SAS**

Todos los análisis se realizaron con la utilización de un software estadístico **SAS**.

2.2.1 Analysis of the translation problems posed by the use of acronyms and initialisms in medical texts

After identifying acronyms and initialisms in the STs and analyzing the TTs in order to determine how the translators dealt with the problem of their translation, it has been concluded that not all acronyms and initialisms were correctly translated according to the translation solutions proposed by Calvo Basarán (1992), (Pakhomov, 2005), Belda Medina (2005), and Kasprowicz (2010).

Taking into account the main problems posed by the use of acronyms and initialisms, according to Pakhomov (2005) and Benavent and Iscla (2003), and their proposed solutions the following analysis was carried out.

The first problem is when shortened forms (acronyms and initialisms) are accompanied by no explanations. Some of examples in the corpus are:

e. g., ST: **PDA**

PDA subjects included 2 premature infants.

TT: **DAP**: Ductus Arteriosus Permeable

Los sujetos con Ductus Arteriosus Permeable (**DAP**) incluyeron 2 niños prematuros.

e. g., ST-**ORAC** values

The **ORAC** values for pindolol and propranolol were 0.62 respectively.

TT: valores **ORAC**.

Los valores **ORAC** para el pindolol y el propranolol fueron 0,62 respectivamente.

For this type of problem the suggested translation solution is to use the developed form in Spanish, and then include within parentheses the acronym or initialism as it is used in the TL. It is also possible to use the acronym or initialism followed by its developed form within parentheses. Once the meaning of the acronym or initialism is clearly stated, then, it is possible to use it further without including its developed form. In the above examples, the first translation solution was correct, the translator used in the TT what PDA stands for that is 'Ductus Arteriosus Permeable'. In the second example the translator should have included the developed form within parentheses for ORAC (oxygen radical absorbance capacity, in Spanish 'Capacidad de Absorción de Radicales de Oxígeno').

The second problem is that some acronyms and initialisms maintain the same form in Spanish as in English, that is, they are borrowing from English, like in the following cases:

e. g., ST: Synergy-**HT**

A microplate reader (Synergy-**HT**) was used for all the scavenging essays.

TT: Sinergia **HT**

Un lector del microplato (Sinergia-**HT**) se utilizó para todos los ensayos.

e. g., ST: **ECGs**

Abnormal **ECGs** were present in less than 30% of this entire series.

TT: **ECGs**

Estaban presentes **ECGs** anormales en menos del 30% de esta serie.

In this case the proposed solution is also to include what the acronym or initialism stands for in English as well as in Spanish, so that the reader has a full understanding of it. In the above examples, the translators should have written Sinergia-HT (high-technology, 'alta tecnología') and 'ECGs (electrocardiograms, 'electrocardiogramas').

The third problem comes up when the acronym or initialism form changes when translated into Spanish because they have an accepted or standardized equivalent, like in the case of:

e. g., ST: **CHD**: congenital heart disease

In congenital heart disease (**CHD**), neurological abnormalities suggestive of hypoxia-ischemia are often apparent before cardiac surgery.

TT: **ECC**: enfermedades congénitas del corazón

En las enfermedades congénitas del corazón (**ECC**) y antes de la cirugía cardíaca aparecen anomalías.

e. g., ST: **MVP**: mitral valve prolapse

Confounding by mitral valve prolapse (**MVP**) could also account for some of the association.

TT: **PVM**: prolapso de válvula mitral

La confusión con prolapso de válvula mitral (**PVM**) pudiera también ser la causa de la asociación.

In these examples the solutions given by the translator is correct. The translator uses in the TTs the standardized Spanish equivalents of the acronyms and initialisms. This is the case in which the translator has to search extensively in auxiliary sources (dictionaries, glossaries, databases) to find the correct and accepted equivalent in the TL.

The fourth type of problems that can occur when translating initialisms is the inclusion of the names of national institutions and organizations, which not only represents a problem from a linguistic point of view, but also from a cultural point of view since these institutions, organizations or groups may have a local character. One example of this case is the following initialism:

e. g., ST: insured **HMO** population

It may be more difficult to detect an association that actually exists, particularly in an insured **HMO** population.

TT: población **HMO** asegurada

Puede ser más difícil detectar una asociación que realmente existe, particularmente en una población **HMO**.

Once more the solution here is to provide the develop form and the shortened form, that is, the initialism. For example, when it is the case of a local institution, that may not be fully recognized beyond local or regional contexts, it is advisable to offer its full developed form in the SL and an explanation or equivalent in Spanish, so that the TT readers have a clear understanding of it. In the above case the initialism in the ST was not accompanied by an equivalent or explanation, and the translator was not able to come up with a satisfactory translation solution. Once again, in this case, searching in reference or auxiliary sources becomes a crucial step to provide a translation solution that works. HMO stands for 'Health Maintenance Organization', a business in the United States that provides medical care to groups and individuals for a set monthly premium. Since this is an institution set in the context of the U.S. health care system, it is advisable to provide its full form in English and an explanation in Spanish: "Puede ser más difícil detectar una asociación que realmente existe, particularmente en una población asegurada por la HMO (Health Managament Organization, una organización estadounidense que brinda atención médica mediante pagos mensuales)."

The fifth problem that appears when using chemical compounds and elements of the periodic table. This is the case of:

e. g., ST: **KCL**

Working solutions of DAF-2 diluted with the buffer (**KCL**)...

TT: **KCL**

Las soluciones de DAF-2 con las que se trabajó, diluídas con el neutralizador (**KCL**).

e. g., ST: **NaCl**

Working solutions of DAF-2 diluted with the buffer (**NaCl**) ...

TT: (**NaCl**).

Las soluciones de DAF-2 con las que se trabajó, diluídas con el neutralizador (**NaCl**)...

When translating these types of acronyms and initialisms, choosing the appropriate Spanish prepositions that may clarify the connection between the different nouns combined in each chemical structure poses a translation problem, that not only implies linguistic skills on the part of the translator (that will allow to find the nucleus of the acronym or initialism, its relation with the rest of the forming elements, and its relation to the rest of the elements of the sentence), but also cultural knowledge (which will imply finding the relations between the elements from a scientific or technical point of view). The following example illustrates this problem:

e. g., ST: **SSRI**: selective serotonin specific reuptake inhibitors

Scavenging activities of pindolol may contribute for enhancing and/or accelerating selective serotonin specific reuptake inhibitors (**SSRI**).

TT: **IERSS**: inhibidores específicos en la reabsorción de la serotonina selectiva

Las actividades de depuración del pindolol pudieran contribuir a incrementar los inhibidores específicos en la reabsorción de la serotonina selectiva (**IERSS**).

In the above case, the translator provided the appropriate prepositions in Spanish to make clear the meaning of the acronyms and initialisms in the TT, as proposed the authors previously mentioned. In the first case the prepositions added were 'en' and 'de' in Spanish for the initialism of the ST (**SSRI**, 'selective serotonin specific reuptake inhibitors') thus, in the TT it was **IERSS** 'inhibidores específicos en la reabsorción de la serotonina selectiva '. One thing that should also be taken into consideration in cases like this is the existence of standardized equivalents.

The seventh problem that arises when translating acronyms and initialisms is related to conveying gender in Spanish. As it was previously mentioned, in English gender is neutral, in this language most words have no gender marks, thus gender is ascribed based on pragmatic considerations. Here translators had to find the nucleus, and assign the appropriate gender in, like in the following cases:

e. g., ST: **LDL**: low-density lipoproteins

The low-density lipoproteins (**LDL**) present in the vasculature can be a target for lipid peroxidation.

TT: **LBD**: lipoproteínas de baja densidad

Las lipoproteínas de baja densidad (**LBD**) que están presentes en la vasculatura pueden ser un blanco para la peroxidación de lípidos.

e. g., ST: **CI**: confidence intervals

The confidence intervals (**CI**) for chest pain associated with migraine were calculated from the ratio of proportions.

TT: **IC**: intervalos de confianza

Los intervalos de confianza (**IC**) para el dolor precordial asociado con migraña fueron calculados de la relación entre las proporciones.

In these cases the solutions given by translators were appropriate because in both cases in the STs, it is not possible, based on linguistic criteria, to determine gender, while in Spanish it is possible to identify gender based on the marks in the semantic nucleus of the initialisms, and make it agree with the articles and adjectives that go with it.

Another problem translators had to face when dealing with initialisms and acronyms is the use of plural forms. As it was mentioned before, it is possible in English to include plural marks in this type of abbreviations; they are represented by a low-case 's' after the acronym or initialism. However, in Spanish the plural mark is represented by the Spanish plural article 'los' or 'las'.

e. g., ST: **EEGs**

It is associated with decreased (**EEGs**) activity.

TT: **EEG**: electroencefalogramas

Esto está asociado con la actividad disminuída de los electroencefalogramas (**EEG**).

e. g., ST: **RCTs**: randomized controlled trials

In the lab randomized controlled trials (**RCTs**) have critically analyzed...

TT: **RCTs**: pruebas controladas y aleatorias

En el laboratorio **RCTs** han analizado rigurosamente...

As proposed by Calvo Basarán (1992), Pakhomov (2005), Belda Medina (2005) and Kasprowicz (2010), in the first example no mark of plural is added in the TT to the initialism, only the accompanying article provides this type of grammatical information. In the second case, the translator failed to give an appropriate solution: no definite

article was used, the English initialism was used without further explanation, and a mark of plural (the 's') was added to the initialism. The appropriate way should have been "En el laboratorio, las pruebas controladas y aleatorias (**RCT**) han analizado rigurosamente...".

The ninth analyzed problem is the use of multiple modification of a noun without using connectors and using premodification, a phenomenon that is very common in English, especially in scientific and technical language. In Spanish, different syntactical rules apply to these cases and this type of modification is done using different mechanisms, mainly by using prepositions as connecting elements and postmodification.

e. g., ST: **SSRI**: selective serotonin specific reuptake inhibitors

Scavenging activities of pindolol may contribute for enhancing and/or accelerating selective serotonin specific reuptake inhibitors (**SSRI**).

TT: **IERSS**: inhibidores específicos en la reabsorción de la serotonina selectiva

Las actividades de depuración del pindolol pudieran contribuir a incrementar los inhibidores específicos en la reabsorción de la serotonina selectiva (**IERSS**).

e. g., ST: **LVEF**: left ventricular ejection fraction

There was found no difference in the primary study of resting left ventricular ejection fraction (**LVEF**) at 30 days.

TT: **LVEF**: la fracción de expulsión del ventrículo izquierdo

No se encontró diferencia en el estudio primario de la fracción de expulsión del ventrículo izquierdo (**LVEF**) a los 30 días.

In these two cases the solutions are appropriate. The ST initialisms needed some connectors in the TT and the translator found the appropriate for each case that were 'en' and 'de' in 'inhibidores específicos en la reabsorción de la serotonina selectiva (**IERSS**)', and 'de' and 'del' for 'fracción de expulsión del ventrículo izquierdo (**LVEF**)'.

The last problem found was related to homonymy, that is, when an acronym or initialism stands for more than one developed form, thus creating ambiguity and confusion in some contexts.

e. g., ST: **FEDER**

The authors greatly acknowledge **FEDER** financial support for the project.

TT: **FEDER**

Los autores agradecen grandemente a **FEDER** por el apoyo financiero para el proyecto.

e. g., ST: **ADMIRAL**

Data from **ADMIRAL** suggests significant benefit.

TT: **ADMIRAL**

Datos provenientes de **ADMIRAL** sugieren beneficios.

In these two cases the solutions given were not explanatory enough. Here the translator should think in terms of the TT readers who may not be familiar with these acronyms. So, the appropriate developed form should have been enclosed in parentheses in each case. '**FEDER**' may stand for 'Fondo Europeo de Desarrollo Regional' or for 'Federación Española de Enfermedades Raras', and '**ADMIRAL**', for 'Automatic and Dynamic Monitor with Immediate Rellocation Loading' or for 'Abciximab before direct angioplasty and senting in myocardial infarction regarding acute and long term follow up'.

There were no examples of the problem related to artificial terms that have no etymological derivation that makes difficult to remember the original meaning of the words they are composed by and at the same time making hard to remember the meaning of the acronym or the initialism.

It can be concluded that most of the solutions given by the translators from the Translation Department in the "Agustín Ruiz de Zárate Ruiz" Medical University of Santa Clara were correct because they coincided with those proposed by Calvo Basarán (1992), Pakhomov (2005), Belda Medina (2005) and Kasproicz (2010). Though some solutions were not appropriate. In this sense, the main difficulties were found concerning the problem of shortened forms accompanied by no explanations, like in the example **ORAC**, and of the use of the names of national institutions and organizations, that was the case of the initialism **HMO**.

Also, since acronyms and initialisms are not solely linguistic forms, but they refer to objective phenomena which are part of a scientific culture, the translator should be able to deal with them as linguistic forms and as cultural referents. So, finding the appropriate translation solution implies, not only a linguistic analysis like the one carried out in this study, but also an extralinguistic analysis, which could be carried out by resorting to experts and auxiliary sources and reference materials.

CONCLUSIONS

The main findings of this study about the translation of acronyms and initialisms from English into Spanish in medical texts dealing with Cardiology are:

- Because of the various elements that characterize medical texts, as specialized texts, the translation process is a very complex activity, where content and form must be taken into account, without losing sight of the various extralinguistic factors that are involved in the production of the ST and the TT.
- Since a cultural referent is any kind of expression denoting any manifestation that can be attributed to a particular community and would be admitted as a trait of that community by those who consider themselves to be members of it, cultural references in medical texts can take several forms, ranging from metaphors and Latinisms to the combination of technical and non-technical words, including abbreviations.
- Acronyms and initialisms, as types of abbreviations, are considered cultural referents because they can be used to refer to a variety of medical concepts and phenomena, including names of diseases, chemical compounds, organizations, geographical locations and environments, procedures, therapies, among others. That is why the translation of acronyms and initialisms should be not only language-dependent but also culture-bound.
- The translation of acronyms and initialisms in medical texts poses a number of problems to the translator, including the use of acronyms and initialisms without their developed form, the lack of equivalents in the TL, the difference between languages in relation to plural and gender marks, the existence of initialisms and acronyms denoting culture-specific institutions, the structure of the developed form of initialisms and acronyms, etc.
- 83 acronyms and initialisms were identified in the corpus. The main translation problems were related to the use of acronyms and initialisms in the TT without

their developed forms, and the presence of acronyms and initialisms denoting culture-specific institutions and organizations in the ST.

- Finally, the precision and quality in the translation of medical texts where acronyms and initialisms are used is only possible if there is not only a comprehensive linguistic analysis of these items, but also an extralinguistic analysis based on the consultation of auxiliary sources and reference materials, as well as specialists in the field under study.

Recommendations and suggestions for future research

Since the findings presented with this study are limited to a restricted number of medical articles in the field of Cardiology, and the use of acronyms and initialisms continue to increase in medical texts with the resulting difficulties for translation, suggestions for future research are the following:

- To carry out similar studies using a larger corpus, in order to arrive to more accurate and comprehensive conclusions about the use of acronyms and initialisms in the field of Cardiology.
- To determine a more precise linguistic and pragmatic approach to make distinctions between acronyms and initialisms.
- To describe and analyze the use of acronyms and initialisms in other areas of Medicine and other types of medical texts.

To create bilingual glossaries of acronyms and initialisms in different areas of Medicine, in order to assist medical translators.

Bibliography

- abbreviation (2010) Diccionario de la Lengua Española. Vigésima segunda edición 2010. Available from <http://buscon.rae.es/draeI/SrvltConsulta>
- abbreviation (n.d.) in *Webster's Online Dictionary*. Available from <http://www.websters-online-dictionary.org/definition/abbreviation>
- Adams, V. (1973). *An introduction to Modern English Word-formation*, London, Longman.
- Alfaro, D. (2003). "Difficulties in Translating Medical Texts". Available from <http://www.translationdirectory.com/article1041.htm>
- Bachean, L. (1995): "Habilidad lingüística comunicativa" en *Competencia comunicativa*, Madrid.
- Bassnett, S. (1980). *Translation Studies*. London: Routledge
- Bauer, M. (1983). *English Word-Formation*, Cambridge, Cambridge University Press.
- Belda Medina, Jose R. (2004). "Translating Computer Abbreviations from English into Spanish: Main Types and Problems". In *Meta*, vol. 49, # 4, p. 920-929. Available from <http://www.erudit.org/documentation/eruditPolitiqueUtilisation.pdf>
- Benavent, R. and Iscla, A. (2003). "Vicios del lenguaje médico y defectos de estilo en la escritura científico-médica (II)". In *Journal Piel*. Vol. 18, No. 01
- Benjamin, J. (1995). "Mapping of medical acronyms and initialisms to Medical Subject Headings (MeSH) across selected systems". Medical Library Association. Mary Shultz, MS, AHIP, Assistant Health Sciences Librarian. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1629436/>
- Bernardo, J.M. (1995). "La construcción de la lingüística. Un enfoque epistemológico". Available from: http://books.google.com.cu/books?id=V_QiJEFdIsC&pg=PA165&lpg=PA165&dq=coseriu+1981+dialecto&source=bl&ots=KdFCNja9O4&sig=FXKNUX-9qcXmpSPFpYjJSPJfY&hl=es&ei=dpA6SrmVBIG0NO7rx8F&sa=X&oi=book_result&ct=result&resnum=4
- Cabré, María T. (1993). *La terminología. Teoría, metodología, aplicaciones*.

- Barcelona: Antàrtida-Enpúries.
- Calvo Basarán, Joaquín. (1992) "Abbreviation and Accronyms Translation". In *Punto y Coma*. No. 5, febrero. Available from <http://ec.europa.eu/translation/bulletins/puntoycoma/05/pyc051.htm>
- Cannon, G. (1989). "Abbreviations and Acronyms in English Word-Formation," *American Speech*, 64.
- Caudet, M^a Amparo.(2001). "El español como lengua de la ciencia y de la medicina". In *Panace@*, vol. 2, No. 4. Available from: <http://www.caribjsci.org/epub1/alcina.pdf>
- Crystal, David (1995). *The Cambridge Encyclopedia of the English Language*. Cambridge. Press Syndicate of the University of Cambridge.
- culture (n.d.) in *Webster's Online Dictionary*. Available from <http://www.websters-online-dictionary.org/definition/culture>
- Del Corral, Milagros. (2003). Opening Speech by UNESCO's Representative, Deputy Assistant Director-General for Culture and Director of the Division of Arts and Cultural Enterprise at the Regional Meeting on Arts Education in the European Countries, Canada and the United States of America. Helsinki, Finland. Available from portal.unesco.org/culture/.../12653841273Opening_speech.../Opening%2Bspeech.pdf
- Faber, P. (2005). "La traducción del discurso científico y su terminología" Lección Inaugural. Apertura Curso Académico. Secretaría General de la Universidad de Granada.
- Fonseca, C. (1999). "Abreviaturas y siglas del inglés útiles en cirugía general". Available from <http://www.medtrad.org/recursos/enlaces.html>
- Gile, Daniel. (1995). *Basic Concepts and Models for Interpreter and Translator Training*. John Benjamin Publishing Company.
- Giraldo, J. (2008) "Análisis y descripción de las siglas en el discurso especializado de genoma humano y medio ambiente" (Ph.D. thesis, Institut Universitari de Lingüística Aplicada, Universitat Pompeu Fabra.
- Grygoruk, A. (2009). "Functional approach to translating specialized texts". Available from [http:// www.ifa.amu.edu.pl/yImp](http://www.ifa.amu.edu.pl/yImp)

- Hermans, T. (ed.) (1985). *The Manipulation of Literature. Studies in Literary Translation*. London and Sydney: Croom Helm.
- Hildegard, M, R. (2009). "Aspectos culturales de la traducción científica en España". Available from: file:///G:/trad cient tecn/Hildegard Resinger Aspectos culturales de la traducción científica en España - ELE.htm.)
- Hoffman, Ch. (ed). (1996). *Language, Culture and Communications in Contemporary Europe*. Available from [http://books.google.com.cu/books?id=whacJr2_JVcC&pg=PA153&lpg=PA153&dq=vermeer+culture+language&source=bl&ots=ENrpYTU1YX&sig=oMhws8LjHeQM R4tW8SYApbQScM&hl=es&ei=75M6SsDdOqaoM4W3rK4F&sa=X&oi=book_result&ct=result&resnum=\)](http://books.google.com.cu/books?id=whacJr2_JVcC&pg=PA153&lpg=PA153&dq=vermeer+culture+language&source=bl&ots=ENrpYTU1YX&sig=oMhws8LjHeQM R4tW8SYApbQScM&hl=es&ei=75M6SsDdOqaoM4W3rK4F&sa=X&oi=book_result&ct=result&resnum=))
- Iscla, A. (2011). "Los problemas del lenguaje técnico en la literatura médica actual". Available from <http://www.medynet.com/elmedico/informes/informe/lenguaje.htm>
- Iscla, A. and Benavent, R. (2002). "Problemas del lenguaje médico actual" Direcció General de Salut Pública. Conselleria de Sanitat i Consum. Generalitat Valenciana. Instituto de Historia de la Ciencia y Documentación López Piñero (Universitat de València-CSIC).
- Izquierdo, Rosa María; Leis, Aurora; Llanso, Lourdes. (1983). *Técnicas de la Traducción y la Interpretación*. Ministerio de Educación Superior, Universidad de La Habana. Facultad de Lenguas Extranjeras.
- James, K. (2002). "Cultural Implications for Translation", in *Translation Journal*, Vol.6, no 4, October. Available from <http://accurapid.com/journal/22delight.htm>
- Kasprovicz, M. (2010). "Handling Abbreviations and Acronyms in Medical Translation". In *Translation Journal*. Vol.14, No.2 April. Available from <http://translationjournal.net/journal/52abbreviations.htm>
- Martínez, A. (2008). "Limitaciones y condicionantes de la práctica profesional de la traducción médica: aplicaciones a la combinación lingüística inglés-español". Available from <http://www.uclm.es/actividades0708/congresos/esletra/>
- Ministère de l'Éducation, du Loisir et du Sport (2011). "Culture in the School, A Class Act. Cultural Activities Month at School". Available from http://www.mels.gouv.qc.ca/sections/cultureEducation/moisculture11/index_en.as

p#)

- Molina Martínez, L. (2001). "Análisis descriptivo de la traducción de los culturemas árabe-español" (Ph.D. Thesis, Universitat Autònoma de Barcelona)
- Munday, Jeremy (2006). *Introducing Translation Studies*. London: Routledge,
- Navarro, F. (2011). "La traducción médica en el siglo XXI". Available from <http://www.elcastellano.org/artic/fnavarro.htm>
- Navarro, F. (2011). "Siglas médicas". Available from <http://medicablogs.diariomedico.com/laboratorio/tag/siglas/>
- Newmark, P. (1988). *A Textbook of Translation*. New York: Prentice Hall International
- Nida, E. (1964). *Towards a science of translating*. Leiden: E. J. Brill.
- Nida, E. (1999): 'Language and Culture', Seminar at the Facultat de Ciències Humanes, Traducció i Documentació, University of Vic (Spain), May.
- Nida, E. and C. R. Taber. (1969): *Towards a Science of Translating*, the Netherlands, J. Brill.
- Pankratjeva, N. (2007). "Untranslatability from Linguo-Cultural Aspect". Available from <http://www.sta-edu.lv/conf2007/translationology/tran2.htm>
- Pérez, G. (2005). "Algunas consideraciones sobre la traducción de los textos médicos". In *Acimed*, vol. 3, nro. 3. Available from http://bvs.sld.cu/revistas/aci/vol3_3/acisu295.htm
- Pérez, G. S. (1998): "La traducción de textos técnicos (alemán-español), género y subgéneros" (Ph.D thesis, Universitat Autònoma de Barcelona)
- Sevilla, M. M. and Sevilla, J. M. (2003). "Una clasificación del texto científico-técnico desde un enfoque multidireccional". Available from http://www.medtrad.org/panacea/IndiceGeneral/n26_tribuna-Ciruelos.pdf
- Spence, R. (2004). "A Functional Approach to Translation Studies" (Ph.D. Thesis, Universität des Saarlandes)
- Stolze, R. (2009). "Dealing with cultural elements in technical texts for translation", *The Journal of Specialized Translation*, Issue 11. Available from http://www.jostrans.org/issue11/art_stolze.php
- Txabarriaga, R. (2009). "IMIA Guide on Medical Translation". Available from <http://www.imiaweb.org/uploads/pages/438.pdf>

Appendix I

List of articles comprising the corpus

Carro Jimenez, E. J. and J. E. Lopez (2005) "Primary Pulmonary Hypertension and Pregnancy". In *Boletín Asociación Médica de Puerto Rico*, Vol. 97, No. 4. Octubre-Diciembre 2005

Dean Kurth, C. et al. (2001) "Cerebral Oxygen Saturation Before Congenital Heart Surgery". In *Annals of Thoracic Surgery* 2001, No. 72

Ellis S. G. (2000) "Review of immediate angioplasty after fibrinolytic therapy for acute myocardial infarction: Insights from the RESCUE I, RESCUE II and other contemporary clinical experiences". In *American Heart Journal*, Vol. 139, No. 6, June 2000

Falkeborn M., et al. (1996) "Long-term Trends in Incidence of and Mortality from Acute Myocardial Infarction and Stroke in Women: Analysis of Total First Events and Deaths in the Uppsala Health Care Region, Sweden". In *Epidemiology* January 1996, vol. 7, No. 1

Gomes, A., D. Costa, J. L. Lima and E. Fernandez (2006) "Antioxidant activity of B-blockers: An effect mediated by scavenging reactive oxygen and nitrogen species?". In *Bioorganic and Medicinal Chemistry*, No. 14

Horri M. and R.Vakili (2006). "Evaluation of Cardiovascular and Lipid Profile Abnormalities in Obese children and Adolescents". In *Iranian Journal of Medical Sciences* June 2006; Vol 31 (2).

Mathew, Joseph P. et al. (2004) "A Multicenter Risk Index for Atrial Fibrillation after Cardiac Surgery". In *Journal of American Medical Association*, April 14, 2004-Vol 291, No14:

Sternfelt B., P. Stang and S. Sidney (1995) "Relationship of migraine headaches to experience of chest pain and subsequent risks for myocardial infarction". In *Neurology* 1995, No. 45

Appendix II

List of acronyms and initialisms found

Abb ST	Abb TT	Acr	Ini	Prop	Mix	SNOMED	Part of speech	Syntax	Gram. Relation	Comb. letters- numbers
RNS	ENR		x	x		5	noun	total	noun	-
ROS	EOR		x	x		5	noun	total	noun	-
PMS	MSF		x		x	5	noun	total	noun	-
NOS	SION		x	x		5	noun	total	noun	-
SOD	DESO		x		x	5	noun	total	noun	-
HO	HO		x		x	5	noun	total	noun	-
MPO	MPO		x		x	5	noun	total	noun	-
HOCL	HOCL		x		x	5	noun	total	noun	-
NO	NO		x	x		5	noun	total	noun	-
ONOO	ONOO		x		x	5	noun	total	noun	--
PUFA	AGPI		x		x	5	noun	total	noun	-
LDL	LBD		x	x		5	noun	total	noun	-
SSRI	IERSS		x	x		5	noun	total	noun	-
AD	AD		x		x	5	noun	total	noun	-
DAF	DAF		x		x	5	noun	total	noun	-
EDTA	EDAT		x		x	5	noun	total	noun	-
DTPA	ADTPA		x		x	5	noun	total	noun	-
AAPH	DHAA		x		x	5	noun	total	noun	-
DMSO	DMSO		x		x	5	noun	total	noun	-
ADP	ADP		x		x	5	noun	total	adjective	-
GP	GP		x		x	5	noun	total	adjective	-
TG	TG		x		x	5	noun	total	noun	-
ACE	ECA		x	x		5	noun	total	adjective	-
NSAIDs	MAINEs	x			x	5	noun	total	noun	-
CHD	ECC		x	x		1	noun	total	noun	-

DHCA	HPPC		x	x		1	noun	total	noun	-
PDA	DAP		x	x		1	noun	total	adjective	-
HLHS	SCIH		x	x		1	noun	total	adjective	-
TIMI	TIMI	x		x		1	noun	total	noun	-
MI	MI		x	x		1	noun	total	noun	-
CHF	CHF		x	x		1	noun	total	noun	-
MVP	PVM		x	x		1	noun	total	noun	-
CHF	ICC		x	x		1	noun	total	noun	-
TIA	AIT		x	x		1	noun	total	noun	-
PPH	---		x	x		1	noun	total	noun	-
VSMC	CVML		x	x		4	noun	total	noun	-
CNS	SNC		x	x		4	noun	total	noun	-
LV	LV		x	x		4	noun	total	noun	-
HT	HT		x	x		6	noun	total	adjective	-
SAS	SAS		x	x		6	noun	total	adjective	-
USA.	USA.		x	x		9	noun	total	noun	-
ICU	UCI	x		x		9	noun	total	noun	-
MN	-		x		x	6	noun	total	noun	-
LVEF	LVEF		x	x		11	noun	total	noun	-
ORAC	ORAC		x	x		11	noun	total	adjective	-
BMI	IMC		x	x		11	noun	total	noun	-
CI	CI		x	x		11	noun	total	noun	-
LDL	LDL		x	x		11	noun	total	noun	-
OR	RP		x	x		11	noun	total	noun	-
RR	RR		x	x		11	noun	total	noun	-
QRS	QRS		x	x		8	noun	total	adjective	-
ST-T	ST-T		x	x		8	noun	total	adjective	-
FCT	FCT		x	x		10	noun	total	adjective	-
FEDER	FEDER	x		x		10	noun	total	adjective	-
FSE	FSE		x	x		10	noun	total	noun	-
NIM	NIM	x		x		10	noun	total	noun	-
KPMCP	KPMCP		x	x		10	noun	total	noun	-

RAPPORT	RAPPORT	x		x		10	noun	total	noun	-
NHANES	NHANES	x		x		10	noun	total	noun	-
ADMIRAL	ADMIRAL	x		x		10	noun	total	noun	-
GUSTO III	GUSTOIII	x		x		10	noun	total	adjective	-
HMO	HMO		x	x		10	noun	total	adjective	-
ICD	CIE		x	x		10	noun	total	noun	-
GLIM	GLIM		x	x		10	noun	total	adjective	-
CABG	IDAC	x		x		3	noun	total	noun	-
CPB	DCP		x	x		3	noun	total	noun	-
MRI	IRM		x	x		3	noun	total	noun	-
NIRS	EIC		x	x		3	noun	partial	noun	-
ANOVA	ANOVA	x			x	3	noun	total	noun	-
EEGs	EEGs	x			x	3	noun	total	noun	-
PCI	PCI		x	x		3	noun	total	noun	-
PTCA	PTCA		x	x		3	noun	total	noun	-
RCTs	RCTs		x	x		3	noun	total	noun	-
TAMI	TAMI	x		x		3	noun	total	noun	-
ECGs	ECGs	x		x		3	noun	total	noun	-
TGA	TAM	x		x		3	noun	total	noun	-
FeCl2	FeCl2		x		x	5	noun	partial	noun	x
H2SO4	H2SO4		x		x	5	noun	partial	noun	x
KCL	KCL		x		x	5	noun	partial	noun	
NaCl	NaCl		x		x	5	noun	partial	noun	
NaNO2	NaNO2		x		x	5	noun	partial	noun	x

List of abbreviations

- 1- ST: Source Text
- 2- TT: Target Text
- 3- Acr: Acronyms
- 4- Int: Initialisms
- 5- Prop: Proper
- 6- Mix: Mixed
- 7- SNOMED: SNOMED Classification
- 8- Part of speech: Part of speech
- 9- Syntax: Syntax

10-Gram. Rel.: Grammatical Relation

11-Comb. letters-numbers: Combination of letters and numbers

Appendix III

Complete list of acronyms and initialisms in ST and TT

1- ST: **RNS**: reactive nitrogen species

In other studies pindolol was shown to be a potent scavenger of the peroxy radical and of reactive nitrogen species (**RNS**).

TT: **ENR**: especies de nitrógeno reactivo

En otras investigaciones, el pindolol demostró ser un potente depurador del radical peróxido y de las especies de nitrógeno reactivo (**ENR**).

2- ST: **ROS**: reactive oxygen species

A number of studies have shown that some β -blockers are scavengers of reactive oxygen species (**ROS**).

TT: **EOR**: especies de oxígeno reactivo

Un número de investigaciones han demostrado que algunos β -bloqueadores son depuradores de especies de oxígeno reactivo (**EOR**).

3- ST: **PMS**: phenazine methosulfate

Metoprolol, timolol, sotalol, were shown to protect red blood cells against phenazine methosulfate (**PMS**).

TT: **MSF**: metosulfato de fenazina

El metoprolol, timolol, sotalol, protegen a los glóbulos rojos del metasulfato de fenazina (**MSF**).

4- ST: **NOS**: nitric oxide synthase

In the cardiovascular system, O_2^- is produced by the uncoupled nitric oxide synthase (**NOS**).

TT: **SION**: sintasa impar del óxido nítrico

En el sistema cardiovascular, el O_2^- es producido por la sintasa impar del óxido nítrico (**SION**).

5- ST: **SOD**: superoxide dismutase

O_2^- is converted to hydrogen peroxide by the enzyme superoxide dismutase (**SOD**)

TT: **DESO**: dismutasa de la enzima superóxido

El oxígeno O_2 es convertido en peróxido de hidrógeno por la dismutasa de la enzima superóxido (**DESO**).

6- ST: **HO**: hydroxyl radicals

Trace levels of transition metals can lead to the formation of hydroxyl radicals (**HO**).

TT: **HO**: radicales hidroxilos

Los niveles de señal de metales en transición pueden conllevar a la formación de radicales hidroxilos (**HO**).

7- ST: **MPO**: myeloperoxidase

Myeloperoxidase (**MPO**), a hydrogen peroxide oxidoreductase contributes to the bactericidal capabilities of the cells.

TT: **MPO**: mieloperoxidasa

La mieloperoxidasa (**MPO**), una oxidoreductosa del peróxido de hidrógeno contribuye con la capacidad bactericida de estas células.

8- ST: **HOCL**: hypochlorous acid

A hydrogen peroxide oxidoreductase contributes considerably to the bactericidal capabilities of these cells via formation of hypochlorous acid (**HOCL**).

TT: **HOCL**: ácido hipocloroso

Una oxidoreductosa del peróxido de hidrógeno contribuye en gran medida con la capacidad bactericida de estas células en la formación del ácido hipocloroso (**HOCL**).

9- ST: **NO**: nitric oxide

Nitric oxide (**NO**) is the most relevant reactive nitrogen species in the vasculature.

TT: **NO**: óxido nítrico

El óxido nítrico (**NO**) es la especie de nitrógeno reactivo más relevante en la vasculatura.

10- ST: **ONOO**: peroxyntirite

Peroxynitrite (**ONOO**) is the most relevant reactive nitrogen species in the vasculature.

TT: **ONOO**: peroxinitrito

El peroxinitrito (**ONOO**) es la especie de nitrógeno reactivo más relevante en la vasculatura.

11- ST: **PUFA**: polyunsaturated fatty acids

ROO is involved in the propagation phase of lipid peroxidation, which results from the oxidation of polyunsaturated fatty acids **PUFA**.

TT: **AGPI**: ácidos grasos poliinsaturados

El ROO está directamente inmerso en la fase de propagación de la peroxidación de lípido, la cual es resultado de la oxidación de los ácidos grasos poliinsaturados (**AGPI**).

12- ST: **LDL**: low-density lipoproteins

The low-density lipoproteins (**LDL**) present in the vasculature can be a target for lipid peroxidation.

TT: **LBD**: lipoproteínas de baja densidad

Las lipoproteínas de baja densidad (**LBD**) que están presentes en la vasculatura pueden ser un blanco para la peroxidación de lípidos.

13- ST: **SSRI**: selective serotonin specific reuptake inhibitors

Scavenging activities of pindolol may contribute for enhancing and/or accelerating selective serotoninine specific reuptake inhibitors (**SSRI**).

TT: **IERSS**: inhibidores específicos en la reabsorción de la serotonina selectiva

Las actividades de depuración del pindolol pudieran contribuir a incrementar los inhibidores específicos en la reabsorción de la serotonina selectiva (**IERSS**).

14- ST: **AD**: antidepressant

Scavenging activities of pindolol may contribute for enhancing and/or accelerating selective serotoninine specific reuptake inhibitors (SSRI)-induced antidepressant (**AD**) effect.

TT: **AD**: antidepresivo

Las actividades de depuración del pindolol pudieran contribuir a incrementar los inhibidores específicos en la reabsorción de la serotonina selectiva (IERSS), el efecto del antidepresivo (**AD**) inducido.

15- ST: **DAF**: diaminofluorescein

Diaminofluorescein (**DAF**) was obtained from Sigma-Aldrich (Saint Louis, USA).

TT: **DAF**: diaminofluorescina.

Diaminofluorescina (**DAF**) se obtuvo del Sigma-Aldrich (Saint Louis, USA).

16- ST: **EDTA**: ethylenediamine-tetraacetic acid

Ethylenediamine-tetraacetic acid (**EDTA**) was obtained from Sigma-Aldrich (Saint Louis, USA).

TT: **EDAT**: la etilenodiamina del ácido tetracético

La etilenodiamina del ácido tetracético, (**EDAT**) se obtuvo del Sigma-Aldrich (Saint Louis, USA).

17- ST: **DTPA**: diethylenetriaminepentaacetic acid

Diethylenetriaminepentaacetic acid (**DTPA**) was obtained from Sigma-Aldrich (Saint Louis, USA).

TT: **ADTPA**: ácido dietilenotriaminapentacético

El ácido dietilenotriaminapentacético (**ADTPA**) se obtuvo del Sigma-Aldrich (Saint Louis, USA).

18- ST: **AAPH**: Azodiisobutyramidine dihydrochloride

Azodiisobutyramidine dihydrochloride (**AAPH**) was obtained from Fluka Chemie GmbH (Steingheim, Germany).

TT: **DHAA**: dihidrocloruro azodiisobutiramidine

El dihidrocloruro azodiisobutiramidine (DHAA) se obtuvo de Fluka Chemie GmbH (Steingheim, Germany).

19- ST: dissolved in DMSO

Propranolol, and pindolol were dissolved in DMSO.

TT: disueltos en DMSO

El propranolol y el pindolo fueron disueltos en DMSO.

20- ST: **ADP** inhibitors

However the relevance of the results is cast into doubt by major changes in **ADP** inhibitors...

TT: inhibidores **ADP**

Sin embargo, la relevancia de los resultados ha sido puesta en duda por cambios mayores en inhibidores **ADP**.

21- ST: intravenous **GP IIb / IIIa** inhibitors

However, the relevance of the results is cast into doubt by major changes in intravenous **GP IIb / IIIa** inhibitors.

TT: inhibidores intravenosos de las **GP IIb / IIIa**

Sin embargo, la relevancia de los resultados ha sido puesta en duda por cambios mayores en los inhibidores intravenosos de las **GP IIb / IIIa**.

22- ST: **TG**: triglycerides

LDL- cholesterol levels were calculated for samples containing triglycerides (**TG**).

TT: **TG**: triglicéridos

Se calcularon los niveles de colesterol LDL a partir de las muestras que contenían los triglicéridos (**TG**).

23- ST: **ACE**: angiotensin-converting enzyme

Predictors all recurrent atrial fibrillation including older age with drawal of angiotensin-converting enzyme (**ACE**) inhibitors.

TT: **ECA**: enzima convertidora de angiotensina

Los pronósticos de fibrilación arterial recurrentes incluían edad avanzada, abandono del inhibidor enzima convertidora de angiotensina (**ECA**).

24- ST: **NSAIDs**: nonsteroidal anti-inflammatory drugs

However, administering nonsteroidal anti-inflammatory drugs (**NSAIDs**) was associated with the reduction in the atrial fibrillation.

TT: **MAINEs**: medicamentos antiinflamatorios no esteroideos

Sin embargo la administración de medicamentos antiinflamatorios no esteroideos (**MAINEs**) se asociaba con una reducción de la fibrilación arterial.

25- ST: **CHD**: congenital heart disease

In congenital heart disease (**CHD**), neurological abnormalities suggestive of hypoxia-ischemia are often apparent before cardiac surgery.

TT: **ECC**: enfermedades congénitas del corazón

En las enfermedades congénitas del corazón (**ECC**) y antes de la cirugía cardíaca aparecen anomalías.

26- ST: **DHCA**: deep hypothermia, and/or total circulatory arrest

Many of these problems have been attributed to deep hypothermia, and for total circulatory arrest (**DHCA**).

TT: **HPPC**: hipotermia profunda y/o paros circulatorios totales

Muchos de estos problemas han sido atribuidos a las hipotermias profundas y/o paros circulatorios totales (**HPPC**)

27- ST: **PDA**

PDA subjects included 2 premature infants.

TT: **DAP**: Ductus Arteriosus Permeable.

Los sujetos con Ductus Arteriosus Permeable (**DAP**) incluyeron 2 niños prematuros.

28- ST: **HLHS**

Two subjects (**HLHS**, pulmonary atresia) received a fentanyl infusion.

TT: **SCIH**: Síndrome Cardíaco Izquierdo Hipoplásico

Dos sujetos (con Síndrome Cardíaco Izquierdo Hipoplásico, (**SCIH**), y Atresia Pulmonar) recibieron una infusión de fentanil.

29- ST: **TIMI**: Thrombolysis In Myocardial Infarction

Background Prompt restoration of Thrombolysis In Myocardial Infarction (**TIMI**) grade 3 flows improves survival in patients with myocardial myocardial infarction.

TT: **TIMI**: trombólisis en el infarto del miocardio

Una rápida restauración del flujo de la trombólisis en el infarto del miocardio (**TIMI**) de grado 3 aumenta la supervivencia.

30- ST: **MI**: myocardial infarction

Background Prompt restoration...improves survival in patients with acute myocardial infarction (**MI**).

TT: **MI**: infarto del miocardio

Una rápida restauración...aumenta la supervivencia en pacientes con infarto del miocardio (**MI**).

31- ST: **CHF**: congestive heart failure

It was noted a significant benefit in preventio of severe congestive heart failure (**CHF**).

TT: **CHF**: falla cardiaca congestiva

Se notó un beneficio significativo en la prevención de la falta cardiaca congestiva severa (**CHF**).

32- ST: **MVP**: mitral valve prolapse

Confounding by mitral valve prolapse (**MVP**) could also account for some of the association.

TT: **PVM**: prolapso de válvula mitral

La confusión con prolapso de válvula mitral (**PVM**) pudiera también ser la causa de la asociación.

33- ST: **CHF**: congestive heart

Reports have suggested that atrial fibrillation is associated with an increase incidente of congestive heart failure (**CHF**).

TT: **ICC**: insuficiencia cardiaca congestiva

Informes indican que la fibrilación atrial está asociada con una incidencia creciente de insuficiencia cardiaca congestiva (**ICC**).

34- ST: **COPD**: chronic obstructive pulmonary disease

Hypertension of chronic obstructive pulmonary disease (**COPD**) were more frequently in the validation cohort.

TT: **EPOC**: enfermedad pulmonar obstructiva crónica

La hipertensión y la enfermedad pulmonar obstructiva crónica (**EPOC**) eran más frecuentes en la cohorte de validación.

35- ST: **TIA**: transient ischemic attacks

The validity of the subtype classification, especially transient ischemic attacks (**TIA**) was lower, however.

TT: **AIT**: ataques isquémicos transitorios

Sin embargo, la validez de la clasificación del subtipo, especialmente los ataques isquémicos transitorios (**AIT**) era inferior.

36- ST: **PPH**-primary pulmonary hypertension

Primary pulmonary hypertension (**PPH**) is a disorder intrinsic to the pulmonary vascular bed.

TT: hipertensión pulmonar primaria

La hipertensión pulmonar primaria es un trastorno intrínseco de la red vascular pulmonar.

37- ST: **VSMC**: vascular smooth muscle cells

ROS are produced in the cardiovascular system by endothelial cells, vascular smooth muscle cells (**VSMC**).

TT: **CVML**: células vasculares del músculo liso

Los EOR se producen en el sistema cardiovascular por denominadas células endoteliales, células vasculares del músculo liso (**CVML**)...

38- ST: **CNS**

The potential value of pindolol in pathologies affecting **CNS** was also previously reported.

TT: **SNC**

El valor potencial del pindolol en patologías que afectan el **SNC** fue informado previamente también.

39- ST: **LV**: left ventricular

Left ventricular (**LV**) mass, using echocardiography of all participants was obtained.

TT: **LV**: ventrículo izquierdo

Se obtuvo en todos los participantes la masa del ventrículo izquierdo (**LV**) utilizando la ecocardiografía.

40- ST: Synergy-**HT**, BIO-TEK

A microplate reader (Synergy-**HT**, BIO-TEK) was used for all the scavenging assays.

TT: Sinergia **HT**, BIO-TEK

Un lector del microplato (Sinergia **HT**, BIO-TEK) se utilizó para todos los ensayos.

41- ST: **SAS** statistical software

All analyses were performed using **SAS** statistical software.

TT: un software estadístico **SAS**

Todos los análisis se realizaron con la utilización de un software estadístico **SAS**.

42- ST: St. Louis, **USA**

Catalase from bovine liver was obtained from Sigma-Aldrich (Saint Louis, **USA**).

TT: St. Louis, **USA**

La catalasa del hígado de bovino se obtuvo del Sigma-Aldrich (Saint Louis, **USA**).

43- ST: **ICU**

With further work, cerebral oximetry might be used to guide (**ICU**) care.

TT: **UCI**: unidades de cuidados intensivos

En trabajos posteriores, la oximetría cerebral se podría utilizar para guiar las unidades de cuidados intensivos (**UCI**).

44- ST: **MN**

In Rochester, MN, however stroke incidence was stable in the 1970s.

TT: not given

Sin embargo en Rochester, la incidencia de accidente cerebrovascular era estable en los años de 1970.

45- ST: **LVEF**: left ventricular ejection fraction

There was found no difference in the primary study of resting left ventricular ejection fraction (**LVEF**) at 30 days.

TT: **LVEF**: la fracción de expulsión del ventrículo izquierdo

No se encontró diferencia en el estudio primario de la fracción de expulsión del ventrículo izquierdo (**LVEF**) a los 30 días.

46- ST-**ORAC** values

The **ORAC** values for pindolol and propranolol were 0.62 respectively.

TT: valores **ORAC**

Los valores **ORAC** para el pindolol y el propranolol fueron 0,62 respectivamente.

47- ST: **BMI**: body mass index

...weight measurements used to calculate body mass index (**BMI** = weight in kg/ (height in meters)) was 1.3 kg.

TT: **IMC**: índice de masa corporal

...el peso utilizado para calcular el índice de masa corporal (**IMC**=peso en Kg. /altura en metros) fue de 1,3 kg.

48- ST: **CI**: confidence intervals

The confidence intervals (**CI**) for chest pain associated with migraine were calculated from the ratio of proportions.

TT: **IC**: intervalos de confianza

Los intervalos de confianza (**IC**) para el dolor precordial asociado con migraña fueron calculados de la relación entre las proporciones.

49- ST: **LDL**: cholesterol levels

LDL was 127.9 +- 24.32 mg/dl

TT: **LDL**: niveles de colesterol

LDL fue de 127, 9 +- 24, 32 mg/dl

50- ST: **OR**: odds ratio

Risk factors associated with atrial frillation were advanced age (odds ratio (**OR**)) for ten years increase, 1.75.

TT: **RP**: razón de probabilidad

Los factores de riesgos asociados con fibrilación arterial eran la avanzada edad (razón de probabilidad (**RP**)), para un aumento de diez años 1,75.

51- ST: **RR**: relative risks

Cohort and age group-specific relative risks (**RR**) were calculated.

TT: **RR**: riesgos relativos

El cohorte y los riesgos relativos (**RR**) específicos del grupo fueron calculados.

52 - ST: right inferior **QRS** axis

The electrocardiogram revealed right ventricular enlargement, right inferior **QRS** axis.

TT: **QRS** axial inferior derecho

El electrocardiograma revela alargamiento ventricular derecho, **QRS** axial inferior derecho.

53- ST: **ST-T** changes

The electrocardiogram revealed secondary **ST-T** changes.

TT: cambios **ST-T** secundarios

El electrocardiograma reveló cambios **ST-T** secundarios.

54- ST: **FCT**

The authors greatly acknowledge **FCT** financial support for the project.

TT: **FCT**

Los autores agradecen grandemente a **FCT** por el apoyo financiero para el proyecto.

55- ST: **FEDER**

The authors greatly acknowledge **FEDER** financial support for the project.

TT: **FEDER**

Los autores agradecen grandemente a **FEDER** por el apoyo financiero para el proyecto.

56- ST: **FSE**

David Costa acknowledges **FSE** for his PhD grant.

TT: **FSE**

David Costa agradece a **FSE** por su gran PhD.

57- ST: **NIM** Incorporated Philadelphia, PA.

In this study, it was measured with a prototype frequency domain cerebral oximeter (**NIM** Incorporated Philadelphia, PA.).

TT: **NIM** Incorporated Philadelphia, PA.

En este estudio esta se midió con un oxímetro cerebral de prototipo de dominio frecuencial (**NIM** Incorporated Philadelphia, PA.).

58- ST: **KPMCP**: Kaiser Permanente Medical Care Program

...37,047 men who were members of the northern California Kaiser Permanent Medical Care Program (**KPMCP**) during 1971...

TT: **KPMCP**: Programa de Atención Médica Permanente Kaiser

...37,047 hombres que eran miembros del Programa de Atención Médica Permanente Kaiser, California del Norte (**KPMCP**) durante 1971.

59- ST: **RAPPORT**

Data from **RAPPORT** suggest significant benefit.

TT: **RAPPORT**

Datos provenientes de **RAPPORT** sugieren beneficios significativos.

60- ST: **NHANES**: National Health and Nutrition Examination Survey

Using data from the National Health and Nutrition Examination Survey (**NHANES**)...

TT: **NHANES**: Revisión de Exámen de Salud Nacional y Nutrición

Utilizando los datos de la Revisión de Exámenes de Salud Nacional y Nutrición (**NHANES**)...

61- ST: **ADMIRAL**

Data from **ADMIRAL** suggests significant benefit.

TT: **ADMIRAL**

Datos provenientes de **ADMIRAL** sugieren beneficios.

62- ST: **GUSTO III**

A report from the **GUSTO III** study suggests a potential 30-day mortality benefit.

TT: **GUSTO III**

Un reporte proveniente del estudio **GUSTO III** sugiere un beneficio potencial de la mortalidad a los 30 días.

63- ST: insured **HMO** population

It may be more difficult to detect an association that actually exists, particularly in an insured **HMO** population.

TT: población **HMO** asegurada

Puede ser más difícil detectar una asociación que realmente existe, particularmente en una población **HMO**.

64- ST: **ICD**: International Clasification of Diseases

The diagnosis in both registers was based on International Clasification of Diseases.

TT: **CIE**: Clasificación Internacional de Enfermedades

Los diagnósticos en ambos registros se basaban en la Clasificación Internacional de Enfermedades.

65- ST: program package **GLIM**

The models were estimated by the maximum likelihood method by means of the program package **GLIM**.

TT: programa de empaquetamiento **GLIM**

Se estimaron los modelos por el método de probabilidad máxima por medio del programa de empaquetamiento **GLIM**.

66- ST: **CABG**: coronary artery bypass graft

Atrial fibrillation is a common, but potentially preventable, complication following coronary artery bypass graft (**CABG**) surgery.

TT: **IDAC**: cirugía de injerto en la arteria coronaria

La fibrilación arterial es una complicación común, pero potencialmente prevenible, que sigue a la cirugía de injerto en derivación de la arteria coronaria (**IDAC**).

67 -ST: **CPB**: Cardiopulmonary bypass

Many of these problems have been attributed to cardiopulmonary by-pass (**CPB**)...

TT: **DCP**: derivación cardiopulmonar

Muchos de estos problemas han sido atribuidos a la derivación cardiopulmonar (**DCP**)...

68- ST: **MRI**: magnetic resonance imaging

Neurologic examination and magnetic resonance imaging (**MRI**) are nonspecific tests.

TT: **IRM**: imagen de resonancia magnética

La examinación neurológica y la imagen de resonancia magnética (**IRM**) son pruebas inespecíficas.

69- ST: **NIRS**: near infrared spectroscopy

On the horizon, are noninvasive, bedside, near infrared spectroscopy (**NIRS**).

TT: **EIC**: espectroscopía infraroja cercana.

En el futuro cercano están las tecnologías ópticas no agresivas tales como la espectroscopia infraroja cercana (**EIC**)...

70- ST: **ANOVA**: analysis of variance

Comparisons were made by analysis of variance (**ANOVA**).

TT: **ANOVA**: análisis de variación

Las comparaciones se hicieron por análisis de variación (**ANOVA**).

71- ST: **EEGs**

It is associated with decreased (**EEGs**) activity.

TT: **EEGs**: electroencefalograma

Esto está asociado con la actividad disminuída de los electroencefalogramas (**EEGs**).

72- ST: **PCI**: percutaneous coronary intervention

Because of the results of percutaneous coronary intervention (**PCI**) for MI seem to be improving...

TT: **PCI**. Intervención coronaria percutánea

Como los resultados de la intervención coronaria percutánea (**PCI**) para MI parecen desarrollarse...

73- ST: **PTCA**: percutaneous transluminal coronary angioplasty

Methods and Results Data from controlled trials of rescue percutaneous transluminal coronary angioplasty (**PTCA**).

TT: **PTCA**: angioplastia coronaria transluminal percutánea

Se realiza una revisión de datos de pruebas controladas de angioplastia coronaria transluminal percutánea (**PTCA**).

74- ST: **RCTs**: randomized controlled trials

In the lab randomized controlled trials (**RCTs**) have critically analyzed...

TT: **RCTs**: pruebas controladas y aleatorias

En el laboratorio **RCTs** han analizado rigurosamente...

75- ST: **TAMI**: Thrombolysis And Angioplasty in Myocardial Infarction

The first of these was the Thrombolysis and Angioplasty in Myocardial Infarction (**TAMI**).

TT: **TAMI**: Trombolisis y angioplastia en el Infarto del Miocardio

La primera de estas pruebas fue la Trombolisis y angioplastia en el Infarto del Miocardio (**TAMI**).

76- ST: **ECGs**

Abnormal **ECGs** were present in less than 30% of this entire series.

TT: **ECGs**

Estaban presentes **ECGs** anormales en menos del 30% de esta serie.

77- ST: **TGA**

TGA subjects included 6 with intact ventricular septum.

TT: **TAM**: transposición de las arterias mayores

En los sujetos con transposición de las arterias mayores (**TAM**) incluyó 6 con septum ventricular intacto.

78- ST: **FeCl₂**

Reaction in mixtures contained the following reagents: **FeCl₂**...

TT: **FeCl₂**

Las mezclas reaccionantes contenían en un volumen: **FeCl₂**...

79- ST: **H₂SO₄**

It was prepared with dropwise addition of a 10 % of **H₂SO₄**.

TT: **H₂SO₄**

Se preparó con la adición de un 10 % de **H₂SO₄**.

80- ST: **NaH₂PO₄**

Working solutions of DAF-2 diluted with the buffer (**NaH₂PO₄**) ...

TT: **NaH₂PO₄**

Las soluciones de DAF-2 con las que se trabajó, diluídas con el neutralizador (**NaH₂PO₄**)...

81- ST: **KCL**

Working solutions of DAF-2 diluted with the buffer (**KCL**)...

TT: **KCL**

Las soluciones de DAF-2 con las que se trabajó, diluídas con el neutralizador **(KCL)**.

82- ST: **NaCl**

Working solutions of DAF-2 diluted with the buffer **(NaCl)** ...

TT: **NaCl**

Las soluciones de DAF-2 con las que se trabajó, diluídas con el neutralizador **(NaCl)**.

83- ST: **NaNO2**

It was mixed with **NaNO2** in a Y junction.

TT: **NaNO2**

Este se mezcló con NaNO2 en una unión Y.
