Access to health in an intercultural setting: the role of corpora and images in grasping term variation

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Medical concepts can often be lexicalized in several ways depending on aspects such as the facet of the concept being underlined or the particular communicative setting in which the concept is being used. This feature of terminology is known as terminological variation. In this paper we consider terminological variation as a tool to improve interlinguistic and intercultural communication, a key issue in the provision of universal access to health care. To facilitate the identification and analysis of terminological variation, the paper also proposes some search strategies to highlight this phenomenon in corpora, the main source of terminological information. Finally, images are proposed as a key issue in the localization process needed to bridge communication gaps between health care providers and lay audiences. The data used in the paper are taken from an international cooperation project aimed at providing health providers in Yucatan, Mexico, with materials and training in intercultural communication for healthcare mainly in Spanish and Mayan, and from a research project on lexical variation[1].

1. Introduction

Universal health access is a basic right that however is far from being accomplished due to economic, language and cultural barriers[2] which lead to difficult access to health care and poor communication between patients and health professionals. In many places, such as the Yucatan peninsula in Mexico, it is often the case that mainstream health care based on Western medicine coexists with traditional culture-based practices and this means that interculturality is a key issue in succeeding in the provision of healthcare. Interculturality within health care is defined as the explicit incorporation of the collective cultural load of the patient into his/her relationship with the healthcare provider, who is in turn source, generator and transmitter of a different form of culture (Campos, 2011). In addition, culture encompasses not only the products of a society as embodied in its institutions and objects, be they traditional or Western, but also world views, experiences and behaviour schemata (López-Rodríguez, 2003, p. 152).

Furthermore, low health literacy is often an obstacle reflected in the difficulties the patient faces to understand the medical concepts used by the provider (Brooke Lerner, Jehle, Janicke, & Moscati, 2000). As a result, health authorities and providers are increasingly concerned with health literacy, defined by the American Medical Association (n.d.) as the "ability

to obtain, process and understand basic health information and services needed to make appropriate health decisions and follow instructions for treatment".

In this context, translators are essential in the crosslinguistic and crosscultural mediation that often takes place in medical settings where there may be asymmetries of medical knowledge between health professionals and patients, as well as cultural and linguistic differences due to different national identities. According to Angelelli (2008, p. 130) in cross-cultural medical encounters interpreters (and hence translators) occupy the unique position of understanding both interlocutors' points of view and points of reference. The literature on health interpreting includes studies assessing translational accuracy and mistranslations (omissions, substitutions, etc), and their effect in clinical practice (Pöchhacker & Shlesinger, 2007, pp. 2–4). Many of these mistranslations are related to cultural differences between the participants in healthcare communication, patients' low health literacy, and terminological variation. Thus, maintaining accuracy in meaning and promoting intercultural understanding should be a priority for translators and interpreters in medical and health settings, a priority shared by translators in general: "Translators mediate between cultures (including ideologies, moral systems and socio-political structures), seeking to overcome those incompatibilities which stand in the way of transfer of meaning" (Hatim & Mason, 1990, p. 223).

The aim of this paper is to present different forms of terminological variation (register-based and dialectal variation) in medical settings and their relevance in intercultural and interlinguistic communication. We will illustrate ways in which terminological variation can be a useful tool to bring medical knowledge closer to different audiences. Our methodology for retrieving and analysing different forms of denominative variation is based on the use of electronic corpora and search strategies. Finally, images are proposed as a key issue in the localization process needed to bridge communication gaps between health care providers and lay audiences, and we illustrate this with examples from our cooperation project in the Yucatan peninsula. Our data are extracted from the methods and results of research in this cooperation project entailing the production of Mayan and Spanish audiovisual materials for the promotion of health care in the Yucatan peninsula, and in the context of a research project on terminological variation aimed at the study of this phenomenon from a communicative as well as a cognitive perspective.

2. Culture and medical knowledge in healthcare communication

In interlinguistic healthcare communication there are cultural elements whose understanding is essential for health decisions and treatment. Therefore, the use of translation procedures helping to bridge the gap

between source language and target language, while maintaining accuracy, are key. Montalt & González Davies (2007, pp. 180–181) mention the following translation strategies: exoticism, cultural borrowing, calque, transliteration, communicative translation and cultural transplantation.

While these are useful strategies at the microtextual level, translating in an intercultural setting requires going beyond the textual level. Consequently, Montalt & González Davies (2007, p. 184), following Katan (1999) indicate that mutual understanding between different linguistic communities may be hindered by the relevance given by these communities to context vs. text in communication. In this regard, Latin American cultures are closer to so-called *High Context Cultures*, for which "communication takes place through context rather than through texts" (Katan, 1999). Cultures where text is more important than context in communication are referred to as *Low Context Cultures.*[3]

As part of our cooperation project, we became familiar with the health situation and the reasons for hospital admission of the indigenous populations in the Yucatan peninsula from 2010 to 2012. In this setting, communication takes place between two high context cultures (Mexican and Spanish), however, health information and practices are based on two different medical systems (Western medicine and Traditional medicine[4]), which are not always successfully integrated. Health resources provided by international organizations such as Unicef and PAHO are neither assimilated nor accepted by the local population. The Yucatan peoples do not accept these resources because they do not represent their physical features and local identities as reflected in customs, clothes, houses, and everyday artifacts. Traditional medicine in Mexico, as in many Latin American countries is based on humoral medicine, defined by Foster (1987, p. 355) as "an ethnomedical system in which local foods and medicines are labeled with "hot" and "cold" markers, and illness is believed to be a disturbance to the temperature equilibrium in the body that is treated through the principle of opposites" (as cited in Worley, 2011, p. 5).

Such folk medicine and practice pose a communication problem for doctors prescribing Western medicine to indigenous peoples since their world views and cognitive frame for understanding disease and healing are different. Smith (2003, p. 3) mentions that in Mexican traditional medicine vitamin C is considered a "cold food", and therefore an inappropriate treatment for a "cold disease" like an upper respiratory tract infection.

These cultural differences also pose translation and terminological challenges since there are medical conditions that are endemic to certain geographical areas due to environmental circumstances and/or cultural practices. Such conditions are known as "culture bound syndromes", "culture specific diseases" (O'Neil, 2010) or "syndromes of cultural filiation" (Fagetti, 2004). Culture specific diseases are usually referred to with local names (e.g., *ku ben ba, mal viento, tip' te*) because of their cultural and environmental specificity, and they are recognized in

Traditional medicine but not always in Western medicine. Some of the most reported culture bound syndromes in the area of scope of our project are *mal de ojo/ ojo* (evil eye or strong eye), *aire* (group of diseases caused by leaving a hot environment and entering a very cold one), and *susto* (fright sickness)[5].

Considering the distance between these two medical systems and the need to acknowledge the cultural idiosyncrasies of the indigenous peoples, it was necessary to find a common framework for communication between doctors and patients in which basic concepts related to disease and their basic conceptual relations (cause, effect, location, etc.) are integrated. In fact, all cultures have systems for classifying diseases on the basis of etiology, signs/symptoms and treatments (Neff, 1996).

The first such common framework is the MEDICAL EVENT proposed by Faber (2002, p. 8) (Figure 1). It constituted the backbone for connecting medical terminology in English and Spanish of varying degrees of specialization in an information resource on cancer called OncoTerm[6] (Faber, López-Rodríguez, & Tercedor, 2001; López-Rodríguez, Faber, & Tercedor, 2006). In the MEDICAL EVENT, the main conceptual categories in a prototypical medical process were identified: RISK FACTOR, BODY_PART, CONDITION, SYMPTOM, DIAGNOSTIC PROCEDURE, INSTRUMENT, TREATMENT, THERAPEUTIC OR HEALING AGENT, SIDE EFFECT, SPECIALISTS and HOSPITAL. It was ascertained that all these categories were valid and applicable to different medical domains (Faber, 1999, p. 99; Faber & Mairal, 1999).
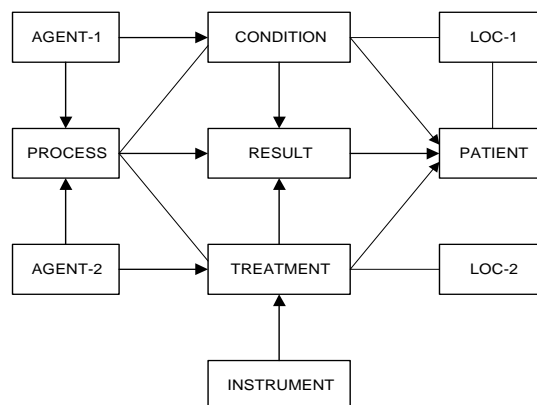

Figure 1: Medical event (Faber, 2002, p. 8)

This figure permits us to relate, define and paraphrase specialized terms on the basis of general language vocabulary. For example, the concept *radiation therapy* was represented in relation to basic concepts such as TREATMENT, INSTRUMENT, THERAPEUTIC AGENT, RESULT and LOCATION, as

shown in Figure 2. This template was the foundation for terminographic definitions.

radiation therapy	
IS-A	[TREATMENT]
USES-[AGENT-2 = THERAPEUTIC AGENT]	high-energy rays
USES-[INSTRUMENT]	linear accelerator tomotherapy machine
HAS-[RESULT]	elimination of cancer cells
AFFECTS	body part [LOCATION-2]
Definition treatment involving the use of high-energy rays to damage cancer cells and stop them from growing and dividing.	

Figure 2: Representation of the concept RADIATION THERAPY

To our mind, this framework can help bridge the gap between the medical knowledge and vocabulary of experts and those of patients, and between users and providers of health services who use different lexicalizations of concepts according to different situations and communication needs because it breaks down concepts into meaning units (see Section 3, Figure 4). As a result, this framework can be applied to integrate the knowledge and practices of different medical traditions, and to explain and define medical conditions to different audiences as in the following example:

Language	Terms	Definition
Mayan	*Tip 'te, Tip 'te tuch*	A disease [CONDITION] affecting the digestive system [BODY PART AFFECTED] caused by mixing hot and cold food, eating in excess or making heavy efforts [AGENTS OF DISEASE]. The treatment for this disease is a therapeutic massage called *sobada* [TREATMENT] carried out by a *partera* (midwife) [SPECIALIST].
Spanish	*cirro, pasmo del cirro, latido umbilical, cirro ladeado*	
English	There is not an equivalent in English. The translator can use the words in Mayan or Spanish (exoticism: *cirro, Tip 'te…*) or adapt the reference to the target language (cultural transplantation: belly button ache, stomach ache).	

Figure 3: Conceptual categories to promote understanding of medical terminology

The second framework that can help patients and interpreters come to grips with specialized medical objects, entities and procedures, is a better understanding of the Greek and Latin basis of medical terms. In our cooperation project, the population who spoke Mayan and Spanish obtained a better understanding of medical terminology after their etymology had been explained. In this regard, Peckham (1994), studying reactions in 180 orthopedic patients reported that 80% of them thought that there was a difference between a *fractured bone* and a *broken bone*. Montalt & González Davies (2007, p. 267) include an appendix of Latin and Greek roots for medical terminology, which are organized thematically. Greek and Latin roots in medical terminology can facilitate classification of terms into main conceptual categories such as these. The above classification constitutes again a framework for the organization of medical knowledge in the same vein as Faber's medical event.

3. Terminological variation in corpora as a key for use in intercultural communication

The multiple ways to designate a concept through different expressions is often referred to as terminological variation[7]. Thus, term variants are the different lexical manifestations of a term designating a particular concept. Researchers in both translation and terminology have long acknowledged the cognitive and communicative motivation of terminological variation. Although variation has been approached mostly from the cognitive

perspective recently (Fernández, 2010; Fernández & Kerremans, 2011; Tercedor, 2011), its communicative aspects have been tackled in many studies as well (Freixa, 2006; Freixa, Fernández, & Cabré , 2008; Tercedor & Méndez, 2000). Medical concepts can be lexicalized in several ways depending on the facet of the concept being underlined, given a particular domain or a particular interest in the sender, something which brings about the multidimensional character of medical terminology, a feature it shares with other specialized domains. Furthermore, a particular term choice can be made on the grounds of the communicative setting in which it is going to be used, entailing geographic features, a marked register, or both. This feature of terminology is key in succeeding in health promotion in an intercultural setting. In this paper, we will therefore concentrate on the communicative motivation of terminological variation and how this feature can be incorporated in corpus linguistics for terminological purposes.

One of the most influential approaches to linguistic variation was the one by Halliday, McIntosh and Strevens (1964, p. 77), who distinguished between linguistic variety according to the *use* to which language is put (register), and variety according to the characteristics of the *users* engaged in communication (dialect). This approach to language variation was applied to Translation Studies by many authors (Baker, 1992; Hatim & Mason, 1990; *inter alia*), and can be applied to terminological variation. The communicative reasons for choosing one term or another are the focus of Sections 3.1 and 3.2.

Language enables us to construe items of world knowledge in different ways (Wierzbicka, 1995) and the way in which it is done depends on many factors intrinsic to the concept and its features or to the way it is perceived. Thus, the distinction between what the word means "objectively" and what it means to its user is not always obvious. In this regard, the cognitive paradigm challenges the objectivist view that distinguishes between the semantics and pragmatics of concepts, the distinction between what the word means and all the encyclopaedic knowledge that you happen to have about the things the word refers to (Lakoff, 1987, p. 138). This consideration of semantics and pragmatics as a continuum is key in the understanding of lexical instances of concepts as equally relevant, their relevance being dependant upon the particular context in which the term is going to be used.

For a long time corpora have proved useful in the identification of terminological variation in medicine (López-Rodríguez, 2001; Tercedor, 1999). The different types of terminological variants, whether register-dependent or not, require different types of corpora. In order to compile register-dependent terminological variants a corpus of texts for a lay audience or a corpus of texts with different levels of specialization is needed, whereas to identify variations within the same level, a corpus containing texts of the same level of expertise can be used (Tercedor & Méndez, 2000).

In a corpus of semi-specialized medical texts, the use of what has been called knowledge probes (Ahmad & Fulford, 1992) and knowledge-rich contexts (Meyer, 1994) can help translators detect register variation in texts: one of the variants is the specialized term and the other is a hypernym, which is followed by a paraphrase of the specialized term. Meyer et al. (1999 cited in L'Homme & Marshman, 2007, p. 70) identify three main types of knowledge patterns:

- Lexical patterns: is the, is a, such as, and other, known as […]
- Grammatical patterns: for example, NOUN + VERB to explain the function of the specialized term
- Paralinguistic patterns such as the use of parenthesis or commas.1

The use of these patterns to detect terminological variants that can be of use in contexts such as the one in Yucatan described above, will be shown in examples taken from the 32 million corpus of the OncoTerm project.[8] We will also search the CREA corpus (Reference Corpus for Contemporary Spanish),[9] and Sketch Engine,[10] a Corpus Query System providing access to large corpora and producing concordances, and word sketches (a corpus-derived summary of a word's grammatical and collocational behavior). In this paper we exploit these resources either offline (with WordSmith Tools[11]) or online to extract concordances and word sketches as a way to grasp conceptual relations and term variants (López-Rodríguez, 2007; Tercedor & López, 2008).

3.1. Register-based variation

Register is understood as a combination of three variables: field, tenor and mode (Halliday et al., 1964). Halliday (1993, p. 25) defines these variables as follows: (a) field is the social action in which the text is embedded; it includes the subject-matter, as one special manifestation; (b) tenor is the set of role relationships among the relevant participants; it includes level of formality as one particular instance; (c) mode is the channel of communication selected, it includes the medium (spoken or written).

Tenor is normally associated to the personal relation in terms of social distance or formality between the user and his/her audience. This notion has been called "formal tenor" (Hatim, 1997, p. 18) and "personal tenor" (Hatim & Munday, 2004, p. 190). In any case, tenor is a particular privileged category (Hatim, 1997, p. 26) because it interacts with field and mode. The interaction between tenor and field gives rise to technicality: the more formal the occasion, the more technical the use of language (Hatim & Munday, 2004, p. 81). When tenor interacts with mode, tenor determines the purpose for which language is used such as to persuade, to inform, to

exhort or to discipline. Hatim and Mason (1990, p. 51) call it *functional tenor.*

Drawing on this approach, terminological variation due to register mainly encompasses variation reflecting the social relation between the participants (formal register) as well as the knowledge shared by participants (technicality or degree of specialization). For example, a doctor can use the expression *chemo* in an informal situation with a colleague, *low-dose chemotherapy* in a research journal, and *medication* to communicate with his/her patient.

The increasing number of standardized medical vocabularies, such as SNOMED CT®, ICD, CPT®, MeSH, or UMLS—to mention a few—show the complexity and nuances of communication in medical settings, and of variation according to use (register) as shown in the following example involving different types of users such as patients, companies, health organizations, clinicians and information management professionals.

Figure 4: Different terms and standards for one concept and different users (Source: IMO ® Interface Terminology: http://www.e-imo.com/

One of the ways of acting interculturally when providing health information is through the selection of paraphrases to better target the particular ways of

conceiving health by a given cultural and linguistic community. That is why, when recording medical terminology for different purposes, different communicative settings should be considered and marked.

For the purpose of corpus analysis and its use in the improvement of intercultural communication in health settings such as the one described above, the classification of texts according to communicative settings is essential. This can be achieved in two ways: (a) grouping texts in folders according to technicality/degree of specialization (specialized, semi-specialized, text for the general public) and formality (formal, neutral, informal); (b) adding in each text a header with tags relating to the pertinent communicative setting(s).

The first approach was followed in OncoTerm, where the texts included only basic tags (for example, author, title, journal and pages in the case of research articles), and the files division into folders was the basis for searches to retrieve terminological variants. For example, the introduction of the knowledge probe *called* served to generate concordances where the words to the left of *called* were an explanation or paraphrase of the meaning of the specialized term to the right *(bronchi, epidermoid carcinoma, bronchoscopy,* and so on*)*. These paraphrases were very indicative of the kind of information to be included in the definition of terms for a lay audience (Pearson, 1998; López-Rodríguez, 2001). Other useful expressions were: *is known as / is referred to as / is called / means / is defined as.*

```
1     e product of the body's cells. Tubes called bronchi make up the

2     ancer: squamous cell carcinoma (also called epidermoid carcinoma),

3     oat and into the bronchi. This test, called bronchoscopy, is

4     e chest between two ribs. This test, called thoracoscopy, is

5      also may be removed in an operation called a pneumonectomy.

6      the vein or muscle. Chemotherapy is called a systemic treatment

7     One new type of radiation therapy is called radiosurgery. In

8     out only a small part of the lung is called a wedge resection.

9      the vein or muscle. Chemotherapy is called a systemic treatment

11    . Like surgery, radiation therapy is called local treatment

12     lung is taken out, the operation is called a lobectomy. When one

13    n one whole lung is taken out, it is called a pneumonectomy.
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Figure 5: Concordance lines around *called* (López-Rodríguez, 2001, p. 513)

As to the second approach to classify texts with a view to detect register variation, in the framework of the two research projects described in this paper, a corpus of medical texts for different contexts has been compiled and is now being tagged following the following schema in order to filter

texts by keywords, medical domain, audience, and so on. We have used an adaptation of the tags proposed by the Lexicon research group (http://lexicon.ugr.es) for the corpus of EcoLexicon, a terminological knowledge base on the Environment (http://ecolexicon.ugr.es/en/). The annotation is based on XML language, and is the result of selecting from the Dublin Core metadata[12] the most relevant for translation purposes. The domain and keywords tags ensure the comparability of the texts so that the texts under study share similar terminology. These tags also illustrate the overlapping between field, tenor and mode.

Tag	Meaning of the tag	Values for tags	Register variation
<la></la>	Language	ISO code for languages	Not applicable
<d></d>	Domain	Areas of the International Classification of Diseases (ICD)	Field
<k></k>	keywords	Keywords in Medline	Technicality (interaction field-tenor) The synonyms used in the text for the Medline keywords indicate formal tenor and/or technicality.
<u></u>	Audience	<e> expert <s> semi-expert <l> lay	Technicality (interaction field-tenor) Formal tenor
<g></g>	Genre	<abs> abstract <arti> research article <thes> thesis <pate> patent <adve> advertisement […]	Functional tenor (interaction tenor-mode)

Figure 6: Tags to filter register variation

Even when the corpus has not been tagged, when translating medical terms in intercultural contexts it is possible to obtain good examples by consulting on-line corpora such as the CREA (Corpus de Referencia del Español Actual) or the ones available from Sketch Engine (López-Rodríguez & Buendía, 2011) as will be seen in the following section.

3.2. Dialectal variation

In terminology, studies on medical variation normally focus on variation according to register. However, in real medical encounters in an intercultural context, health providers and translators should also consider medical variation according to dialect (diatopic, diastratic, and chronolectal variation). All these have an impact on the strategies chosen to adapt the message to particular groups of receivers in a specific geographical, social and temporal context.

Within diatopic or geographical variation, corpora are valuable tools to confirm intuitions about the geographical uses of words. The use of tools such as Diatopix[13] or Sketch Engine and its available corpora can provide dialectal variants and confirm "terminological hunches". In the case of the Spanish TenTen corpus of Sketch Engine, only examples of European Spanish can be obtained, although the enormous size of the corpus (more than 2100 million words) constitutes a real advantage. And so, a Google search may indicate that, if we encounter the acronym ETV in Mexico, it is likely to refer to the term *Enfermedades Transmitidas por Vector* while in Spain, it stands for *Enfermedad Tromboembólica Venosa*. This can be confirmed by searching the expression ETV in the context of *venosa* and then, in the context of *vector* within a collocational span of 15 words in the Spanish TenTen corpus. No results for ETV referring to *Enfermedades Transmitidas por Vector* were found in the corpus of European Spanish (Figure 7).

para la enfermedad tromboembólica *venosa* (ETV	) a los profesionales sanitarios que atienden
de la e nfermedad tromboembólica *venosa* (ETV	) en pacientes con procesos médicos. </p>
de la enfermedad tromboembólica *venosa* (ETV	) y en los criterios diagnósticos para establecer
entidad, la enfermedad tromboembólica *venosa* (ETV	). Cuando en TEP sintomáticas se ha realizado
de la enfermedad tromboembólica venosa (ETV	) en la población general es de 1 por cada
juntasla enfermedad tromboembólica *venosa* (ETV	) sigue siendo una gran desconocida para
<p> La enfermedad tromboembólica venosa (ETV	), tanto en su expresión de trombosis venosa
<p> La enfermedad tromboembólica venosa (ETV	) es una patología cada vez más frecuente
pulmonar (La enfermedad tromboembólica *venosa* (ETV	) en cualquiera de sus formas (trombosis
de la enfermedad tromboembólica *venosa* (ETV	), prevención de ictus en pacientes con
prevenir la enfermedad tromboembólica *venosa* o ETV	) en cualquiera de sus formas: la trombosis
como enfermedad tromboembólica *venosa* (ETV	), el término global para trombosis venosa
prevención de enfermedad tromboembólica *venosa* (ETV	) en patología médica (1) , se debería cuantificar
es la enfermedad tromboembólica *venosa* (ETV	), cómo se desarrolla, cuáles son los síntomas
prevenir la enfermedad tromboembólica *venosa* (ETV	) en cualquiera de sus formas, la trombosis
de la enfermedad tromboembólica venosa (ETV	) en patología médica (8) establece además
recomienda de forma sistemática profilaxis para ETV	cuando la trombosis *venosa* profunda y/o
en riesgo la vida. El tipo más común de ETV	es la trombosis *venosa* profunda (TVP),
<p> "La enfermedad tromboembólica *venosa* (ETV	) es una patología de gran interés sanitario
<p> La Enfermedad Tromboembólica Venosa (ETV	). La enfermedad tromboembólica *venosa* comprende

Figure 7: The acronym ETV in the Spanish TenTen corpus of Sketch Engine

In any case, if we want to use a corpus including texts in Mexican and European Spanish, the CREA should be the best choice, although it often needs to be complemented with other sources of information and a thorough collocational analysis.

If the corpus is compiled for a special purpose, as in our case, tags referring to geographical variation such as the ones below should be used.

Tag	Meaning of the tag	Values for tags
<la></la>	Language	ISO code for languages
<c></c>	Country of publication	ISO codes for countries
<v></v>	Geographical variation	For example: Es-es (European Spanish) Es-mx (Mexican Spanish)

Figure 8: Tags to filter dialectal variation

In our corpus the selection of the tag <v>Es-mx</v> in combination with a syndrome of cultural filiation such as "cirro" has allowed us to retrieve instances of dialectal use not only of the searched term but also of its linguistic and cultural context, thus improving our knowledge of Mexican traditional medicine. The concordances show the most frequent co-occurring words, synonyms and related terms.

N	Concordance
1	, si no se trata a tiempo puede incluso llevar a la muerte.5 Los síntomas del cirro son dolores de estómago, diarrea, vómitos, inapetencia y mala
2	se realiza a través de su reposicionamiento. La sobada para reubicar el cirro es una de las prácticas más complicadas de hacer y las partera
3	. Cuando lo agarro está brincando". (Doña Soco, partera) "Si uno tiene el cirro, va al doctor y nada. El doctor no sabe, las mujeres van con el d
4	una enfermedad específica a la que se refiere con la expresión "tener el cirro". El desplazamiento de los órganos no se da de manera casual,
5	del baño se realiza la sobada, que se inicia localizando la posición del cirro y del útero para comenzar su reposicionamiento. Este masaje, a
6	, se efectúa la sobada sobre el vientre. También se verifica la posición del cirro y del "intestino". Con esta última sobada se cierra la lista de técr
7	al masaje de sus manos. Las parteras sostienen que para reposicionar el cirro son necesarias tres sobadas: una cada ocho días; aunque aseg
8	La sobada al octavo día después del parto es la más importante, pues el cirro de la mujer está "en desorden" y su cuerpo, aunque parcialment
9	realizado durante el parto. Los órganos más afectados son el útero y el cirro. Durante el parto, de hecho, el útero se baja y el cirro se despla
10	cuyo objetivo es el de componer definitivamente el cuerpo de la mujer y el cirro. Es más vigorosa que las anteriores y se lleva a cabo algunas
11	, sino también a su alineación con el tip'te' (en lengua maya yucateca) o "cirro" (en español) un órgano que, según los habitantes de Kaua, se
12	órganos deben ser regresados a su posición correcta. Una vez ubicado el cirro se procede a arrastrarlo hacia el ombligo. Las modalidades de e
13	si la enfermedad no es grave. La sobada inicia con la ubicación del cirro, que se realiza hundiendo el dedo índice en el ombligo de la per
14	son el útero y el cirro. Durante el parto, de hecho, el útero se baja y el cirro se desplaza. Sobada al día siguiente del parto Al día siguiente d
15	enfermedades de naturaleza psicosomática: el ojo,33 los malos vientos, el cirro, etcétera, males que los médicos alópatas generalmente no toma
16	manipulación son similares a las descritas anteriormente para componer el cirro, aunque la presión de las manos es menor y los tiempos de ejec
17	para componer el cirro o el útero. SOBADA PARA COMPONER EL CIRRO Cuando el cirro se mueve por una caída o un esfuerzo excesi
18	correcto de los órganos, sino también a su alineación con el cirro o tip'te', "órgano" ubicado debajo del ombligo y cuya vitalidad se
19	clases de sobadas que efectúan las parteras: - Sobada para componer el cirro - Sobadas durante el embarazo - Sobadas durante el puerperio
20	de alguna otra enfermedad, como el tip'te tuch ("latido umbilical", cirro o "cirro ladeado"). c) Por exponerse a cambios bruscos de temperatura
21	costumbre. El reposicionamiento se verifica por el hecho de que ahora el cirro "brinca" de nuevo debajo del ombligo. A partir de ese momento l
22	fuera del ciclo reproductivo femenino (sobre todo para componer el cirro) la mujer en edad reproductiva es la persona que más se somete

Figure 9: Using the corpus to search for instances of dialectal use: the case of *cirro*

Dealing with terminological variation in a multicultural setting also means being aware of variation due to social (diastratic) and geographical (diatopic) differences on the part of speakers. A doctor in Spain or Mexico may use the term *metanfetamina (methamphetamine)* to refer to an extremely addictive drug. However his/her patients can refer to this drug with one of the street names used in their respective countries, which may not be familiar terms for the doctor.

Regarding chronolectal variation, there are not many corpus data shedding some light on either the language of children in clinical settings or the use of child language (i.e., language used by the child and controlled actively by her: Jakobson, 1969) by paediatricians examining them. Expanding previous corpora on child language such as the ones contained in the CHILDES database (http://childes.psy.cmu.edu/) to include healthcare situations in different countries and different dialects could be a promising research area. Such a corpus would be helpful in finding the Mexican equivalent of the children expression *pupa* found in this example from the Spanish component of the CHILDES project (Figure 10).

```
848  *MOT:  <ay (.) que golpe> [% hablando por boca de la muñeca]!
849  *CHI:  no fue nada Barbie (.) que te caí(s)te en la +/.
850  *CHI:  no fue nada (.) Barbie.
851  *MOT:  <iiii@o (.) me hice pupa> [% hablando por boca de la muñeca]!
852  *MOT:  Meca (.) le vamos a tener que echar a Barbie un poco de agua
853         oxigenada (.) eh!
854  *CHI:  mira mami (.) mira como no fue nada.
855  *MOT:  si (.) no [/] no tiene pupa ahí!
856  *CHI:  donde?
857  *MOT:  <<me duele> [/] me duele la pierna>
858         [% hablando por boca de la  muñeca]!
```

Figure 10: A mother and child talking about pain in the CHILDES database[14]

To facilitate the understanding of medical concepts and their different terminological variants in intercultural and interlinguistic health settings, images can be used as a link between concepts and their lexicalizations. Therefore, we propose that visually representing medical conditions is a basic step into a better intercultural and interlinguistic communication, as well as an important tool for the generation of texts based on controlled languages. Following is an example of a visual representation of a medical symptom for kids (tummy ache / dolor de tripa) and the geographical distribution of the terminological variant chosen. This issue is considered in greater depth under 4.
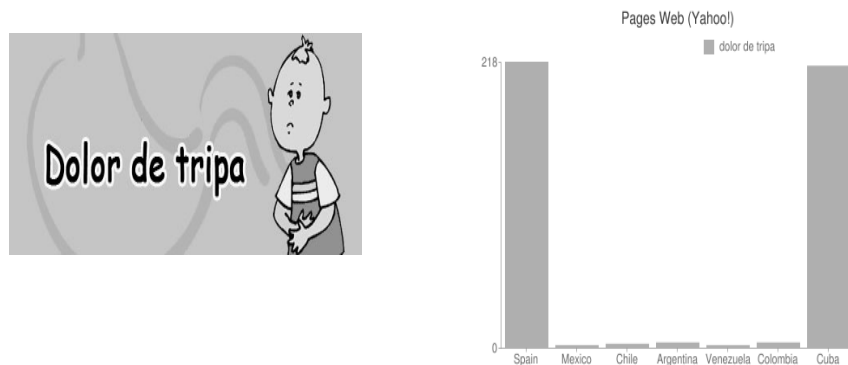

Figure 11: Visual representation of the concept STOMACH PAIN for children (left) and presence of the terminological variant "dolor de tripa" as retrieved by Diatopix

4. Images triggering term variation in patient-health provider communication

Images can help bridge communication obstacles in health settings provided they are chosen on the grounds of a particular degree of

specialization or a focus on a particular aspect of a medical concept. The use of images to represent general medical concepts is a common communicative tool in hospital and other health facilities. Projects such as the *Hablamos Juntos program* (http://www.hablamosjuntos.org) have long been working in studying universal signs and icons to direct patients within hospital settings.

Images can be used to bridge communication obstacles and to improve patients' knowledge about disease and health, as in the following information leaflet:

Figure 12: Symptoms of diabetes (Servicio de Salud de Yucatán, 2010, p. 2)

The leaflet describes the symptoms of diabetes in plain language and with visual support so that low literacy patients can understand. "Necesidad de orinar con frecuencia", is a paraphrase that would rarely be included as a term entry in traditional terminology settings. However, it is a better option to ensure comprehension by lay persons than the medical term *polyuria*. By the same token, "sed excesiva" is used instead of the medical term *polidipsia*, and "falta de energía" instead of *astenia*. This register-based form of variation is key in bringing closer concepts to lay audiences or audiences with limited language proficiency. Such strategy is further enhanced by the use of images that facilitate understanding of medical concepts. Images in this context serve as a sort of interlingua between medical concepts and their lexicalizations, but the interpretation of images, icons and body language by different individuals and cultures is also an important issue to consider, as revealed by our cooperation experience in Yucatan.

Images are thus a thorny issue in any process entailing cultural and linguistic adaptation (localization) for health promotion. In our cooperation project, patients did not have confidence in existing healthcare materials

(mainly in printed form) due to the fact that they had been designed with a focus on global use (written in majority languages and lacking cultural referents) and therefore, patients' identities were not reflected. Consequently, we addressed this challenge by designing and developing audiovisual and printed materials in Mayan and Spanish and by assessing the cultural, technical and linguistic aspects that should be considered with a focus on localization, reflected both in language and images. As for language, local cultural concepts were chosen to empower the language and culture. For example, analogies using local concepts such as "me pondré grande como una ceiba" (I will grow tall as a ceiba) were used to illustrate eating habits for children. Images were chosen on the basis of cultural adequacy after anthropologic consultation and field studies to ensure local acceptance.

Figure 13: Local features in the design of printed materials (left) and cartoons (right). Source: Animated videos and education materials from the University of Granada cooperation project *Procuración de justicia y acceso a la salud por parte de la población indígena de Yucatán: mediación interlingüística e intercultural*

We have briefly illustrated how in multimodal scenarios images play an important role in the access to health serving as a bridge between the concept and its lexicalizations. In this context, their motivated choice relates to the textual configuration and the terminological variants chosen.

6. Conclusions

In this paper we have illustrated how terminological variation reflects different communicative and social context-bound motivations in designating concepts. The nature of the concept and its salient features are a basic aspect to study terminological variation, although register can

determine the choice of one or another lexicalization. Furthermore, the suitability of a particular term choice in a geographical setting can enhance communication between health care providers and patients. In an interlinguistic and intercultural setting, the awareness of these forms of variation is fundamental in succeeding in providing access to health for all. The corpus-based examples and visual resources provided indicate new ways to improve patient-doctor communication and health literacy. Some issues such as the cognitive motivation for a particular terminological choice in a medical encounter or the relation between term variants and images remain to be researched, and experimental methods such as those searching for spontaneous production are a promising venue for researching terminological variation.

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[1] This research has been carried out within the framework of two projects. (1) Procuración de justicia y acceso a la salud por parte de la población indígena en México: mediación interlingüística e intercultural is a Joint Project of the University of Granada and the Higher Education Institute of Translation and Interpreting, Mexico DF, funded by the Center of Cooperation Initiatives of the University of Granada (CICODE). (2) VariMed: Denominative variation in medicine: Multilingual multimodal tool for research and knowledge dissemination (FFI2011-23120), a three year (2012-2014) research project funded by the Spanish Ministry of Economy and Competitiveness, with the participation of researchers from the University of Granada, University Pablo de Olavide, and University of Valladolid (Spain), Rutgers University (USA) and Carleton University (Canada), aimed at the study of denominative variation from a cognitive and communicative perspective.

[2] Medical journals such as the Journal of General Internal Medicine are devoting whole issues to language barriers in health care.

[3] The cline representing the role of context in various cultures was proposed by Copeland & Griggs (1986 cited in Zografi 2009, p. 136) and it goes from High Context Cultures to Low Context Cultures as follows: Japanese – Chinese – Arab – Greek – Mexican – Spanish – Italian – French – French Canadian – English – English Canadian – American – Scandinavian – German – Swiss-German.

[4] Kangwa (2010) discusses the differences between Traditional Medicine and Western Medicine.

[5] Biblioteca digital de la Medicina Tradicional Mexicana:
http://www.medicinatradicionalmexicana.unam.mx/index.php

[6] http://www.ugr.es/~oncoterm

[7] The concept has been refeered to as onomasiological variation in the cognitive linguistics paradigm (Geeraerts, Grondelaers and Speelman (1999), distinguishing between formal variation (use of synonyms) and conceptual onomasiological variation (use of the hyperonym and hyponym alternatively). However in the field of terminology this form is rarely used and full synonymy is rare.

[8] http://www.ugr.es/~oncoterm/

[9] http://corpus.rae.es/creanet.html

[10] http://www.sketchengine.co.uk/

[11] http://www.lexically.net/wordsmith/index.html

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