MEDICAL TRANSLATION IN THE 21ˢᵗ CENTURY – CHALLENGES AND TRENDS*

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1. Introduction

Historically translation and medicine have gone hand in hand. A brief look at history reveals that medical translation has existed since the oldest forms of cuneiform writing on clay tablets in Ancient Mesopotamia. Archeologists have found a dictionary in Sumerian, Ugaritic, Akkadian and Hurrian dating from around 1300 BCE containing medical information in its pre-scientific form. Much later, in fifth century BCE Greece, we find the Corpus Hippocraticum, a body of texts that inspired further study and spread to other languages and cultures in subsequent centuries, such as in the work of Galen some 400 years later, whose work was translated into Arabic at the House of Wisdom in

Baghdad in the ninth century CE. Between the ninth and the twelfth centuries, Arab translations were in turn translated into Latin, together with commentaries added by other Arab scholars (Montalt 2005). According to Savage-Smith (2001) medieval and early modern scholars in Europe drew upon Islamic traditions and translations as the foundation for their medical studies. Following Wallis & Wisnovski (2016) medieval textual cultures in general, and medicine in particular, can best be understood as products of dynamic processes of transmission, translation and transformation in which translators played a key role as active agents in reshaping and recontextualising knowledge and texts.

In subsequent centuries, medicine gradually turned into a scientific discipline and made huge progress, generating an ever-increasing amount of information as well as compelling needs for knowledge transference, international communication and translation (Montalt 2013). In recent decades, medical translation and interpreting have become important niches for professional translators and interpreters. National and international health authorities – such as the WHO or the EMA –, pharmaceutical companies selling medicines in the global market, medical publishers providing books for the future professionals in myriad languages, medical devices manufacturers for all medical specialties, public and private hospitals and other health centres, biomedical research teams – in need to publish their results in international journals in English –, and NGOs dealing with complex public health issues – such as those encountered in humanitarian crises – are among the many organisations in need of translators and interpreters. Thus, the scope of medical translation is rich and varied in genres – ranging from research articles to biomedical patents to fact sheets for patients –, terminologies, registers, styles, formats, modes as well as in health cultures and ethical restrictions and dilemmas.

This rich scenario for medical translation is further enhanced by three emerging forces that are driving healthcare and biomedical research into new territories: patient-centred care (PCC), personalised medicine (PM) and translational medicine (TM). All three bring to the fore the importance of information transfer, recontextualisation and communication, and therefore offer potential niches for translators and interpreters (Montalt, forthcoming).

Specialised training in medical translation is starting to respond to the fast-growing needs of the marketplace with specific programmes covering the particulars of this professional activity and focusing on domain specialisation, specific resources and the tools of the trade. In a globalised world and in the case of a highly internationalised profession such as translation and interpreting, specialised training requires efforts of coordination and harmonization among countries. A good example of this much-needed international cooperation

in Europe is the EMT – European Master's in Translation. Its main goal is to improve the quality of translator training in order to enhance the labour market integration of young language professionals. EMT brings together different stakeholders – Universities, employers, employees, governmental institutions, etc. – in an effort to share information and devise strategies in higher education. At the core of this project is the EMT translator competence profile defining the basic competences that translators need to work successfully in today's market, some of which are addressed in this issue. Our belief is that research can provide data and reflection to support informed decisions in the area of education and also in that of professional practice.

However, as far as research in medical translation is concerned, it is still at an incipient stage. In his bibliographical study Franco-Aleixà (2010: 159) points out that widespread systematic research in medical translation and interpreting only started at the beginning of the 21st century and has focused primarily on professional aspects, quality, pedagogy, documentation, tools and history. Much of the research done before then had a predominantly prescriptive orientation, and focused mainly on the terminological issues related to highly specialised texts. More recently medical translation has been redefined to encompass not only a great variety of specialities and medical concepts, but also of resources, texts, communicative situations, organisations, contexts, and participants. This open perspective on medical translation includes not only highly specialised texts about biomedical research, but also the education of health professionals, patients' education, popularisation, and the media.

This special issue of MonTI is an invitation to reflect on the relevance and scope of both medical translation and translators working with medical texts. It is also an invitation to explore how the traditional topics of medical translation – such as terminological issues – have evolved and how new interests have emerged in recent years, including expert-to-lay translation, the professional profiles of medical translators, the training of medical translators, or the improvement of clinical communication through translation and mediation.

2. The terminology issue

Appropriate use of medical terminology is one of the core conditions for successful communication in monolingual and multilingual healthcare communities. Medical terminology is diverse not only in terms of the obvious differences between languages, but also due to differences between registers or communication channels. Some features of medical terminology can be observed across languages: Latin and Greek influences, affixation (e.g. *dermatitis, conjunctivitis, gastritis* and also *fail-failed-failure*) eponymy (e.g. *Parkinson's*

disease, Alzheimer's disease) or the doublet phenomenon – pairs of words of different origins which are used in different registers, e.g. *swelling – edema, begin – initiate* (Salager 1983, Mićić 2013, Uherová, Horňáková 2013, Džuganová 2013). What seems to be particularly problematic for medical translators and writers is adapting their terminological choices to genre-specific and register-specific conventions. Salager (1983) divided English medical terms into three groups – basic English (BE), fundamental medical English (FME) and specialised medical English (SME). In a recent study Fage-Butler and Nisbeth Jensen (2016) initially used a division into technical and semi-technical terms, which was later replaced with a five-category division: dictionary-defined medical terms, co-text-defined medical terms, medical initialisms, medication brand names and colloquial technical terms. In each of those divisions the lay/expert differences serve as axes of division and each of those divisions accounts for the fact that units from the general register are used in medical communication.

On the one hand, lexical units associated with general register, doublets, synonyms, and polysemous terms seem to be in conflict with monoreferentiality (Gotti 2011) or univocity (Felber 1984) principles and the need for clarity and precision in interprofessional communication (Mitzkat, Berger, Reeves, Mahler 2016). On the other hand, there is a strong tendency to avoid polysemy and synonymy, and control medical terminology, which is now to a large extent standardized, especially in regulatory registration and reporting areas.

The advent of medical information systems plays an important role in increasing standardization and control over medical terminology (Cimino 1998, Awaysheh, Wilcke, Elvinger, Rees, Fan, Zimmerman 2017) as term classifications are integrated into healthcare information systems to enable electronic exchange of clinical data. Healthcare terminology systems facilitate the diagnosis process, decision-making, reporting etc. One of the most widely used classifications is the International Statistical Classification of Diseases and Related Health Problems, whose current version ICD-10 will soon be replaced with ICD-11. It is a standardized terminology tool developed by the WHO and used in diagnostics and epidemiology. International Classification of Functioning, Disability and Health (ICF) – also developed by the WHO –provides a framework for describing health conditions in its four chapters: 'Body functions', 'Body structures', 'Activities and participation' and 'Environmental factors' (WHO 2001). SNOMED CT is one of the leading healthcare terminology system, which is in fact a consolidation of two controlled terminologies: SNOMED RT and Clinical Terms Version 3 (Wang, Barrett, Bentley, Markwell, Price, Spackman, Stearns 2001). It is maintained by the International Health

Terminology Standards Development Organisation (IHTSDO). Formal terminologies are also developed by nurses: the International Classification for Nursing Practice (ICNP) is a dictionary of terms developed by the International Council of Nurses (ICN) to facilitate description and reporting in nursing practice (ICN 2015). The above list is not exhaustive; in fact, there is an abundance of clinical classifications (e.g. ICD, ICF, ICPC, MedDRA, DSM, MEDCIN for diagnosis, CPT, CDT, HCPCS for procedures, at least several classifications for nursing, diagnostic tests, medical devices etc.). One of the reasons for the manifold classifications is that none of them is a universal one – they serve different purposes and are used in different sectors of healthcare. Nevertheless, they need to be compatible since data are transferred between different systems. Therefore, mapping between terminologies is both a necessity and a challenge when terminologies or classifications need to be aligned to ensure adequate information exchange (Fung 2007, Cardillo 2015).

International terminology systems and classifications are translated into a number of languages. ICD-10 was developed in English and translated into 42 languages by expert translators, although the term that the WHO (2010) uses to refer to interlingual transfer is "*multilingual representation*" (not "*translation*" to emphasise the desired equivalence of concepts resulting from a semasiological approach rather than word-for-word transfer. The ICD-11 is being developed with computerized assistance and human experts in the validation process to ensure equivalence of concepts. The ICNP has so far been translated into 19 languages, including Polish (ICN 2015). As the original Classification is subject to updates, new translations are required to reflect the changes in the original. The Guidelines for the translation of the ICNP suggest striving for cross-cultural equivalence of concepts rather than word-for-word translation or "etymological equivalence". Translators are advised to "avoid ambiguous terms that have more than one meaning" (ICN 2008), which means that polysemous and synonymous terms are to be avoided. ICN guidelines for translation also include recommendations to avoid colloquial phrases and jargon, and a recommendation on tackling terminological gaps: "if there is no appropriate term in the target language, translate the source term into a set of words using the definition" (ICN 2008). Such knowledge-based approaches (cf. Deléger, Merabti, Lecrocq, Joubert, Zweigenbaum, Darmoni 2010) usually involve teams of healthcare professionals and terminology experts who perform semasiological work and validation processes before suggesting final target terms. Terminologies or classifications can also be translated automatically (or semi-automatically) with the use of parallel corpora and alignment tools (Deléger, Merabti, Lecrocq, Joubert, Zweigenbaum, Darmoni

2010). Consistent, clear and monoreferential terminology can improve the effectiveness of health information exchange and its adequate use in translation is a critical quality factor.

3. Medical translation quality

Medical translation quality may affect clinical processes (cf. Flores *et al.* 2003), which is why the role of verification is another frequently emphasised aspect. A valid verification process starts as early as in the pre-translation phase when the source is prepared and includes assuring compliance with the conventions and requirements of specific text genres or functions, such as readability and clarity in expert-lay communication. A fairly frequently applied but debatable method of translation review is back-translation. The International Medical Interpreters Association (IMIA) advise against applying back-translation as a method for verification for the reason that it might not reveal "the target language contextual and usage nuances" (IMIA 2009: 2) or awkward literal translation. Nevertheless, the blind back-translation technique is frequently used in quality assurance (cf. Fernández Piera & Ardura Ortega 2012), especially in the sector of medical research and clinical trials, as it is required by Ethics Committees and regulatory authorities in a number of countries (Grunwald & Goldfarb 2006: 2). Translation agencies which conform to European Standard ISO 17100:2015 ensure quality in the area of human resources (competent translators, revisers and reviewers), pre-production (e.g. enquiry, feasibility, agreement), the translation process (including check, revision, review and proofreading) and post-production. The standard, however, does not provide any measures for assessing the quality of the translated text and only gives vague general guidelines on checking the translation, such as omissions, semantic, grammatical and spelling mistakes, and "ensuring compliance with relevant translation project specifications" (ISO 17100:2015). Institutions which handle translated texts develop their own medical translation verification procedures, e.g. the International Medical Interpreters Association (IMIA) requires two verifications, the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) uses a review method which involves two parallel forward translations, reconciliation, two back-translations, comparison and reconciliation, then a review and harmonisation of the target text (Andriesen 2006: 15-16). Parallel translation can also be applied as a standalone quality assurance method: two parallel translations are produced, then compared and adjusted, if necessary (Andriesen 2006: 16). The translation of instruments such as questionnaires or scales can be verified by means of cognitive debriefing, i.e. collecting feedback from a sample group

on how they understand the wording of a question or statement to verify if it is readable and lay-friendly while reflecting the original concept (cf. Engel, Koester 2014). In fact, lay-friendliness and readability have become crucial quality factors as they are essential in expert-lay communication.

4. Expert-lay medical translation

In medical translation, there is often a rather symmetrical relationship between the author of a text and the target audience. In other words, expert-to-expert translation. However, during the past decades, the Western World has seen an increasing demand from "ordinary" people who want to be able to understand their tax returns, utility bills, pension schemes and not least information pertaining to their health. The 1970s saw the rise of the Plain Language movement and in general a less authoritative society supports the policy that non-experts should be able to understand texts directed at them. Concepts like patient-centeredness and patient empowerment are considered crucial in modern health communication. The concept of patient-centeredness was introduced in the late1960s as a new and more psychosocial approach to medical thinking. It required health care professionals to have a holistic view on their patients and include the patients' needs and wishes in their medical care plans (see Holmström & Röing 2009, who also provide a review of the many different ways of understanding both patient-centeredness, patient empowerment and their interrelation). Contrary to patient-centeredness, the origin of patient empowerment is not found within health care but in Paulo Freire's pedagogical theories from the 1960s and 1970s (Askehave *et al.* 2010). The fundamental meaning of the concept is of course to put someone into power, which implies making the patient able to make or participate actively in making important decisions regarding their own health on an informed basis: "Empowerment is a process through which people gain greater control over decisions and actions affecting their health" (WHO 1998: 7).

It goes without saying that it is impossible to claim that patients are at the centre of their own health care or to empower patients if they do not understand information directed at them. In this context, the concept of health literacy is important: "Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good *health*" (WHO 1998: 10). Increasingly, research within health communication has been focused on the concept of health literacy, which emphasizes the fact that even among laymen, ability to understand health-related information ranges from no health literacy, to functional health literacy, to interactive

health literacy and to critical health literacy (Nutbeam 2000). This wide span of health literacies means that generally translations, which function as mass communication (i.e. potentially aimed at for example an entire population) need to be targeted at the lowest common denominator.

A case in point as far as mass health communication aimed at the layman is concerned is the European Patient Information Leaflet (PIL), which became a legal requirement (Council Directive 92/27/EEC) in 1992 (full implementation in 1999) to ensure that patients understand important information about their medication. Many health communication texts, such as the PIL, are first produced in English and then translated to other languages (Danish in the following exemplification) and this fact potentially poses a danger to lay-friendliness. A danger which a good medical translator can remove. Contrary to the expert-to-expert translational situation mentioned above, the relationship between the sender and the target audience is now an asymmetrical one. In some cases, the English source text is still dominated by expert language as the sender, the expert, has failed to translate intralingually. But even in cases where the source text is very lay-friendly, we often see that the translator has reverted to a certain degree of expert medical language in the translation (Askehave & Zethsen 2000, Nisbeth Jensen & Zethsen 2012, Nisbeth Jensen 2013). Some of the main reasons for this seem to be that more than half of the PILs are not translated by trained translators, but by people with a medical background (typically pharmacists) (Askehave & Zethsen 2000, Nisbeth Jensen 2013). Understandably, experts find it hard to identify which expressions cause readability problems for laymen. However, even when the PILs are translated by trained medical translators, there is a tendency to revert to expert medical language (Askehave & Zethsen 2000, Nisbeth Jensen & Zethsen 2012, Nisbeth Jensen 2013). Perhaps because this constitutes the default for the medical translator who may have become a semi-expert within the field of medicine and has lost acute awareness of what people in general would understand and what they would find difficult. Also, English uses Latin/Greek-based terminology for many medical expressions where Danish (and many other languages) has an expert term and a layman term to an extent where non-experts will only know and use the layman term (Zethsen 2004). Even a trained translator may fail to translate some of this Latin-based terminology intralingually, because it is perfectly lay-friendly in English.

Within medical translation/health communication, more research is needed for at least two reasons: first to document the translations which may well be successful as far as the interlingual denotative meaning is concerned, but which fail to reach the layman target group by failing to carry out the intralingual

part of the translation; and second: to explore more in depth why the target group is not met. Perhaps, the intralingual aspect of expert-to-lay medical translation should also to a larger degree be incorporated in the training of future medical translators.

5. The contributions of the present volume

In this issue, the authors have addressed a number of research questions about a range of topics – texts, intertextual relationships, patients as readers, ethics, metaphors, specialised training, multimodality, quality and back translation. Regarding methodology, this issue shows that a variety of approaches are needed – often in combination – to respond to the relevant research questions in medical translation. These methodologies include quantitative tools – such as corpus linguistics or questionnaires – as well as qualitative approaches – such as focus groups, direct observation of participants, genre analysis or conceptual analysis. New research methodologies – such as 'netnographic analysis' (see Bundgaard & Nisbeth in this issue) – are making their way into medical translation to respond to new formats and environments of professional communication.

Among the genres that have attracted the attention of researchers, some are in the written mode – patient information leaflet (PIL), fact sheet for patients (FSP), and informed consent (IC) – and some others in the oral mode – the medical consultation (MC) and the IC. In fact, the IC has been dealt with in both modes in the same study (Elena Pérez in this issue), acknowledging the complex nature of doctor-patient communication and pointing at a more integrated approach to multimodality. Recent research along these lines (Montalt & García-Izquierdo 2016) underlines the importance of redefining crucial genres such as the medical consultation and the informed consent from a multimodal point of view in which the oral, the written and the audio-visual modes converge, perform certain functions and complement each other in fruitful ways.

The choice of genres of this issue shows a clear interest in expert-to-lay translation, where important asymmetries between the discourse communities involved determine the way communication takes place. The discourse communities of the health professionals – in particular doctors and nurses – have their own implicit and explicit norms and agendas as well as higher social status, which results in – and reflects – a clear power imbalance. In comparison with patients, the health professional collective is far more homogeneous and knows the health system better. On the other hand, patients are more heterogeneous in needs, expectations, previous medical knowledge as well as in cultural and linguistic backgrounds and origins. In the case of the IC the

asymmetries have legal and ethical consequences. Healthcare professionals are becoming more aware of the importance of offering the patients comprehensible explanations that can inform their decisions adequately. In 2016 the national organization that gathers all professional colleges of doctors in Spain published a guide of good practices regarding the IC in response to growing complaints from patients.

We find a growing interest in patient-oriented translation studies. The issue of comprehensibility – or readability – is the main focus in "Análisis del efecto de la traducción (inglés-español) en la legibilidad del prospecto de medicamento" by Raquel Martínez Motos. In this case, the genre at stake is the PIL, another genre framed in expert-to-lay communication in which the patient plays a crucial role. Elena Pérez focuses on the comprehensibility of the IC in interpreter-mediated interactions in which the crucial element is the signature of an IC form. In both studies the authors reach a similar conclusion: that translation – and interpreting – is a gain rather than a loss. Foreign patients who are assisted by interpreters in situations in which the IC form is not available in their own language, seem to understand better what they consent to because of the interpreter's involvement in facilitating understanding. Similarly, translated PILs seem to be more comprehensible than originally-written PILs in Spanish.

However, it is not always easy to make decisions and ethical dilemmas – such as confidentiality, impartiality and non-discrimination – often arise in asymmetrical situations because there may be disagreement between ethical responsibilities and professional duties. As we have seen, ethical issues are often involved in medical translation and interpreting. Different genres are governed by different ethical norms whether they be implicit or explicit. They take centre stage in the article by Carmen Pena-Díaz, who questions and observes a group of medical interpreters. In her study, she provides convincing examples of how the interpreter needs to explain the reasons for certain behaviours of both patients and health professionals in order to avoid misunderstanding. This may be at odds with the fact that facilitating information is not recommended and there are no protocols for omitting information whilst interpreting.

Another area that researchers in medical translation explore in this issue is teaching. Manuel Cristóbal Rodríguez and Emilio Ortega focus their study on the PIL in the context French-Spanish. Their contribution emphasizes the usefulness of corpus linguistics for translation purposes, and more specifically, for training medical translators. Another way of approaching the training of medical translators is through multimodality. Starting from her own experience in the Italian context, Michela Canepari aims at providing motivating resources and solutions for the medical translation classroom. Effective use of audiovisual

aids for medical translation courses offered to non-medical students contributes to developing students' lexicon and background knowledge. One of the concepts this author explores is that of intergeneric translation. The issue of intergeneric translation in healthcare settings becomes the core in the article by Muñoz, Ezpeleta & Saiz, and in this case the focus is on a different genre, fact sheets for patients (FSP). Intergeneric translation may involve interlingual translation, but of course always intralingual translation. The article is based on an empirical study carried out by the GENTT Research Group (Universitat Jaume I, Spain) in which a series of intralingual strategies were used to make real fact sheets for cancer patients more comprehensible and effective for these readers. In an approach that is not often seen, these strategies were validated by the patients, and the results are used as the basis for a training proposal aimed at improving medical translators' skills for dealing with this type of intralingual translation.

A third area of inquiry that we can find in this issue is back translation in the medical domain. This topic is explored by Kristine Bundgaard & Matilde Nisbeth Brøgger who performed a nethnographic study of translators' attitudes towards back-translation in the medical domain. Their results indicate that this particular quality assurance tool needs more attention since translators do not always know the procedure or are unaware of its purpose. One of the possible solutions is including a requirement to inform prospective translators of the purpose and best practices in relevant guidelines.

Finally, Sylvie Vandaele focuses on medical metaphors and their translation, closing the issue with a diachronic view. She shows that conceptualization indices in health and life sciences form stable lexical networks which can be observed in contemporary and ancient medical texts. They are stable but not fixed: lexical networks are "open sets" with room for creativity, especially in the popularization discourse. She also engages in a relevant discussion about the role of machine and assisted translation both in the profession and in the educational contexts.

This technological discussion will develop in the future because technology may bring radical changes in the role of the medical translator as well as in translator training. Research into artificial intelligence and neural machine translation together with the development of 'controlled languages' and the further spread of English as a *lingua franca* will surely have an impact in healthcare interpreting and medical translation. Some of the highly routinized genres – such as research articles or summaries of product characteristics in the pharmaceutical industry – as well as some of the more mechanical processes in the field of multilingual terminological management are likely to benefit

from automatization. In addition, some technological advances will improve multimodal communication, including new apps for patients that facilitate more personalized, more direct and faster communication.

At the same time, in the era of personalised medicine and patient-centred care, it would not be too risky to anticipate a growth of human translation with high degrees of adaptation – to specific audiences, cultures, media, formats, etc. – and creativity where attention to the individual is paramount. In this emerging scenario quality is not restricted to terminological accuracy and accessibility to factual knowledge but includes interpersonal and attitudinal dimensions such as how emotion and empathy are conveyed in texts and inter- actions, and how they affect the health of patients. This is a promising new development that can open up avenues of enquiry and professional practice in a type of highly sensitive communication where words are not merely car- riers of medical information but also triggers of emotions which, if dealt with properly, may contribute to the well-being of the target reader or interlocutor, or, conversely, become a hindrance.

References

ANDRIESEN, Simon. (2006) "Quality Control in Medical Translations." *Innovations in Pharmaceutical Technology*. Electronic version: <http://www.iptonline.com/articles/public/IPT_25_p12NonPrint.pdf>

ASKEHAVE, Inger *et al*. (2010) "At styrke patienten i en New PublicmManagement verden: En udredning af betydningspotentialet i begrebet patient empow- erment." In: Horsbøl, Anders & Mariann B. Sørensen (eds.) 2010. *Sundhedskommunikation på sygehuset*. Aalborg: Aalborg Universitetsforlag, pp. 147-179.

ASKEHAVE, Inger & Karen Korning Zethsen. (2000) *The Patient Package Insert of the Future: (report for the Danish Ministry of Health)*. Århus: Handelshøjskolen i Århus, Det erhvervssproglige fakultet.

AWAYSHEH, Abdullah; Jeffrey Wilcke; François Elvinger; Loren Rees; Weiguo Fan & Kurt Zimmerman. (2017) "A review of medical terminology stand- ards and structured reporting." *Journal of Veterinary Diagnostic Investigation – Online First*. Electronic version: <http://journals.sagepub.com/doi/pdf/10.1177/1040638717738276>

CARDILLO, Elena. (2015) *Mapping between international medical terminologies. Annex 4 to SHN Work Package 3*. Electronic version: <http://www.semanti-chealthnet.eu/SemanticHealthNet/assets/File/SHN%20288408%20D3_3%20rev2%20Annex%204_Cardillo_SHN_D3_3_final.pdf>

CIMINO, James J. (1998) "Desiderata for Controlled Medical Vocabularies in the Twenty-First Century." *Methods of Information in Medicine* 37:4-5, pp. 394–403.

Council Directive 92/27/EEC.

Deléger, Louise; Tayeb Merabti; Thierry Lecrocq; Michel Joubert; Pierre Zweigenbaum & Stéfan Darmoni. (2010) "A Twofold Strategy for Translating a Medical Terminology into French." *AMIA Symposium Proceedings,* pp. 152–156.

Džuganová, Božena. (2013) "English medical terminology – different ways of forming medical terms." *JAHR – Annual of the Department of Social Sciences and Medical Humanities* 4:7, pp. 55-69.

Engel, Uwe & Britta Koester. (2014) "Response effects and the cognitive involvement in answering survey questions." In: Engel, Uwe; Ben Jann; Peter Lynn; Annette Scherpenzeel & Patrick Sturgis (eds.) 2014. *Improving Survey Methods Lessons from Recent Research*. New York & London: Routledge.

Fage-Butler, Antoinette M. & Matilde Nisbeth Jensen. (2016) "Medical terminology in online patient–patient communication: evidence of high health literacy?" *Health Expectations* 19:3, pp. 643–653.

Felber, Helmut. (1984) *Terminology Manual with emphasis on principles and methods*. General Information Programme and UNISIST, Unesco International Information Centre for Terminology. Paris & Vienna: Infoterm. Electronic version: <http://unesdoc.unesco.org/images/0006/000620/062033EB.pdf>

Fernández Piera, María & Mónica Ardura Ortega. (2012) "Adaptación del consentimiento informado a la legislación española en los ensayos clínicos internacionales." *Panace* 36:13, pp. 291-293.

Flores, Glenn *et al*. (2003) "Errors in medical interpretation and their potential clinical consequences in pediatric encounters." *Pediatrics* 111, pp. 6-14.

Fung, Kin Wah *et al*. (2007) "Combining Lexical and Semantic Methods of Inter-Terminology Mapping Using the UMLS." *Studies in Health Technology and Informatics* 129, pp. 605–609. Electronic version: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2430093/>

Gotti, Maurizio. (2011 [2008, 2005]) *Investigating Specialized Discourse*. Bern *et al*.: Peter Lang.

Grunwald, David & Norman Goldfarb. (2006) "Back Translation for Quality Control of Informed Consent Forms." *Journal of Clinical Research Best Practices* 2:2. Electronic version: <http://www.gts-translation.com/medicaltranslation-paper.pdf>

Holmström, Inger & Marta Röing. (2010) "The relation between patient-centeredness and patient empowerment: A discussion on concepts." *Patient Education and Counseling* 79, pp. 167-172.

International Council of Nurses (ICN). (2008) *Translation Guidelines for International Classification of Nursing Practice (ICNP®)*. Geneva. Electronic version: <http://www.icn.ch/images/stories/documents/programs/icnp/icnp_translation_guidelines.pdf>

International Council of Nurses (ICN). (2015) *About ICNP®*. Electronic version: <http://www.icn.ch/what-we-do/about-icnpr/>

International Medical Interpreters Association (IMIA). (2009) *Guide on Medical Translation*. Electronic version: <http://www.imiaweb.org/uploads/pages/438.pdf>

ISO 17100:2015 *Translation Services-Requirements for Translation Services*. International Organization for Standardization. Technical Committee ISO/TC37.

Mićić, Sonja. (2013) "Languages of Medicine – present and future." *JAHR – Annual of the Department of Social Sciences and Medical Humanities* 4:7, pp. 217-233.

Mitzkat, Anika; Sarah Berger; Scott Reeves & Cornelia Mahler. (2016) "More terminological clarity in the interprofessional field – a call for reflection on the use of terminologies, in both practice and research, on a national and international level." *GMS Journal for Medical Education* 33:2. Electronic version: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4895843/>

Montalt, Vicent. (2005) *Manual de traducció cientificotècnica*. Vic: Eumo.

Montalt, Vicent & Maria González Davies. (2007) *Medical translation step by step. Learning by drafting*. New York: Routledge.

Montalt, Vicent & Mark Shuttleworth. (2012) *Translation and knowledge mediation in healthcare settings*. *Linguistica Antverpiensia* 11. Electronic version: <https://lans.ua.ac.be/index.php/LANS-TTS/issue/archive>

Montalt, Vicent. (2013) "Medical translation." In: Chapelle, Carol A. (ed.) 2013. *The Encyclopaedia of Applied Linguistics*. Oxford: Wiley-Blackwell.

Montalt, Vicent & Isabel García-Izquierdo. (2016) "Exploring the link between the oral and the written in patient-doctor communication." In: Ordóñez-López, Pilar & Nuria Edo-Marzá (eds.) 2016. *Medical Discourse in Professional, Academic and Popular Settings*. Bristol, Buffalo & Toronto: Multilingual Matters.

Montalt, Vicent (2017). "Patient-centred translation and emerging trends in medicine and healthcare." *The EST Newsletter*, European Society for Translation Studies. Electronic version: <http://www.est-translationstudies.org/committees/news_editors.html>

Nisbeth Jensen, Matilde & Karen Korning Zethsen. (2012) "Translation of patient information leaflets: Trained translators and pharmacists-cum-translators – a comparison." *Linguistica Antverpiensia. New Series*. 11, pp. 31-49. Electronic version: <https://lans-tts.uantwerpen.be/index.php/LANS-TTS/article/view/295/185>

Nisbeth Jensen, Matilde. (2013) *Translators of Patient Information Leaflets: Translation experts or expert translators?: A mixed methods study of lay-friendliness*. Aarhus: Aarhus University, Aarhus School of Business and Social Sciences. PhD thesis.

Nutbeam, Don. (2000) "Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century contemporary health." *Health Promotion International* 15, pp. 259-267.

Salager, Francoise. (1983) "The Lexis of Fundamental Medical English: Classificatory Framework and Rhetorical Function (A Statistical Approach)." *Reading in a Foreign Language* 1:1, pp. 54-64.

Uherová, Zdenka & Anna Horňáková. (2013) "Medical terminology and its particularities." *JAHR – Annual of the Department of Social Sciences and Medical Humanities* 4:7, pp. 631-638.

Savage-Smith, Emilie (2001) *Islamic Medical Manuscripts at the National Library of Medicine*. Rockville Pike: U.S. National Library of Medicine. Electronic version: <https://www.nlm.nih.gov/hmd/arabic/welcome.html>.

Wallis, Faith & Robert Wisnovsky. (2014) "Introduction: Agents of Transmission, Translation and Transformation." In: Wallis, Faith & Robert Wisnovsky (eds.) 2014. *Medieval Textual Cultures: Agents of Transmission, Translation and Transformation (Judaism, Christianity, and Islam Tension, Transmission, Transformation)*, pp. 1-11. Berlin & Boston: De Gruyer.

Wang, Amy Y.; James W. Barrett; Tim Bentley; David Markwell; Collin Price; Kent A. Spackman & Michael Q. Stearns. (2001) "Mapping between SNOMED RT and Clinical terms version 3: A key component of the SNOMED CT development process." In: Bakken, Suzanne (ed.) 2001. *AMIA Symposium Proceedings,* pp. 741–745. Electronic version: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2243316/pdf/procamiasymp00002-0780.pdf>

World Health Organization (WHO). (1998) *Health promotion glossary.* Electronic version: <http://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf>

World Health Organization (WHO). (2001) *ICF: The International Classification of Functioning, Disability and Health.* Electronic version: <http://apps.who.int/classifications/icfbrowser/>

World Health Organization (WHO). (2010) *ICD-11 Revision project plan.* Electronic version: <http://www.who.int/classifications/icd/ICDRevisionProjectPlan_March2010.pdf>

Zethsen, Karen. (2004) "Latin-based terms: True or false friends?" *Target* 16, pp. 125-142.

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