INTRODUCTION TO THE VOLUME

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1. Cultural perspectives and starting points in the analysis of medical discourse

This volume brings together five selected papers on medical discourse from the *Clavier 17 – International Conference Representing and Redefining Specialised Knowledge* held in Bari from November 30th to December 2nd 2017. The conference website drew attention to a theme – the capacity of specialised knowledge and discourse to influence our everyday lives – which I wish to examine in this Introduction. In particular, I want to suggest that specialised medical corpora, such as those presented in the papers collected here, provide a framework that helps those engaging with medical discourse to determine how the everyday and the specialised combine to shape the discourse of medical professionals and non-medical communities in relation to both long and short-term factors. Naturally, this includes those cases where the influence runs in the opposite direction where, that is, our everyday lives and needs affect specialised discourse. These opposing trends are one reason why contemporary Medicine is such a vast canvas of expectations, activities and discourses which, if they are to be properly understood and analysed, need to be addressed and summarised holistically.

Accordingly, my starting point is that the papers contribute, in an exemplary way, to illustrating the shifting boundaries in today's society between the two major poles making up the medical discourse cline: healthcare discourse occupies one end, clinical discourse the other. In my view, while the former records the demand for personalised therapies and individual medical services, the latter documents research into society's collective medical needs. Naturally, innovations in both the theory and practice of Medicine have taken place which simultaneously affect both ends of the cline, often causing the cline's endpoints to move further apart and with the further effect that various points along the cline have come to be redefined in recent years. In particular, evidence-based medicine (EBM), in its various forms:

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> has made a clear and probable permanent mark on the face of medicine. The introduction of clinical epidemiology into the daily practice of clinicians has offered a systematized, scientific approach to the practice of medicine. (Sur, Dahm 2011, p. 489)

EBM began to emerge in the early 1990s (Sur, Dahm 2011, p. 487; Zimerman 2013) linked, in its original conception, to efforts to remove bias in medical data. The approach has *inter alia* seen the rise of the *systematic review* genre which, by adopting well-defined inclusion and exclusion criteria, collates, re-analyses and re-interprets data acquired in previous studies. Various tools have emerged to make EBM concepts more widely understandable, one of which is the EBM pyramid, further described in Stefania Consonni's article. As an infographic, the pyramid can be readily found with an Internet search as well as in many online videos which use it to illustrate the principle of hierarchical ranking of evidence levels and the correspondence of each level with a specific type of research article. Thus, the pyramid helps explain some basic EBM principles – why, for example, *case reports* and *case series*, which relate respectively to the clinical history of an individual patient and groups of patients with the same condition, are ranked lowest, while *systematic reviews*, with their greater commitment to bias-eliminating criteria, are placed higher up insofar as they are considered more reliable.

However, EBM is an evolving concept, with many knock-on effects, some aspects of which are relevant to the concerns of this volume, as they characterise the evolution that contemporary medical genres are undergoing. *Reporting guidelines* published by different organisations constitute a first adjustment. Besides providing guidance on general issues such as readability, each presents checklists designed to ensure the inclusion of specific data, a way of ensuring standardised structures in the publication of research. Thanks to these guidelines, the expectation is that evidence will be published in a form that facilitates clinical decisions, permits experiments to be replicated and, above all, ensures that evidence can be more easily incorporated into other types of research article, most notably *systematic reviews*. The most well-known reporting guidelines are: CARE for Case Reports; CONSORT for randomised trials; PRISMA for systematic studies; SPIRIT for study protocols; STROBE for observational studies. First port of call for those readers wishing to explore the characteristics and evolution of *Reporting guidelines* as a genre is the EQUATOR network, an acronym standing for Enhancing the QUAlity and Transparency Of health Research, whose mission:

> is to achieve accurate, complete, and transparent reporting of all health research studies to support research reproducibility and usefulness. Our work increases the value of health research and helps to minimise avoidable waste of financial and human investments in health research projects. (http://www.equator-network.org/)

A second adjustment is the reconceptualisation and redesign of the EBM pyramid. As a markedly visual genre entextualising abstract hierarchical concepts, the original pyramid came with the assumption that, as they were prone to a higher level of bias, the genres at the bottom of the pyramid would be less valid than those at the top (Shaneyfelt 2016, p. 121). Doubts about this assumption have led to suggestions that *systematic reviews* should be separated from other types of evidence, and hence other types of research article, on the grounds that they are not the apex of the pyramid but rather a tool for re-analysis and inspection. Hence the publication of reshaped pyramids where *systematic reviews* are represented as a magnifying lens superimposed on a truncated pyramid through which evidence is viewed and re-examined. One result is the renewed pyramid's greater applicability in a wider range of contexts and easier access to the principles it encapsulates:

> This pyramid can be also used as a teaching tool. EBM teachers can compare it to the existing pyramids to explain how certainty in the evidence (also called quality of evidence) is evaluated. It can be used to teach how evidence-based practitioners can appraise and apply systematic reviews in practice, and to demonstrate the evolution in EBM thinking and the modern understanding of certainty in evidence. (Murad *et al*. 2016, p. 127)

A third adjustment stems from the consideration, that while the preference for certain types of research article, for example *systematic reviews* over *case reports*, is not in itself questioned, it is nevertheless subordinate to the principle that:

> Judgment is necessary for interpretation of all evidence, whether that evidence is high or low quality. (Guyatt *et al*. 2008, p. 925)

In this respect, the *Grading of Recommendations, Assessment, Development and Evaluation* system, better known as GRADE, is another corrective, based on the observation that rating the quality of evidence is not the same as grading the strength of recommendations that need to be drawn up and applied in clinical practice. GRADE thus introduces additional forms of ranking and grading:

> To achieve transparency and simplicity, the GRADE system classifies the quality of evidence in one of four levels −high, moderate, low, and very low […] Evidence based on randomised controlled trials begins as high quality evidence, but our confidence in the evidence may be decreased for several reasons, including: Study limitations; Inconsistency of results; Indirectness of evidence; Imprecision; Reporting bias. Although observational studies (for example, cohort and case-control studies) start with a "low quality" rating, grading upwards may be warranted if the magnitude of the treatment effect is very large (such as severe hip osteoarthritis and hip replacement), if there is evidence of a dose-response relation or if all plausible biases would decrease the magnitude of an apparent treatment effect. (Guyatt *et al*. 2008, p. 926)

Understanding the way conflicting principles are resolved in medical discourse might be thought to matter only to those concerned with specialised discourse. In actual fact, the dramatic effects on daily lives arising from reliance on one report or on one principle to the exclusion of others have been a stimulus for rethinking the scientific principles on which EBM is based (Rosner 2012) and how it is applied in healthcare (Wieringa *et al*. 2018). A good example of the care that needs to be taken in the formulation and dissemination of specialised discourse is the debate in online media around HRT (Hormone replacement therapy) where fear is easily aroused:

> Wary of hormone replacement therapy (HRT)? Join the club. Ever since a report by a massive U.S. study called the Women's Health Initiative (WHI) claimed in 2002 that it carried a significant risk of breast cancer and heart disease, most menopausal women remain scared of taking it. Before the alarming news made headlines, around one in four British women was taking HRT. The WHI study's heavily publicised warning sent shockwaves throughout the world. Suddenly a therapy which promised to banish debilitating menopausal symptoms such as night sweats and hot flushes was demonised as a lady-killer. Prescriptions for HRT more than halved in the ensuing two years in the UK, plummeting from around six million a year to just 2.3 million — where the numbers remain today, according to the British Menopause Society. (John Naish, *The Daily Mail,* September 4, 2018)

Ensuring that appropriate safeguards are incorporated in specialised medical discourse as regards the use and definition of words in specialised contexts is, of course, essential, if only because such discourse becomes part of other discourses with significant social consequences. *Randomised controlled trials* (RCTs) are an example:

> There is a danger that the current UK government's interest in RCTs is driven not by their methodological suitability, but because they lend themselves to a model of governance that values context-free quantification and benchmarking. In this situation, RCT advocates would do better by helping build institutions that could put the evidence from trials in its proper context, clarify the conditions under which interventions work or do not work and why, and interpret the meaning of RCTs in relation to plural sources of evidence. This requires engagement across science and politics, alongside an acknowledgement that evidence for policymaking requires expertise as well as data. The new RCT movement needs to grasp this message if it is to benefit the lives of those who are the subject of policy interventions. (Pearce, Raman 2014, p. 398)

Accordingly, various issues relating to interpretation of specialised medical discourse are dealt with in all the papers collected here. The appropriate handling of evidence in scientific discourse is, for example, expertly dealt with in Sabrina Fusari's paper on meat and its carcinogenicity which investigates how medical and other evidence comes to be interpreted and misinterpreted in Public Health. In particular, her paper confirms the significance of the correct interpretation of guidelines and ranking systems when handling medical data. At the same time, this paper, like the others in this volume, is also a demonstration of the significant role that specialised corpora and specialised uses of general corpora play in exploring medical evidence in terms of contradictions in categorisation, differences in research goals and methods, as well as potential misunderstandings and manipulations.

While *data certainty*, or *data confidence* as it is often referred to in medical publications, has become a distinctive benchmark for the clinical end of the cline, thanks to EBM's quest to validate and certify data quality, the opposite end of the cline has, at the very same time, undergone substantial change, in particular, as regards responses to patient needs and demands. Smart patient-centred technologies, whether concerned with integrating specific devices such as smartphones into healthcare systems (Agarwal *et al*. 2010; Ventola 2014) or with developing AI-based solutions for specific services such as AI-assisted Picture archiving and communication systems (PACS) (Alberich-Bayarri 2017), have produced unprecedented healthcare benefits in the management of acute and chronic conditions. In the process, they have given rise to terms such as Precision, Individualised or Personalised Medicine, each of which tend to reflect specialised interpretations of the concept of *individual* that merit further attention in discourse analysis and corpus studies. This is the case, for example, in the field of diabetology (Coons *et al*. 2017; Jameson, Longo 2015; Saucier *et al*. 2017; Swan 2009) where, besides *individual patients*, terms like *patient-centred, precision, individualised* or *personalised* often refer to *individual communities* and what they share as well as what distinguishes them from each other. This is typical of the descriptions of the merger of continuous glucose monitoring (CGM) and insulin pump technologies and the effects this development has on different communities:

> Progressively more accurate and precise, reasonably unobtrusive, small, comfortable, user-friendly devices connect to the Internet to share information and are *sine qua non* for a closed-loop artificial pancreas. CGM can inform, educate, motivate, and alert people with diabetes. CGM is medically indicated for patients with frequent, severe, or nocturnal hypoglycemia, especially in the presence of hypoglycemia unawareness. […] When continuous glucose monitoring (CGM) first became commercially available in the year 2000 its measurement error was more than ±20%. Today, overall measurement error has been reduced by twofold (±10%), and accuracy continues to improve. Size, weight, complexity, and cost of CGM sensors/devices have decreased, whereas the duration of use, specificity, user-friendliness, user interface and displays, data management, and software for data analysis have improved. Numerous studies have demonstrated clinical benefits in multiple patient populations – pediatrics, adolescents, and adults, type 1 and type 2 – with various levels of glycemic control at baseline. Benefit is directly proportional to frequency of use. The effectiveness of CGM can be synergistic with the benefits associated with insulin pumps. (Rodbard 2016, p. S2-3)

One effect of the often slow progress in technological innovation – work on CGM technologies began as long ago as the 1960s (Aathira, Jain 2014) – is, of course, a concomitant desire for technological advances that speed up an end to affected communities' suffering. The advent of wearables, such as fitness trackers and smart bracelets, rings and watches, as well as mobile devices such as smartphones and tablets, represents a tangible expression and part fulfilment of this dream as *inter alia* such devices provide greater mobility and freedom for both patients and caregivers. In this role, they straddle the subtle boundaries between satisfying consumer needs and healthcare needs:

> you might not realize just how many other things wearable devices can measure. Some of the things smartwatches and activity trackers can measure are downright strange — such as fertility and diabetes — while others are useful to most consumers even though you likely didn't know about them before. (Silbert 2019, p. 1)

The evolution of technology and the changes it brings about are, in my opinion, an under-rated field in corpus studies considering that we live in an age in which mobile technologies have profound effects on everyday lives but which are also linked to mHealth's creation of specialised meanings. This brings with it a strong potential for meaning change in very basic words, most obviously in the relationships between *consumer*, *caregiver* and *patient*. Location tracking devices, which use *GPS, Cell ID and Google Wi-Fi Touch* to track people who need to be protected, are already on the market and include devices for those suffering from AD (Alzheimer's) or other types of dementia (Surendran *et al*. 2018). They respond to a caregiver's *find-you* desire to protect an elderly relative. As such, while some of these devices are clip-on attachments, pendants and wrist bracelets that replicate consumer-oriented wearables, others take the less fashion-conscious form of shoe implants and ankle bracelets, a sign that the subtle boundary between consumer and genuine healthcare needs is being crossed. A tiny, limited step this may be but one that heralds the potential to meet various needs on the constantly expanding healthcare-clinical research cline given that from a clinical research perspective, wearables also represent an opportunity to consolidate the development of predictive digital biomarkers for neurological disorders such as AD, since sensors can be used to record subtle changes over long as well as short timespans. Thus, besides recording slower driving speeds and shorter travel distances, both suggestive of cognitive impairment, sensors can also be used to record changes in gait metrics, sleep patterns, eye movements, pupillary reflexes and disruptions to the brain's cholinergic system, all part of the goal of monitoring many individuals in order to gather evidence of typical patterns that allow more confident diagnoses to be made in the early stages of such diseases:

> In the quest for gold standards for AD assessment, there is a growing interest in the identification of readily accessible digital biomarkers, which harness advances in consumer grade mobile and wearable technologies. (Kourtis *et al*. 2019, p. 1)

Wearables are thus a tangible indication that the healthcare-clinical research cline now stretches from consumer products to clinical research based on mHealth and Big Data (Istepanian *et al*. 2018). The dream of blending social and medical functions within a single device comes, however, with considerable debate about the complexities entailed – clinical, regulatory, ethical, legal, respect for privacy – that change, condition and constrain the interactions and their interpretations that those concerned, be they doctors, patients, caregivers or other parties, expect to engage in. This is exemplified in evaluations of wearables for neurological disorders (for Alzheimer's, see Ienca *et al*. 2017; for epilepsy and Parkinson's, see Ozanne *et al*. 2018 and Johansson *et al*. 2018; for the role of affective computing in autism, epilepsy, and sleep memory formation, see Picard 2014). The rise of both wearables and IoT (Internet of Things) in healthcare (Metcalf *et al*. 2016; Yuehong *et al*. 2016) suggests that the pace of change is accelerating and will continue to do so, creating new expectations about the fulfilment of healthcare dreams in the management, and above all, self-management of chronic illness. This is the case for instance with insulin-dependent diabetics, where there is a particularly strong awareness that the day when the closed-loop artificial pancreas will provide flawless non-stop automated coverage is drawing closer and closer (Breton *et al*. 2012; Clarke *et al*. 2009):

> Thanks to the effective integration of engineering and medicine, the dream of automated glucose regulation is nearing reality. (Doyle *et al*. 2014, p. 1191)

While better self-management and innovations in chronic care delivery systems (Chiauzzi *et al*. 2015; Milani, Lavie 2015) have contributed to reducing the stresses associated with chronic illness, the medical dreams in question transcend healthcare self-management and affect all aspects of the healthcare-clinical research cline. Diabetology is again a good example. In the process of transcending the capabilities of the natural pancreas, artificial pancreas technology has encouraged other dreams and the process of their fulfilment. Combined CGM and insulin pump technology now hooks up with the smartphone (Lanzola *et al*. 2016), meaning that data can be sent directly to remote patient monitoring systems in hospitals which, in their turn, feed the data pool that allows clinical research to achieve even higher standards of data confidence. This process makes use of, and strengthens, Remote Monitoring [RM], less prominent today in the public eye, but a technology destined, as suggested above, to have an ever greater social and medical impact:

> Although rare at this moment, incentives to use RM technology are likely to increase in the near future as the body of evidence of clinical and/or economic benefit grows. (Rojahn *et al*. 2016, pp. 1-2)

All these examples underpin the impact of technology on both the healthcare and clinical research poles of contemporary Medicine. The fulfilment of medical dreams triggers changes in the way people, in their professional and lay roles, talk and write about medical events, one reason why we need specialised medical corpora that explore, for example, the discourse aspects of digital healthcare communication in different communities (Hunt, Harvey 2015; Crawford *et al*. 2014). Such studies can give us a better understanding, for example, not just of the role of technological innovations in the realisation of medical dreams, but also of the effects that they have on the frequency and meaning of some very basic words used in Medicine, a matter not underestimated in the papers in this volume, but which, nevertheless, is very much in need of further investigation and consolidation.

What, for example, in contemporary Medicine is the meaning and frequency across different medical specialties of the term *patient*? How frequently in everyday and specialised discourse does it refer not so much to *real* patients, whether viewed individually or collectively, but instead to *hypothetical* ones? The ranks of these imaginary patients have certainly increased as a result of *virtual patient* genres such as *interactive virtual patient scenarios* used in healthcare training (Shah *et al*. 2012) and *simulated hospital patient flows* used to promote cost-effective healthcare management (Heinrichs *et al*. 2008; White 2005). As simulations, they have one foot in the services provided by real hospitals, the other in the world of *what-if* hypotheses and predictions (Trickett, Trafton 2007; Bewley, O'Neil 2013; Reese *et al*. 2010), so that the meanings associated with well-known patient categories such as *hospitalised patients*, *discharged patients* and *recurrent patients* are now dependent on the way these genres, with their inherent ambiguity, are interpreted by different communities, all of which brings us back to the basic question: what effects do digital worlds and digital technologies have on the meaning of basic medical terms?

To what degree, for instance, when used in healthcare simulation services, do words like *simulated* and *standardised patients,* still retain their traditional association with *real* people trained to act out acute or chronic medical conditions in face-to-face contacts with medical trainees (Churchouse, McCafferty 2012)? To put the matter another way, to what extent are the terms *virtual patient* and *simulated patient* now conflated in medical training simulations? How are these terms used in highly specialised contexts where trainees' interactional and clinical competences (Battles *et al*. 2004) are measured, for example, with reference to simulations of various patient categories including, for example, *difficult patient simulations* (Gorini *et al*. 2008; McGrath *et al*. 2018; Rizzo, Talbot 2016; Levine *et al*. 2016)? To judge from a survey of 536 articles published between 1991 and December 2013 of the use of *virtual patient* in healthcare education, alas not carried out within corpus linguistics, or indeed any field of linguistics, such questions *do* get posed but are only partially answered:

> There are potential limitations to our study. The aim of our research was to classify the body of literature about virtual patients. Therefore we focused exclusively on the search term "virtual patient", not including other potentially related search terms, such as "patient simulation". (Kononowicz *et al*. 2015, p. 17)

What stands out in this and many other non-linguistic studies, such as the *systematic reviews* published in medical journals, is either the absence of the word *corpus* or its use in a way that is hard for discourse analysts and corpus linguists to swallow as the term is used merely to describe a set of publications on the same theme in which frequency counts rarely go beyond counting the number of times a specific item recurs, for example, the number of patients within a cohort who can be attributed to specific subgroups. Discourse analysts and corpus linguists will inevitably share the conviction, expressed in various ways in this volume, that the tools and concepts of corpus studies are beneficial in many medical domains, where there is a need to understand the *relations* existing between terms, in particular, their typical distributions relative to each other, a matter successfully explored, for example, in the paper by Stefania Maci and her co-authors. Such studies have significant applications in medical training but alas the message that specialised corpora, their construction and use need to be part of basic medical training in digital and multisemiotic literacy is hard to get across (Baldry 2011) and, alas, even contested. This issue is further discussed, with reference to the papers by Anna Loiacono and Francesca Tursi and by Davide Taibi, Ivana Marenzi and Qazi Asim Ijaz Ahmad, in *Section 3* of this Introduction in relation to corpora as part of simulation services.

The need for more corpus-based studies concerned with basic medical terms, a task that this volume successfully undertakes, is all the more important given that what appear to be everyday words will in fact take on specialised meanings that are frequently the source of misinterpretation and misunderstandings:

> […] the term "virtual patient" is used to describe a multitude of technologies and approaches, making effective communication difficult when educators, researchers and IT specialists share their experiences with VPs. (Kononowicz *et al*. 2015, p. 12)

Somewhat ironically, the expectations that accompany scientific certainty and precision, whether in the field of medical analysis or discourse analysis, seldom avoid the need to reckon with, and measure up to, human nature with all its failings, in particular its tendency to reject and decry the expertise of others when reacting to bad news or sudden illness. Doctors and patients still play the age-old cat-and-mouse game of not trusting each other, of complaining about each other's incompetence and asserting that they know best, a game that has characterised Medicine throughout its history. However, the discourse that surrounds the mutual accusations of fallibility has changed, as is highlighted in the following scene from an episode in the *House M.D.* TV series, appropriately named *Epic Fail*, where the untrusting patient, Vince, mentions to his doctors, Thirteen and Taub, that he might be suffering from mercury poisoning as he eats a lot of sushi, while they suspect CRPS (complex regional pain syndrome) – incorrectly as the correct diagnosis eventually turns out to be Fabry disease:

> **VINCE**: I don't buy it.
> **TAUB**: CRPS isn't that well understood, but –
> **VINCE**: I think it's mercury poisoning. I eat a ton of sushi.
> **THIRTEEN**: And you're currently getting mixed reviews in "Speed-the-Plow" on Broadway. (Vince and Taub look at her questioningly) Google it. It's pretty hard to consume enough fish to give yourself mercury poisoning, and it doesn't usually present solely with pain.
> **VINCE**: But it can. Check out the "Atlantic Medical Journal". This guy came in with burning pain caused by, uh, "erythromelalgia", caused by mercury poisoning.
> **THIRTEEN**: Who needs actual doctors when you got the internet?
> **VINCE**: No offense, but doctors make mistakes. Medical errors are up 30% this year.
> **TAUB**: You should check the rate of patient error.
> **VINCE**: There's a ton of information out there. Why wouldn't I educate myself, be my own advocate? CRPS came up in my search too. But I've never had any skin discoloration, and my pain is sporadic and not constant. It's got to be worth one lousy blood test.

How different this discourse is from medical interviews from the pre-Internet era. Note, in particular, Vince's references to online sources, including medical journals, his use of acronyms, technical terms and, of course, statistics. These features are consistent with his attempt to undermine the authority and power that derive from specialised discourse, by emulating and, as it were, 'highjacking' it. As such, the scene captures and characterises a typical flashpoint in contemporary Medicine arising from the changed nature of doctor-patient discourse. The discourse has changed because the patients have changed as a result of easy access to specialised discourse that new technologies have made possible. Besides benefits, this comes with a greater potential for loss of trust. This focus is reflected in the episode title *Epic Fail,* often used to describe unexpected and humiliating defeats associated with digital genres, but in Vince's case attributable to the failures in providing a correct diagnosis as well as to the flaws in the video games that he designs that are in fact caused by his illness. Vince's statement is, of course, an extreme form of *do-it-yourself* medicine that characterises this episode's exploration of lay *vs.* technical and specialised discourse. That the changing boundaries between these types of discourse can undermine mutual respect is, of course, well-known to experienced doctors in the real world and not just the TV world. Thus, for instance, one doctor has noted that patients currently undergoing total joint arthroplasty are different from those in the past. Not satisfied with increased wealth, life activity expectation, and life expectancy, they expect miracles – a result of the revolutionary explosion of, access to, and dissemination of information:

> Our patients are citizens of our modern age. Our public has come to expect miracles in medicine as the norm, yet these miracles are not without inherent risk. The trap implicit in allowing an incompletely informed populace to drive the decisions we make may be bridged by a more complete understanding of who our patients are and what their needs include. This discussion attempts to offer some insight into the forces at play. It focuses on how the changes in society, population, and technology have affected patients' knowledge and attitude toward medicine and what our response as physicians should be. (Mason 2008, p. 1)

Naturally, the desire to identify with medical dreams and miracles is part of human nature so much so that it comes as no surprise that in today's digital world the layman is urged to be properly informed about "best practices" in medical treatments and encouraged, for better or for worse, to prise open the sealed box of clinical knowledge and get right inside in order to discover its secrets. Indeed, it is not by chance that Vince mentions being his *own* advocate. While his despair and protests are understandable, his use of this word is a reference to the *patient advocate*, an emergent healthcare professional whose role in circumventing incomprehension and mistrust is defined by the PACB, the Patient Advocate Certification Board, as follows:

> A patient advocate is a professional who provides services to patients and those supporting them who are navigating the complex healthcare continuum. Advocates work directly with clients (or with their legal representatives) to ensure they have a voice in their care and information to promote informed decision making. Advocates may work independently or in medical or other organizational settings. They serve individuals, communities, disease-specific populations, and family caregivers. Synonyms may include health advocate, healthcare advocate, healthcare advocacy consultant, healthcare consumer advocate, and other phrases that imply this role. (*https://pacboard.org/decisions-and-documents/*)

Regardless of doubts about the *patient advocate*'s status, training, true value and future evolution (Schwartz 2002), the rise of such intermediaries shows that compared with the past (Kaba, Sooriakumaran 2007; Conti, Gensini 2008; Harrison 2018), the doctor's addressee is no longer solely the *individual* patient:

> A core challenge of 20th-century medical education was reconciling the clinical care of patients with a scientific approach to medicine. Educators using proposals as diverse as the Flexner Report and patient-centered medicine struggled to ensure the continuous progress and clinical application of medical science while upholding and advancing the ideals, ethics, and art of bedside practice. In 2011, this struggle continues but must give some ground to another challenge: With expanding health care costs and inequities at critical mass, the next generation of physicians must be taught how to integrate population consciousness into clinical practice. […] One might say that we can no longer ignore the other 300,000,000 patients in the room. (Kontos *et al*. 2011, p. 1341)

Studying the structure of medical interviews (Silverman 1987) often from the standpoint of power relationships and asymmetries (Pizzini 1990; Steele *et al*. 1990; Menz, Al-Roubaie 2008) and more generally the doctor-patient relationship in medical discourse analysis (Gotti, Salager-Meyer 2006; Ferguson 2001; Heritage, Maynard 2006) has, of course, been an area of considerable success for discourse analysis and corpus studies. However, for those studying contemporary medical discourse there is a need to recognise the changed circumstances of 21st century Medicine and to make adjustments. As the contributions in this volume demonstrate, one effect of the stretching out of the two ends of the medical cline is to redefine the doctor-patient relationship, reshaping its empowerments and dualities. Like it or not, the patient is often viewed – and not just in the United States – as a consumer of healthcare services, so much so that, as Fusari's paper demonstrates, much contemporary healthcare documentation is not about doctors and patients but about consumers. The latter are *potential* patients who become *real* patients only when the protective web, spun in many Public Health contexts by national and international institutions such as health and food safety agencies, fails.

Indeed – despite all contemporary Medicine's efforts to shield specific patient communities – through better triage systems (Parenti *et al*. 2014), better patient safety in hospitals (Pronovost, Vohr 2010), better discharge and follow-up procedures and protocols (Naylor *et al*.1999; Gonçalves-Bradley *et al*. 2016; Shoeb *et al*. 2012), or even investment in transitional care for those with continuous complex care needs (Coleman 2003) – the pressure is such that the rope holding together the various points of the healthcare-clinical research cline inevitably snaps. Consumer protection and whistleblowing then step in. Public outcries expose flaws in healthcare services that go well beyond Vince's private face-off with his doctors. Hospital interpreting services based on video links are a classic example of what can go wrong in doctor-patient interaction when speedy access to digital services of the required quality is not available:

> Many deaf patients have taken to social media to complain about the use of video interpreting services in emergency rooms. (https://www.statnews.com/2017/05/22/deaf-patients-interpreters/)

Indeed, such protests are the first step in a process that leads to the courts upholding the right to interact as an integral part of healthcare services:

> regardless of whether a patient ultimately receives the correct diagnosis or medically acceptable treatment, that patient has been denied the equal opportunity to participate in healthcare services whenever he or she cannot communicate medically relevant information effectively with medical staff. (US Court of Appeals, Case: 16-10094, p.14, 05/08/2017; http://media.ca11.uscourts.gov/opinions/pub/files/201610094.pdf, page14)

The right to interact is, of course, conditioned by the way healthcare services are structured. When video interpreting services fail because doctors and hospital healthcare workers do not know how to operate the equipment or when poor screen quality effaces the meaning-making resources on which sign language depends, the spotlight inevitably falls on the ties between interaction, service planning and, above all, teamwork (Keating, Mirus 2003). As a further consequence, it also falls, more indirectly, on the need to redefine the nature of interaction in medical contexts in a digital society.

However, the right to interact also affects doctors and other healthcare workers just as much as it affects patients and their caregivers. Thus, one answer to the issue of not knowing what to say to patients who expect miracles lies in teamwork and, of course, training to become part of a medical team, something that has often been shown to be a significant response when it comes to rare diseases. CRPS, complex regional pain syndrome, *is* indeed, just as the scene in *Epic Fail* portrays it, a rare disease that is hard to diagnose and hard to treat as it is a poorly understood condition causing persistent, severe and debilitating pain. The 21st century has seen the rise of multidisciplinary approaches that exemplify efforts to bring the healthcare and clinical research aspects of contemporary Medicine closer together; in the case of CRPS, this has been done by strengthening, on the healthcare side, patient education, self-management, physical rehabilitation, pain relief and psychological support and, on the clinical research side, by promoting new configurations of specialist knowledge:

> We have learned much about CRPS in the past 10 years, and we have been given a glimpse into some treatments that for the first time, promise effective pain reduction for those with long-standing disease. The quality of clinical trials has much improved and the quantity of research into this condition has skyrocketed. While we still do not know what causes CRPS, one has the sense that efforts to tackle this fascinating, debilitating condition are exemplary for the progress of the new field of Pain Medicine to come into its own. (Goebel 2011, p. 1747)

Teamwork combined with innovation in both techniques and technologies is a game-changing aspect of contemporary Medicine that leads to new medical specialties that successfully link up both ends of the medical cline. This is a recurrent feature of contemporary Medicine that needs to be fully grasped when contemplating the construction and use of specialised medical corpora. We have already outlined the effects of Personalised care in the field of diabetology, but can further exemplify the interplay between changes in medical service culture and teamwork in relation to drug therapy and its use of automated delivery systems (Goundrey-Smith 2019). This field is characterised by transitions to new areas of clinical research:

> Individuals respond differently to drugs and sometimes the effects are unpredictable. Differences in DNA that alter the expression or function of proteins that are targeted by drugs can contribute significantly to variation in the responses of individuals. Many of the genes examined in early studies were linked to highly penetrant, single-gene traits, but future advances hinge on the more difficult challenge of elucidating multi-gene determinants of drug response. This intersection of genomics and medicine has the potential to yield a new set of molecular diagnostic tools that can be used to individualize and optimize drug therapy. (Evans, Relling 2004, p. 464)

However, it also affects the other end of the cline thanks to the introduction of the electronic prescription (EP) of drugs, all part of the era of paperless hospital healthcare systems:

> NHS hospitals in England are expected to be paperless by 2020 as set out in a comprehensive framework published by the National Information Board. The use of hospital electronic prescribing (EP) systems is therefore likely to increase rapidly in the near future. The aim of this review is to summarise the available evidence of the impact of inpatient EP on patient safety, with a focus on implications for the UK. […] The review concludes with considerations of the evolution of EP in healthcare, especially in relation to advances in health information technology, inpatient involvement with their medication in the context of EP, and how EP may be used by policymakers and end users to further benefit patient safety. (Ahmed *et al*. 2016, p. 1758)

The rapid increase in the use of integrated EP and RD (robotic dispensing) in hospitals (Beard 2017; Crawford *et al*. 1998) shows that while some aspects of the IOT hospital are already part of the here and now, many others, despite many challenges, are imminent (Laplante 2016) including changes in the way interactions between people are envisaged. Indeed, Medicine is clearly in a state of transition towards complex forms of teamwork that tie together all aspects of the medical cline in a way that ensures all forms of discontinuity are avoided. Capturing this transitional state through corpus studies, which, includes, of course, the construction and design of multimedia corpora such as the one described in the paper by Davide Taibi, Ivana Marenzi and Qazi Asim Ijaz Ahmad, will provide a better understanding of the influence that specialised knowledge and discourse have on our everyday lives.

Indeed, when I re-read the papers in this volume, I really feel that these corpus-based studies are helping to pinpoint cases where doctors and clinicians are caught between opposing demands, such as those generated by the varying interpretations of EBM that I have described above, which go a long way to defining contemporary Medicine. As such, I feel that the papers rightly go beyond many traditional studies of medical discourse with their focus on *direct* forms of interaction – such as the analysis of doctor-patient medical interviews (Schegloff 1999; Ong *et al*. 1995; Maynard, Heritage 2005) or the analysis of the structure of research articles written for and read by medical elites (Hopkins, Dudley-Evans 1988; Swales 1990; Salager-Meyer 1991; Hyland 1998). There is an urgent need to map out the more mediated and indirect forms that characterise today's medical discourse and to focus on teamwork in contemporary Medicine, highlighting the involvement of non-medical professionals whose contribution is nevertheless fundamental to the promotion of healthcare services and clinical research. All this requires discourse and corpus studies to be related to the cultural, philosophical, organisational and technological aspects of contemporary Medicine as well as the purely textual. Only when this wider perspective on medical discourse is embraced, will it be possible to really understand all aspects of how specialised medical knowledge and discourse are influencing our everyday lives.

2. Using specialised corpora to explore transition and teamwork: terminological, textual and interactional aspects

If I have not yet presented the papers collected in this volume, it is because I wanted to set the stage with my vision of contemporary medical discourse as a set of transitions and negotiations between convergent and non-convergent interests that cover an ever-expanding constellation of contexts. Although no reference is explicitly made in the papers published in this volume to the healthcare *vs.* clinical research cline that I have characterised above, I find it hard *not* to interpret them collectively as different perspectives on this cline. In their various ways, the papers deal with a range of professional figures who participate in discourse communities that occupy various points along this cline, each with their own discourse styles and each needing to make adjustments when engaging with other communities, given the multiplicity of audiences and addressees that contemporary medical discourse needs to take on board.

As they browse through this volume, readers, especially those exploring corpus-based approaches to medical genres for the first time, will appreciate the value of having five very different illustrations of specialised medical corpora in a single volume. The intriguingly dissimilar choices the authors have made as regards the type of corpora they have used and the type of linguistic and textual units they have chosen to explore, chime with my belief that careful reflection on starting points in the analysis of medical discourse is essential given the very varied cultural frameworks in which contemporary Medicine works. Thus, while Stefania Consonni's paper – short title *HIV Discourse in the British Medical Journal, 1985-2005* – is based on a corpus of research article *titles* that appeared in the *BMJ* in relation to HIV over a 20-year period, Sabrina Fusari's paper – *Does Meat Cause Cancer?* – instead uses a corpus assembled from a range of academic journals featured in the database *Elsevier Science Direct* to explore the relationships between cancer and food in terms of *collocations* and *collocational patternings*. While both these papers are based on small, highly specialised corpora created by the authors, the paper by Stefania Maci, Réka Jablonkai, Marek Łukasik, Sophiko Daraselia and Daniel Knuchel – *Disambiguating Near Synonyms in Medical Discourse* – uses the *BNC* to examine the distributional characteristics of *three lemmas*, specifically *illness*, *disease* and *sickness* – in terms not just of the differences arising from their use as singular/plural *lexical items* but also, in terms of the *semantic profile* emerging from these terms' deployment in the different contexts implicit in contemporary Medicine, which, of course, includes lay/professional contrasts.

The paper by Anna Loiacono and Francesca Tursi – *Mapping Medical Acronyms* – focuses on the trials and tribulations facing medical students when learning, and learning about, medical *acronyms*, and provides an important snapshot of students transiting from lay discourse to professional discourse. Learning to cross that Rubicon also requires an ability to look back and reflect critically on the effects of selecting one discourse style over another and to understand that, while abbreviatory strategies (acronyms included) are typical of professional discourse, as well as being both culture-dependent and language-dependent, they are nevertheless increasingly being mastered by patients, caregivers, consumers and other non-medical professionals who incorporate them into their everyday 'semi-professional' discourse. The acronyms described in this paper were extracted from the *House Corpus*, whose derivation from the well-known TV series is described in the final paper by Davide Taibi, Ivana Marenzi and Qazi Asim Ijaz Ahmad. As suggested by the title *– Ain't that sweet: Reflections on scene level indexing and annotation functionalities in the House Corpus Project* – this paper explores the construction of a multimedia corpus around a further but somewhat unusual unit of analysis in corpus studies: *scenes*. As such, the paper considers the value of the scene as a meaning-making unit, when using a specialised corpus as a form of simulation, in other words, as a way of exploring simulated activities in medical and language-related training activities in universities. In so doing, it lays the bases for exploring the still uncharted waters of the relationship between corpora and the world of simulated medical services that I have referred to above and further describe in *Section 3* of this Introduction.

No two papers in this volume consider medical discourse in the same way. So just where do these papers fit on the healthcare-clinical cline sketched out above? Although the papers are published in alphabetical order based on the initial letter of the first author's surname, other more meaningful distributions suggest themselves, for example, the issue of the contribution that the papers make to language variation in corpus studies. They do so in a way that does not question the centrality in medical discourse of the medical interview or the research article but which, nevertheless, implies that other forms of medical discourse, in particular discourse that is spoken, written-to-be-spoken and written-for-non-specialists, need to be investigated. This a first step in ensuring that genres such as the medical interview and the research article are studied in terms of the way they meet up with and interact with other forms of medical discourse (Morris, Chenail 2013; MacDonald 2002; Zabielska 2015). In this respect, transition is a keyword when analysing contemporary medical discourse as it affects so many of the basic terms whose meanings are too often assumed as being in some way fixed.

While this is not the place to provide a full semantic history of the words *clinic*, *clinical* and *clinician*, their changes in meaning amply illustrate how a change in cultural perspective can cause meanings to shift from one end of the medical cline to the other. In the 17th century, *clinic* meant a "bedridden person, one confined to his bed by sickness," (source: www.etymonline.com/word/clinic), a *patient-centric* standpoint, which helps us to understand and appreciate both the mid-19th century the use of the term *clinician* as "one who makes a practical study of disease or sick persons," (source*:* https://www.etymonline.com/search?q=clinician) and, in addition, the subsequent extension to the teaching of medical students that we find in the online OED's definition "Of or pertaining to the sick-bed, *spec.* to that of indoor hospital patients: used in connection with the practical instruction given to medical students at the sick-beds in hospitals". This meaning is partly the result of the work of William Osler (1849-1919), the first to bring medical students out of the lecture hall for bedside clinical training:

> The medical clinic instructional model that Osler put into effect revolutionized medical teaching in the art and science of diagnosis and patient care. […] Medical students became actual members of the patient care team, taking histories, doing physicals, doing the laboratory work, and making rounds with the residents and faculty. Thus evolved the medical clerkship, which was extended to surgery, obstetrics and gynecology. This clerkship did for the clinical students what laboratory work did for the scientists. (Walker 1990, p. 19)

While the above quotation – and in addition other sources such as the entry for *clinic and clinical* in the online OED – show that towards the end of the 19th century *clinical* referred to observations made about individual patients, often in a teaching context, and a *hospital clinic* was the place where this was carried out, today in many English-speaking countries a *hospital clinic* increasingly refers mostly to a medical centre for *outpatients*, unlike other cultures and languages which use cognate forms of this word to refer to the wards in which hospitalised patients are looked after or, more abstractly, to the science of treating such patients. While medical training still continues in such outpatient clinics, a further break with the past is that explicit patient consent is often required as regards medical trainees' right to be present. As the State of Victoria's website for *Specialist clinics in hospitals* demonstrates, patients' rights prevail and are indeed supported, where necessary, by the intermediation of *patient representatives*, a further indication that modern healthcare is much more than just the doctor-patient relationship:

> These specialist clinics, which are sometimes referred to as 'outpatients', are for people who are not currently admitted to the hospital. […] Patients may be seen by a range of health care professionals, including students from allied health, nursing and medicine who are in different stages of their training. Public hospitals are teaching hospitals and it is intended that students

> interact with patients to increase their clinical knowledge. However it is your right to refuse to be seen by a student. Your doctor should introduce these staff to you. If you do not want additional staff present please let the doctor know. This will not affect your care in any way. […] Every Victorian public hospital has a patient representative, and their name and telephone number can be provided to you by the health service. […] The patient representative will work with you to find a resolution to any complaint, or, if necessary, investigate the matter further. (www.betterhealth.vic.gov.au/health/servicesandsupport/specialist-clinics-in-hospitals)

To my mind, a major role of specialised corpora, underscored many times in this volume, is to point out transitions to new meanings and to warn that, while today's dictionary entries are themselves evidence-based and illustrated with examples taken from carefully-constructed corpora, this does not necessarily mean that the definitions they provide have been updated to reflect contemporary meanings. In this respect, dictionary definitions of *clinical* are rather interesting. For example, the online Merriam-Webster's definition of clinical –"*of, relating to, or conducted in or as if in a clinic such as* a*: involving direct observation of the patient: clinical diagnosis*; b: *based on or characterized by observable and diagnosable symptoms: clinical treatment, clinical tuberculosis see also clinical psychologist*"–has certainly moved on from the online OED's "*Of or pertaining to the sick-bed"* definition quoted more fully above; as the OED is a historical dictionary, this is perfectly in keeping with the *end-of-the-19th-century* definitions already mentioned. Note, however, that the Merriam-Webster definition still focuses on the *observable* and the *direct*, the latter also the major focus in the online Collins dictionary: "*Clinical means involving or relating to the direct medical treatment or testing of patients"*.[1]

While the words *based on* at the start of the second part of Merriam-Webster's two-part definition *do* point to this word's extension into the research world's analysis and aggregation of data, the concept of *direct* observation, treatment or testing, which both Webster and Collins underscore, would appear to be at odds with many of the examples given. Thus of the 32 examples quoted in Collins, mostly taken from *The Times*, *The Sunday Times* and *The Sun*, the most frequent collocation is *clinical trials* (12/32). Quite apart from suggesting that the expression *clinical trials* is now part of the everyday knowledge of these newspapers' lay audience, the very fact that in more than a third of the examples the observation in question relates to *data* and not to *patients* suggests that the everyday meaning today is a far cry from bedside collocations such as *Clinical Professor; clinical medicine, clinical clerk, clinical instruction; clinical thermometer; Clinical Clerkship* that we find in the OED's 19th century examples. Indeed, TV medical soaps apart, *bedside*

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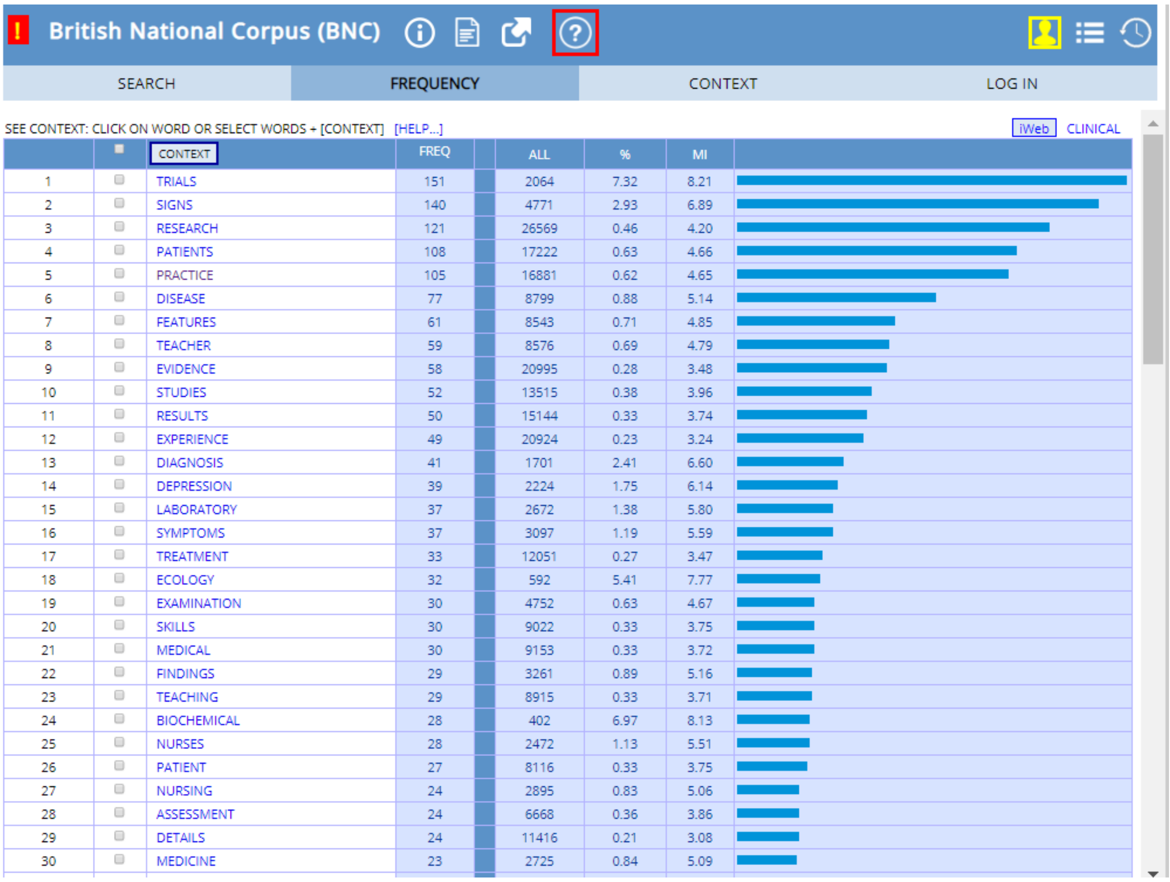
[1] OED: https://www.oed.com/view/Entry/34381?redirectedFrom=clinical#eid; Merriam-Webster*:* https://www.merriam-webster.com/dictionary/clinical; https://www.collinsdictionary.com/dictionary/english/clinical.Retrieved 28.06.2019

clinical lectures appear to be giving way to less theatrical and more mediated forms of doctor-patient interaction.



SEE CONTEXT: CLICK ON WORD OR SELECT WORDS + [CONTEXT] [HELP...]

	☐	CONTEXT	FREQ	ALL	%	MI
1	☐	TRIALS	151	2064	7.32	8.21
2	☐	SIGNS	140	4771	2.93	6.89
3	☐	RESEARCH	121	26569	0.46	4.20
4	☐	PATIENTS	108	17222	0.63	4.66
5	☐	PRACTICE	105	16881	0.62	4.65
6	☐	DISEASE	77	8799	0.88	5.14
7	☐	FEATURES	61	8543	0.71	4.85
8	☐	TEACHER	59	8576	0.69	4.79
9	☐	EVIDENCE	58	20995	0.28	3.48
10	☐	STUDIES	52	13515	0.38	3.96
11	☐	RESULTS	50	15144	0.33	3.74
12	☐	EXPERIENCE	49	20924	0.23	3.24
13	☐	DIAGNOSIS	41	1701	2.41	6.60
14	☐	DEPRESSION	39	2224	1.75	6.14
15	☐	LABORATORY	37	2672	1.38	5.80
16	☐	SYMPTOMS	37	3097	1.19	5.59
17	☐	TREATMENT	33	12051	0.27	3.47
18	☐	ECOLOGY	32	592	5.41	7.77
19	☐	EXAMINATION	30	4752	0.63	4.67
20	☐	SKILLS	30	9022	0.33	3.75
21	☐	MEDICAL	30	9153	0.33	3.72
22	☐	FINDINGS	29	3261	0.89	5.16
23	☐	TEACHING	29	8915	0.33	3.71
24	☐	BIOCHEMICAL	28	402	6.97	8.13
25	☐	NURSES	28	2472	1.13	5.51
26	☐	PATIENT	27	8116	0.33	3.75
27	☐	NURSING	24	2895	0.83	5.06
28	☐	ASSESSMENT	24	6668	0.36	3.86
29	☐	DETAILS	24	11416	0.21	3.08
30	☐	MEDICINE	23	2725	0.84	5.09

Figure 1
Context of Use Map for *clinical*; British National Corpus: www.english-corpora.org/bnc/.

Support for the belief that dictionary definitions of *clinical* ought to recognise that the term *clinical* no longer pertains exclusively to the healthcare end of the medical cline, but now also embraces quite extensively clinical research at the opposite end with its far more indirect and abstract relationships, comes from the *British National Corpus (BNC)* where, as shown in Figure 1, the high frequency of use of *clinical* in relation to *trials*, *signs*, *research* can be compared with much lower rankings for direct observations and interactions with patients suggested by collocates such as *nurses*, *nursing*, *assessment*, *details*. The contrastive ranking of *patients* (*i.e.* collective) and *patient* (*i.e.* specific patient) is particularly noteworthy.

The closer inspection that specialised corpora provide brings further important confirmatory evidence, specifically from the *House Corpus* described in two of the volume's articles. The *House M.D.* TV series is a modern-day reconstruction of *clinical* in the Victorian sense of a clinician as a bedside sleuth epitomised by the Edinburgh-trained physician Conan Doyle, whose most famous literary creation, Sherlock Holmes, is unquestionably the basis for Greg House, the lead clinician in this TV series (Mamatas 2007). Given that the series focuses on House's brilliant diagnoses of the rare conditions that his patients are suffering from, as well as his 'lecturing' of his medical team who have missed vital diagnostic clues, the *House Corpus* could have been expected to show that this TV series makes a very large use of the word *clinical*. In fact, it shows the opposite. The term occurs in just 25 of the 6300 or so scenes, with an overall score of 29 tokens, 21 of them in the expression *clinical trial(s)*. By contrast, the term *medical* appears in 323 scenes (395 tokens) and *clinic* in 245 scenes (348 tokens).

Naturally, it can be objected that a TV medical soap is not a true reflection of today's everyday or specialised discourse. However, other sources and considerations support the view that the rise of EBM has left an 'indelible mark' on the term *clinical* causing its meaning to change. EBM's scientific and cultural role in this process of semantic change can perhaps be best appreciated when viewed, in a diachronic perspective, as the most recent stage in the much longer textual and terminological journey that *clinical trials* (and the methods used to acquire and report data) have undergone – which brings us to another major port of call: *The James Lind Library: www.jameslindlibrary.org/*:

> To illustrate the evolution of ideas related to fair tests of treatments from 2000 BC to the present, the James Lind Library contains key passages and images from manuscripts, books and journal articles, many of them accompanied by commentaries, biographies, portraits and other relevant documents and images, including audio and video files. New material is being added to the website continuously, as relevant new records are identified and as methods for testing treatments evolve. (Chalmers *et al*. 2008, p. 259)

Regardless of whether we consider this site as a corpus or 'merely' a fascinating collection of texts relating to the rise, evolution and fortunes of *clinical trials*, the site's timeline search tools are sufficient to allow counts to be made in the *Records* section for the presence of *clinical* in text titles. There are none prior to the 18th century, 2 out of 22 records in the 18th century; 4 out of 24 in the 19th century, 23 out of 93 in the first part of the 20th century and then a massive increase to 75 out of 157 in the second part of the century. The decline in the 21st century – only 4 out of 29 – is partly due to the fact that the word *clinical* is omitted as the term *trials* is considered distinctive in itself and partly due to the fact that subtler classifications are now incorporated into research article (RA) titles. As Consonni puts it in her article: "compound titles allow readers and fellow researchers to rank the evidence provided in the RA within the EBM hierarchy" and thus determine "what impact its results can be expected to have in terms of methodological credibility".

Without wishing to labour the point any further, there is a need for specialist corpora to examine the meaning of basic terms such as *clinical* in medical websites that explain *clinical trials* to laymen. In this respect, we should recall that EBM divides *clinical studies* into *observational studies* and *clinical trials*. While the distinction may be clear to medical professionals, considerable effort is needed to explain their distinctive functions to lay persons, in particular when promoting participation in *clinical trials* which, unlike *observational studies*, crucially depend on recruiting volunteers *not* participating in any other clinical trials. Besides explaining eligibility criteria, dedicated websites thus undertake the task of explaining the rules of the game but also coax lay persons into overcoming their reluctance to participate in clinical trials with reference to the benefits for others with the same social and/or medical status, which is why we find the US *National institute on Aging*: (www.nia.nih.gov/health/what-are-clinical-trials-and-studies) giving an age-related example, while the *Cystic Fibrosis Foundation* (www.cff.org/) presents a disorder-related example.

While slogans such as *Help us blaze a trail to better treatments and a cure for CF* are indicative of the promotional techniques used in advertising and marketing discourse in today's highly specialised medical interpretations of social advertising, such persuasion differs markedly from that traditionally associated with medical 'healthscare' campaigns (Baldry 2005, pp. 45-63; Baldry, Kantz 2009) as it typically underscores individuals' contributions to research that benefit society as a whole. But it does more than that. In its in attempts to override the layman's association of *clinical* with *pain* and dispel the layperson's fears of clinical trials, such discourse focuses on the emotional as well as cognitive aspects of *clinical trials*. Only carefully-designed specialised corpora extending the range of contexts on which exemplification is based will guide dictionary writers and others to the typical patterns of use of basic medical terms in today's society and thus provide socially as well as medically relevant definitions. This means embracing less easily capturable connotations such as the affective values of fear-inducing words like *clinical*, *disease*, and *cancer* to name just a few.

Consumer is another word that merits special treatment as it helps define what constitutes medical discourse in today's society. While I have already mentioned the links between *patient* and *consumer*, their relationship requires further consideration as multiple intersections exist between the food system continuum and the healthcare-clinical research cline, one of which relates to the care required to ensure consumer protection in the form of food safety, which is determined through the analysis of specialised food system datasets, as underscored by the World Health Organisation (WHO):

> Information is required for food safety decision-making by all stakeholders in the food system continuum – from primary producers through to the consumer and all the actors in between, including risk assessors, policy-makers and communicators. Despite the increasing complexity of food systems, digital technologies are permitting the collection of an unprecedented amount of data from a virtually unlimited number of points along and around the food chain. The synthesis of these massive amounts of data requires considerable investment but can yield

> unparalleled insights and information applicable to food safety, public health and trade never before possible following the analysis of smaller isolated datasets. (WHO: Digitalization, Food Safety and Trade 2019, p. 1)

In the light of this statement with its focus on the significance of data management in links between trade, food safety and public health, it is hardly surprising that Sabrina Fusari's article carries out a thorough investigation of the key words used in one of the specific intersections between these two clines, namely the link between cancer and human consumption of meat. Nor is it surprising that her paper, and the specialised corpus she has created, both make multiple uses of the word *consumer*. Fusari's corpus is, in fact, mostly made up of responses by the scientific and medical community as well as international organisations to a document published by the *International Agency for Research on Cancer (IARC),* the WHO's specialized cancer agency which promotes international cancer research collaboration. Acutely, Fusari's paper points out the need to understand that expressions in contemporary medical and scientific publications that look like everyday discourse often turn out to be specialised discourse with meanings quite different to the ones they might have been assumed to have. Thus, as Fusari points out, *strength of scientific evidence* is, as we have already seen from the discussion of EBM, a reference to the systems used to grade the quality of data in research, not a healthcare indication of the risks of eating too much meat. As Fusari puts it: "the intrinsic truthfulness of the IARC findings, or the extent to which they should revolutionize the public's eating habits to protect them against cancer risk, is beside the point: what matters is the rigour of the scientific analysis provided, as well as the soundness of its methodological approach".

As such, her paper adds to our understanding of the tense relationship between the specialised and the everyday in both healthcare and clinical research as the subject matter is inevitably a contentious Public Health issue. While terms such as *strength of scientific evidence* are well-known traps for the unwary, the process of defining terms technically and scientifically is far more deeply rooted than might at first be suspected. For example, the misalignment that Fusari quotes between what the *FAO/WHO Food Standards Programme* says counts as meat in its *Codex Alimentarius* and what the *U.S. Department of Health and Human Services* says in its *Dietary Guidelines for Americans* becomes more than comprehensible when we understand that they represent very different positions on the healthcare-clinical research cline. Thus, while the *Dietary Guidelines for Americans* documentation is part of a national consumer education programme urging individual consumers to adopt specific daily dietary habits, the *Codex Alimentarius* is instead a sixteen-volume compilation of general principles, general standards, definitions, codes, commodity standards, methods and recommendations published in English, French and Spanish addressing nations and their food safety policies.

Indeed Volume 10 deals with *Meat and meat products; soups and broths* and is the result of the work of the *Joint FAO/WHO Codex Alimentarius Commission* whose basic task is the preparation of food standards. No wonder then that the IARC's promotion of international cancer research collaboration is such an uphill struggle.

A first step towards implementing Fusari's own recommendation that the scientific community should accept the participation and intermediation of linguists in developing scientifically precise definitions and taxonomies for *meat* lies, in my view, precisely in the encouragement, manifested in all the papers in this volume, for discourse analysts to explore the process of consultation, negotiation and decision-making, whether carried out by governmental and inter-governmental institutions or by medical teams, and to determine the potential effects of their various positionings through specialised corpora. Just as we need to understand what *meat* means in different cultures, so we need to understand what *health* and *healthcare* means in contemporary Medicine in the different contexts and cultures in which these terms are used. In this respect, a more comprehensive study of how the food system continuum intersects with the healthcare-clinical research continuum would be a valuable starting point, as it would need to go beyond issues of data confidence and precision and deal instead with the need for food safety agencies to reflect on trust-building communication strategies for the poor as well as the rich:

> Food safety authorities should evaluate the best ways to harness new information and communication technologies to enhance consumer awareness and build trust, keeping in mind it is often difficult for consumers to differentiate between fact-based stories and unverified and false information. Additionally, it is important to recall that access to information via the internet is biased by wealth status, level of education, location (urban *vs.* rural) and gender. A focus on digital communication strategies could disadvantage segments of the society in need of particular attention with respect to food safety information. (WHO: Digitalization, Food Safety and Trade, 2019, p. 4)

In urging the construction of specialised corpora that explore the management of information in the field of food safety and its intersections with Public Health, it is, however, important to reflect once more on the role of technology, which, as we have already seen, is a likely source of change in the semantic profile of basic words associated with contemporary Medicine. Indeed, what is particularly interesting about the WHO's *Digitalization, Food Safety and Trade* publication is that its promotion of Big Data, IoT and artificial intelligence balances out their potential contributions to food safety for some communities with a need to understand their drawbacks for others, which means that key words such as *health hazard* and *risk assessment* need to be carefully tracked through specialised corpora vis-à-vis subtle changes in their meanings:

> Importantly, AI applications are being applied in the field of food safety risk assessment. Chemical risk assessments have traditionally relied on costly and time-consuming modelling based on animal testing, limiting throughput and raising animal welfare concerns and applicability to humans. With the current ability of computational and mathematical approaches using large quantities of data, predictive models are being generated that are based on high throughput cellular and *in vitro* assays, structural homology of chemicals and shared biochemical pathways, with the goal of facilitating a more inclusive risk assessment that ultimately is expected to aid in the faster and cheaper development of international food safety standards […] Machine learning is being employed to harness the wealth of foodborne pathogen genomic sequence data to predict health outcomes and improve hazard characterization of specific pathogens in risk assessment models. […] Use of such "black-box" techniques is problematic from both scientific and regulatory transparency perspectives; presents challenges for legal enforcement and communication and represents a potential barrier for adoption of the use of this technology. (WHO: Digitalization, Food Safety and Trade 2019, p. 2)

The paper by Stefania Maci and co-authors completes our survey of basic terms but also raises the issue of the interplay between general corpora and specialised corpora. I do not want to enter into the issue of what constitutes a specialised corpus or what constitutes a general corpus, at least as regards the issue of size since there is no theoretical reason why a specialised corpus could not be as big as, or even bigger than, the 100 million word *British National Corpus (BNC)* (source *www.natcorp.ox.ac.uk/corpus/*) that Maci and her co-authors use. Even if it was in some way pared down to include texts that prioritised food safety hazards, a food safety corpus would probably be regarded as a specialised corpus of immense proportions given the WHO's description of the domain in terms of zettabytes:

> Worldwide, over 25 billion devices are currently connected to the internet. Around the globe, the total number of sensors, monitors, computers, smartphones and other devices communicating with each other—through the Internet of Things (IoT)—is expected to exceed 75 billion by 2025. When applied to food safety, it is important to recognize that data may be collected from a very wide variety of sources and sectors (e.g. precision agriculture fertilization history, transport temperatures, geo-spatial, environmental and temporal metadata, hospitals records, ports of entry for imported foods, or sensors on individuals refrigerators or attached to personal smart phones). Such data complexity mirrors the increasing complexity of food supply chains and requires enormous (zettabytes) amounts of storage. Data mining tools such as web crawling, web scraping, data-mining and text extraction from scientific, industry and government databases can yield valuable information to better understand food safety hazards, and control measures and their implications for trade. (WHO: *Digitalization, Food Safety and Trade* 2019, p. 2)

The relationship between size and specialisation has, of course, been broached in the field of healthcare communication, for example, by Atkins and Harvey (2010) who refer to Sinclair (1991) and Flowerdew (2004), when describing the compilation of their corpus on young people's beliefs about health and illness:

> Although we ideally wanted to collect more data, taken by Sinclair's (1991: 18 pronouncement that a corpus should be as large as possible), we argue that, for the purpose of beginning to identify and describe patterns and commonalities in young people's beliefs about health and illness, one million words is a sufficient amount of data, or at the very least constitutes a

> substantial starting point. Given its size and focus on a particular communicative setting (the domain of adolescent health advice seeking), the corpus constitutes a specialised corpus. For a specialised corpus, one million words is by no means a small amount (according to Flowerdew 2004: 19, a corpus is generally considered small if it contains no more than 250000 words). […].
> (Atkins, Harvey 2010, p. 608)

To my mind *specialised*, when applied to corpora, relates not to size but rather to the way in which a corpus is either constructed or used. Thus Atkins and Harvey have constructed a corpus that is specialised insofar as it relates to a specific *domain* (HIV/AIDS), a specific *age group* (adolescents), a specific *genre* (adolescents' health emails whose hallmark is the "frank and meticulous detail of their self-disclosures"), a specific *goal* (providing a socially and medically useful survey) and a specific *message* (the need for evidence-based sex education programmes). Moreover, what really counts is the result – the evidence-based nature of the corpus. The data on young people's (mis)understanding about health and HIV/AIDS was not elicited using traditional questionnaire-based methods and is thus all the more viable and valuable as a "unique vantage point from which to survey contemporary adolescent sexual health", one with "practical relevance for health practitioners and educators concerned with the health of young people" (Atkins, Harvey 2010, p. 616).

However, the article by Stefania Maci and her co-authors is also a demonstration that, within corpus studies, *specialised* may also refer to the uses to which much larger corpora such as the BNC can be put. Thanks to the *specialised* technique of semantic profiling which relates frequency counts of collocational patterns to semantic tags such as *BODY PART*, *TRANSMISSION* and *TREATMENT*, the *BNC* can be explored in terms of the typical contexts in which *illness*, *disease* and *sickness* outperform each other in terms of frequency. The result is that a much higher level of precision is reached in understanding the differences between these near synonyms when compared with definitions given by the various dictionaries that Maci and her co-authors consulted, whose shortcomings they describe very much along lines already illustrated above in relation to *clinical*. Significantly, what again counts in this approach is the *specific* application to which the emerging evidence can be put – in this case, its value in medical training in English for medical trainees whose L1 is not English and who have difficulty in grasping the typical contextual distributions of words like *illness*, *disease* and *sickness* as they are not likely to have precise matches in other languages. This is something that Maci and her co-authors successfully describe in relation to German and Italian but with the intention to "gain insights into potential translation problems of medical terms and phrases from English into other languages, for instance, Georgian, German, Italian, Hungarian and Polish, and vice versa."

The interplay between different corpora, as a confirmatory device for scholars in the pursuance of their research, has long been be pursued in corpus studies (Bianchi 2012, p. 52) and is, in part, facilitated by a third port of call: www.english-corpora.org/ which now hosts many corpora that were formerly located at https://corpus.byu.edu/, and which *inter alia* facilitates comparison of results obtained from specialised corpora with those of general corpora. However, such checking also needs to be seen in terms of applications in teaching and learning contexts in recognition of the fact that, as Maci and her co-authors state, a "clear understanding of the semantic profiles of the English terms will facilitate the selection of the most appropriate equivalent in any given context." Indeed, they rightly posit that the semantic profiling they have used could be applied to other corpora such as the *Corpus of Contemporary American English (COCA)*, for confirmatory evidence.

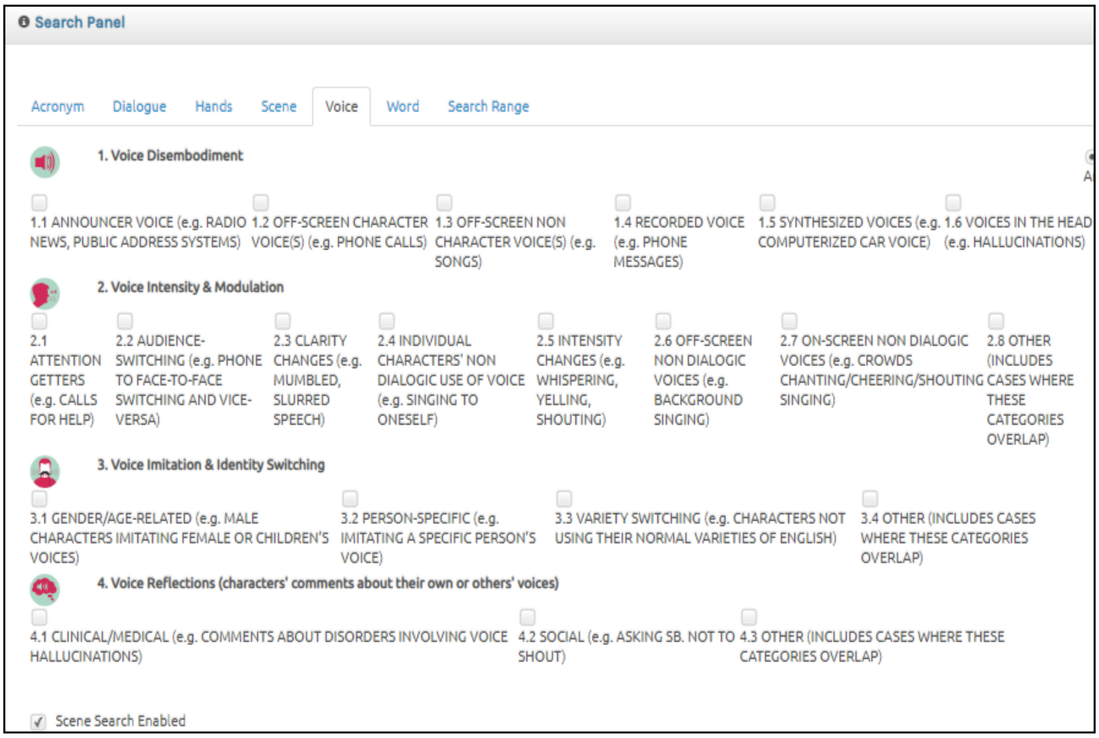
Potentially, semantic profiling is thus a tool which can indicate at what points on the healthcare-research cline these words occur relative to each other, something that a *domain-specific or genre-specific* corpus, by virtue of the restrictions that it has chosen to adopt, can normally only do with reference to one or two points on the cline. It is, of course true that:

> The methodological advantage of using a specialised corpus is that its smaller size lends itself to a more detailed, qualitative based examination than is possible with larger, more general corpora, such as their 100 million word British National Corpus or the Bank of English. The close examination of concordance lines with recourse to the linguistic co-text, for example, provides a rich source of data to complement more quantitative-based studies. (Atkins, Harvey 2010, p. 608)

However, medical trainees struggling to understand the difference between *sickness* and *illness* or indeed between *health, wellness* and *well-being* are unlikely to be happy with a qualitative-based examination that takes the form of a 'close examination of concordance lines' and will prefer far simpler visual takeaways such as a Venn diagram showing the degree to which these terms overlap in the different contexts along a cline, or other forms of simulation. Indeed, the fact that in the current volume there is a single surviving example of the once ubiquitous concordance and just a handful of references to type/token ratios – spot them if you can – might lead some to complain that this volume is not about *corpus linguistics* but also others to point to the usefulness of a volume of *corpus studies* that promotes cultural, social, technological and educational aspects when exploring medical texts and genres in English. Corpus interfaces need to provide syntheses of data from different sources such as dashboard combinations of various types of data from general and specialised corpora in keeping with the many types of displays and other innovative forms of data presentation now found in many clinical research sectors and many everyday healthcare contexts, all of which provide much-needed immediacy of interpretation. Even if this at the expense of marginalising traditional concerns such as *POS tagging* and *mark-up* mentioned only briefly in this volume, such an approach ensures specialist knowledge really does meet up with everyday experience and needs.

3. Corpus as simulation

It follows from the previous section that a specialised corpus can be defined in relation to: (a) the texts it contains; (b) the units of analysis it presupposes; (c) the social uses and applications it permits. It also follows that specialised corpora can combine these characteristics in ways that, at first sight at least, may be viewed as surprising and which constitute a challenge to established conceptions of specialised corpora. This is the case with the two papers in this volume that refer to the *House Corpus* in which the primacy of words, if not questioned, is muted by the need for a more complete representation of medical events and interactions.



1. Voice Disembodiment

☐ 1.1 ANNOUNCER VOICE (e.g. RADIO NEWS, PUBLIC ADDRESS SYSTEMS)
☐ 1.2 OFF-SCREEN CHARACTER VOICE(S) (e.g. PHONE CALLS)
☐ 1.3 OFF-SCREEN NON CHARACTER VOICE(S) (e.g. SONGS)
☐ 1.4 RECORDED VOICE (e.g. PHONE MESSAGES)
☐ 1.5 SYNTHESIZED VOICES (e.g. COMPUTERIZED CAR VOICE)
☐ 1.6 VOICES IN THE HEAD (e.g. HALLUCINATIONS)

2. Voice Intensity & Modulation

☐ 2.1 ATTENTION GETTERS (e.g. CALLS FOR HELP)
☐ 2.2 AUDIENCE-SWITCHING (e.g. PHONE TO FACE-TO-FACE SWITCHING AND VICE-VERSA)
☐ 2.3 CLARITY CHANGES (e.g. MUMBLED, SLURRED SPEECH)
☐ 2.4 INDIVIDUAL CHARACTERS' NON DIALOGIC USE OF VOICE (e.g. SINGING TO ONESELF)
☐ 2.5 INTENSITY CHANGES (e.g. WHISPERING, YELLING, SHOUTING)
☐ 2.6 OFF-SCREEN NON DIALOGIC VOICES (e.g. BACKGROUND SINGING)
☐ 2.7 ON-SCREEN NON DIALOGIC VOICES (e.g. CROWDS CHANTING/CHEERING/SHOUTING SINGING)
☐ 2.8 OTHER (INCLUDES CASES WHERE THESE CATEGORIES OVERLAP)

3. Voice Imitation & Identity Switching

☐ 3.1 GENDER/AGE-RELATED (e.g. MALE CHARACTERS IMITATING FEMALE OR CHILDREN'S VOICES)
☐ 3.2 PERSON-SPECIFIC (e.g. IMITATING A SPECIFIC PERSON'S VOICE)
☐ 3.3 VARIETY SWITCHING (e.g. CHARACTERS NOT USING THEIR NORMAL VARIETIES OF ENGLISH)
☐ 3.4 OTHER (INCLUDES CASES WHERE THESE CATEGORIES OVERLAP)

4. Voice Reflections (characters' comments about their own or others' voices)

☐ 4.1 CLINICAL/MEDICAL (e.g. COMMENTS ABOUT DISORDERS INVOLVING VOICE HALLUCINATIONS)
☐ 4.2 SOCIAL (e.g. ASKING SB. NOT TO SHOUT)
☐ 4.3 OTHER (INCLUDES CASES WHERE THESE CATEGORIES OVERLAP)

☑ Scene Search Enabled

Figure 2
Screenshot of the *House Corpus* highlighting possible selections for Voice.

Figure 2 shows the search panel of this corpus which allows many different types of searches – linguistic, multimedia and multisemiotic – to be carried out, many of them as combinations of these search types. For example, a search might start out as purely linguistic in nature, looking for a specific lexical item's occurrences both in its (multi)word form and/or in its abbreviated acronym form. However, this can become a multimedia search when associated to the *Scene Search Enabled* function, as this allows viewings of the scenes to be made in which the searched-for lexical items occur. However, yet a further step can be taken. As Figure 2 shows, a search in this specialised corpus can identify those scenes which include, for instance, expressions of voice intensity – shouting, whispering etc. – thus making the results more selective, both quantitively (fewer examples to discard) and qualitatively (greater specificity). The searched-for words thus come to be explictly characterised *multisemiotically,* in this case in terms of two interdependent but analytically and functionally different meaning-making resources: *voice quality* and *language*. This is in addition to being illustrated in the context of the scenes in which they occur, i.e. *multimedially*.

The potential and flexibility of this corpus is such that a search may omit lexical items altogether as searches can be implemented, for example, that identify those scenes where hallucinations occur (*SELECTION 1.6*) or those where voice disorders, such as ‘voices in the head’ are discussed. When, by means of the *SCENE* menu, selections are added that pinpoint activities carried out in specific hospital locations such as the ICU unit, the Maternity Ward or the Biopsy Room and then associate them with other selections referring to specialised hand movements using the *HANDS* menu, we can begin to see a new application for specialised medical corpora emerging, one that relates to the world of simulation in medical training, in this case a simulation of a hospital in terms of its activities and interactions. Thus, as the article by Davide Taibi, Ivana Marenzi and Qazi Asim Ijaz Ahma explains, the *House Corpus* has been constructed in such a way that it can easily be incorporated into advanced teaching and training activities, a matter further illustrated in the article by Anna Loiacono and Francesca Tursi in relation to medical trainees’ learning about the abbreviatory strategies used in scientific discourse in English. Indeed, when using this corpus it becomes easier to show where the abbreviatory strategies used in English resemble those of other languages but, equally, how they also differ from them.

That instruction in medical discourse in English can be framed within simulations is an important step forward in terms of its integration into the training frameworks used vis-à-vis both undergraduate and postgraduate medical trainees. Investment in simulation in Medicine is growing by the day and takes many forms that run from mannequins to virtual reality:

> From the first "blue box" flight simulator to the military's impetus in the transfer of modeling and simulation technology to medicine, worldwide acceptance of simulation training is growing. Large collaborative simulation centers support the expectation of increases in multidisciplinary, interprofessional, and multimodal simulation training. Virtual worlds, both immersive and Web-based, are at the frontier of innovation in medical education. (Rosen 2008, p. 157)

Time and again, the issues of teamwork that I have described above are expressed in the medical literature in terms of failures in teamwork and communication with a solution being sought in simulation:

> Medical errors are one of the leading causes of death annually in the United States. Many of these errors are related to poor communication and/or lack of teamwork. Using simulation as a teaching modality provides a dual role in helping to reduce these errors. Thorough integration of clinical practice with teamwork and communication in a safe environment increases the likelihood of reducing the error rates in medicine. By allowing practitioners to make potential errors in a safe environment, such as simulation, these valuable lessons improve retention and will rarely be repeated. (Kuehster, Hall 2010, p. 123)

Only time will tell whether specialised corpora and medical simulation can meet up in ways that embrace some of the many activities and services that populate the healthcare-clinical research cline that I have sketched out above.

* * *

I wish to dedicate this Introduction, and indeed this volume, to the memory of Guy Aston, a pioneer in corpus linguistics. I had the fortune for brief periods in the 1970s to be his colleague both in Faculty of Letters, University of Bologna and in Pescara at the Libera Università Abruzzese, now Università degli Studi "G. d'Annunzio" Chieti-Pescara, and will never forget the courage he showed when facing up to the difficulties shared by all teachers of English linguistics in those demanding times; nor will I forget the great kindness he showed towards me personally on the few yet memorable occasions we met.

Bionote: Anthony Baldry's engagement with medical discourse began in December 1979 with a course he taught at the University of Pavia to postgraduate students which included reflection on the then recently published *Glasgow Coma Scale* and on the correspondence between Italian and English medical terminology vis-à-vis this and other key medical texts. Forty years later, after teaching hundreds of courses on medical discourse in English, in various Italian universities, he continues to engage with medical discourse with the same passion mostly within a sociolinguistic approach that explores the evolution of medical genres over time and which makes particular reference to multisemiotic corpora.

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