



# Keywords and lexical bundles within English pharmaceutical discourse: A corpus-driven description



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## ABSTRACT

Little attention has been paid so far to keywords and lexical bundles used in the English language typical of the pharmaceutical field. Conducted from a register-perspective (Biber & Conrad, 2009), this exploratory and descriptive research is intended to fill in the gap in corpus linguistics studies on phraseology and register variation within written English pharmaceutical discourse. More specifically, this empirical study presents a corpus-driven description of the use and functions of keywords (top-50 by keyness) complemented by a similar description of lexical bundles (top-50 by frequency) used across samples of patient information leaflets, summaries of product characteristics, clinical trial protocols and chapters from academic textbooks on pharmacology, all collected in a purpose-designed corpus. The results revealed salient links between situational, linguistic and functional features of the four pharmaceutical registers under scrutiny and showed that patterns of language use differ considerably due to topic- and function-related differences between the text types, despite their dealing with a similar theme, namely with medicines or medicinal products. Although primarily intended as descriptive, the data presented in this paper may have significant pedagogical value, notably with respect to teaching ESP to students and practitioners in the pharmaceutical field.

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## 1. Introduction

So far, linguistically-oriented research on biomedical, medical or pharmaceutical discourses has been conducted from a variety of perspectives, including discourse analysis (e.g. Atkinson, 1995; Chenail, 1991; Cordella, 2004), genre analysis (Donesch-Ježo, 2013; Marco, 2000) or modality (Vihla, 1999), to name but a few. Corpus linguistic studies conducted to date have focused on spoken interactions in healthcare contexts, including encounters between patients and doctors, nurses, physiotherapists, pharmacists, occupational therapists, National Health Service (NHS) health advisers or hospital chaplains among others (Adolphs, Brown, Carter, Crawford, & Sahota, 2004, p. 10; Atkins & Harvey, 2009, p. 606; Harvey & Adolphs, 2011, p. 477). Other studies conducted so far have been dispersed as fragments of larger research on medical discourse in written contexts (e.g., Biber & Finegan, 1994; Gledhill, 1995, 2000; Gotti & Salager-Meyer, 2006; Verdaguer, Laso, & Salazar, 2013) or have focused on a single text variety and a limited selection of linguistic features (e.g. Gledhill, 1996; Paiva, 2000). However, it is difficult, if not impossible, to find any studies aimed at showing that language used in pharmaceutical contexts varies across text varieties or discourse communities (e.g. legislators, regulatory institutions, scientists, doctors, pharmacists,

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patients etc.). Consequently, there is a lack of readily available descriptions of linguistic variation in one pharmaceutical text variety relative to other pharmaceutical text varieties, in particular in terms of recurrent vocabulary and phraseologies.

This situation poses a particular challenge for students of pharmacy or practitioners in the pharmaceutical field who are non-native speakers of English and who sometimes have no choice but to use the English language in their education and/or professional work. For example, pharmacists in non-English-speaking countries often communicate with foreign patients in English; students of pharmacy in the world over read state-of-the-art specialist literature written in English; throughout the world hospital pharmacists participate in clinical trials in which it is now customary to use English to handle required documentation and professional correspondence. In the scenarios described above, the language used to speak or write about drugs and medicines is bound to vary as it is used with different purposes in mind and in different communicative situations. However, the current state of linguistic affairs ignores this heterogeneous and variable nature of the written language used in the range of pharmaceutical contexts.

Thus, the rationale behind this exploratory and descriptive study is that a description of key vocabulary and phraseologies may be particularly useful for teaching purposes, particularly at educational institutions specializing in training pharmacists or pharmacy technicians who are non-native speakers of English, or future translators of various types of specialist texts. Also, this study may yield insights into the specificity of a particular pharmaceutical text type relative to other pharmaceutical text types, thereby providing empirical evidence of considerable register variation within pharmaceutical discourse.

The main hypothesis adopted in this study is based on the idea of linguistic variation, defined as variability in the choice of linguistic forms in different situational contexts of language use (Biber, 2006; Biber & Conrad, 2001, 2009; Halliday & Hasan, 1976; Holtz, 2011; Teich & Fankhauser, 2010). Because there are different users, production circumstances and communicative functions, it is hypothesized that the four pharmaceutical text types under scrutiny, found in different contexts of the use of medicines, prioritize different vocabulary and phraseologies and thereby reveal a high degree of linguistic variation. Hence, the assumption at the heart of this paper is that pharmaceutical discourse does not constitute a single, homogenous and uniform linguistic phenomenon.

In order to verify this claim, four pharmaceutical text types are explored in this paper, namely patient information leaflets (PILs), summaries of product characteristics (SPCs), clinical trial protocols (CTPs) and selected chapters from academic textbooks on pharmacology (ATs). Found in sales packages of medicines, the main communicative function of PILs is to provide specific information concerning proper use of medicines by patients. Since they are primarily targeted at a general public, the PILs are written by pharmaceutical companies in a plain user-friendly style, with technical terms frequently accompanied by or substituted with explanations, and in accordance with guidelines issued by regulatory authorities (Montalt Resurreccio & Gonzalez Davies, 2007, pp. 68–72). SPCs are attached to the application for marketing authorization submitted to the European Medicines Agency (EMA) or to a national competent authority in countries-members of the European Union. These texts provide detailed descriptions of medicines in terms of their pharmacological, chemical, pharmaceutical and toxicological properties as well as of the clinical use to which they can be put (Montalt Resurreccio & Gonzalez Davies, 2007, p. 73). More specifically, SPCs provide information for health professionals (pharmacists, doctors and other healthcare workers) on how to administer medicines safely and effectively. Furthermore, the SCPs are highly conventionalized in that they follow a standard form for every medicinal product and provide the same types of information in a fixed order, as specified in the guidelines issued by EMA (Montalt Resurreccio & Gonzalez Davies, 2007, p. 73). CTPs present results of experiments on human or animal subjects conducted in order to describe pharmacological and pharmacodynamic effects related to the use of medicines, including any adverse reactions or any other matters impacting their safe and efficient use (Montalt Resurreccio & Gonzalez Davies, 2007, pp. 80–81). Describing objectives, design and methodology of a clinical trial, the CTPs are used as reference documents by a number of different specialists involved in clinical trials, such as investigators, study site coordinators, pharmacists, laboratory staff, statisticians, to name but a few (Fitzpatrick, 2005, p. 2; Wang & Bakhai, 2006, p. xii). Finally, ATs aim to introduce novices to a particular field of study (in this case – pharmacology) and to explain some concepts to readers who are new to the field (Biber & Conrad, 2009, p. 113). In general terms, the academic textbooks consist of chapters, which can be further divided into shorter sections and subsections, presenting theories and concepts falling within the scope of a given discipline. As such, the content of the ATs is typically factual, and the information is presented therein in a maximally objective way (Biber & Conrad, 2009, p. 113).

Advances in corpus linguistics in recent years have now made it is easier to identify repeated events in language use, notably the repeated use of recurrent vocabulary and prefabricated strings of word forms associated with situational contexts of use of the whole variety of professional registers. This study employs corpus linguistics methods to identify *register features*, such as keywords (short KWs) and lexical bundles (short LBs) typical of four pharmaceutical text types under scrutiny. To that end, the study draws extensively on earlier studies conducted by Biber, Conrad, and Cortes (2004), Biber (2006), Hyland (2008) and Goźdz-Roszkowski (2011).

The main part of the analysis concerns the exploration of KWs. According to Scott (2008b, p. 176), KWs are those words “whose frequency is unusually high in comparison with some norm”, i.e. they occur more frequently in a text or corpus (or a particular text type) than in another text or collection of texts (or text types) contained in a reference corpus. Goźdz-Roszkowski (2011, p. 35) argues that KWs can “reveal not only a great deal about the subject matter, the ‘aboutness’ of a particular genre, but they can also specify the salient features which are functionally related to the genre”. In practice, KWs are qualitatively explored through their typical co-occurrence patterns in texts or corpora. This procedure enables one to classify KWs into provisional categories in the form of tentative labels reflecting various discourse functions of these KWs, e.g. a type

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