Journal of
Medical English Education

Journal of Medical English Education

Journal of Medical English Education, the official publication of The Japan Society for Medical English Education, was founded in 2000 for the purpose of international exchange of knowledge in the field of English education for medical purposes. For citation purposes, the registered name of the Journal replaced the dual name that had appeared on the cover before Vol. 6 No. 1. The *Journal of Medical English Education* is a continuation of Medical English, Journal of Medical English Education and is the registered name of the Journal.

第16回 日本医学英語教育学会 学術集会 開催案内

　日本医学英語教育学会は1988年に第1回医学英語教育研究会が開催され，その後，医学英語に関する研究を推進し，医学英語教育の向上を図る目的で学会として発展して参りました。現在では400名以上に及ぶ会員を有しております。

　医学英語教育は卒前・卒後・生涯教育として重要であり，医療の国際化，医師国家試験の英語問題導入や医学英語検定試験など，専門職教育の限られた時間でどのように教育を行うかが課題です。学術集会では例年，医療系の英語教育に係わる教員・研究者が参加し研究・事例を報告します。平成25年度学術集会は下記により開催します。日本医学教育学会の委員会に起源をもつ本会に是非ご参加いただき，医学英語教育について情報を交換していただければと思います。

記

学会名：第16回医学英語教育学会学術集会

日　時：平成25年7月20日（土）～21日（日）

会　長：伊藤昌徳（順天堂大学医学部附属浦安病院 脳神経外科）

会　場：東京ベイ舞浜ホテルクラブリゾート（〒279-0031　千葉県浦安市舞浜1-7)

演題募集：平成25年2月1日正午～4月20日 正午

　　　　（医学英語教育の目標・教育方法・評価，学生評価，語学教育と専門教育の統合，実践力教育，医学・看護学・医療系教育における医学英語教育，英語教員による医学英語教育，医学・看護学・医療系教育者による医学英語教育，医学英語教育におけるシミュレーション教育・ICT活用，教員教育能力開発，医学英語論文校閲，医学論文編集，医学論文作成における倫理，医学英語検定試験，その他の医学英語教育に関連する演題）

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問合せ先：日本医学英語教育学会・事務局

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First Announcement

The 16th Annual Conference of the Japan Society for Medical English Education

The Japan Society for Medical English Education (JASMEE) held its first meeting as a 'study group' in 1988. Since then, the society has continued to grow in promoting the development of medical English education, supported by over 400 members.

Medical English education has become a significant part of basic, postgraduate and continuing education. With the globalization of medicine and recent changes, such as the introduction of the Examination of Proficiency in English for Medical Purposes (EPEMP), JASMEE has become active not only within the society itself but has also extended its involvement and responsibilities in ways which contribute to society.

The 16th JASMEE academic meeting will include plenary lectures, oral presentations, poster presentations, symposia and workshops. We welcome submissions on various topics related to medical English education such as: educational methods, assessment, student evaluation, integration of language education and specialized education, medical English for nursing and other healthcare related fields, medical English editing, teaching of medical writing, EPEMP etc.)

Date: July 20 (Saturday) to July 21 (Sunday), 2013

Venue: Tokyo Bay Maihama Hotel Club Resort

1-7 Maihama, Urayasu City, Chiba

President: Masanori Ito

(Department of Neurosurgery, Juntendo University Urayasu Hospital)

Abstract submission: abstracts should be submitted online, in either English or Japanese.

Online abstract submission begins: February 1, 2013 (noon)

Deadline for abstract submission: April 20, 2013 (noon)

Registration: Please access the JASMEE homepage for details.

URL: http://www.medicalview.co.jp/JASMEE/gakujutu.shtml

For inquiries, please contact: The JASMEE Secretariat (c/o Medical View, Attn: Mr. Eguchi)

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Journal of Medical English Education

The official journal of the Japan Society for Medical English Education

国を超えて世界に発信する「言語」を目指して

　日本を取り巻く国際政治が緊迫している。各国の研究者・教育者交流を通じて人と人は国が異なっても理解し合えるが，国 対 国となると異なる次元の話となってしまうようである。同様な問題は，世界各地に生じている。教育は勿論国を超えて理解し合える場であるが，一方で国家間で教育が異なっているため，医学，歯学，薬学，看護学ではグローバルスタンダードが設けられたりしている。これは，国家を超えて教育について一つの「言語」で理解し合うための手段ともいえる。

　本学会並びに本誌は，まさにグローバル化の中で高い意義を持つ学会そして雑誌となるポテンシャルを持っている。英語を第1言語とする国は少ないが，英語で書かれた医学書をテキストとして教育を行っている国は数多い。日本は情報が比較的早く自国語化されることから医学教育における英語，医学英語の比重が高くないが，英語を日常で使用しない国を含めると医学英語の教育は世界中に需要があるといえる。世界の中では医学の共通言語は英語といえるが，その教育については英語を母国語としない国の方が需要が高く，教育が進んでいてもおかしくない。

　この数年本誌の編集に携わり邦文論文の編集を担当しているが，最近あまり忙しくない状況で，英文論文編集者がもっぱら活躍している。本誌のバックナンバーは世界から閲覧できるようになっており，グローバルなニーズがある領域にグローバルに情報を発信できる環境となっている。むろん今後も日本の中に発信すべき情報も本誌としては掲載を継続するが，小規模ながらも本誌は世界に開かれており，論文が国際的に活用されることもあることを意識していきたい。

　毎回のお願いとなるが，学会と本誌が発展するためにも，医学英語教育を向上させるための試みや成果が多く寄せられることを期待したい。そして，本誌が世界の医学教育の中で「言語」となることが夢である。

日本医学英語教育学会
副編集委員長（Japanese Editor）
吉岡 俊正
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Corpus Analysis Demonstrates that Scientific Writing Uses the Structure "*<Disease>* was diagnosed…" More than "*<Person>* was diagnosed…"

Eric Hajime Jego

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Background: Corpus linguistics allows access to a large number of samples of how a particular expression is used within various specifically defined contexts. Those involved in Medical English Education can make use of corpus methodologies to see how expressions are actually used.

Objectives: To compare the usage of the expression *was diagnosed* within two contexts: 1) scientific writing for medical professionals 2) writing for the general public.

Methods: Two collections of samples of medical writing were compiled; one of writing aimed at the scientific community and the other aimed at the general public. Frequency data was obtained and compared from both collections for two specific ways that the phrase *was diagnosed* was used. The two patterns are as follows: (1) *<Disease>* + *was diagnosed*, as in "cancer *was diagnosed*"; (2) *<Person>* + *was diagnosed*, as in "she *was diagnosed*".

Results: Among the 458 instances of the phrase *was diagnosed* found in scientific writing included in this study, 94% followed pattern (1) above. Among the 324 instances found in samples of general English, 39% followed pattern (1), while 61% followed pattern (2).

Conclusion: Whereas in writing for the general public, both patterns are commonly used, in scientific writing, pattern (1) was found to be more common.

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Keywords corpus research, medical English usage, was diagnosed, Bank of English

1. Introduction

Corpus linguistic methodologies can provide objective data to support or refute whether a particular expression is commonly used. A corpus is defined by John Sinclair — the father of Corpus Linguistics[1] — as "a collection of naturally occurring language text, chosen to characterise a state or variety of a language."[2] A large collection of samples of naturally occurring written discourse stored electronically can be accessed to help identify how language is actually used within a predetermined context. This objective data can be used to solidify or challenge linguistic theories[3] as well as lend support to one's intuition as one person's intuition alone can too often be misleading.[4]

English for Medical Purposes is taught by language education professionals or by medical professionals or both. Those instructors who are equally proficient in both areas are scarce. A fundamental obstacle to overcome is how to effectively draw upon the appropriate aspects of language education and merge them with the fundamentals of current medical practice to maximize the medical English learning experience for the students. How a particular expression is used within professional medical contexts may not be immediately obvious to the language professional. Conversely, a medical professional may require support in terms of the most effective pedagogical practice. Thus, drawing upon corpus linguistics' methodologies can be useful in attempting to bridge the gap between medicine and English language learning.

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This corpus analysis will attempt to identify how the phrase *was diagnosed* is used in two different forms within two contexts. These forms and contexts will be specifically defined in the Methods section below. *Was diagnosed* is of particular interest because within medical writing there are inconsistencies in how this phrase is used depending on whether the target readers are specialists or not.

2. Purpose of This Study

When teaching English for Medical Purposes, it is important to ensure that learners understand how to use typical medical English expressions. An example is the word diagnosed. The American Medical Association's (AMA) *Manual of Style* describes the correct and preferred usage of *diagnose* as follows:

11.1 Correct and Preferred Usage of Common Words and Phrases.

Diagnose, [⋯] appl[ies] to conditions, syndromes, and diseases. Patients themselves are not diagnosed but their conditions may be diagnosed.

Incorrect: The patient *was diagnosed* as schizophrenic 4 years ago.

Correct: The patient's schizophrenia *was diagnosed* 4 years ago.[5]

Thus, *to diagnose* is a verb that describes what is done by doctors to diseases and not to people. However, the Oxford dictionary defines the verb *diagnose* in the following way: "To identify the nature of (an illness or other problem) by examination of the symptoms; to identify the nature of the medical condition." The three examples listed are, "Two doctors failed to diagnose a punctured lung," "she was ... diagnosed as having epilepsy," and "20,000 men are diagnosed with skin cancer every year."[6] Longman's dictionary describes *diagnose* in the following way.

To find out what illness someone has, or what the cause of a fault is, after doing tests, examinations etc: **diagnose sb as (having) sth** *Joe struggled in school before he was diagnosed as dyslexic.* | **diagnose sth as sth** *The illness was diagnosed as mumps.* | **diagnose sb with sth** *She was diagnosed with breast cancer.*[7]

As they are based on general English corpora, current dictionaries such as Oxford and Longman's reflect real world general English usage. Therefore, both usages of *was diagnosed* identified above, can be said to be commonly accepted. In contrast, the *AMA Manual of Style* only recommends one usage pattern for professional medical writing (condition + *was diagnosed*). Corpus methodologies will be used to attempt to identify how the phrase was diagnosed is actually used and if there exist differences in writing for the general public versus writing for medical professionals.

3. Methods

The past form, *diagnosed* was chosen over its present form *diagnose* because of relative frequencies. Initially, frequency searches for the single word *diagnose* versus the single word *diagnosed* were performed. Frequencies were determined using a preliminary combined search of the Bank of English and the British National Corpus using the Corpus Hub at Birmingham[8] concordancer for both words (diagnosed: 6359 vs. diagnose: 1113). The frequencies of the two words were alternatively determined using the online concordancer WebCorp[9] (diagnosed: 2226 vs. diagnose: 342) by including only domains of Impact Factor scientific journals. Impact Factor is an internationally recognized "measure of the frequency with which the average article in a journal has been cited in a particular year."[10] While many criticisms exist against the use of the Impact Factor,[11] it remains widely accepted in many institutions as a way to evaluate relative journal importance on a field by field basis. For the purposes of this study, building a corpus of representative scientific English involved selecting articles from journals which are widely accepted by the scientific community. The assumption is made that journals with an Impact Factor tend to have more rigorous peer-review procedures[12] thus presumably leading to English usage which is more likely to be widely acceptable to members of the greater scientific/medical community. To know how most researchers tend to use particular expressions, it helps to examine a large collection of representative samples of what researchers have written in widely accepted journals. More details regarding the sample selection methods and the journals included can be found below in section 3.1. After examining the frequencies of the various forms of "diagnose" described above and determining the most frequently used expression using the past tense *diagnosed*, the phrase *was diagnosed* was selected as the key phrase for this study. (see section 4 for details).

The following are terms and conventions used in this corpus study. *<Disease>* refers to the pattern in which *was diagnosed* appears after a disease or a medical condition. Examples include, *illness was diagnosed*, *cancer was diagnosed*, and *tuberculosis was diagnosed*. The basic *<Disease>* pattern is illustrated in the formula below:

<Disease> = medical condition + *was diagnosed*

In the *<Disease>* pattern, as illustrated above, medical

condition may be either specific or general. The distinction is that in the *<Disease>* pattern, the expression *was diagnosed* is preceded by a medical condition and not a person.

The other pattern examined in this study is the *<Person>* pattern. In this pattern *was diagnosed* is used after a person or people. Examples include the following: *She was diagnosed*, *Ted was diagnosed* and *the patient was diagnosed*. The basic *<Person>* pattern is illustrated in the formula below:

<Person> = person + *was diagnosed*

In this formula, person represents people in either a general or a specific sense. The distinguishing feature between the two patterns is that in the *<Disease>* pattern, *was diagnosed* is preceded by a medical condition whereas in the *<Person>* pattern, *was diagnosed* is preceded by a person. This study is an examination of semantic preference, which is defined as the collocation of a lexical item [in this case, *was diagnosed*] with items from a specific semantic subset [in this case, *<Disease>* vs. *<Person>*].[13]

3.1. The two corpora: 1) medical English corpus 2) general English corpus

The first corpus is a collection of sample sentences obtained from medical research articles from selected widely accepted scientific/medical journals. The journals included in this study with their recent approximate Impact Factor in parenthesis, are as follows: *The New England Journal of Medicine* (53), *The Lancet* (33), *Cell* (32), *Nature* (31), *Science* (31), *The Journal of the American Medical Association* (30), *British Medical Journal* (13), *Canadian Medical Association Journal* (9), and the *Medical Journal of Australia* (3). These journals were selected based on 1) their relatively high Impact Factors in their respective countries and on 2) the variety of English they represent. Because no standardized measure exists to evaluate the representativeness of the English used in a particular journal, it is assumed, for the purposes of this study, that journals with a higher Impact Factor can reasonably be assumed to have a more rigorous peer-review process[11] and are more likely to be considered acceptable by the scientific community.

The second corpus is a collection of sample sentences from non-academic sources representing actual general English usage. The Corpus Hub at Birmingham was used to search The Bank of English, one of the largest general English corpora in existence. Efforts were made to exclude all research articles using the selection boxes available within the Corpus Hub at Birmingham framework. These were rejected to ensure that the extracted sample sentences

were all of examples of general English. Among the excluded categories were: Life Sciences & Allied Applications and Medicine under Commonwealth Books, Academic under Academic American books, and the *New Scientist* magazine under British Magazines.

3.2. Analysis of both corpora compiled for this study

For the medical English corpus, Webcorp was used to obtain all of the sample sentences including *was diagnosed* within medical research articles from all the journals identified above and made into one text file. For the general English corpus the Corpus Hub at Birmingham was used to obtain all of the sample sentences of general English from the Bank of English corpus which included the phrase *was diagnosed*. These two text files (medical English corpus and general English corpus) were examined line by line to identify and remove duplicates resulting in the finalized versions of the two corpora analysed in this study. The two patterns *<Disease>* and *<Person>* were examined within both the medical English corpus and the general English corpus using AntConc 3.2.2w software toolkit.[14] This a concordancing software program developed by Laurence Anthony (Faculty of Science and Engineering, Waseda University, Japan) was used to automate searching for and organizing the findings.

4. Results

Following the methodology described above, the analysis resulted in the following data. The phrase *was diagnosed* appeared 459 times in the medical English corpus and 325 times in the general English corpus for a total of 784 times. Each instance was identified as either falling into the *<Disease>* category or the *<Person>* category as determined by the answer to the question "What *was diagnosed*?" If the answer was a medical condition, the instance was assigned to the *<Disease>* category whereas if the answer was *a person* (including one instance of "dog" and one of "family"), the instance was assigned to the *<Person>* category (see **Table 1**). Note that one instance of "and *was diagnosed*" from the medical English corpus was unclear because it referred to a "case" which, is sometimes itself used to refer to both medical conditions and humans. Although the context in which the instance appeared was examined, the author's intentions were unclear, therefore, that instance was excluded. In the medical English corpus, one instance of "and *was diagnosed*" was rejected because it referred to a car. See **Appendix 1** for a table of all the words appearing

Table 1. Frequencies of the phrase *was diagnosed* in each category *<Disease> <Person>* from both the medical English corpus and the general English corpus

	<Disease>	<Person>	Total
medical English corpus	94% (430)	6% (28)	458*
general English corpus	39% (125)	61% (199)	324**
Total			782***

* one instance was undetermined thus excluded

** one instance was rejected because it could not be categorized

*** total taking into account the two omissions

immediately to the left of the phrase *was diagnosed* in each sample sentence from both the medical English corpus and the general English corpus.

As shown in **Table 1**, it was found that the sample sentences in the scientific journals included in this study mostly adhered to the *AMA Manual of Style* defined usage of *was diagnosed* with 94% of the instances referring exclusively to medical conditions.

As revealed by the analysis of the medical English corpus and the general English corpus, the top five words which are represented by <u>medical condition</u> in the *<Disease>* category are listed in order of frequency for the formula below.

<Disease> = <u>medical condition</u> + *was diagnosed*

<u>problem</u>: 1) cancer; 2) disease; 3) diabetes; 4) tuberculosis; 5) condition (see **Appendix 1** for a complete categorised list) (note that <u>medical condition</u> here is meant to represent a disease or a condition in a general or specific sense as described in the Methods section above)

As revealed by the analysis of the medical English corpus and the general English corpus, the top five words which are represented by <u>person</u> in the *<Person>* category are listed in order of frequency for the formula below.

<Person> = <u>person</u> + *was diagnosed*

<Person>: 1) I; 2) he; 3) she; 4) who (as a relative pronoun referring to a person); 5) husband (see Appendix 1 for a complete categorised list)

Within the sample sentences from the general English corpus, both the *<Disease>* and *<Person>* patterns were common with the latter assuming a greater proportion (39% and 61% respectively). There were some instances whereby the pattern was not clear from the word immediately preceding the phrase *was diagnosed*. In each of those cases, the context in which the instance occurred was examined to ascertain what was being diagnosed. Examples of these included the following: "296 subjects in whom *CIND was diagnosed*" and "thrombosis and embolism in both groups *was diagnosed* clinically." Included among those were 15 instances of "and *was diagnosed*." Each one was examined

and separated appropriately into the *<Disease>* or *<Person>* pattern.

5. Discussion

This corpus study attempted to identify how the phrase *was diagnosed* is used in two different contexts. More specifically, to compare usage of the phrase *was diagnosed* in scientific research articles with that in general English.

5.1. <Disease> vs. <Person> as they relate to medical English and general English

The corpus analysis of *was diagnosed* showed that the scientific journals included in this study tended to adhere to the *AMA Manual of Style* guidelines. The *<Disease>* pattern, which is the accepted pattern, was overwhelmingly more common. This is substantiated by the following examples: "a chromosomal abnormality *was diagnosed* by amniocentesis", "Alzheimer's disease (ad) *was diagnosed* in 64% of those people" and "among the patients in whom cancer *was diagnosed* within the first year..." Although there were instances of the *<Person>* pattern within the medical English corpus such as "she *was diagnosed* with type 1 diabetes" those examples were rare and represented only 6% of the total 458 instances included in this study.

Comparing the relative number of instances of the *<Disease>* pattern and the *<Person>* pattern in both the medical English corpus and the general English corpus revealed an important point. Because the sample sentences in the medical English corpus reliably and consistently make use of the *<Disease>* pattern coupled with the fact that both the *<Disease>* and the *<Person>* patterns were both common in the general English corpus shows there is a very clear distinction between research article usage and general usage. In other words, in medical/academic writing, the *<Disease>* pattern was used almost exclusively, whereas in general English writing, both patterns were regularly used. Examples from the general English corpus include the following:

<Disease> pattern

· diabetes *was diagnosed* before the general election

· cancer *was diagnosed*, his inquisitiveness helped him

<Person> pattern

· Charlie *was diagnosed* with a brain tumour

· her mother *was diagnosed* with breast cancer

While the authors of the samples from scientific articles included in this study made use of *was diagnosed* to refer almost exclusively to a medical condition, the authors of

sample sentences from non-academic sources included in this study also included a larger proportion of instances whereby *was diagnosed* was used to refer to a person. The evidence suggests that the *AMA Manual of Style* guidelines apply to the scientific writing community whereas, for the general public, the common dictionary definitions described in the Introduction (section 1) which consider both the *<Disease>* and *<Person>* patterns as acceptable, appear to both be widely used.

5.2. <Disease> vs. <Person> in the scientific journals

While it was found that most instances (94%) in the sample sentences from the scientific journals included in this study adhered to the *AMA Manual of Style* standards, it is notable that approximately 60% of the *<Person>* pattern instances within the medical English corpus came from one journal in particular, *The Lancet*. That is to say, compared with the other scientific journals, *The Lancet* appears to have a greater number of inconsistencies in usage of the phrase *was diagnosed*. Among those were examples such as "he *was diagnosed* with schizophrenia" and "a 32-year-old woman *was diagnosed* with carcinoma of the gallbladder". Although it could not be clearly determined by examining each of these sentences, it is possible that these were samples from articles which were not typical scientific research articles but commentary and perhaps even patient accounts.

5.3. Limitations

Within this study were some notable weaknesses. First, the various categories within the Corpus Hub at Birmingham framework are not all clearly identifiable as academic or non-academic. Although extensive effort was made to avoid the problem, it is possible that some general English sample sentences were inadvertently included in the medical English corpus and vice versa. As stated in section 5.2, even within widely accepted scientific journals, not all the articles are traditional research articles and thus could be expected to make use of either pattern. This could be a likely explanation for why there were some examples of *was diagnosed* referring to a person even in scientific journals.

A second weakness is the lack of equal representation from each of the nine journals. Due to issues related to availability and ease of access, a disproportionate number of samples from academic sources were taken from the *New England Journal of Medicine* which may lead to an American English bias. To address the issue of American versus British English usage conventions, Google Scholar was used

to perform an advanced search of the phrase *was diagnosed* in the *British Medical Journal*. Among the top 100 hits, 100% of the instances of *was diagnosed* referred to medical conditions and not people. A similar search within *The Lancet*, another British journal, revealed that among all the instances of *was diagnosed* in the top 100 hits, only 5 referred to people while the remaining instances referred to medical conditions. This is more evidence supporting the assertion that the *<Disease>* pattern is more common in scientific medical research article writing regardless of the variety of English.

Another possible explanation for the low occurrence of the *<Person>* pattern in the medical English corpus could be because the samples in that corpus were taken from formal research articles and purposely excluded other forms of scientific medical writing such as case reports. Further research is required to determine if the examination of other forms of scientific writing would yield different results. Nevertheless, the results of this study suggest that in scientific/medical research articles from widely accepted journals, *was diagnosed* is more commonly used with medical conditions and not people.

6. Conclusion

It was found that 94% of the instances of *was diagnosed* from scientific research articles appearing in widely accepted journals did reflect the *AMA Manual of Style* guidelines which state that *diagnosed* should be used with a medical condition, not people. Therefore, based on the results of this study, it can be said that research articles widely accepted journals tend favour the *<Disease>* pattern.

Assuming that standard corpus-based dictionaries such as *Oxford* and *Longman's* reflect the general public's real English usage, it is to be expected that general English writing mirrors the usage outlined within those dictionaries. The corpus-driven data obtained in this analysis supports this assertion with 39% of the instances being of the *<Disease>* type (ie medical condition + *was diagnosed*) while 61% were of the *<Person>* type (ie person + *was diagnosed*) confirming that both are commonly used within general English contexts.

In light of these findings, the pedagogical implications are as follows: when being taught the written usage of the expression *was diagnosed*, it is recommended that students be instructed that this expression is most commonly used to refer to medical conditions when writing formal research articles. Also, that when writing for the general public, using this expression to refer to both medical condi-

tions and people is acceptable common practice. Based on the results, it is recommended that these differences in usage be highlighted when the phrase *was diagnosed* is encountered by medical English learners.

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Appendix 1

The words immediately preceding the phrase *was diagnosed* in the sample sentences in the medical English corpus are shown below. Each sample sentence was examined to determine if it was of the *<Disease>* pattern (abbreviated to *<D>* in the first column below) or the *<Person>* pattern (abbreviated to *<P>* in the first column below). The second column is the number of occurrences of that word which appeared immediately before the phrase *was diagnosed*. For example, the first sample sentence data entry reads "*<D>* 70 cancer". This means the sample sentence had the phrase "cancer was diagnosed" which is of the *<Disease>* pattern and it appeared 70 times in the corpus. Note that closer inspection of "and" revealed five *<Disease>* pattern and three *<Person>* pattern instances with one instance that was undeterminable and thus left out.

<D>	70	cancer
<D>	22	disease
<D>	22	diabetes
<D>	17	infection
<D>	16	tuberculosis
<D>	12	pcp
<D>	11	that
<D>	10	labor
<D>	9	thrombosis
<D>	9	dementia
<D>	5	and
<P>	3	and
?	1	and
<D>	8	infarction
<D>	7	syndrome
<D>	7	asthma
<D>	6	nephropathy
<D>	6	myocarditis
<D>	5	which
<P>	4	she
<D>	4	reinfarction
<D>	4	it
<D>	4	hypertension
<D>	4	failure
<D>	4	condition
<D>	4	aids
<D>	3	significance
<D>	3	hemorrhage
<D>	3	hae
<D>	3	disorder
<D>	3	case
<D>	3	adenoma
<D>	2	zoster
<P>	2	woman
<P>	2	who
<D>	2	sclerosis
<D>	2	recurrence
<D>	2	pneumonia
<P>	2	patient
<D>	2	palsy
<D>	2	mgus
<D>	2	mellitus
<D>	2	media

<D>	2	malaria
<P>	2	i
<P>	2	he
<D>	2	gvhd
<P>	2	groups
<D>	2	enterocolitis
<D>	2	embolism
<D>	2	deletion
<D>	2	deficiency
<D>	2	cirrhosis
<D>	2	cardiomyopathy
<D>	2	carcinoma
<D>	2	bleeding
<D>	2	bacteremia
<D>	2	angina
<D>	2	anemia
<D>	2	ad
<P>	1	zomer
<P>	1	years
<D>	1	virilization
<D>	1	vestibulitis
<D>	1	vera
<D>	1	ventriculomegaly
<D>	1	vaginosis
<P>	1	twenties
<D>	1	tract
<P>	1	these
<D>	1	telangiectasia
<D>	1	system
<D>	1	syphilis
<D>	1	stroke
<D>	1	stenosis
<P>	1	son
<D>	1	sinusitis
<D>	1	shunt
<D>	1	scid
<D>	1	sars
<D>	1	s
<D>	1	retinopathy
<P>	1	remaining
<D>	1	rejection
<D>	1	pyelonephritis
<D>	1	purpura

<D>	1	prostate
<D>	1	pregnancy
<D>	1	preexcitation
<D>	1	polymyositis
<D>	1	polymicogyria
<D>	1	pneumonitis
<D>	1	photo
<D>	1	pfo
<D>	1	pectoris
<D>	1	palate
<D>	1	occlusion
<D>	1	nevus
<D>	1	neither
<D>	1	myeloma
<D>	1	multiforme
<D>	1	more
<D>	1	mia
<D>	1	married
<D>	1	lymphoma
<D>	1	leukomalacia
<D>	1	leukemia
<D>	1	lesion
<D>	1	lentis
<D>	1	keratitis
<D>	1	iv
<P>	1	individual
<D>	1	Impairment
<D>	1	immunodeficiency
<D>	1	illness
<D>	1	hypothyroidism
<D>	1	hypogonadism
<D>	1	hypertrophy
<D>	1	hyperprolactinemia
<D>	1	hyperplasia
<D>	1	hyperhomocysteinemia
<D>	1	hsa
<D>	1	homocystinuria
<D>	1	histiocytosis
<D>	1	hillyard
<D>	1	hematuria
<D>	1	hefh
<D>	1	gout
<D>	1	glucosuria

<D>	1	gestation
<D>	1	gammopathy
<D>	1	gallbladder
<D>	1	fevr
<P>	1	family
<D>	1	examination
<D>	1	exacerbation
<D>	1	epithelium
<D>	1	episode
<D>	1	epilepsy
<D>	1	enteritis
<P>	1	enrolled
<D>	1	emphysema
<D>	1	ehrlichiosis
<D>	1	ehrlichia
<D>	1	edema
<D>	1	dysfunction
<P>	1	dylan
<D>	1	dermatomyositis
<D>	1	defect
<D>	1	crc
<D>	1	cough
<D>	1	classification
<D>	1	cind
<D>	1	but
<D>	1	bu
<D>	1	breast
<D>	1	began
<D>	1	autism
<D>	1	ataxia
<D>	1	arteriosus
<P>	1	armstrong
<D>	1	apnea
<D>	1	aplasia
<D>	1	apathy
<D>	1	angioedema
<D>	1	aneurysm
<D>	1	alps
<D>	1	alkaptonuria
<D>	1	adrenoleukodystrophy
<D>	1	achalasia
<D>	1	abnormality

Below is the list of words preceding the phrase *was diagnosed* in all the sample sentences in the general English corpus. As above, the labels *<D>* and *<P>* in the first columns denote sentences of the *<Disease>* pattern and those of the *<Person>* pattern respectively. Note examination of "and" revealed one *<Disease>* and four *<Person>* instances with one instance that referred to a car. This instance was left out because it did not fit into either pattern.

Label	Count	Word
<P>	35	i
<P>	35	he
<D>	25	cancer
<P>	24	she
<D>	14	condition
<D>	10	it
<P>	8	who
<D>	7	illness
<D>	6	syndrome
<P>	4	and
<D>	1	and
?	1	and
<D>	5	which
<P>	5	husband
<D>	5	disease
<D>	5	autism
<P>	2	years
<D>	1	years
<D>	3	this
<P>	3	son
<D>	3	pregnancy
<P>	2	wife
<D>	2	tuberculosis
<D>	2	problem
<D>	2	meningitis
<P>	2	harris
<P>	2	father
<D>	1	wrist
<D>	1	what
<P>	1	walker
<P>	1	vincent
<D>	1	tumour
<D>	1	tendon
<P>	1	tani
<P>	1	sutton

Label	Count	Word
<P>	1	stirlingshire
<D>	1	spondylitis
<D>	1	spine
<P>	1	spaniard
<P>	1	small
<P>	1	sharon
<P>	1	secretary
<D>	1	sclerosis
<P>	1	schipperke
<P>	1	saturday
<P>	1	sara
<P>	1	roy
<P>	1	rosa
<P>	1	reynolds
<P>	1	redgrave
<P>	1	recovered
<P>	1	recently
<P>	1	ray
<D>	1	phlebitis
<P>	1	phil
<D>	1	peritonitis
<P>	1	patient
<P>	1	paltrow
<P>	1	palsy
<D>	1	outbreak
<P>	1	nolan
<P>	1	nobody
<P>	1	mother
<P>	1	months
<P>	1	mitchell
<P>	1	mccann
<P>	1	margaret
<D>	1	malaria
<P>	1	maisey
<D>	1	lymphoma

Label	Count	Word
<D>	1	leukaemia
<P>	1	latter
<P>	1	later
<P>	1	king
<P>	1	keswick
<P>	1	kenny
<P>	1	keenan
<P>	1	kathleen
<P>	1	k
<P>	1	jules
<P>	1	joseph
<P>	1	jonathan
<P>	1	johnson
<P>	1	jim
<P>	1	james
<P>	1	is
<D>	1	injury
<D>	1	influenza
<P>	1	hunter
<D>	1	him
<D>	1	her
<P>	1	grandes
<P>	1	friend
<D>	1	fracture
<P>	1	forwood
<D>	1	fasciitis
<D>	1	failure
<D>	1	epilepsy
<D>	1	endometriosis
<P>	1	emily
<P>	1	eloise
<P>	1	elizabeth
<P>	1	eight
<P>	1	ehrenreich
<P>	1	durkan

Label	Count	Word
<P>	1	dublin
<D>	1	disorder
<P>	1	diamond
<D>	1	diabetes
<P>	1	dentist
<D>	1	deafness
<P>	1	dave
<P>	1	daughter
<P>	1	daphne
<D>	1	coronary
<P>	1	company
<P>	1	colbert
<P>	1	claimant
<D>	1	cjd
<P>	1	chris
<P>	1	children
<P>	1	charlotte
<P>	1	charlie
<P>	1	champion
<D>	1	cause
<D>	1	bronchitis
<D>	1	breakthroughs
<D>	1	beryllium
<P>	1	beardwell
<P>	1	back
<P>	1	baby
<P>	1	babbel
<P>	1	anne
<D>	1	anaemia
<P>	1	alfie
<D>	1	ailment
<P>	1	aged
<D>	1	activity

Appendix 2

All the instances of *was diagnosed* found in *The Lancet* are listed below.

<Disease> pattern samples

1   the first U.S. case of novel H1N1 disease *was diagnosed*

2   in January 2002. Adenocarcinoma of the gallbladder *was diagnosed*

3   seemed to be a mild upper-respiratory infection *was diagnosed*

4   2 weeks. A large bifrontal glioblastoma multiforme *was diagnosed*

5   spot had been excised and a malignant blue nevus *was diagnosed*

6   included (three involving children). Acute sinusitis *was diagnosed*

7   to the patients' clinical details. Lacunar stroke *was diagnosed*

8   Ventriculomegaly *was diagnosed*

9   lived for 24 years after his adrenoleukodystrophy *was diagnosed*

<Person> pattern samples

1   Joanne Forshaw is 26, and *was diagnosed*

2   Susanna Lohiniemi is 35 years old, and *was diagnosed*

3   Jim Brock is 27 years old and *was diagnosed*

4   mission to annoy you". When, aged 4 years, Dylan *was diagnosed*

5   is a journalist who works in Ireland. He *was diagnosed*

6   Samantha Hillyard *was diagnosed*

7   good blood glucose control. Personal account I *was diagnosed*

8   the risk of amputation. Personal account When I *was diagnosed*

9   in an HIV-infected patient. The patient *was diagnosed*

10   Denise Drake *was diagnosed*

11   process, and one of the remaining 563 *was diagnosed*

12   reading material. Since her incarceration, she *was diagnosed*

13   Melanie Pearson is 28 years old. She *was diagnosed*

14   The title refers to the age at which she *was diagnosed*

15   18 years, then to Europe at 23 years. She *was diagnosed*

16   a storyline in which a mother in her twenties *was diagnosed*

17   A 61-year-old woman *was diagnosed*

18   A 32-year-old woman *was diagnosed*

19   In 1941, a woman aged 33 years *was diagnosed*

20   has been a few weeks now since Mr Zomer *was diagnosed*

A Cross-sectional Analysis of Lexical Bundles: "Stance" in Written Medical Discourse

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This paper investigates the characteristics of written academic discourse by means of a corpus-based analysis. It examines those multi-word expressions usually referred to as lexical bundles such as 'in order to,' 'compared to,' 'be explained by' and so on. Bundles have begun to attract considerable attention in corpus studies in English for Academic Purposes (EAP). However, the issue of differences according to field or genre-specific collocations and set phrases still remains uncertain. This paper will specifically explore the structures and functions of 4- or 5- word bundles in written medical discourse. The data was accumulated according to the following specialized subfields: genome biomedicine, clinical surgery, nursing and public health. All articles were then separated according to the following rhetorical sections: Introduction, Methods, Results and Discussion (Fig. 1).

In addition to the statistical analysis of those items, I explored another aspect of the function: evaluation. In the academic genre, combined with corpus-based studies, 'evaluation' or 'authorial stance' seems to be a central issue in analyzing language functions. It is said, however, to be a very difficult task to identify and retrieve evaluative expressions in corpora. In this study, I intend to demonstrate the evaluative expressions from a perspective of 'collocation' in large corpora. The analysis shows that the sets of lexical bundles found in those different sub-disciplines and rhetorical sections play a greater part in establishing cohesive and persuasive discourse, and performing genre-specific lexico-rhetorical functions, both for readers and writers of academic articles.

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Keywords English for Medical Purposes, research articles, corpus linguistics, lexical bundle, stance, discourse analysis

1. Introduction: theoretical framework

Frequently recurring multi-word expressions are often referred to as clusters, chunks or bundles. These are a special type of word combination which seems to be prominent in academic prose and keys to efficiently understand academic texts such as research articles. Lexical bundles perform particular discourse functions and are both an important component of fluent linguistic production and essential factor in successful language learning. [1,2]

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The study of the prepatterned nature of language has attracted the attention of researchers in applied linguistics, which goes back to early nineteenth century; Jespersen studied collocations and fixed expressions[3] and Firth developed the idea of *polysystematism*, which is famous for the quotation 'you shall judge a word by the company it keeps'.[4] Firth also used the terms "collocation" and "collocability" to describe the habitual occurrence of one word with one or more other words.[4] From a perspective of language teaching and learning, Pawley and Syder argue that "fluent and idiomatic control of a language rests to a considerable extent on knowledge of a body of 'sentence stems' which are 'institutionalized' or lexicalized'" (p.191) (**Table 1**),[5] claiming that acquiring lexical phrases plays an important role for both L1 and L2 learning. Natinger and DeCarrico gives definition what they call lexical phrases: "These phrases are patterned sequences, usually consisting of a syntactic frame that contains slots for various fillers, " such as 'a ___ ago' which is realized in 'a month ago' or 'a year ago', "and run the gamut from completely fixed, unvarying phrases to phrases that are highly variable" (p.118).[6] Natinger and DeCarrico also assert that such lexical phrases occupy a

Table 1. Lexicalized sentence stem（Pawley and Syder, 1983）

Realization	Grammatical frame（stem）
I'm sorry to keep you waiting.	NP be-TENSE sorry to keep-TENSE you waiting
I'm so sorry to have kept you waiting.	
Mr X is sorry to keep you waiting all this time.	

position between lexis and syntax, in the sense that: "They are similar to lexicon in being treated as a unit, yet most of them consist of more than one word, and many of them can at the same time be derived from the regular rules of syntax, just like other sentences"（p.118）.[7]

These points are echoed by Sinclair who also mentions that language is organized in terms of lexico-grammar, asserting that meanings are made in chunks of language that are more-or-less predictable.[7] Vocabulary items are not always single items or simply "content words."[8] In other words, grammar is the output of repeated collocational groupings.

With these new theories, combined with corpus-based analysis, many studies have focused on the use of collocations in the academic genre. Gledhill explores the discourse function of collocation in research article of pharmaceutical science, specifically targeting grammatical words such as *been, has, have, is* and so on rather than lexical items.[9] Analyzing the use of collocational frameworks, Marco has shown that the frameworks *the … of*, *a … of*, and *be … to*, when used in medical papers, enclose restricted sets of lexical items, and that the selection of specific collocates for these frameworks is conditioned by the linguistic conventions of the genre.[10]

Many researchers have referred to the importance of those fixed expressions in the written discourse produced by native and non-native speakers of English. Charles has investigated the phraseological patterning in reporting clauses produced by native speakers of English and discussed their rhetorical functions, suggesting that "working with patterns can be beneficial in raising students' language awareness".[11]

In the academic genre, combined with corpus-based studies, 'evaluation' or 'authorial stance' seems to be a central issue in analyzing language functions. Thompson and Hunston define evaluations as an "expression of the speaker or writer's attitude or stance towards, viewpoint on, or feelings about the entities or propositions that he or she is talking about"（p.5）,[12] and focus on academic discourse communities with their genres and their practice of knowledge construction. Despite the pervasiveness of recent studies on evaluation in academic discourse, both written and spoken, there exists a crucial problem for corpus researchers with respect to exploring and identifying such evaluative items in corpora. As Römer rightly points out, picking and listing up of a handful of words and phrases manually is not a difficult task, though "[i]dentifying evaluation in corpora is far from straightforward", because "the group of lexical items that indicate evaluative meaning is large and open"（p.116）,[13] which makes a fully systematic and comprehensive account of evaluation extremely difficult.

To cope with this problem, Römer proposes methods of tracing evaluative items in a corpus of academic writing, and used *Collocate*,[14] a program for finding collocations in a corpus in order to look at word combinations instead of single words, with the aim of extracting larger recurring patterns which would highlight evaluative bundles.[3] The result reveals that the displays of 4-grams and 5-grams seem to have a strong tendency towards evaluative meaning and are typical of the academic genre as compared to BNC.[15] Since this methodology seems to be highly beneficial and effective once we decide to use large corpora in order to obtain insights on rhetorical tendencies, for example, among the different disciplines automatically rather than manually, I have adopted this approach in the exploration of evaluative bundles in the present study, which will be further discussed in the next section.

2. Methodology: corpus data and n-gram analysis

At present, the study of corpus-based language use has become increasingly interdisciplinary or cross-disciplinary,[1,2,11,16,18] and in the field of science research writing much attention is paid to the phase of discourse functions that appears in different rhetorical sections: so-called IMRD（Introduction, Methods, Results and Discussion）. Despite the relatively large number of works on corpus-based discourse analysis in medical research papers, few attempts have been made to uncover the rhetorical distinctiveness of sub-disciplines such as Genome Bio-science, Nursing, PH and Clinical surgery. I have compiled the corpus for each of these for this research. These corpora, the *Medcorpus*, consist of four subfields in medicine, the text data having been compiled from electric on-line journals（http://www.pubmedcentral.nih.gov/）. Each sub-corpus is a collection of research articles published from 2001 to 2006（**Table 2**）. Each sub-corpus of PubMed articles in these sub-disciplines was selected by the author based on his（and his students'）specific interests.

Table 2. Subfields and size of *Medcorpus*

Sub-fields	Size of Corpus 2,214,163	Number of articles
Genome Bio-science	725,047	184
Nursing	442,055	250
Public Health	574,705	188
Clinical Surgery	472,356	188

All articles have been divided into their rhetorical section manually and section-tagged so that we can exploit and extract only the designated rhetorical parts of the files. This annotation enables both investigation of the intra-textual variation within a certain sub-field and the interdisciplinary comparison. In the next stage, I extracted parts of text files according to each rhetorical section, and collected them into integrated files, such as *genome_abstract, genome_introduction, genome_method* and *genome_result* for all sub-fields respectively (**Fig. 1**).

For retrieving lexical bundles from those integrated files, I carried out frequency counts of 3-, 4- and 5-grams using the "N-Grams" command in *AntConc*.[20] This function performs a full extract of any n-grams from the whole corpus once "n" is specified. Comparing the high frequency groups of these three n-grams patterns, the 4-word combinations seem to display a relatively satisfactory and revealing result semantically. As Cortes observes, "many four-word bundles hold three-word bundles in their structures",[2] and four-word bundles are, in many cases, already included in five-word bundles such as 'it is likely to' and 'is likely to', therefore, the present study focuses on four-word bundles. To illustrate the distinctiveness of *Medcorpus* against general corpus, F-LOB[21] and Frown[22] were chosen for the reference corpus – these corpora are less specialized 2 million word corpus of English – and this study employed a conservative cut-off point of 20 times in a million words.

3. Results and Discussions: cross-discipline and cross-sectional

3.1. Quantitative analysis

Regarding the use of 4-grams bundles, the results indicate that items of evaluative bundles with a frequency of at least 20 times per million words occur much more frequently in medical corpora than F-LOB[21]/Frown[22] (21 items in Genome Bio-Science, 8 in Nursing, 11 in PH and 24 in Clinical Surgery) (**Table 3 & Figure 2**). In the F-LOB[21]/Frown[22] corpus, only 5 evaluative bundles appear in the top 100. At the same time, however, there are certain discrepancies in regard to the preference of lexical bundles among the 4 sub-fields. While the Nursing and PH corpora employ fewer evaluative

bundles and are dominated by research-oriented – especially 'topic-oriented' – and 'text-oriented' bundles, The Genome and Surgery corpora use evaluative bundles 4 or 5 times more often than the F-LOB[21]/Frown[22] corpus, and research-oriented – especially 'procedure-' and 'description-oriented' bundles are prominent. (Here, a framework for analyzing bundles was taken from Hyland.[1])

It is also noticeable that there are certain commonly-observed items and/or tendencies between Genome and Surgery in terms of the types of bundles used in each corpus, as compared to the Nursing and PH corpora. This affinity in evaluative bundles may be attributed to genre-specificity found in both disciplines. Genome Bio-science and Clinical Surgery are both experiment-based and analyze the function of the human body and, in many cases, perform lab experiments both at the micro and macro level. Nursing and Public Health, on the other hand, primarily treat patients as intact individuals or groups of individuals, usually by conducting statistical surveys or tests. Thus the topics of research articles in the Nursing and PH are often associated with real-world social phenomena such as economic status,
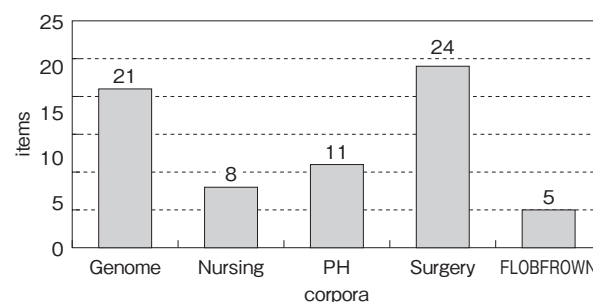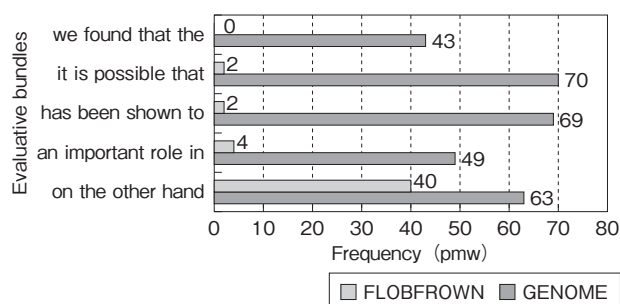

Figure 1. Data compilation (Yokoyama et al. 2012)[19]

Figure 2. Items of evaluative bundles in Top 100

Figure 3. Comparative results of GENOME and FLOB/FROWN

Table 3. 4-gram bundles in Top 100 frequency

	Genome	Nursing	PH	Surgery
1	in the presence of	end of life care	in the United States	in the present study
2	in the absence of	quality end of life	aged years and older	in the presence of
3	on the basis of	at the end of	the total number of	symptoms of chronic bronchitis
4	in the present study	the end of life	at the time of	in the pathogenesis of
5	in this paper we	in the United States	family history of diabetes	**on the other hand**
6	**it is possible that**	the health care system	disease control and prevention	**an important role in**
7	**has been shown to**	the quality of care	for disease control and	**has been shown to**
8	as well as the	at the time of	fruit and vegetable intake	in the development of
9	**on the other hand**	the results of this	can be used to	in this study we
10	the total number of	end of shift deficiencies	of this study was	in the absence of
11	in the case of	on the basis of	centers for disease control	as well as the
12	the expression of the	**on the other hand**	this study was to	the present study we
13	a large number of	**were more likely to**	the centers for disease	in the regulation of
14	in this study we	as well as the	**were more likely to**	**been shown to be**
15	the univariable synthesis method	at the same time	american indian n-o	**play a role in**
16	**an important role in**	in end of life	indian n o t	**play an important role**
17	the gold standard dataset	in the control group	the spatial scan statistic	as well as in
18	been shown to be	the extent to which	behavioral risk factor surveillance	for the first time
19	**was found to be**	**it is important to**	to oral hypoglycemic agents	**it has been shown**
20	the presence of the	success in problem solving	a family history of	on the basis of
21	according to the manufacturer's	the end of the	the results of this	an increase in the
22	**have been shown to**	health and social care	it is important to	at the time of
23	is shown in figure	**more likely to be**	risk factor surveillance system	c3h/hej mice
24	to the manufacturer s	of life care in	the extent to which	**we have shown that**
25	**were found to be**	results of this study	the purpose of this	for the development of
26	**play a role in**	the purpose of this	as well as the	**has been shown that**
27	see materials and methods	improve the quality of	**more likely to be**	**have been shown to**
28	the presence of a	in the united kingdom	**on the other hand**	**it is likely that**
29	to be involved in	of this study was	the spatial distribution of	of nmt p nrb
30	**we found that the**	the role of the	adherence to oral hypoglycemic	to the development of
31	an approximate distribution of	the time of the	in the current study	**a role in the**
32	has an approximate distribution	are shown in table	the results of the	**studies have shown that**
33	the present study we	as a result of	as a result of	the end of the
34	in the regulation of	a wide range of	department of health and	**a significant increase in**
35	is required for the	**are more likely to**	risk for developing diabetes	is one of the
36	is the number of	in the study group	the number of cases	of this study was
37	**these results suggest that**	social sciences citation index	**are more likely to**	alveolar type i cells
38	in the range of	this study was to	in this study we	**important role in the**
39	is based on the	behaviour and network therapy	n o t program	in the lungs of
40	the basis of the	related quality of life	of mile or less	it has been reported
41	**are more likely to**	social behaviour and network	results of this study	**it is possible that**
42	**as shown in figure**	bradford s law of	the strength of the	of the lung parenchyma
43	can be used to	in the absence of	fresh fruits and vegetables	sp a and sp
44	dutch pedigrees with lhon	in the intervention group	**has been shown to**	at the end of
45	**play an important role**	in this study we	one of the most	**have shown that the**
46	the rest of the	of the health care	the United States and	of cd t cells
47	used in this study	quality of care for	to be associated with	a and sp d
48	destabilization of ptsg mrna	s law of scattering	corresponding author abstract introduction	alveolar type ii cells
49	in the number of	the results of the	of the u s	as a result of
50	sequence to structure and	during the study period	adults aged years and	at the same time

	Genome	Nursing	PH	Surgery
51	in the context of	health related quality of	in the absence of	chronic obstructive pulmonary disease
52	**is consistent with the**	nursing and allied health	of fruits and vegetables	in vitro and in
53	response to phosphosugar stress	of life care is	the behavioral risk factor	nmt p nrb protein
54	**studies have shown that**	the purpose of the	used in this study	of the sars cov
55	the amount of information	the use of a	affiliations corresponding author abstract	the results of the
56	as a result of	to improve the quality	all author affiliations corresponding	this is the first
57	at the level of	definition of nursing informatics	at high risk for	c3h/hej mice
58	**it has been shown**	in the context of	author affiliations corresponding author	has been reported that
59	**it is possible to**	**it is possible that**	for each of the	**we found that the**
60	see additional data file	of end of life	**have been shown to**	in the context of
61	the results of the	practice based research networks	in addition to the	one of the most
62	an increase in the	purpose of this study	in the present study	to be associated with
63	data not shown in	the average number of	**was found to be**	vitro and in vivo
64	discriminating between tumor types	the informatics nurse specialist	author s declare that	and stored at c
65	from the gold standard	the most frequently cited	breast and cervical cancer	at least in part
66	in contrast to the	the risks and benefits	competing interests the author	**be due to the**
67	in discriminating between tumor	to participate in the	declare that they have	be involved in the
68	sense and antisense transcripts	**were less likely to**	interests the author s	the expression of the
69	test statistic this is	findings of this study	is one of the	this study was to
70	the destabilization of ptsg	in the developing world	more likely to have	at c for min
71	the end of the	of quality end of	s declare that they	cch mediated increase in
72	the partial regression coefficients	of the patient s	that they have no	for min at c
73	was used as a	the hcb care benefit	the author s declare	for the presence of
74	and structure to sequence	the institute of medicine	they have no competing	in a dose dependent
75	in the sargasso sea	the quality of life	were included in the	in ifn · mice
76	structure and structure to	the total number of	a health care professional	levels of mcp and
77	the size of the	use of hip protectors	access to health care	of the present study
78	the values of the	i do n t	**been shown to be**	student s t test
79	to structure and structure	long term care facilities	in the form of	the aim of this
80	**we conclude that the**	of family medicine research	on the number of	the development of pulmonary
81	with mrna decay enzymes	one of the most	purpose of this study	the p v curve
82	at the end of	patients and their families	the american indian n	the present study was
83	**it is important to**	the development of a	willingness to use a	**there was a significant**
84	of gene shuffling events	the end of shift	and cervical cancer screening	to be involved in
85	presented in this paper	the findings of this	in the u s	a dose dependent manner
86	shown in figure b	to the development of	ripley s k function	as a consequence of
87	the expression levels of	with regard to the	the district of columbia	associated with an increased
88	the number of samples	activities of daily living	with a health care	c cd t cells
89	to the ellipse path	an important role in	activities of daily living	cd c cd t
90	a final concentration of	and end of life	analysis was used to	effect of deep inspiration
91	a wide range of	as shown in table	as part of the	et al reported that
92	**are likely to be**	children of adolescent mothers	**been found to be**	in contrast to the
93	as well as in	data information and knowledge	control and prevention cdc	in of the patients
94	at the time of	end of shift deficiency	in this paper we	**it has been suggested**
95	for the ith sample	**et al found that**	**it is likely that**	**may be due to**
96	has been shown that	in relation to the	of the total population	**may contribute to the**
97	in addition to the	in the area of	proportion of late stage	**plays an important role**
98	**is likely to be**	interface flow process audit	quality of life and	the presence of a
99	is one of the	low risk cap patients	spatial distribution of the	the presence of the
100	ith sample in	public health and health	using data from the	was approved by the

educational level, and the socio-cultural problems of particular countries. This genre-specificity of Nursing and PH tends towards the inferential arguments, and "knowledge is typically constructed as plausible reasoning rather than as nature speaking directly through experimental finding" (p.16).[1]

Some results in **Table 3** appear to be anomalies such as 'symptoms of chronic bronchitis', 'fruit and vegetable intake', 'to oral hypoglycemic agents', 'c3h/hej mice' and 'american indian n-o'. This may be due to the limited corpus or a focus upon specialized volumes or issues, but the vast majority of results clearly indicate that evaluative bundles are widespread in medical research articles, and each sub-discipline has its own preference of the bundles. In the future, we hope that the size of the corpus analyzed will increase so that anomalous results can be avoided.

In order to display the contrast between evaluative bundles in the *Medcorpus* and general language use, the frequency of higher ranking evaluative bundles from Genome and F-LOB[21]/Frown[22] are compared (**Figure 3**). A marked difference in frequency can clearly be observed between the two corpora, the exception being *on the other hand*. Since this lexical bundle frequently occurs in evaluative expressions with previous or subsequent direct context, it is likely more apt to call it as a stance 'marker' rather than an 'item.' In other words, it "may not always be readily visible but becomes apparent when we look at the wider lexical context" (p.122).[13] It is worth noting that, if we carefully examine concordances of *on the other hand*, there are far fewer instances of evaluative context found in the F-LOB[21]/Frown[22] corpus. This point will be discussed in a later section.

Research articles have a highly conventionalized structure, and are typically organized into abstract, introduction, methods, results and discussion. Thus, according to its own function, each section reveals its own rhetorical convention by means of lexico-grammatical features. Evaluative expressions are one of particular feature that reinforces this claim. Vihla provides a solid illustration with the inter-textual variation of epistemic modals frequency, and suggests that evaluative expressions are more prominent in the introduction and discussion than in the methods and results sections.[17]

In an attempt to examine the evaluative bundles from a cross-sectional and cross-disciplinary perspective, frequency of a hedging or epistemic bundle, *it is possible that*, and a booster bundle, *an important role in*, were indicated in **Figure 4** and **Figure 5**. The results presented in both figures suggest that evaluative bundles are especially widespread in the Discussion sections, regardless of the sub-

fields. In contrast to the hedging bundle, however, the booster bundle *an important role in* shows a relatively high frequency in Introduction sections. Introductions appear to have a primarily rhetorical purpose, often linked with the need to provide academic validity to the article as well as a useful background for non-specialist readers.[8] This thematic structure is reflected in the high frequency of the booster bundle *an important role in*, the function of which, in the Introduction and the Discussions, is to persuade the reader to accept academic validity. This is also supported by the fact that, in the Genome and the Nursing corpora, this booster bundle also occurs in the Abstract section, which obviously has the rhetorical function of highlighting research outcomes.
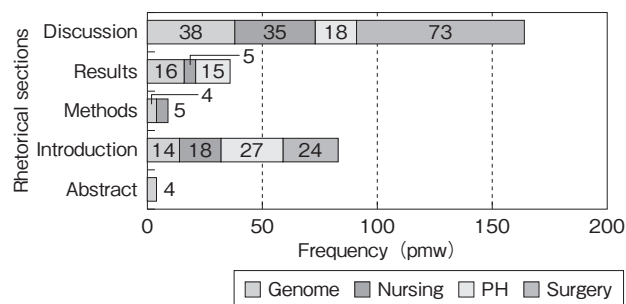
3.2. Concordance analysis

As pointed out in the previous section, *on the other hand* is a stance marker, and in many cases is incorporated in an
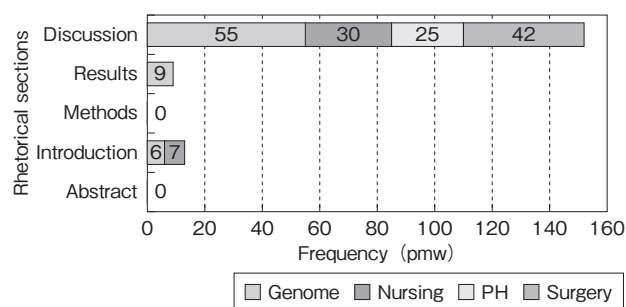
Figure 4. Frequency of "it is possible that" in 5 rhetorical sections
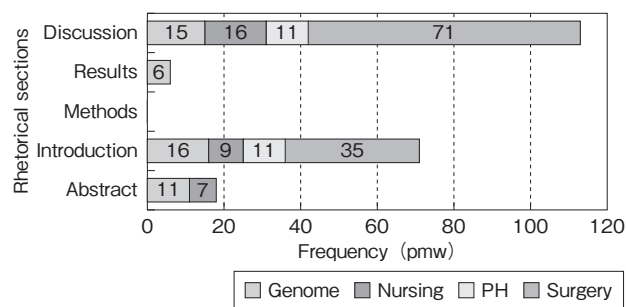
Figure 5. Frequency of "an important role in" in 5 rhetorical sections

Figure 6. Frequency of "on the other hand" in 5 rhetorical sections

evaluative context in research articles. It is clear that this lexical bundle is likely to be associated with argumentation by highlighting two different claims or findings. Therefore, as **Figure 6** shows, this bundle occurs in the Results sections. It is relatively frequent, but less significant than the above-mentioned evaluative bundles.

Turning now to the evaluative context that appears with *on the other hand*, I did a concordance search of the bundle in the Genome corpus. A few selected lines are presented as follows:

(1) **On the other hand**, a purine-rich diet and climatic factors have an equally important role in the etiology of the disease. Because UAN is a very common disorder, it must result from many different combinations of …

(2) **On the other hand**, this variant is rather common in the general Sardinian population (frequency 32%). Together, these results provide convergent evidence for the interpretation that Ala62Thr may contribute to …

(3) **On the other hand**, a similar proportion of common mtDNA and Y-chromosome haplotypes appear to have either been lost from the Icelandic gene pool or were not among the founding lineages.

(4) **On the other hand**, CheW is expected to either shift the equilibrium toward the kinase-activating state or at least not influence it, which according to our argument is characterized by a smaller methylation rate.

(5) In the PNS, **on the other hand**, peripheral axons (both motor and sensory) generally regenerate quite well.

There are also many cases in which the evaluative comments are introduced prior to the signaling marker *on the other hand*.

(6) different results obtained for the neurons may be explained by the fact that we previously used frozen tissue sections or that they were derived from patients suffering from temporal lobe epilepsia. **On the other hand** the actual human brain tissue used was from aged patients and did not correspond to the age of the mice included in this study.

(7) This could contribute to some variance of betweenness values of a protein with a particular (high) connectivity. **On the other hand**, the existence of high-between-

ness nodes specifically with low connectivity suggests that there are proteins outside such clusters that connect those clusters.

(8) the current amino acid sequence comparison presented in Figure 1 indicates that the CRPs derived from viruses of the genera Furo-, Hordei-, Peclu-, and Tobra-virus are phylogenetically related. **On the other hand**, these proteins are so different from CRPs encoded by Pomo-, Beny- and Carlaviruses that the latter ones could not be included in the alignment (Fig 1). The present study shows that the SBWMV …

(9) Interestingly, both inactivated and attenuated SPPV showed significant increase in the IL-10 production from peritoneal macrophages. **On the other hand**, decreased in vitro SOD activity of cultured peritoneal macrophages noticed in SPPV treated groups may also enhance in vivo virus survival in, and in the presence of phagocytes.

Without detailed disciplinary knowledge it is not possible to be precise, but concordance examination suggests that in *Medcorpus* most instances are related to explanation, argumentation or reasoning characterized by reporting verbs (e.g., *suggest, show*), modal hedges (e.g., *may, could, must*), adverbs or adjectives (e.g., *interestingly, significant*) and so on.

In contrast to the abundance of evaluative comments with **on the other hand** in *Medcorpus*, it is not necessarily the case with F-LOB[21]/Frown[22] corpus.

(10) … watching British companies, as I can testify, playing Shakespeare to large, attentive, Bard-hungry throngs in places as diverse as Athens and Tbilisi. But, **on the other hand**, there is the infinitely more mysterious Shakespeare: the dramatist of no fixed abode whose work takes new resonances in different cultures. In Europe he seems European:

(11) … power bloc drawn from a restricted and highly uniform social background and so is able to achieve a high level of solidarity. Rule by an inclusive power elite, **on the other hand**, exists where a solidaristic power bloc is not dominated by any particular class.

(12) Natural disasters like the Bangladesh flooding cannot be prevented, but their consequences can be alleviated by forward planning as well as aid afterwards. Famine,

on the other hand, is entirely preventable, and its continuing ravages across Africa are a disgrace to the human race. We all know the problems - inefficient local logistics, corrupt

⑬ "I would rather go home and make jam and be a girl which is still the honest truth," she maintains. **On the other hand**, the actress is very clear about why her screen career has proved so durable. It boils down to talent. "When people say I'm a survivor, I feel it underestimates why

⑭ The theology of Descartes, Wolff and the Enlightenment offered, **on the other hand**, only a systematic principle of order. Despite an increasing divergence in their later understanding of Logos, both Hegel and Coleridge continue to find in Christ, first,

⑮ Holland merger there will be further rationalisation and the possibility that production could eventually be transferred to other factories elsewhere. A somber thought, but **on the other hand** if a miracle does occur and tractor sales improve substantially Basildon could become buoyant again.

However, as in ⑮, evaluative comments appear in the FLOB[21]/FROWN[22] corpus where the text seems to have highly evaluative nature.

4. Conclusions

This paper has shown that the n-gram tracking methodol-

ogy suggested by Römer is extremely useful for retrieving and identifying evaluative expressions in a semi-automatic manner.[13] Furthermore, the detected lexical bundles must be considered as very important building blocks that reflect the rhetorical functions of the written discourse in the corpora. Recognizing the clear advantages of this methodology, however, we should not rely upon it to the exclusion of other possible strategies, because the evaluative meanings can be conveyed by a wide variety of lexical items and syntactic structures. But at least, as Römer notes, the suggested automatic extraction procedure leads to those expressions that are most frequent and most typical of the specialized text type under analysis.[13]

As previously mentioned, it is reported that epistemic modals, one type of evaluative expression, are prominent in Introduction and Discussion sections, and is a typical rhetorical convention commonly observed in written medical discourse. This genre specificity can also be confirmed collocation-wise by a statistical analysis of 4-gram lexical bundles ranked in the top 300, which includes both evaluative and non-evaluative items.

Figure 7 shows the results of plotting the score of the inter-sectional (IMRD plus Abstract) variance identified by correspondence analysis based on the top 300 lexical bundles that appeared most frequently in *Medcorpus*. This figure reveals a clear view of the difference of rhetorical conventions represented by the 4-gram collocations, and the most marked contrast lies between the two major groups: 1) Abstract, Introduction and Discussion and 2) Methods and Results. **Figure 8**, on the other hand, shows the result of the differences among the 4 sub-fields of *Medcorpus*. The result also strongly supports the genre-specificity from a
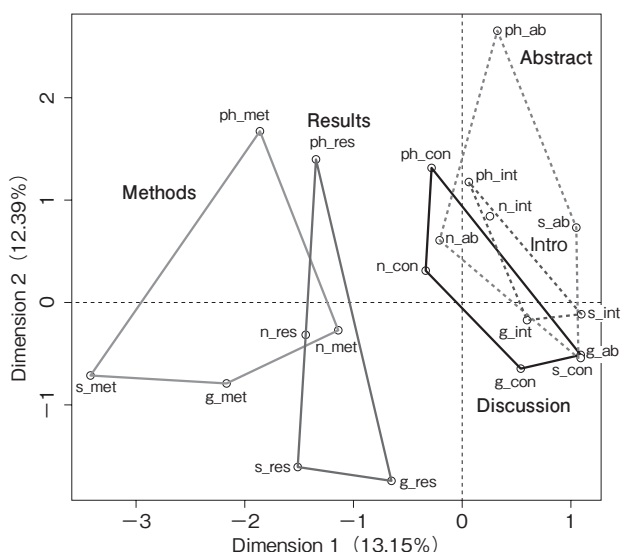
Figure 7. Correspondence analysis of 4-gram bundles appeared in top 300: Rhetorical sections
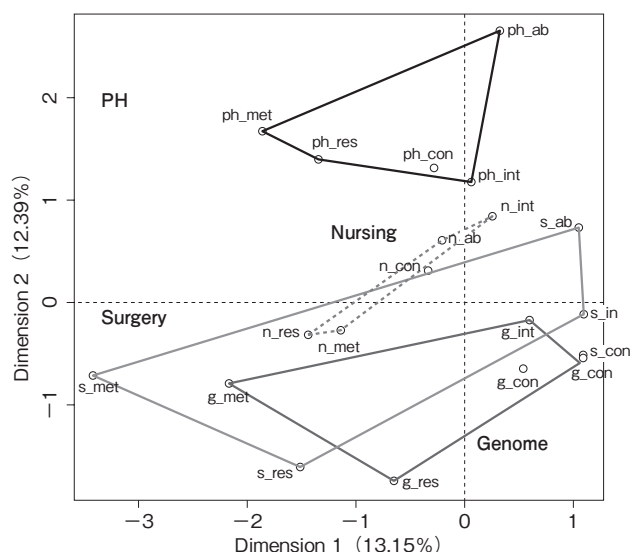
Figure 8. Correspondence analysis of 4-gram bundles appeared in top 300: Medcorpus sub-fields

perspective of collocation. In the light of these outcomes, we can duly assume that these highly standardized and formulaic recurring phraseological patterns are fundamental in constructing academic discourse.

5. Pedagogical implications

With regard to L2 writing, the linguistic choices made by academic writers to express their attitudes in a text (usually described as 'stance', 'evaluation' or 'metadiscourse') are indispensable for creating credible and meaningful written discourse. For examples, students should learn how to tone down or hedge their assertions. Expressing evaluation is one of the most salient characteristics of scientific writing, though L2 learners are well known for using far fewer modal verbs or evaluative bundles than L1 speakers, which indicates that L2 learners use the stylistic or rhetorical devices needed for appropriate politeness strategies inadequately. In this respect, the ability to use such devices appropriately is of great importance in academic writing. In this sense, Eriksson rightly points out "the importance of taking into account the field in which the students work when selecting bundles" (p.195).[23]

The findings of this study should encourage students to raise their awareness of rhetorical conventions, and help them use this knowledge to make more informed linguistic choices in their own writing. In light of this, future research should concentrate on learner corpora to identify the salient characteristics of written discourse of Japanese medical students.

Acknowledgement

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Analysis of Number and Length of Reading Passages and Questions in the Examination of Proficiency in English for Medical Purposes

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To determine the appropriate number and length of passages in the reading section of the Examination of Proficiency in English for Medical Purposes (EPEMP), we examined the relationship among subjective evaluations by the candidates, the number of passages, and the word count in each passage.

The dataset for analysis comprised the questions in the reading sections of the second pilot EPEMP and second official EPEMP for levels three and four. In each examination, the number of passages, the word count in each passage, and the average word count per passage were investigated. To examine the occurrence rate of long passages in the reading section, the occurrence rate of passages with >120 words was also calculated. Also, the subjective evaluation scale scores for both the number of questions and the difficulty of the questions were examined.

We found that the length (as defined by word count) of a passage and the rate of long passages in the reading section strongly contributed to the candidates' subjective evaluation of the number of questions. The candidate score and subjective scale score for the difficulty of the questions did not differ significantly between the second pilot and second official examinations in comparing both levels 3 and 4.

Our research may be useful not only to improve the quality of the EPEMP, but also to inform educators who design reading examinations in which candidates are required to read passages and then answer questions about them.

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Keywords medical English, achievement test, validation, reading question, sentence

1. Introduction

With the globalization of the medical field, there is a need to evaluate medical English proficiency for practical use. Since 2008, the Examination of Proficiency in English for Medical Purposes (EPEMP) has been used for this purpose in Japan.[1] The examination has two levels: level four (L4) competence certifies a candidate as having medical English ability equivalent to a graduate of a medical university or college in Japan; level three (L3) competence certifies fluent English for practical purposes in basic interactions with patients. The examination includes various kinds of questions, idioms, fill-ins, synonyms, reading, written conversation, and questions about the text or figures related to practical situations. All examination questions are multiple-choice questions (MCQs), offering four answer options with a single correct answer. In each examination, candidates must answer all questions within 90 minutes. Before the current EPEMP was adopted, two pilot examinations were performed in 2007 to assess the quality of the examination. Because the ability to read quickly and comprehend is necessary in various medical situations, the examination must include a sufficient number of questions involving reading passages (termed "the reading section"). After the first pilot examination, the number of problem-solving questions (i.e., reading short and long passages and answering the related questions; answering the questions about written conversations or practical situations) was increased to a total accounting for half of all questions.[2,3]

Including an appropriate number of questions is an impor-

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Table 1. Background of the examinations

	Second pilot examination		Second official examination	
	Level 3*	Level 4*	Level 3	Level 4
Number of candidates	75	69	172	57
Total number of questions	100	100	90	90
Number of questions in reading section	30	30	30	30
Number of passages in reading section	16	16	11	12

*The same written examination was used.

tant part of ensuring the overall quality of questions in the reading section.[4] We have previously reported the importance of basing examination analysis on both the candidates' subjective evaluations and the item analyses (analyses of scores and discrimination indices).[5] However, especially for the reading section of the examination, there is little evidence concerning the total number and length of the passages and the difficulty of the related questions; i.e., how many words are adequate for one passage, and how many passages should be included in order for most candidates to be able to answer all questions within the available time.

Therefore, we examined the relationship between the candidate's subjective evaluation of the total number of reading questions and the number of words in the passages. We emphasize the importance of considering the length and number of passages in analyzing the scientific data for the English examination.

2. Materials and Methods

2.1. The dataset

The dataset comprised the questions in the reading section of the second pilot EPEMP and second official EPEMP for L3 and L4. The same examination was used for both L3 and L4 of the second pilot EPEMP. For the reading section in each examination, the number of passages and the word count of each passage were examined. The average word count per passage was then calculated. For the purposes of this research, we defined long passages as those with a word count >120 words. To examine the occurrence rate of long passages in the reading section, the occurrence rate of sentences with >120 words was also calculated.

2.2. Candidate score and subjective evaluation

We investigated each candidate's average score on the reading section for each examination. The candidate's subjective evaluation was also measured for each question. Using a five-point scale, the candidates evaluated the difficulty (1, too difficult; 2, difficult; 3, moderate; 4, easy; 5, too easy) and the quantity (1, excessive; 2, too many; 3,

enough; 4, too few; 5, minimal) of the questions in the reading section.

2.3. Statistical analysis

We compared the two groups in terms of average word count per passage using the Mann–Whitney test. To compare the occurrence rate of long passages in the reading section, the chi-square test was used. When comparing the score or subjective scale of the candidates, the F test was performed first to examine the equality of variance. For equal variances, we then used Student's t test to compare the values. For the comparison of groups with unequal variances, Welch's t test was used. Calculations were performed using the statistical software package Stacel2 (OMS Publishing, Saitama, Japan). Differences with a p value <0.05 were considered statistically significant.

3. Results

3.1. Background of the examinations

Table 1 shows the number of candidates and the total number of questions on the examinations. In the second pilot examination, the same written examination was used for L3 and L4. The numbers of questions and passages in the reading sections alone are also shown. In each examination, the questions in the reading section accounted for 30.0% to 33.3% of all questions.

3.2. Comparison of L3 examinations

For the L3 examinations, the word counts of reading passages, the average score, and the results of subjective evaluations for both number of questions and difficulty were compared between the second pilot examination and the second official examination (**Table 2**). Results are reported as number or mean ± standard deviation. Although the number of passages was lower in the second official examination (11) than in the second pilot examination (16), the total word counts of all passages were not markedly different (1930 vs 1867, respectively). Therefore, average word count per passage was significantly higher in the second official examination than in the second pilot examination (175.5 ± 39.1 vs 116.7 ± 55.8, p<0.001). The rate of long passages in the reading section of the second official examination was significantly higher than in the second pilot examination (90.9% vs 43.8%, p=0.013).

Comparing the subjective evaluations for the number of questions, the average scale score was significantly lower (the candidates evaluated the number of questions as "too

Table 2. Comparison in Level 3 examinations

	Second pilot examination	Second official examination	p value
Total word count	1867	1930	—
Average word count / passage	116.7 ± 55.8	175.5 ± 39.1	< 0.001*
Rate of long passage（%）	43.8	90.9	0.013**
Average subjective scale for the number of question	2.3 ± 0.8	2.0 ± 0.8	0.003***
Average score（%）	72.1 ± 17.8	70.4 ± 16.4	0.47***
Average subjective scale for difficulty	2.6 ± 1.0	2.4 ± 0.8	0.29****

*Mann–Whitney test, ** χ^2 test, ***Student's t test, ****Welch's t test

Table 3. Comparison in Level 4 examinations

	Second pilot examination	Second official examination	p value
Total word count	1867	1474	—
Average word count / passage	116.7 ± 55.8	122.8 ± 52.9	< 0.71*
Rate of long passage（%）	43.8	50.0	0.75**
Average subjective scale for the number of question	2.2 ± 0.7	2.1 ± 0.6	0.25***
Average score（%）	63.5 ± 17.4	65.3 ± 22.1	0.62***
Average subjective scale for difficulty	2.3 ± 0.8	2.1 ± 0.9	0.42***

*Mann–Whitney test, ** χ^2 test, ***Student's t test

many"）for the second official examination than for the second pilot examination（2.0 vs 2.3, p=0.003）. However, there were no significant differences between the two groups with respect to average score and average subjective scale score for difficulty of questions（p>0.05）.

3.3. Comparison of L4 examinations

Similar comparisons were performed for the L4 examinations（**Table 3**）. In accordance with the changes made to the number of passages, total word count of all passages was lower in the second official examination than in the second pilot examination（1474 vs 1867）. However, average word count per passage and the rate of long passages in the reading section were not significantly different between the two examinations（p>0.05）. Average subjective scale scores for the number of questions also showed similar values in the two examinations（2.2 and 2.1; without statistical significance, p>0.05）. With respect to the difficulty of the questions, there were no significant differences in the subjective scale scores and average scores between the two examinations（p>0.05）.

4. Discussion

When using English as a second language for academic purposes, reading tends to be the single most important language skill and language use activity.[6] During the reading test, knowledge, sufficient cognitive skills, and problem-solving strategies are needed. The examinees must hold previous information in working memory, integrate the incoming information with existing knowledge, and then consider options and make decisions.[7] Gitomer and Rock[8] suggested that improved test designs include a sufficient number of problem-solving questions. Therefore, evaluating candidate proficiency in medical English requires inclusion of a sufficient number of reading questions that engage problem-solving processes.[9] The ideal examination is characterized by both an acceptable level of difficulty and an appropriate number of questions. If the passages in the reading section of the examination are too long, most of the candidates cannot solve all of the questions within the examination time period. Therefore, determining the appropriate length and number of passages in the examination is important to validate the examination.

It has been widely understood that longer reading passages are associated with a greater difficulty of comprehension items.[10] In examining the difficulty of the reading test for second language learners of Spanish, Brantmeier et al[11] compared the average score of two passages（total word count of 525 with 21 sentences and total word count of 646 with 22 sentences）. For the passage topics, the examinees reported approximately the same degree of familiarity for both passages; however, they scored higher for the shorter passage than the longer passage.

We have found candidate subjective evaluation to be a useful tool for estimating score. Furthermore, because the subjective evaluation of the number of questions and their difficulty are closely related, setting the appropriate number of questions requires investigating the candidates' subjective scale scores for the number of questions.[5]

Comparing L3 examinations, the total word counts of all sentences in the reading sections were similar between the second pilot and second official examinations. However, as there were fewer passages in the second official examination, average passage length was higher, as was the rate of long passages. The candidates evaluated the number of questions in the second official examination as "too many".

With respect to the L4 examinations in which the average word count per passage and the rate of long passages were not significantly different between the two examinations, the subjective evaluations of the number of questions were similar. Although the total word counts decreased from 1867 to 1467, this change did not impact the subjective evaluations. We found that the length (word count) of one passage and the rate of long passages in the reading section strongly contributed to the candidates' subjective evaluation of the number of questions. These findings contribute new insights concerning the perceived difficulty of reading questions. Because the comparison must be performed among candidates with similar medical English ability, we compared L3 and L4 separately. In our analysis, because the average score and subjective scale score for the difficulty of the questions did not differ significantly between the two examinations when comparing both L3 and L4, the obtained result demonstrated higher reliability.

In this analysis, we also calculated the occurrence rate of long passages, using a word count of >120 as the index for long passages. We propose that this is a useful index for determining the appropriate length of reading passages, although there is a lack of strong evidence for defining long or short passages as having more or less than 120 words, respectively. Further research is needed to determine the most valuable threshold for discriminating between long and short passages.

There are some limitations in this study. First, the difficulty of reading questions is evaluated based on both the length and content of the passages. Although the length of passages was analyzed in this study, we did not examine the examinees' familiarity with the topics of the passages. Second, although the comparisons were performed among the L3 and L4 candidates separately, the candidates' backgrounds reflecting their English abilities were not compared. These limitations may be addressed in future research.

Medical staff must acquire the ability to process comparatively long and complex texts within a limited time. This analysis demonstrates the importance of calculating the average word count per passage and the rate of longer passages in an examination. To our knowledge, no scientific evidence has been published with respect to determining the appropriate number and length of reading examination questions. Our research may be useful not only to improve the quality of the EPEMP, but to inform educators who design reading examinations in which candidates are required to answer questions after reading passages.

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Series editors:
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　東京医科歯科大学医学部医学科では，医学のフロンティアを切りひらく，国際的なリーダーとなる人材の育成を目指している。「医学英語」の授業では，情報の収集・発信に必要な英語運用能力を伸ばすだけでなく，グローバルな視点，積極的に議論し自己主張する姿勢，他者とのコミュニケーション能力や協調性，批判的思考，そしてEvidence-based medicineの概念理解と実践力の修得を目標としている。またロンドンのインペリアル・カレッジとの交換留学およびハーバード大学での臨床実習の準備教育も，「医学英語」と連動して行っている。

1. English for Medicine（as of March 2012）

Tokyo Medical and Dental University has two campuses. At the Ichikawa Campus, students have liberal arts education, which includes compulsory English courses for General Academic Purposes. After which they receive professional education at the Yushima Campus which is adjacent to the university hospitals. As a part of this education, the students are required to take the courses of English for Medicine, from their first through fourth year.

1.1. Aim

English for Medicine courses were established in order that TMDU may fulfill its educational mission by nurturing future international leaders or front-runners in healthcare and science. To achieve this goal, we have designed our English for Medicine courses not just for developing the students' English competence but also aiming at fostering their global perspective and communicative attitude, indispensable assets of doctors and scientists in the global era. As a part of the courses, the students are also expected to acquire critical thinking skills and to understand as well as learn how to apply the concept of evidence-based medicine.

1.2. Contents

・1.2.1. Topical Issues

We do not use a set textbook for the English for Medicine courses, but rather, pick up topical issues from science magazines, newspapers, or TV news programs, and edit them as teaching materials. Selected topical issues, which are often complex and controversial, familiarize the students with current problems in medicine and healthcare and help them understand roles of medical professionals in solving them.

We think that dealing with these health- or medicine-related topical issues, rather than practicing English usages at specific clinical contexts, can more effectively motivate the students who have a very limited knowledge of medicine before they start their clinical training in the fifth year. Besides, many of the students do not understand the immediate necessity to use non-Japanese languages in clinical settings in their future. In addressing these controversial issues, the students learn to understand the importance of global communication as they see that current medicine and science, closely intertwined with politics and economics, have posed many problems which cannot be locally resolved but need to be tackled through international cooperation.

・1.2.2. Student-centered Learning

Discussion and presentations are the main activities in our English for medicine courses. The students read articles and/or watch video clips which are assigned as homework before class. In class, the students, in small groups of

four or five, discuss the issues presented in the article/video.

When the students have difficulties in comprehension, the instructors assist them. However, the instructors' role in class is limited to facilitating the discussion so that the students can explore the issues and get to the crucial points by themselves. During the discussion, each group chooses one focused topic for their research, and in the following class, each group makes a short oral presentation based on their research.

This scheme of discussion-research-presentation makes it possible for the students to learn and think by themselves, and through this self-learning process the students are expected to improve their language competence to get information, form and exchange opinions, and express ideas in English.

・1.2.3. Evidence-based Medicine

For the fourth year students, the main goal of our English for Medicine course is for the students to understand and learn to apply the concept of evidence-based medicine. Here again, we have applied self-leaning and learning-by-doing principles. Along with a short lecture series about the concept of evidence-based medicine, the students in small groups have topics assigned for research. They are expected to work together to systematically review and identify the optimal literature, to critically evaluate the validity, the statistical and clinical significance, and the applicability of a study and its results. Working for topics by tackling literature in the English language, students improve their scientific English literacy as well.

・1.2.4. Vocabularies

The students' vocabularies are limited when they enter the university. Lacking the experience of using English in daily life, most of the students do not know laymen's terms for body parts or health conditions. Therefore, in the first and second years, the students learn these basic vocabularies, and then in the third year, they start to learn medical terminology, with the structured combinations of prefix, suffix, and word roots as a basis. A vocabulary quiz is given at the beginning of every session. An e-learning system (ALC Network, http://www.alc.co.jp/eng/) is also available for the students' vocabulary building use.

1.3. Class Size and Frequency

We have tried to downsize the class sizes by increasing the number of instructors, and now the average number of students in each class is 25 for the first through third year students. The fourth year course is run by a single instructor who holds a medical degree. Sessions are held in a large lecture hall that also accommodates interactive as well as small group learning which are utilized frequently..

The total number of sessions of the English for Medicine courses and the terms when they are open are as follows:

First year students:
    7 sessions in the Fall term only
Second year students:
    17 sessions in the Spring and Fall terms
Third year students:
    21 sessions in the Spring and Fall terms
Fourth year students:
    9 sessions in the Spring term only

1.4. Grading

English for Medicine courses are divided into two parts: "English for Medicine I" for the first and second year students and "English for Medicine II" for the third and fourth year students. At the end of each part, the students are given final exams. We have put an emphasis on the importance of class participation. Accordingly, we calculate the final grade based on the class participation (35%), vocabulary quizzes (30%), and final exam (35%).

2. Study-abroad Programs

TMDU offers several opportunities to study abroad. Especially, the exchange programs with the Imperial College, London, and the Harvard Medical School clerkship give excellent chances for the students to expose themselves to the world's most lively and inspiring environments for studying medicine and science. The students need to have a sufficient command of

English in order to maximize the effect of these valuable experiences. English for Medicine courses are regarded as a part of preparatory training for participating in these exchange programs, and the students are required to have shown satisfactory performance in English for Medicine courses in order to qualify to apply for these programs. Apart from mandatory English for Medicine courses, the students who are selected for these programs take preparatory training sessions offered by our English department.

2.1. Exchange Program with Imperial College, London

All the fourth year medical students spend the fall term engaging in individual research projects in laboratories. Every year four students are given a chance to carry out this research at Imperial College, London. The selection of the students is made in April, based on essays and interviews in English and Japanese. Individual or group lessons are available on a voluntary basis to the selected students upon request.

2.2. Clinical Clerkship at Harvard

TMDU students can transfer the credits they take as a participant in the Exchange Clerkship program at Harvard Medical School. From 2004 through 2011, Harvard Medical School had accepted up to 8 TMDU final year students as part of an educational exchange between TMDU and Partners Harvard Medical International, Inc. Following this pioneering stage, TMDU has decided to continue to send qualified students of a similar volume every year to Harvard Medical School for clerkship experiences.

Student selection is through essays, group discussions in English, and individual interviews in English and Japanese. Selected students are required to take mandatory intensive training sessions for eight months. These sessions offer the opportunities for the students to acquire the practical knowledge and linguistic competence that are required in clinical settings in English speaking environments. Under the supervision of English speaking medical professionals, the students develop their skills in history taking, physical examination, oral presentation, and clinical reasoning.

3. Further Renovation

We are making changes in our curricula in order to help the students adapt to rapid changes in society. In 2011, TMDU embarked on a new framework of interdisciplinary education that integrates medical and dental education. This is to achieve our mission to foster leaders/front-runners in healthcare and research in Japan's future society, the society where ever-shrinking working generations must support the elderly population that is already approaching 25%. It has been repeatedly pointed out that preventive and primary care would play an increasingly important role in our quickly aging society, so the close cooperation and coordination between doctors and dentists would be essential in order to provide effective and efficient patient-centered care. Starting April 2012, English for Medicine courses are a part of the integrative curriculum and are now offered to and attended by both medical and dental students. The total number of students enrolled has increased to one hundred fifty, who are streamed into seven classes according to their TOEFL scores. We retain the overall educational schemes that we have run in our old curricula, but plan to make English for Medicine courses more effective, efficient and coordinated with other courses offered in the integrative curriculum. Biostatistics, bioethics, and English for Medicine are the core courses of the "foundation module" of the curriculum and we are redesigning the English for Medicine courses so that they serve as a hub connecting all three courses. For example, the students discuss in English news articles on end-of-life decision-making or refusing treatment on religious basis while they learn these issues in the bioethics course in Japanese.

4. Faculty

Dr Kazuki Takada, an associate professor, is the course director of English for Medicine courses, and is supported by two part-time course coordinators, and one full-time secretary. The course director assumes full responsibility in managing and designing the whole program,

while the course coordinators' main job is to choose topics and to prepare teaching materials according to the director's guidance. Four part-time teachers join them in teaching classes.

5. Evaluation

When TMDU launched a program to send students to Harvard Medical School for clerkship experience in 2004, the number of applicants was fifteen and the number of students accepted was four. Since then these numbers have steadily increased and, in 2011, twenty-three students applied for the program with eight of them qualifying in the final selection. We also have had a steady increase in the number of students who join overseas laboratories during their research semester in the fourth year. Their destinations include Chile, Ghana, Thailand, Switzerland, the USA and the UK. The number of students who take part in international conferences to present their research achievements has also increased. These increases show that the students are not only more enthusiastic about the opportunities to go overseas for their academic activities, but also more confident about their communication skills. We believe that our English for Medicine courses have substantially contributed to this more positive attitude and linguistic competence.

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Kitasato University School of Nursing

医学者北里柴三郎の業績を記念して創立された北里大学は，看護学部を含む生命科学系の７学部から成る。英語教育に関しては，いずれの学部も１）一般目的の英語，２）学術目的の英語，３）専門職業分野の英語，の三領域の目標を持っている。看護学部においても，これらの目標の達成のため，１年次は一般教育部における２科目の必修英語授業により，コンピュータ利用外国語学習（CALL）教室の機能も積極的に活用しながら，読解力とコミュニケーション力を中心に教育し，２年次は看護英語演習（選択科目）による看護英語に特化したオーラル・コミュニケーションの教育，また３・４年次にはUCLA短期留学プログラムのための国際看護論演習（選択科目）が展開されている。今後，英語教育を専門とする一般教育部の教員と看護学部の専門課程の教員との連携を深めることにより，さらなる英語教育の発展が求められる。

1. History and Location

Kitasato University was founded in 1962 by the Kitasato Institute to commemorate the achievements of Kitasato Shibasaburo. It has seven schools, Pharmacy, Veterinary Medicine, Medicine, Marine Biosciences, Nursing, Science and Allied Health Sciences. The School of Nursing was established in 1986 in response to the overwhelming need for higher levels of nursing education, its MA and PhD programs were founded in 1992 and 1998, respectively.

The headquarters of Kitasato University is in Shirokane, Tokyo, while the School of Nursing is in the main campus at Sagamihara, Kanagawa.

2. English Education

2.1. First Year English Education

⑴ English courses for freshmen are part of the general education offered by the College of Liberal Arts and Sciences, for which nine tenured teachers and fourteen part-time teachers teach English to around 1,600 freshmen in all the seven schools.

⑵ In order to allow students to develop proficiency in the four English skills, the university offers two kinds of English courses.

⑶ Three CALL (Computer-Assisted Language Learning) Rooms are used for the individualization of learning and the extension of instructional activities.

⑷ The purpose of college English education is not only to improve language skills, but to deepen students' knowledge of their respective majors, and of the ethical aspects of their future professions.

・2.1.1. English A I, English A II

（Compulsory, 90 minutes/week, once a week, 15 sessions/semester, 1 credit, 120 Nursing students are divided into 3 classes, whose instructors are all Japanese）

Aim: This course mainly aims to enhance students' reading comprehension skills of medical texts and knowledge of medical vocabulary and expressions. Since listening is the basis for all language skills, practice in listening is always associated with the reading activities.

Method 1: Topic-based instruction

Teachers select one topic related to health care and provide a variety of materials related to it.

A sample topic-based instruction:
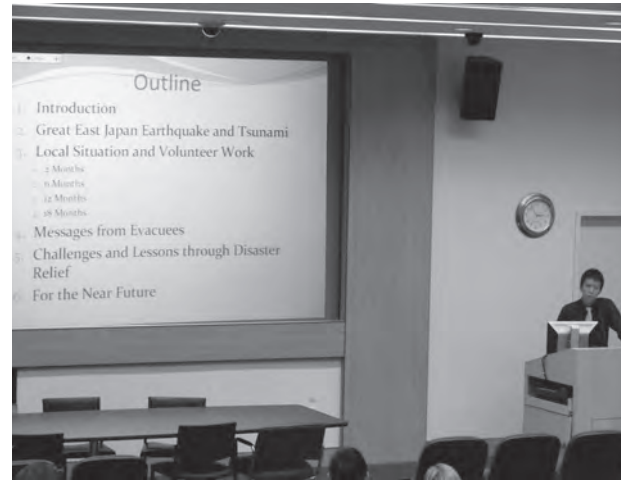
[Topic] Kidney Transplantation

[Material and activities]

1) Textbook（*Understanding Health Care*）

a) Reading of a passage on basic information of kidney transplant, b) Listening activity on the organ mafias, c) Conversation between a nurse and a patient on immunosuppressant drugs, d) Terms and expressions of the renal system

Nursing freshmen in a CALL Room

A Student presenting at UCLA Interchange Program

2) CALL a) Viewing of an English animation on the Internet … Students write about the differences between hemodialysis and peritoneal dialysis in Japanese, b) Viewing of an ABC News report on the Internet … Students write about how social networks worked to find a kidney donor, c) CALL Software (*NetAcademy*) for reading comprehension of an article titled "Do you want to donate your kidney?"

3) Students write their opinion about the transplantation of a kidney.

4) Test of partial dictation and translation of a dialog between a doctor and a patient with kidney trouble.

5) Studying questions for the Examination for Proficiency in English for Medical Purposes (EPEMP) that are related to the renal system.

In this multi-material method, students become adept at one topic (although at an introductory level) and get an opportunity to deepen their thoughts on the topic and reflect on their future role as a healthcare professional.

Method 2: Project-based learning
Introduction of how to use general and academic resources on the Internet

Students select one topic of health care or nursing and engage in the following 3 assignments of information search.

No.1: Find one interesting article using Medline-Plus for general readers and translate it into Japanese.

No.2: Find one abstract of a medical journal using PubMed and translate it into Japanese

No.3: Find one full article of nursing research using PubMed and write its summary in Japanese.

These step-by-step assignments constitute one project for refining basic academic research skills. Students need to learn how to access the latest information provided in English through the Internet in their first year. This is part of the academic literacy education at the College of Liberal Arts and Sciences.

・**2.1.2. English B I, English B II**
(Compulsory, 90 minutes/week, once a week, 15 sessions/semester, 1 credit, 120 Nursing students are divided into 3 classes by student preference from the choices of syllabi taught by one native speaker and two Japanese teachers)

Aim: The goal of English B is for students to gain confidence in communicating in English. Speaking and listening activities are emphasized.

Methods: The focus of the three instructors is somewhat different so that a student's choice of a course will result in higher motivation for learning. For example, one instructor has students study in and out of class a DVD on interaction between nurses and patients for improving listening comprehension, and as a basis for discussion of medical and healthcare related topics; while another teacher makes use of popular music and a movie in English for encouraging listening and speaking skill development. Another instructor employs teacher-made CALL soft-

ware for improving speaking and listening for travel and work situations. There are required performances in conversational speaking, role-plays, individual presentations using Power-Point, and pair discussions.

Principles to guide nursing students in learning to communicate in English: Using English for communication in medical settings requires listening and speaking as essential skills above and beyond reading and writing. Therefore, students need to rethink how to go about learning English and often need to acquire new learning strategies. Gaining self-confidence, the desire to stretch one's potential, the willingness to make guesses, to be flexible, and to make mistakes are important in learning to communicate effectively. Being a good medical professional requires good communication skills. Students can also learn these through how they learn to communicate in English.

2.2. English for Nursing: Second year course

(Elective, 90 minutes/week, 15 sessions/fall semester, native speaker teacher, 1 credit, 24 students (2011))

Aims: 1.To introduce students to nursing methods in foreign countries 2.To expand on their medical vocabulary 3.To use that knowledge in a practical sense using role plays in a hospital or emergency situation

Teaching Method: Listening tasks followed by explanation and grammar check, and then speaking practice in pairs.

Material: A textbook of English for Nursing published in the UK (*Oxford English for Careers: Nursing* ①) supplemented by the teacher's original material. Students learn 1) dialogues in various hospital settings such as doctor-nurse & nurse-patient dialogues, 2) useful expressions for healthcare professionals including communication necessary in an emergency situation such as an AED use, and 3) reading and listening of healthcare-related material.

3. Interchange Program with UCLA

(Pre-visit program: Global Health Nursing Research, elective, 90 minutes/week, 15 sessions/spring semester, 2 credits, Japanese

teacher of International Nursing, 3rd and 4th year students plus some graduate students)

Since 1986, the School of Nursing has had an interchange program with UCLA in the USA. Every other year, about 25 nursing students study at UCLA for two weeks. They attend lectures on nursing, participate in a tour of the UCLA Medical Center, communicate with UCLA nursing students, and present their group work at the end of the stay. This year, two students gave a talk about disaster nursing during their volunteer work in Tohoku following the March 11th earthquake and tsunami in 2011.

4. Conclusion

With high motivation to acquire English, Nursing students at Kitasato University actively participate in their work to make progress in their comprehension and communication skills. They are evaluated based on their class participation, assignments and oral or written exams. Since the goals of English education here are three-fold, i.e., English for general, academic, and nursing purposes, further exchange of ideas and cooperation between nursing specialists of the School of Nursing and English teachers of the College of Liberal Arts and Sciences is essential in the planning of aims, content, and methods to improve Kitasato's English education programs.

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Writing Tips

To Article or not to Article

Reuben M. Gerling

Like living, and not so living, language elsewhere, medical writing does make adjustments and changes to stay with the times and, like language elsewhere, these can not always be explained. Hence the popularity of the perfect form, ʻwe have discoveredʼ, instead of, ʻdiscoveredʼ and ʻhave we found?ʼ instead of ʻdid we findʼ?

In the same way, the article has become unfashionable, with authors leaving it out of their sentences with vengence. Thus, instead of *the authors say*, it is *authors say* and, instead of *the cells turned red*, it is *cells turned red*. All this is, of course, a form of ellipsis and, whenever misinterpretations can occur, they probably will. Ironically enough, the danger is much more portent for people whose everyday language is not English. Writers who are not familiar with the article as well as writers whose language uses the article in a different manner, may find its use in English baffling. They are likely to misinterpret sentences without articles much more than people who are well versed in English.

Like most parts of speech, the article does serve a purpose and provides a means with which we can pinpoint the nouns. Thus, when it is *a heart* it is just any good, old heart that happens to be ticking around, whereas *the heart* will refer to a particular specimen. If the authors talk about *cells*, they are **generally referring to cells** in the body, and writing that *cells tend to divide more speedily under these conditions* states a general truth. On the other hand（and not ʻin contrastʼ as so many medical papers tend to say）,（we discovered that）*the cells divide more rapidly under these conditions*, means that the particular cells in this study did so.

Postoperatively, patients were treated with a topical corticosteroid-antibiotic combination 4 times a day for 3 months —depending on the context, could mean any patients whereas, *Postoperatively, the patients were treated with a topical corticosteroid-antibiotic combination 4 times a day for 3 months* clearly refers to the patients in this study.

In the following example, *Groups did not differ with regard to mean age（p=0.934）and gender distribution（p=0.905）,* the article can be left out as the meaning is quite clear, but, change the tense *Groups do not differ with regard to mean age（p=0.934）and gender distribution（p=0.905）,* and the difference between that and *The groups do not differ with regard to mean age（p=0.934）and gender distribution（p=0.905）,* can be meaningful.

Kruskal-Wallis test was used to compare parameters between patients with SSOH, NTG and control subjects, can survive without the article, as will be the case with most things related to instruments（*we used the newest version of Solar Shoulder* or, *we used newest version of the Solar Shoulder*）.

At times, it may be possible to rewrite in such a way that the article can disappear. The term *a huge amount of*, for example, can be re-written as *much*, which is, of course, much easier to understand.

The following sentences may illustrate some possibilities of dealing with the article,

At high burdens, the number of AM produced appears finite: some free particles remain in the alveoli and may be translocated across the type I epithelium to the interstitial macrophages.

Examined OCT images were scanned horizontally at a 5 mm diameter area with its center on the fovea, might be construed as referring to any scanned images whereas adding a three letter word（*The examined OCT images were scanned horizontally at a 5 mm diameter area with its center on the fovea*）will pin it down as referring to the images in the present study.

Sometimes, questions can be asked（and no one home to answer them）that, to the specialist, may be of critical importance.

Twelve normal subjects had lower levels of blood pressure: were there more than twelve, some of whom had normal blood pressure and some, perchance, higher?

Whereas, *the twelve normal subjects had lower levels of blood pressure,* tells us that all the normal subjects in this study did, indeed have lower blood pressure.

Abscess in the cavity was caused by Staphylococcus aureus, leaves us asking whether there were other abscesses, which, for some inexplicable reasons the researchers decided to ignore, whereas *the abscess in the cavity was caused by Staphylococcus aureus* indicates that only one such collection of pus was found and the cause for it.

We checked the directory and sent the forms to Gerald Obama Reagan, means that there was only one such creature in the listings, whereas, *We checked the directory and sent the forms to the Gerald Obama Reagans*, means that there were many, and we sent the forms to all. If, however, we pick only one of those and send it, then *We checked the directory and sent the forms to a Gerald Obama Reagan*, will be the best construction.

Whereas smaller languages tend to be corrupted by too many terms imported from English, English tends to have problems because it needs to be adopted for too many uses. However, to violate the language as a matter of fashion can only lead to misunderstandings and help no one. Surely, the best way is to observe the rudiments of usage in order to preserve clarity and increase comprehension. The article in English is, in many ways, different from its distant relatives in other languages and should be used to advantage, to enable readers to understand the language and the subject at hand.

Editor's Perspectives

Whither do we wander?

A knock on the door and, when answered, the face of a former student. A cup of tea and stories of life as a young doctor in the wards. Full of bubble and enthusiasm and confidence in treading the chosen path.

'And your English'? A blank face, followed by an embarrassed look and admission that, yes, it would have been nice to know some English, but.

As we not only try to teach but, through research and the introduction of new methods, try to make a difference, shouldn't we also beg for some results? Collect all the graduates you taught ten years ago and see how well they perform in English. Well, maybe better not.

Medical faculty push for results in the English curriculum since they are at the receiving end of the six years' efforts. They do complain that the students are not up to the mark, but do they understand the process leading to the results, or lack thereof?

How many schools have, among their lists of outcomes, clear, achievable goals for the EMP programme? How many of those that conjured up outcomes, have the manpower to realize their programme? How many clinicians go to the English teachers and ask what the students are actually supposed to learn and, following that, try to find out whether the upper class students they work with have actually learned much (or anything!)?

Whether we use the best methods and do all we can, or not, we may wish to establish simple, achievable outcomes and work to reinforce them. At the same time, wherever possible, we may wish to try and recruit the grandees in the clinical departments and establish a dialogue that will start to have them understand the workings of the EMP programme and help them know what to expect.

Reuben M Gerling

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