Troublesome words

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Abstract
Medical writing tends to contain longer, less common, words than English fiction, and they are here termed troublesome words. Troublesome words are an indicator of poor style, and often point to grammatical errors. An easy way to start improving one’s writing is to look for these troublesome words and replace them with shorter, more common synonyms. From quantitative analysis of medical and general English, lists can be drawn up of common troublesome words, and of troublesome words whose prevalence is increasing particularly in medical English. The words discussed here are novel, demonstrate, exhibit, explore, quantify, evaluate, option, perform, execute, represents, and target. Exercises are provided, and readers are encouraged to seek out poor medical writing and to improve it.

This sentence is taken from what is ironically called “the medical literature.”

We aim to demonstrate the value of the alternative concept of social practices for quantitatively operationalising drinking culture.

Francis Crick, who with James Watson won the Nobel Prize for work on DNA, wrote, “There is no form of prose more difficult to understand and more tedious to read than the average scientific paper.” Sir Andrew Macphail, who was professor of the history of medicine in Montreal, reckoned, “There is probably more bad writing in medical journals than in any other kind of periodical.” So it is not just me, or my fellow writers in this issue, or the editorial board of Medical Writing, who see this problem of poor style in medical English. Alex Paton, who was a regular contributor to the British Medical Journal, now the BMJ, nailed it: “The first (and rarest) quality is brevity: short words, short sentences. Why is it that intelligent people (among whom I include doctors) become imbued with verbosity the moment they put pen to paper?”

This article is about words because, once alerted to them, spotting troublesome words is easy. As a general rule, a short word is better than a long one. I asked someone at a meeting why he had used the words “were haemorrhaged” instead of “were bled”. He replied that he thought haemorrhaged was more scientific. Sometimes we do need to use a term more precise than the one in common usage, but bled is a perfectly good word, and haemorrhaged tells us no more about the process.

Resist the urge to use less familiar words. Sir Peter Medawar, another Nobel laureate, reckoned, “People who write obscurely are either unskilled in writing or up to some mischief.”

The prevalence of words in medical writing can be measured from PubMed®, and can be compared with the prevalence of words in English fiction, obtained using Ngram. This allowed me to put numbers to the long accepted impression that medical writers tend to use longer words – e.g., administered instead of given, less familiar words – lethality instead of death, and less precise words – address instead of ask, consider, answer and many other possible verbs. I searched PubMed® for 1975 and 2010, and used Ngram (corpus of English fiction) for 1975 and 2008. The prevalence of a word in medical English was recorded as the number of PubMed titles or abstracts in which the word occurred (corrected for the total number of available articles in English and with available abstracts). Ngram gives a percentage of the corpus. The troublesome words I discuss below are all common words in medical English, or have increased greatly in prevalence between 1975 and 2010. The first word is novel.

NOVEL instead of new
Because the definition given in the Concise Oxford Dictionary (COD) is “interestingly new or unusual”, novel must be more than simply new. In medical articles novel rarely means anything more than new, and is often used for things that are not even new. Between 1975 and 2010, the prevalence of novel increased 18-fold. The rise goes on: 7.5% of titles or abstracts contained novel in 2010; 8.7% – not far short of one in every ten medical articles – did so in 2015.

First, an example of correct usage (taken, as are some of the examples and rewrites, from my book and originally from, or adapted from, articles in medical journals):

The project… discovered a novel class of substances, called benzothiazinones, that could be used in the treatment of tuberculosis and drug resistant tuberculosis.

Novel is correct: when this was published, the benzothiazinones were a completely new class of drug.

With the introduction into practice, side effects of these novel anaesthetics have to be evaluated.

This is from an article published in 2001. The “novel anaesthetic” was xenon, whose anaesthetic properties were described in the early 1950s. Improved technology has made it (just about) economical only recently, but that does not make xenon a novel anaesthetic.

The aim of the study was to assess a novel clinical treatment method for perforated teeth.

The treatment was atelocollagen, which might not have been used before the publication date of 2011 for perforated teeth, but research into its use in dental practice began in the late 1980s.

... might be achieved by applying novel technologies such as video simulation to colonoscopy.

By 2012, when this article was published, video simulation was not even new.

Another word to avoid is innovative (COD: featuring new methods or original ideas), which increased 12-fold between 1975 and 2010.

Although novel, and innovative, are better replaced by new, most of the time even new isn’t necessary: an article titled “Update on novel trends in PET/CT technology and its clinical applications” loses nothing from losing novel.

Sometimes we do need to use a term more precise than the one in common usage, but bled is a perfectly good word, and haemorrhaged tells us no more about the process.”
**DEMONSTRATE or EXHIBIT instead of show or has**

Reserve demonstrate for an active illustration – a working model, an experiment in front of an audience, a computer simulation. Exhibit (and also display) has an unnecessary theatricality.

Studies have demonstrated a decline in prevalence of abdominal aortic aneurysm.

The studies have shown is sufficient here, although better is Abdominal aortic aneurysm is becoming less prevalent.

First, a correlation needs to be demonstrated between the screening test and injury risk.

A correlation needs to be shown.

Crohn’s disease exhibits marked clinical heterogeneity.

Crohn’s disease has or shows; alternatively, Crohn’s disease is clinically heterogeneous.

It exhibits prebiotic properties and was shown to improve mineral absorption.

Exhibits is better replaced by has, but better still is, It is prebiotic…. Note the phrase “was shown to improve”. Such phrases are common in medical writing and here can be replaced by the simple verb, improves.

**EXPLORE instead of study or investigate**

Surgical exploration revealed a well-circumscribed, encapsulated mass.

This is correct: surgeons do explore. Revealed is an over-dramatic word, often used instead of showed, but it is here used appropriately.

The authors tested whether two doses of ischemic conditioning affected motor and cognitive learning to an equal extent, and explored a panel of blood biomarkers…

…strategies to reduce this resistance have not been explored.

Surgeons explore but medical scientists study or investigate. In both examples, studied is the better word than explored. Depending on exactly what they did, measured might be better in the first example.

**QUANTIFY or EVALUATE instead of measure**

Quantify and evaluate are imprecise words: they both imply forming an idea of the amount or number or value of something. To measure implies a standard for comparison.

The assay quantifies free immunoglobulin kappa and lambda light chains…

The limits of quantification were 5 ng/mL for… and 10 ng/mL for…

The aim of this study was to evaluate the effect of sodium hypochlorite on surface micro-hardness…

Radiofrequency ablation induces gas bubbles in ablation zones, and the ablation margin cannot be evaluated accurately on ultrasound immediately after ablation.

In the above examples, the correct words, from the first down, are measures, measurement, measure, and measured.

If precision is not required, if the report is more general, then evaluation (or assessment) is correct, as in these two examples.

… it emphasises issues relevant to the comprehensive planning, implementation and evaluation of national radon programmes.

… the clinical evaluation of new pharmaceuticals…

**OPTION**

Option is a vogue word in colloquial English, but its prevalence has increased more in medical writing (25-fold) than in English fiction (3-fold). By 2012, one in 50 papers contained option or options, and more than two thirds of the occurrences were in the phrase treatment or therapeutic option(s).

The results from this patient indicate that darinaparsin may be a good treatment option…

These results should encourage clinicians and young active adult patients to consider rehabilitation as a primary treatment option after an acute treat.

Heart failure is a major cause of hospital admission, yet there remains a paucity of effective pharmacological management options.

A “treatment option” is just a treatment: omit option. “Effective pharmacological management options” are effective drugs.

**PERFORM or EXECUTE instead of do or carry out**

Patients also performed two walks at 6-month follow-up…

The majority of previous studies on inattentional blindness have been performed at rest…

Perform has connotations of performance and the arts. Did and done are the better words.

… with matching performed at a group, rather than individual, level.

Yes, done is better than performed; but better still is, matched by group rather than by individual.

The system executes double-stranded DNA cleavage efficiently.

The system carries out double-stranded DNA cleavage, but to carry out cleavage is to cleave, so, The system cleaves double-stranded DNA efficiently… and executes its function through binding with the downstream factors without phosphorylation.

Here, neither does nor carries out is correct: “executes its function” means works.

For moderate sized sequences, the method executes on a laptop computer within seconds or minutes.

… the method takes seconds or minutes on a laptop computer.

**REPRESENTS instead of is**

Repsents means to be entitled or appointed to act or speak for (COD). This correct usage is taken from a well written abstract, which was easily understood at first reading.

The group represents five antenatal centres along the Irish Atlantic seaboard, providing care for women with diabetes throughout pregnancy.

Another correct usage is the representation of sensation in the sensory cortex. But represents is usually an indicator of poor style, often embedded in abstracts that are impenetrable. Mostly, represents means is.

Tissue expansion represents an important new approach to…

An impaired pathway contributes to septic death and may represent a novel therapeutic target in critical care medicine.

Gram-positive organisms represented 47%, gram-negative organisms 32%, fungal organisms 13%, and Acanthamoeba 7% of corneal isolates.

Tissue expansion is an approach. An impaired pathway may be – and note novel and therapeutic target (q.v.). Gram-positive organisms were 47% of isolates – but this sentence needs inverting: Of corneal isolates, 47% were Gram-positive, 32% were fungal,…

**TARGET**

Target, and the derivatives targeting and targeted, have a correct use in medical writing.

This gene may serve as a potential therapeutic target in glioma in the future.

… were infused with remifentanil at a target organ concentration of 2.0 ng/mL…

www.emwa.org
Physical targets, which are shot at, have to be hit exactly; overshooting and undershooting are both bad, so particular genes and desired concentrations of a drug are appropriate. Target as a noun, like focus, is fashionable and liked particularly by politicians and administrators, presumably because it sounds more solid than the preferable aim or objective. But, too often, target is used as a “catch-all” in imprecise writing, as noun, verb and adjective: Our target is to target resources to the target population, which may mean, We aim to make our resources available to the right people, or may mean more simply, We want to give money to the right people. Avoid using target as a verb.

It is necessary for us to know who operates on children so that we can target our questionnaire accurately.

There is no verb that easily replaces target here. Direct is possible, but target is a sign that the sentence is badly written. Try: We need to know who operates on children so that we can send the questionnaire to the right people. Those who receive the questionnaire are the intended recipients not the target recipients.

There is a need for interventions targeted at those alcohol-dependent patients who are hard to engage in conventional treatment. Aimed is a better word here.

References
3. Paton A. In: How to Do It: Cognitive learning to an equal extent, and measured a panel of blood biomarkers…

Exercises
I have discussed only 11 words in this article, and mentioned a few more, of the well over 200 in my book.8 Not all those 200 are words to avoid; many are good words, when used properly. You can identify many troublesome words by asking yourself: is that word – ignoring technical medical terms – one that I would use in everyday speech?

Try out the exercises below. These will help you identify troublesome words and troublesome phrases in medical writing.

Exercise 1: Replace the troublesome word
In the following phrases, replace the italicized word.
1. …side effects of these newly introduced anaesthetics have to be evaluated.
2. …might be achieved by applying technologies such as video simulation to colonoscopy.
3. Home telehealth is a pragmatic approach to enhance early detection of symptoms requiring intervention.
4. The authors tested whether two doses of ischemic conditioning affected motor and cognitive learning to an equal extent, and measured a panel of blood biomarkers…
5. …strategies to reduce this resistance have not been studied.
6. Radiofrequency ablation induces gas bubbles in ablation zones…
7. Heart failure is a major cause of hospital admission, yet there remains a paucity of effective drugs.

Exercise 2: Replace the troublesome phrase
In the following sentences, replace the italicised words.
1. Home telehealth is a practical approach to improve early detection of symptoms requiring intervention.
2. The authors tested whether two doses of ischemic conditioning affected motor and cognitive learning to an equal extent, and measured a number of blood biomarkers…
3. The aim of the study was to assess a clinical treatment method for perforated teeth.
4. Heart failure is an important cause of hospital admission, yet there remains a paucity of effective drugs.
5. The majority of previous studies on attentional blindness have been done at rest…
6. This gene may serve as a potential therapeutic target in glioma in the future.

Create your own exercises
PubMed makes it easy to set your own exercises. Search on a combination of any two of the discussed troublesome words, e.g., option AND represents. Limit the search to articles with abstracts and written in English, and scan the retrieved abstracts. Ignore any that are crammed full of abbreviations. (Abbreviations make abstracts impossible to understand: note that I did not use the abbreviation TW for “troublesome words” in the abstract, but instead repeated “troublesome words”.) Also ignore those that are clearly written by someone whose first language is not English. Then rewrite your selected abstracts. You will find that many abstracts are very difficult to understand at first reading: let that be a stimulus to make your articles easy to understand.

What about the sentence taken from “the literature”?
We aim to demonstrate the value of the alternative concept of social practices for quantitatively operationalising drinking culture.

This is, of course, a single sentence taken out of context from the full abstract. As far as I can make out, because the rest of the abstract is just as wordy, it means, We aim to find another way by describing a usable scale of drinking habits.
Answer key

Exercise 1

1. Original: …side effects of these newly introduced anaesthetics have to be evaluated.
Suggested revision/commentary: Side effects are sought or looked for.

2. Original: …might be achieved by applying technologies such as video simulation to colonoscopy.
Suggested revision/commentary: Video simulation is not a technology; it is a method or a technique. A similar error is writing pathology instead of disease or condition.

3. Original: Home telehealth is a pragmatic approach to enhance early detection of symptoms requiring intervention.
Suggested revision/commentary: Home telehealth is a practical, not a pragmatic approach (even though it turned out not to be worthwhile). Improve is better than enhance, which has the sense of intensifying, as in the use of isotopes in radiography.

4. Original: The authors tested whether two doses of ischemic conditioning affected motor and cognitive learning to an equal extent, and measured a panel of blood biomarkers …
Suggested revision/commentary: The authors measured a number of biomarkers, not a panel.

5. Original: …strategies to reduce this resistance have not been studied.
Suggested revision/commentary: Strategies to reduce resistance are ways to reduce, or methods of reducing. The prevalence of strategy (or strategies) increased 22-fold between 1975 and 2010, and occurs in 5% of articles. A strategy is a plan designed to achieve a particular long-term aim (COD); unless that is what you mean, prefer plan, way or scheme. But strategy is often redundant. One in 20 strategies in PubMed is a treatment strategy, and there are other strategies such as therapeutic strategies, coping strategies, teaching strategies, shoulder rehabilitation strategies, and so on. They are no different from treatment, treatment, coping, teaching, and shoulder rehabilitation.

6. Original: Radiofrequency ablation induces gas bubbles in ablation zones …
Suggested revision/commentary: Radiofrequency ablation causes gas bubbles; it does not induce them (in the way a therapist might induce someone to drink less, or syntocinon induces labour).

7. Original: Heart failure is a major cause of hospital admission, yet there remains a paucity of effective drugs.
Suggested revision/commentary: Heart failure is an important cause of hospital admission, not a major one. Major is an overused word, correct in major operation, major complication or (with care) major cause. It should not be used instead of a more explicit adjective such as main, large (or largest), important, serious, obvious, or extensive.

Exercise 2

1. Original: Home telehealth is a practical approach to improve early detection of symptoms requiring intervention.
Suggested revision/commentary: To improve early detection is nearer as for earlier detection.

2. Original: The authors tested whether two doses of ischemic conditioning affected motor and cognitive learning to an equal extent, and measured a number of blood biomarkers …
Suggested revision/commentary: To an equal extent is equally.

3. Original: The aim of the study was to assess a clinical treatment method for perforated teeth.
Suggested revision/commentary: A clinical treatment method is a treatment. It could also be written a method of treating perforated teeth.

4. Original: Heart failure is an important cause of hospital admission, yet there remains a paucity of effective drugs.
Suggested revision/commentary: A paucity of is few; so is a dearth of. Similarly, a myriad, litany or plethora of is many or a lot of.

5. Original: The majority of previous studies on inattentional blindness have been done at rest …
Suggested revision/commentary: A majority of is most. Similarity, a minority of is few.

6. Original: This gene may serve as a potential therapeutic target in glioma in the future.
Suggested revision/commentary: There is redundancy in this sentence: something that may happen is by definition potential, and therefore in the future. Thus: This gene may be a therapeutic target in glioma. I think target for treatment is better than therapeutic target.

“One in 20 strategies in PubMed are treatment strategies, and there other strategies such as therapeutic strategies, coping strategies, teaching strategies, shoulder rehabilitation strategies, and so on. They are no different from treatment, treatment, coping, teaching, and shoulder rehabilitation.”

Author Information

Neville Goodman is a retired consultant anaesthetist. His interest in the English language started at school and was reignited while doing physiological research in Oxford. The first edition of his co-authored book on medical English was written while he was a senior lecturer in anaesthesia at the University of Bristol. The fourth edition appeared in 2014.