

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."¹ 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."² 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?"³

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."⁴

The prevalence of words in medical writing can be measured from PubMed^{®5}, and can be compared with the prevalence of words in English fiction, obtained using Ngram.⁶ This allowed me to put numbers⁷ 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.⁷ 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,⁸ 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 2010.⁷

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).⁷ 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 tear.

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 in-attentional 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

Represents 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 remifentanyl at a target organ concentration of 2.0 ng/mL...

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.

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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 inattentive 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 neater 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 inattention 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.