

Are medical eponyms really dying out? A study of their usage in the historical biomedical literature

PBM Thomas

Chief Resident in Ophthalmology, Department of Ophthalmology, Addenbrooke's Hospital, Cambridge and Department of Psychology, University of Cambridge, Cambridge, UK

ABSTRACT Eponyms are a prominent feature of medical language. Many feel they have had their time and serve only to complicate medical education and conversation. Others argue that eponyms can make unmemorable concepts memorable, can concisely label complex concepts, and promote a valuable interest in medical history.

It is frequently assumed that medical eponyms are marching towards extinction. However, this hypothesis has not been adequately tested. The fate of 8,636 eponyms from contemporary and historical registers is presented here. The annual usage of each eponym in PubMed indexed articles since 1900 is analysed with metrics of eponym prevalence, coinage and extinction. The fate of eponyms named for those implicated in Nazi war crimes is also measured.

The analysis shows that more publications used an eponym in their title in 2014 than ever before. However, the proportion using an eponym title has fallen from a peak of 3% in 1991 to 2% today, while annual extinction of eponyms overtook coinage in the 1980s. This suggests that, while not in dramatic decline, they are perhaps losing market share to more scientific descriptions. There is no ambiguity in the fate of eponyms related to Nazi war crimes which have almost entirely fallen out of use in the last decade.

KEYWORDS eponyms, history, linguistics, Nazi

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INTRODUCTION

Medical school is a busy time, and few courses offer a formal education in medical history. For most clinicians, medical history is an oral tradition, often passed on in the form of anecdotes during ward rounds or teaching presentations. These digressions are often triggered by a medical eponym – an organism, disease, syndrome, sign or similar that has been named for a doctor, patient, or third party. Some eponyms give human context to historical figures: Nobel laureate Adolf von Baeyer's (probably apocryphal) naming of barbiturates after Barbara, a barmaid from Munich,¹ for example. Others demand more sober reflection, reminding us of terrible abuses that have been perpetrated in the name of our profession: Eppinger's spider naevus, for instance, is named for a man who conducted experiments into the lethality of drinking only seawater, using as subjects Romani prisoners in the concentration camp at Dachau.²

Despite their ability to educate, medical eponyms provoke strong feelings among clinicians, and the debate over their continued use is polarised,^{3,4} and has been for

decades.^{5,6} The arguments on both sides are familiar and have recently been succinctly reviewed.⁷ Supporters⁸ argue that eponyms can be memorable, are concise, honour distinguished forebears, and provoke an interest in medical history. Critics³ bemoan their lack of scientific rigour, the frequent misattribution of credit, the occasional attribution of credit to those who have committed crimes against humanity,^{2,9,10} and the existence of multiple variants of a single eponym through grammatical¹¹ and spelling errors or through multiple attribution.

Trends in the use of medical eponyms have often been commented on. Supporters have mourned their decline in the literature since at least 1967,¹² but quantitative proof of decline (or otherwise) has largely been limited to eponyms named for those involved in Nazi atrocities.¹³ The fate of all other eponyms has not been quantified although there is evidence that new eponyms now arise infrequently.⁷ It is the purpose of this paper to fill in this quantitative blank, and give an in-depth analysis of the trends in the usage of medical eponyms over the last 100 or so years.

Correspondence to PBM Thomas
Department of Psychology
University of Cambridge
Downing Street
Cambridge CB2 3EB
UK

e-mail pbmthomas@gmail.com

DATA COLLECTION

There are many medical eponyms, both extant and extinct. To gain a comprehensive insight into their lifecycle and usage, a large list (8,636 in total) was compiled from www.whonamedit.com. A second list of 102 medical eponyms was taken from the 1972 edition of *Notable Names in Medicine and Surgery*,¹⁴ and a third list was compiled of 11 eponyms connected with the perpetrators of Nazi crimes² and their alternative non-eponymous names (Table 1).

Matlab (Mathworks, Nantick, USA) was used to create a 'webscraper' which performed automated searches for every eponym in the title of all indexed publications on PubMed. The number of uses of each eponym per year (of publication) was logged. The total number of publications listed on PubMed per year was also extracted to allow calculation of the yearly proportion of all papers using each eponym. To attempt to control for the changing (increasingly scientific) makeup of PubMed, searches were also made for 50 clinical medicine terms present in publications from the early 19th century (e.g. inflammation, artery and wound) which have not become obsolete. Papers are retrospectively added to the PubMed database as new journals and their archives become listed. The data presented here were extracted during May 2015 and can be considered accurate of the contents of the PubMed database at that point in time. Data analysis was undertaken in Microsoft Excel (Microsoft Corporation, Redmond WA, USA) and Matlab.

TRENDS IN EPONYM USAGE

The three datasets tell us about different aspects of eponym usage.

Trends in the 'whonamedit.com' dataset

This is by far the most comprehensive dataset available. It shows that throughout the 20th and 21st centuries there has been a steady increase in the number of uses of eponyms per year in titles in the PubMed database (Figure 1a). In 2014, the most recent year analysed, the greatest number was seen at 21,733 (compared to 20,779 in 2013 and 1,995 in 1950). Since 1945, the number of eponyms used in a given year has only failed to exceed the preceding year's count in 1956, 1958, 1974, 1978, 1997 and 2007.

However, the number of publications referenced in PubMed per year has also grown dramatically to 1,055,105 in 2014 (at the time the searches were performed) from just 85,580 in 1950: this rate has outstripped eponym usage since 1991 when the prevalence of eponyms in titles peaked at 3%. By 2014 this prevalence had dropped back to 2%. Figure 1a shows the full trends. In order partially to control for

TABLE 1 Eponyms connected with perpetrators of Nazi crimes, and their alternative names

Eponyms connected with the perpetrators of Nazi crimes	Alternative non-eponymous names
Beck–Ibrahim disease	congenital cutaneous candidiasis
Cauchois–Eppinger–Frugoni syndrome	portal vein thrombosis
Clara cells	club cells
Hallervorden–Spatz disease	pantothenate kinase-associated neurodegeneration
Reiter's syndrome	reactive arthritis
Seitelberger disease	infantile neuroaxonal dystrophy
Spatz–Stiefler reaction	paralysis agitans reaction
Van Bogaert–Scherer–Epstein syndrome	cerebrotendineous xanthomatosis
Wegener's granulomatosis	granulomatosis with polyangiitis
Eppinger's spider naevus	spider naevus
Reiter's spirochete	Treponema forans

the changing content of PubMed (an increasing presence of non-clinical science), Figure 1a also compares the annual usage of all eponyms to 50 clinical medicine terms which have remained in constant use since the 19th century. This ratio too has declined steadily since the early 1990s (except for 2014 which shows a small increase), though the trend is less marked.

The number of unique eponyms used per year is shown in Figure 1b. There was a rapid increase in the second half of the 20th century, peaking in 1991 with only a small decline since. Coinage and extinction of eponyms were also assessed in this dataset. Coinage refers to the first year in which the eponym appears in a PubMed title, whereas year of extinction is here defined as the last year in which an eponym was used. Since rarely used eponyms might not appear in a given year only to resurface in the next, extinction is only assessed up until 2005 (eponyms last used in this year which have not yet resurfaced are deemed unlikely to do so). Figure 1b also shows the rates of coinage and extinction of eponyms: during the 1980s extinction overtook coinage, and has remained ahead ever since.

Trends in the 'Bishop and Bailey' dataset

The post-war peak prevalence of this subset of eponyms occurred in 1954. This peak pre-dates publication of the third edition of *Notable Names in Medicine and Surgery* by 18 years, and use of these eponyms was in significant decline by 1972 (the year of publication of the edition). This finding is curious since the period 1954 to 1972 is a time of healthy growth among eponyms in the 'whonamedit.com' dataset. It could alert us to the possibility that a list of eponyms is biased towards those eponyms that are well established at the time it is

compiled, and might not include those that have recently been coined but will go on to widespread use.

Trends in 'Nazi' dataset

Figure 1c shows trends in usage of eponyms related to the perpetrators of Nazi crimes as well as usage of the scientific disease names that refer to the same conditions. Peak prevalence of Nazi eponyms occurred in 1993 and since then there has been a precipitous decline. Only Wegener's granulomatosis, now largely renamed granulomatosis with polyangiitis, remains in common usage and accounts for 77% of the uses among this dataset in 2014. The decline is most dramatic since 2010 which coincides with a marked increase in the usage of the scientific names which refer to the same conditions.

SYNTHESIS

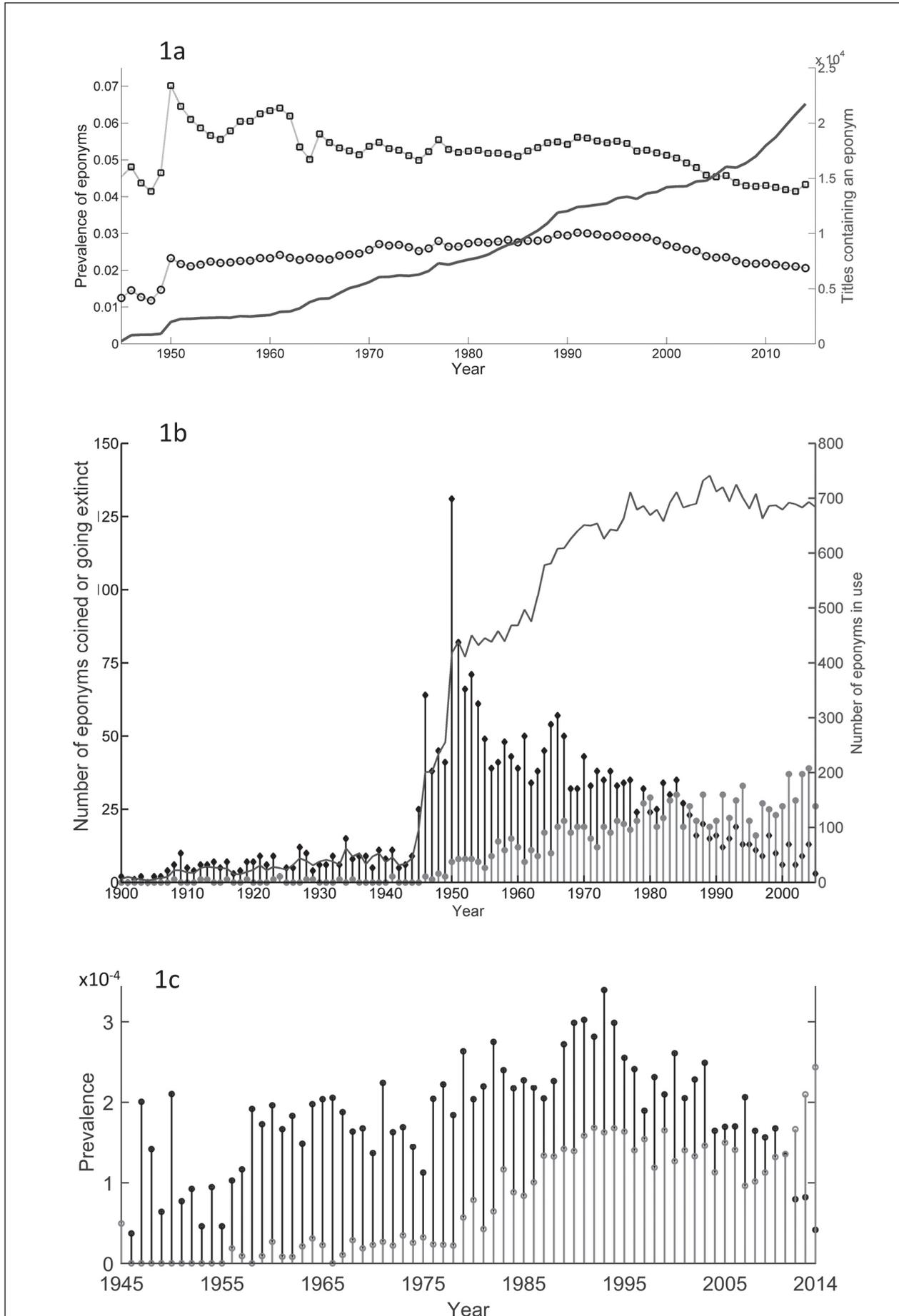
The analysis presented above shows some internal conflict. The raw numbers suggest that eponyms are in rude health, relentlessly increasing in use since 1945. Their prevalence, however, suggests a slow decline. A smaller proportion of papers used eponyms in 2014 than at the 1991 peak. It is hard to say whether this is an artefact of changing research focus within PubMed. The trend is weaker, but still present, when eponym prevalence is measured among those papers containing clearly clinical terms. We also see a slow loss of eponym diversity, with fewer eponyms in active use in 2014 (704) than in 1991 (720) despite an explosion in medical publication over the same period. The increased rate of annual eponym extinction is clear, though we might underestimate coinage: the next 'Alzheimer's disease' might recently have been coined in a small, sub-specialty journal, and not yet broken through to widespread use and attracted the attention of curators of eponym lists.

The story is much clearer when considering those eponyms named for individuals who are implicated in Nazi atrocities. There has been a dramatic decline in their usage, particularly over the past five years. Only Wegener's granulomatosis still occurred regularly in the literature in 2014, though its use is now outnumbered fourfold by the term granulomatosis with polyangiitis. Preliminary data for 2015 suggests that use of 'Wegener's granulomatosis' halved compared to 2014. It would seem these eponyms are finally on the verge of complete extinction.

Although one can make theoretical arguments for and against eponym usage, practicalities of medical language will act strongly to preserve them. If we were to abandon the eponym *Salmonella* (named for Daniel Elmer Salmon, a veterinary pathologist) for example, what would we replace it with, and what would we gain? Is there an alternative succinct and scientific way we can describe this genus, and is it worth the effort and confusion of a rebranding? Other eponyms, such as Alzheimer's disease (named for Aloisius Alzheimer, a German neuropathologist) are so well entrenched in public understanding that rebranding would cause precisely the confusion that a more scientific taxonomy aims to avoid. Therefore many existing eponyms, especially the most prevalent ones, cannot practically be replaced because they are too well entrenched or because there is no concise way of describing them scientifically. The popularity of more obscure eponyms will doubtless fluctuate as fashions change, but the ubiquity of the most used eponyms (*Escherichia*, Alzheimer's disease, *Salmonella*, Parkinson's disease, Crohn's disease, Epstein-Barr virus etc.) provides a strong buffer against a significant short or medium term reduction in the incidence of eponym usage.

It has been suggested that as medicine continues its evolution from phenomenology to science, eponyms should slowly die out.¹⁵ This assumption is questionable, since more established scientific disciplines than ours enshrine eponyms in their most basic language: most physical units and constants, and many recently discovered elements, for example. Taking a reductionist view, one could argue that eponyms exist for two reasons: first, a human desire to be remembered; and second, because there sometimes isn't a better way of naming a concept without resorting to cumbersome and unmemorable descriptions. Theoretical arguments in favour of a scientific nomenclature stand little chance of altering either of these realities. Amid much discussion of their pros and cons, a decline of medical eponyms has often been presumed. However, no hard evidence has been presented to confirm the existence of such a trend. From the analysis presented here, we can conclude that eponyms are now used more than at any point in the past. However, there is evidence that they have been losing market share to more scientific terms for the past two decades. We might have passed peak eponym, but reports of their death are greatly exaggerated.

FIGURE 1 (overleaf) a) Total annual post-war eponym usage (black line, right axis) in Pubmed, annual eponym prevalence (black circles, left axis), and annual eponym prevalence among papers using one of 50 clinical terms (black squares, left axis); b) The total number of unique eponyms used in each year between 1900 and 2005 (black line, right axis), and the number of eponyms coined (black diamonds, left axis) and becoming extinct (black circles, left axis) in each year; c) The prevalence of eponyms related to Nazi atrocities (filled black circles) and their scientific alternatives (open black circles), 1945–2014.



HISTORY

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