Google trends as a tool in ENT Epidemiology

Rudd J, Hickson C, Mckay-Davies I

Google trends (GT) holds potential as a tool for search data to provide meaningful insight into population behaviour and it’s links with healthcare. (1) This was demonstrated as an effective tool to predict outbreaks of flu by aggregating google search queries which were found to be generally consistent with conventionally collected health surveillance data. (2) Researchers in the US predicted presentations to emergency departments one week in advance of warnings coming from the Center for Disease Control (CDC).

Figure 1 Chart showing correlation between google searches and figures from the Centers for Disease Control. ILI – Influenza Like Illness. Chart adapted from (3)

GT has been used in other contexts in healthcare research but with many methodological flaws and little reproducibility but very little work has been performed with GT in the specialty of ENT save for Braun et al. from Germany. (4,5) They identified temporal trends of Google searches in Germany of various ENT related search terms. In particular the annual cyclical pattern of sinusitis, epistaxis and the peak of searches for tinnitus on Mondays, GT has not been studied in the UK in this context (5) Specific advantages include the immediacy of the results in contrast with data collected as patients present which then is centralized and released at a later date.

Objectives

To assess interest in ENT conditions using google trends and whether google trends RSV (Relative Search Volume) matches temporal peaks of incidence for ENT conditions in the UK. Comparison of RSV and admissions data for epistaxis.

Method

GT searches were conducted for ENT presentations in the UK between 2013 and 2018 using the search terms: tonsillitis and (nose bleed). (1) Further searches were conducted for the term ‘nose bleed’ between 2005 – 2009 and compared with epistaxis admission data from Olaleye et al. (6)

Results

Results of searches are displayed below, the Y axis is Relative Search Volume, which is described by Google as representing search interest relative to the highest point on the chart for the given region and time. In the UK, peak incidence of google searches for the search term ‘nose bleed’ typically lies in February. Tonsillitis as a search term also had a clear cyclic pattern with peaks in winter and a nadir in summer. (Figure 2)

Cumulative RSV vs Epistaxis Admissions
2005-2009

Epistaxis admissions decreased in the summer in East Kent over a 5 year period between 2005-2009 as did RSV for the UK over the same period.(6) Using Spearman’s Rho to assess correlation between epistaxis admissions by month and RSV $R = 0.36$ ($p = 0.25$), but when analysed by quarters $R = 1$ ($p = 0$), indicating a statistically significant association. (7)

Discussion

Admissions for tonsillitis and epistaxis vary with the seasons, generally increasing in winter which is evidenced by Hospital Episode Statistics (HES) data. (8). Relative search volumes on Google for ‘nose bleed’ and tonsillitis also vary in a similar cyclical pattern and there is strong correlation between RSV and admissions for epistaxis between the seasons. However there are limitations to this analysis including different populations with epistaxis admissions versus ‘Nose bleed’ google searches for the UK due to the inaccessibility of such localised Google data. Furthermore there is selection bias when questioning Google trends as other terms can be used to search for a bleeding nose. Potential practical applications of this technology in healthcare are many. Public understanding and interest in certain pathologies can be assessed, in particular Schootman et al. used Google Trends to gauge interest and thus success of ‘cancer awareness’ days. (9) Other uses have been demonstrated by Samaras et al. such as the potential to forecast the peak incidence of scarlet fever five weeks pre-arrival in the UK. (10)

Traditional methods of data collection are comparatively resource and time heavy unlike GT but various studies have demonstrated the limited ability of Google trends data to correlate with true incidence of disease.(4) Google trends data can provide immediate results for population search queries giving an insight into behaviors in relation to pathology. However there are few current practical uses but certainly it’s a powerful tool requiring more research to elucidate it’s benefits within ENT.

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