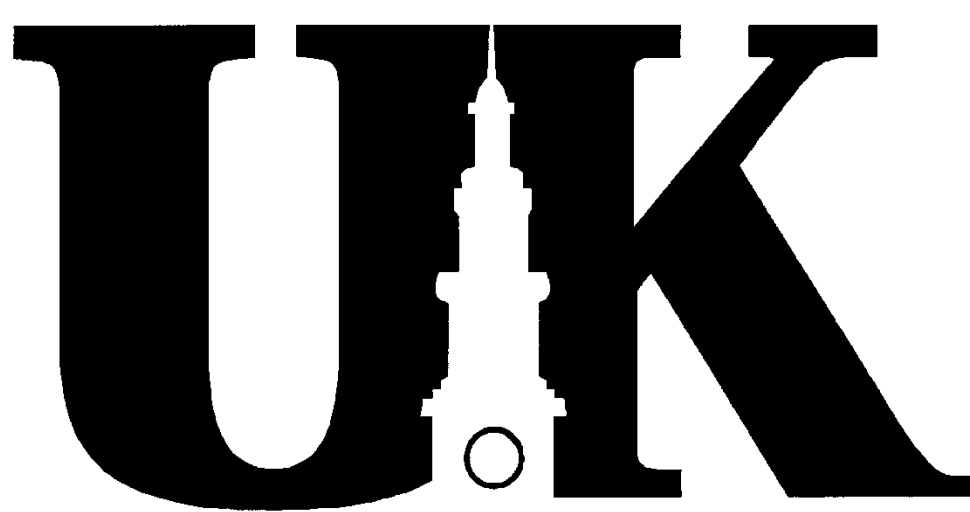




# Evaluation of Common Google Keywords and Readability of Web Based Information Relating to Pediatric Dentistry

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## INTRODUCTION

- As healthcare has adopted a more patient-centered care approach, better adherence to treatment and improved quality of life has resulted (Allen). As such, in a field like Pediatric Dentistry, it is important for oral health providers to recognize that parents are the surrogate decision makers for their children. It is the parents' responsibility to act in the best interest of their child. In order to fulfill this obligation, the parent must be an active participant in the child's health care.
- There has been a worldwide increase in Internet usage of 400% between the years of 2000 and 2009 (Shiavo, 2008). As new digital technologies are incorporated into our daily lives, the impact of this reliance on technology is not fully understood. Regarding healthcare, however, there has been 'a shift in the role of the patient from passive recipient to active consumer of health information' (McMullan, 2006). Parents are increasingly seeking additional information regarding possible treatments and potential outcomes on the web.
- Wald et al. states 'the use of web-derived information can yield better informed patients with a higher likelihood of adherence and improved health outcomes'. However, not all websites are created equal and some are more credible than others. It is up to the reader to interpret the information and determine the credibility for themselves. Variables such as reading level and search engine algorithm play a role in what information readers are exposed to and how this information is interpreted.
- The American Medical Association recommends patient education materials be written at a sixth-grade level and reports the average reading level of adults is at an 8<sup>th</sup> grade level. Author could not find reading level recommendations from the American Dental Association or American Academy of Pediatric Dentists. For the purpose of this study, the AMA reading level recommendation was used.
- A study by Jennings et al. evaluated adult literacy from the ages of 16-65 (a range that is highly applicable to surrogate decision makers of pediatric patients) stated that 'about 14 percent of Kentucky adults on average have no or virtually no literacy skills. In other words, about 340,000 Kentuckians lack the minimal skills needed to function effectively in the marketplace, the workplace, the home and the community.'
- Author could not find specific information detailing the health literacy of adult Kentuckians, but a national study outlines national health literacy rates of '36% of the adult participants had basic or below basic health literacy skills.' (Cutilli et al.)

## METHODS

**Sample:** 53 highly searched keywords relating to Pediatric Dentistry were harvested from Google AdWords producing a search analysis of n=1,060 websites.

**Design:** A web-based analysis of highly searched keywords pertaining to Pediatric Dentistry was completed. Each keyword was searched on Google utilizing Incognito Mode. An analysis of key aspects of resultant top 20 websites per keyword was completed.

**Procedures:** A search query was completed from each commonly searched keyword. Analysis of the top 20 subsequent websites was completed using 4 verified readability calculators (Flesch Kincaid Formula, Gunning Fog Index Scale, Smog Index, and Dale Chall Formula). The Top Level Domains (TLDs) were evaluated for trends in readability levels per each domain (.com, .org, .net, .gov, and a combined category of uncommon TLDS labelled "others") and the changes in readability as the search results progressed from the first website to the 20<sup>th</sup> website. Furthermore, the percentage of websites that were private practitioner advertisements was also evaluated.

**Measures:** An analysis to determine readability levels as it pertains to Top Level Domains and progression through search results, as well as evaluation of the proportion of private advertisements versus solely information websites.

**Statistical analysis:** Linear Mixed Model

### Overall Percentage of Top Level Domains

TLD	.com	.org	.gov	.edu	.uk/.ca	"Other"
Count (%)	724 (68.3%)	178 (16.8%)	66 (6.2%)	26 (2.5%)	40 (3.8%)	26 (2.5%)

## RESULTS

Of the 1,060 websites evaluated, all exceeded the recommended 6<sup>th</sup> grade reading level recommended by AMA.

48% of websites evaluated were private advertisements paid for by dentists/dental offices. The keyword associated with the highest percentage (95%) of advertisements was 'white fillings'.

The keywords associated with the lowest percentage (0%) of advertisements were 'Formocresol pulpotomy' and 'abscess tooth'.

When comparing advertisements to non-advertisements, readability scores significantly decreased for all formulas. Advertisements are significantly easier to read.

The most common TLD was .com, followed by .org, .gov, .edu, .uk/.ca, and other, respectively.

Readability score increased significantly for all 4 formulae as Google search rank increased.

The category with the lowest reading level score was Non-Nutritive Oral Habits for all 4 categories (easiest to read). The categories with the highest reading level score was General Anesthesia for Flesch-Kincaid Formula, Gunning Fog Index, and Smog. Silver Diamine Fluoride had the highest reading level score for Dale Chall Formula.

Category	F-K	GFI	SMOG	Dale-Chall
Conscious Sedation	12.1 (10.7)	15.2 (14.3)	11.1 (10.4)	8.5 (8.4)
General Anesthesia	13.1 (12.7)	16.1 (16)	12 (11.6)	8.5 (8.4)
Nitrous Oxide	9.6 (9.2)	12 (11.8)	8.7 (8.4)	8.1 (8)
Sealants	9.3 (9.2)	11.5 (11.4)	8.1 (8)	8.3 (8.4)
Fluoride	10.9 (10.4)	13.5 (13.1)	10 (9.6)	8.6 (8.4)
X Rays	12.2 (11.3)	15.2 (14.4)	10.9 (10.4)	8.5 (8.2)
Infection	9.9 (9.4)	12.8 (12.1)	9.2 (8.9)	8.1 (8)
Restorative	9.3 (9.1)	11.9 (11.7)	8.6 (8.4)	7.8 (7.6)
Pulpotomy	12.4 (11.9)	15.8 (15.3)	11.5 (10.9)	8.6 (8.6)
Silver Diamine Fluoride	11.8 (12.5)	14.3 (14.4)	10.6 (10.6)	9.1 (9.1)
Thumb/Finger Sucking	8.5 (8.3)	10.8 (10.8)	7.6 (7.5)	7.1 (7)

### Overall Percentage of Private Advertisements

Advertising	Yes	No	Missing
Count (%)	512 (48.3%)	547 (51.6%)	1 (0.1%)

## CONCLUSIONS

Website readability scores were significantly higher than that recommended by the American Medical Association, as well as significantly higher than the average reading level of Kentucky residents.

The Top Level Domain with the highest readability level was .com with .gov being the most difficult to read.

As Google search results progressed, there was a significant increase in reading level found for all verified formulae.

There is a significant proportion (48%) of private advertisements in the keyword search results.

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