

# Lost in translation: Doctorlingo aims to improve doctor-patient communication discourse.

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## Introduction

### Problems

#### 1) Health Literacy

Low literacy rates are linked to poorer decision-making, therapeutic outcomes, and adherence. Approximately 36% of the US adult population has limited health literacy<sup>1</sup>.

#### 2) Open Notes

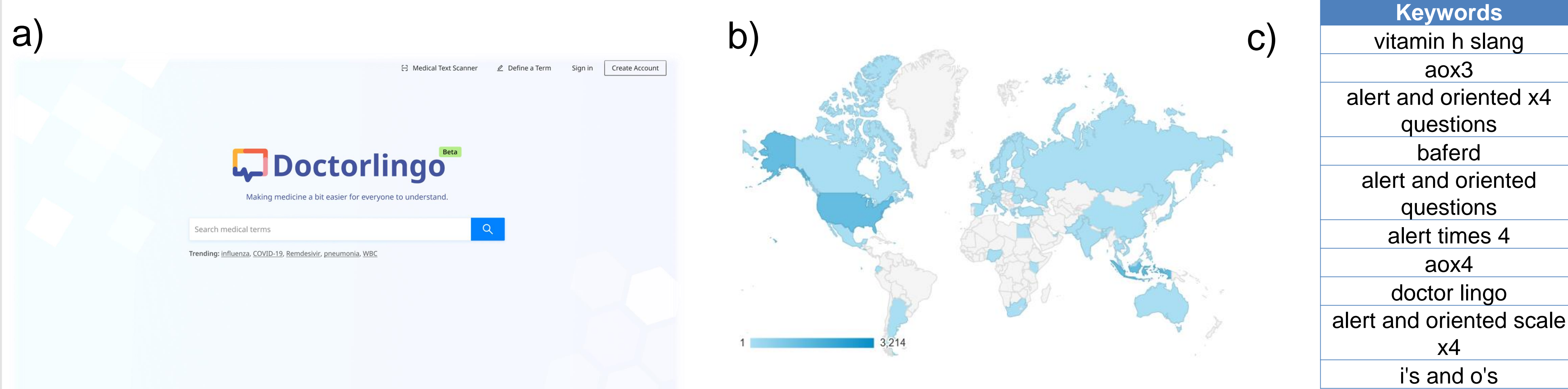
The Federal Open Notes Act (ONC) now allows direct access to medical notes with no filters<sup>2</sup>. Physicians, specifically Oncologists, are concerned with the ability of their patients to comprehend medical chart information<sup>3,4</sup>. Likewise, research has shown that the biggest concern from patients is navigating the medical jargon in the notes<sup>5</sup>.

### Proposed Solution

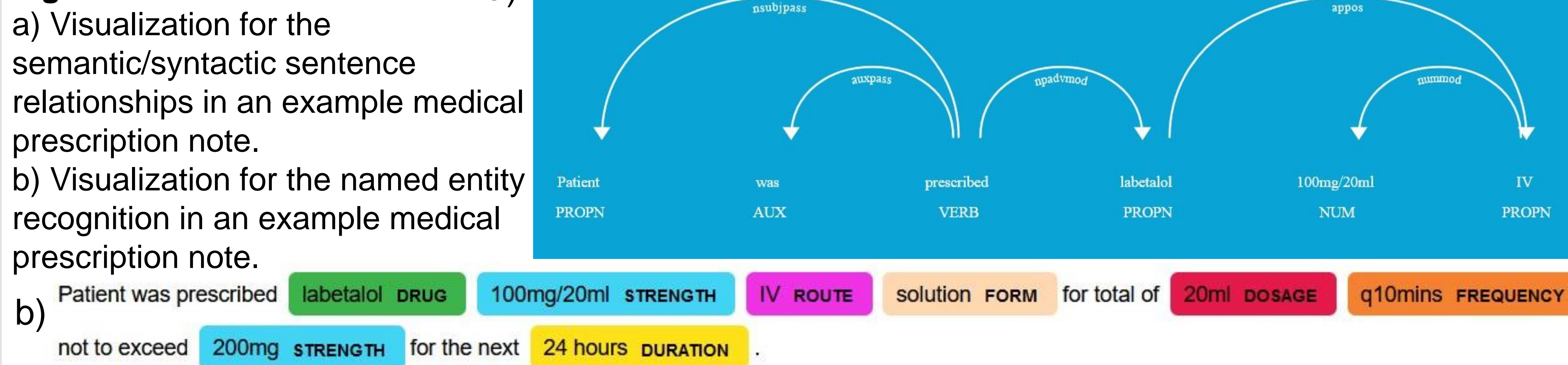
We propose a web application, [Doctorlingo.com](https://www.doctorlingo.com) (DL), for dejargonizing medical language into simple English. This tool is created with the patient's best interest at the forefront. It must encompass elements of usability, accessibility, and readability. These elements must be able to be quantitatively measured through analytics and qualitatively measured through user interactions.



**Figure 1:** a) Prototyped wireframe for version 2.0 homepage. b) Countries utilizing DL c) Short list of keywords currently ranking in top positions on Google.



**Figure 2:**



## Methodology

### Application Goals:

Use state-of-the-art technologies to create a mobile web application with an application program interface (API) for integrations into healthcare applications. Ability for users to interact through crowdsourcing. Utilize human-in-the-loop artificial intelligence for developing a natural language processing corpus (glossary that links related words and items) pipeline.

### Evaluation:

Metrics of usability, accessibility, and optimization using industry standard healthcare website analytic tools<sup>5</sup>. User experience team of five non-medical professionals (including designers, researchers, and accessibility engineers) created the user-facing portal. User research was conducted moderated testing.

## Results

### Application:

We created a Progressive Web-Application (PWA) with crowdsourcing capabilities (Fig. 1a)<sup>6</sup>. The PWA is disability friendly, containing hundreds of ARIA attributes. We are utilizing a GraphQL API<sup>7</sup>. We created a medical corpus created with ~14 million terms. There is medical note interpretation using syntactic and semantic sentence relationships (Fig. 2a) and named entity recognition (Fig. 2b).

### Evaluation:

In April 2021, there were 6,000 monthly users across 46 countries (Fig. 1b). 78% of users were on mobile devices. All current terms have an average reading level of 8<sup>th</sup> grade. We hold the #1 position on Google for 8 keywords, with 195 keywords in top 20 (Fig. 1c). User moderated testing feedback was incorporated to make changes to the user interface.

## Conclusion

Patient-physician communication is often poor due to the medical jargon, acronyms, and even slang that physicians often use. DL, as an automated medical jargon translation tool, serves as a useful tool to enhance both the spoken and written interaction between medical professionals and lay people.

There is a need for the continued development and implementation of automated keyword detection and simplified translation of patient medical records. This tool may prove useful for understanding drug prospectuses, increasing therapeutic adherence, and supplementing other medical information sources.

Further research will need to be conducted in order to accurately assess the effectiveness of this tool in improving physician-patient communication.

## Acknowledgements

We would like to thank the entirety of the Doctorlingo volunteer team.

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