

## Background

- Poor health literacy has been associated with worse health outcomes.<sup>1</sup>
- A 2003 survey demonstrated that only 12% of US adults have a proficient health literacy, and about 80 million US adults would have difficulty with basic health tasks, such as following the directions on a prescription label.<sup>2</sup>
- As of 2017, third-party websites are now second only to doctors as the primary source of patient-focused medical information (MI). This trend is consistent across age groups, from millennials to adults 65+.<sup>3</sup>
- MI created for patient comprehension may be unsuitable because it is often written at an advanced reading level<sup>4</sup> and online compendia often have misinformation.<sup>5,6</sup>
- There is a dearth of research in this area and no standard tool to evaluate accuracy and completeness, in combination with readability of patient-focused MI resources.
- An unmet need exists in ensuring access to medical information (MI) which is comprehensible for the majority of the US population.

## Objective

- To evaluate the top 6 consumer drug information websites using the FDA-approved package inserts of the top 9 prescribed drugs for accuracy, completeness, and readability of medical information.

## Methods

- The top six medical information websites were identified through a point-based system assigned through a Google search exercise; Wikipedia and Pharma websites were excluded.
- The top 9 prescribed drugs were determined from a 2017 PharmacyTimes article citing a 2014 source.<sup>7</sup>
- As no validated tool exists for evaluating patient-focused MI, a rubric was developed using the following selected categories based on the US package insert (PI): Indications, dosing, dosage forms, administration, contraindications, warnings, adverse events (AEs), drug interactions (DDI), pregnancy & lactation, pediatric & geriatric use, hepatic & renal impairment, drug abuse, overdose, MOA, storage, missed doses
- Additional categories were added to assess readability, organization & appropriate referral to healthcare providers.

## Methods (continued)

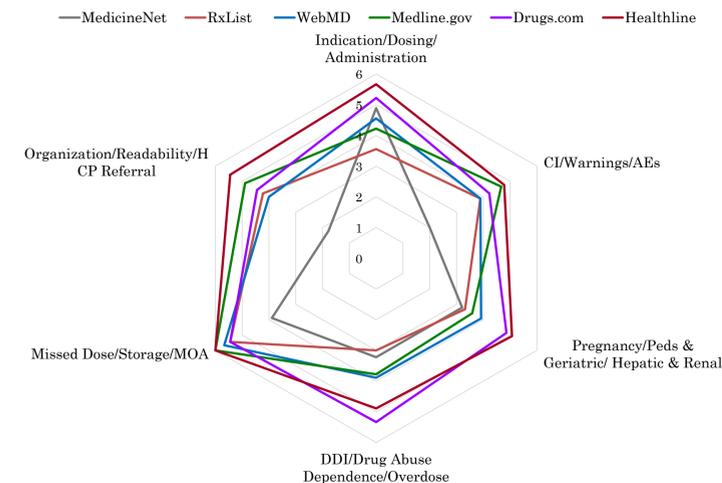
- Scoring for each category was based on the “Suitability Assessment of Materials” (SAM), which was created for evaluation of health-related information for adults.<sup>8</sup> The websites were scored against the USPI of each drug.
- Two pharmacists independently reviewed each drug-website combination and adjudicated score discrepancies
- Scores are reported as a percentage of the total possible score
- The Mann-Whitney U test was used to make pair-wise comparisons between the scores of each of the 6 websites. The Bonferroni correction was used to establish  $\alpha=0.003$

## Results

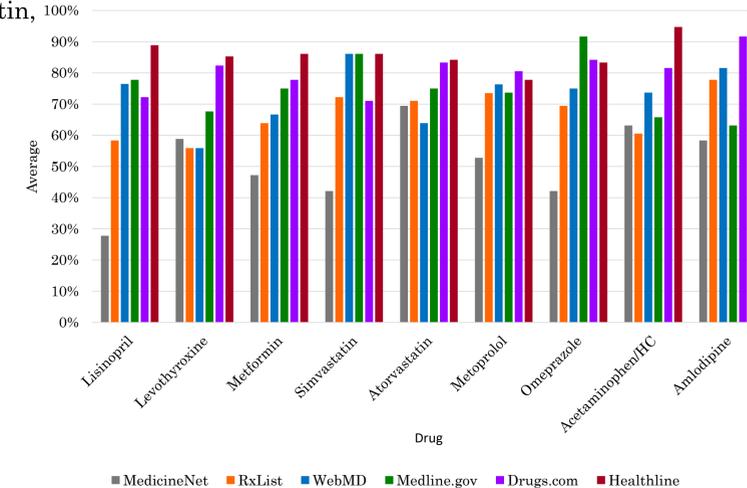
The top 9 prescribed drugs were reviewed:  
Lisinopril, Levothyroxine, Metformin, Simvastatin, Atorvastatin,  
Metoprolol, Omeprazole, Acetaminophen/Hydrocodone,  
Amlodipine

### Top 6 websites reviewed Average score

MedicineNet	51%
RxList	67%
WebMD	73%
Medline.gov	75%
Drugs.com	81%
Healthline	87%



Scores Per Drug by Website



Statistical Analyses			
Websites compared	P value	Websites compared	P value
Drugs.com vs. WebMD	0.085	WebMD vs. RxList	0.133
Drugs.com vs. Healthline	0.024	WebMD vs. Medline.gov	0.859
Drugs.com vs. MedicineNet	0.0004*	Healthline vs. MedicineNet	0.0004*
Drugs.com vs. RxList	0.003*	Healthline vs. RxList	0.0005*
Drugs.com vs. Medline.gov	0.185	Healthline vs. Medline.gov	0.015
WebMD vs. Healthline	0.0026*	MedicineNet vs. RxList	0.01
WebMD vs. MedicineNet	0.0027*	MedicineNet vs. Medline.gov	0.001*
*P values < 0.003 were considered statistically significant		RxList vs. Medline.gov	0.07

## Limitations

- The primary limitation of this analysis is that the rubric is not a validated measure.
- A scoring system was used to determine which websites were the most common, because no such data exists demonstrating which websites receive the most patient traffic. However, patients may also search by brand name, side effect, ADR, or benefit, which was not addressed by the scoring system.
- For the purpose of statistical analyses, we assumed that the scores on a particular website by drug were not statistically different, in order to make comparisons across each website.

## Conclusions

- The developed rubric enabled a quantitative assessment of the quality of patient-focused MI websites.
- MedicineNet was identified as the least reliable website, with the lowest average score, deficiencies in safety information, and the highest number of statistically significant differences favoring other in our pair-wise comparison.
- Healthline was the most reliable website, with the highest average score, and second highest amount of statistical differences.
- Validation of the developed rubric and a larger data set are needed for more robust analyses of patient-focused MI sources.

## References

1. Berkman ND, et al. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med* 2011;155(2):97-107.
2. <https://health.gov/communication/literacy/issuebrief/>
3. <https://www.hospitals.healthgrades.com/hospitals/resources/march-2017/where-do-consumers-get-their-medical-information>
4. Badarudeen S, et al. Assessing readability of patient education materials. *Clin Orthop Relat Res* 2010;468:2572-80
5. Randhawa AS, et al. A collaborative assessment among 11 pharmaceutical companies of misinformation in commonly used online drug information compendia. *Ann Pharmacother* 2016;50(5):352-59
6. Talwar SR, et al. Implementing a process to review product-specific misinformation in online drug information compendia. *Ther Innov Regul Sci* 2015;49(2):262-8
7. Guerra T. “The Top 200 Drugs of 2017?” *PharmacyTimes*. 6-Nov-17
8. Wolf MS, King J, Wilson EAH, et al. Usability of FDA-approved medication guides. *J Gen Intern Med* 2012;27(12):1714-20

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