

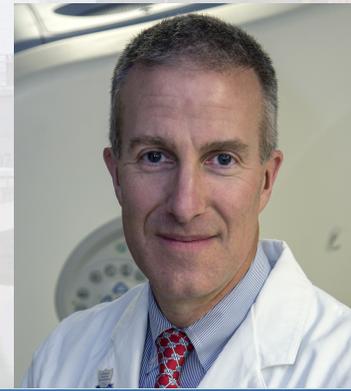
Radiology Report Readability: An Opportunity for Adding Value to Patients

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Financial Disclosure

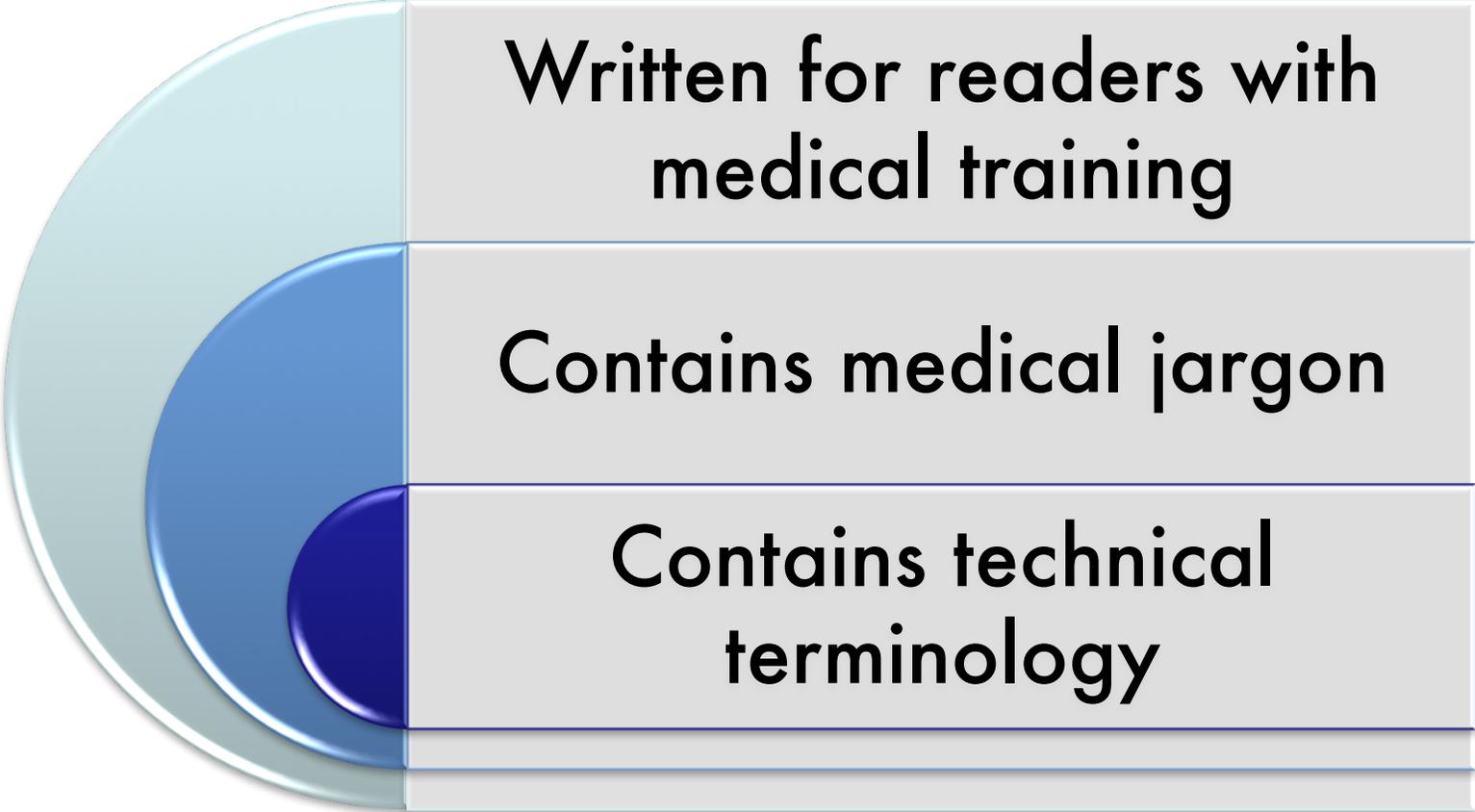
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Traditional Radiology Report



Written for readers with
medical training

Contains medical jargon

Contains technical
terminology



Radiology Report in Patient-Centered Era



Patient portals

How much can patients understand reading radiology reports?



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Purpose

To determine average reading level of radiology reports across all subspecialties and all imaging modalities



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Material and Methods

1

- HIPPA Compliant
- Institutional Review Board Exempt

2

- Study period: March 1, 2017 – March 31, 2017
- Location: Quaternary-care academic hospital

3

- Material: All radiology reports finalized during the study period
- Extracted from the institution's RIS system (Analytical Informatics, Baltimore, MD)

4

- Readability indices were determined using Readability Studio (Oleander Software, Ltd., Vandalia, Ohio)
- Reading grade level and reader age were determined using Flesch-Kinkaid score, Flesch reading scale, FORCAST, Cunning Fog and Smog. Scores were reported as averages*.

*For further details on readability indices used in the study please see the reference slide at the end of the presentation



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Material and Methods

Analysis

- Analyzed radiology reports were segmented by subspecialties and imaging modalities

Subspecialties

- Abdominal Imaging, Breast Imaging, Cardiothoracic Imaging, Community Radiology, Emergency Radiology, Interventional Radiology, Neuroradiology, Nuclear Medicine, Musculoskeletal Radiology, Pediatric Radiology

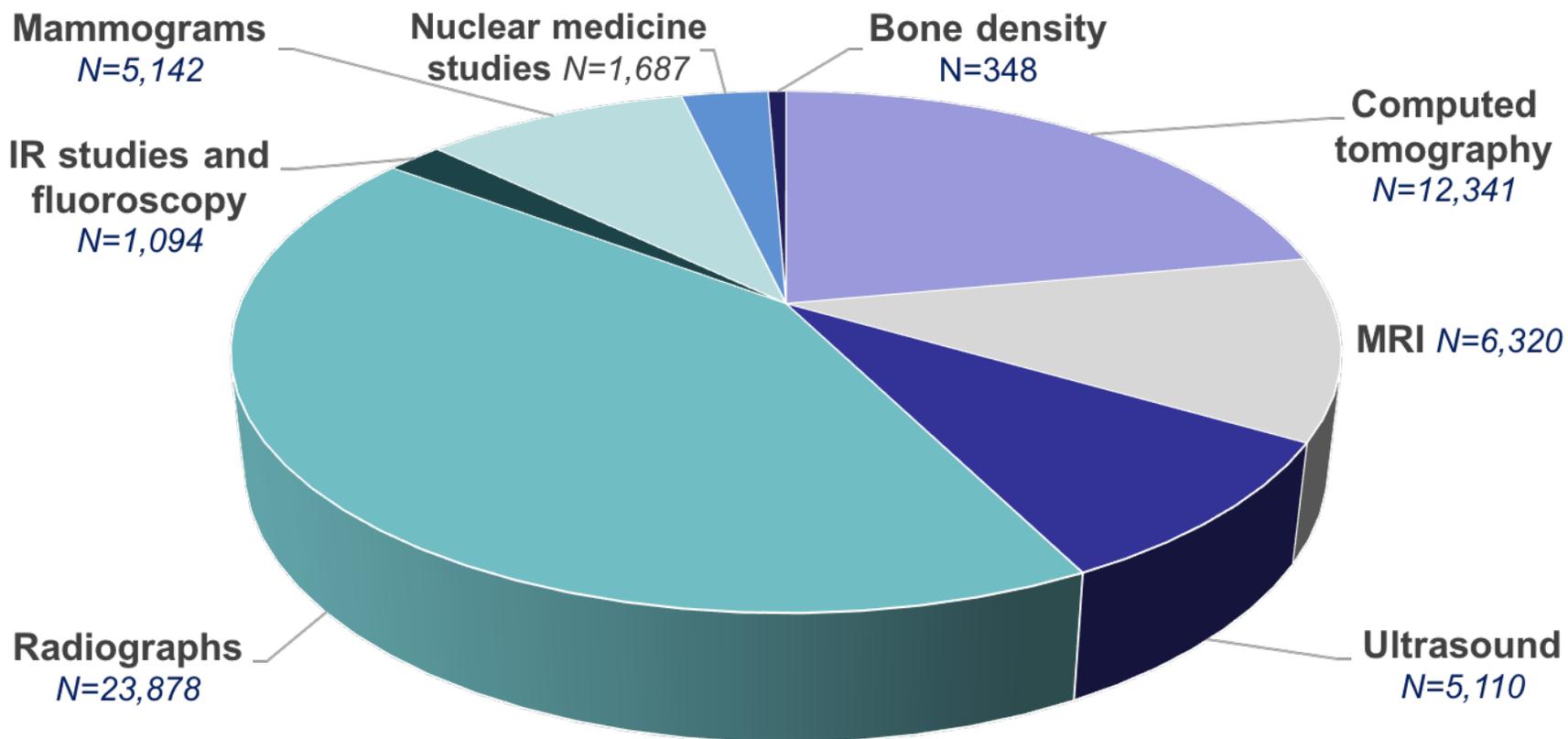
Modalities

- CT, MRI, ultrasound, radiographs, interventional radiology studies and fluoroscopy, mammograms, nuclear medicine studies, bone density



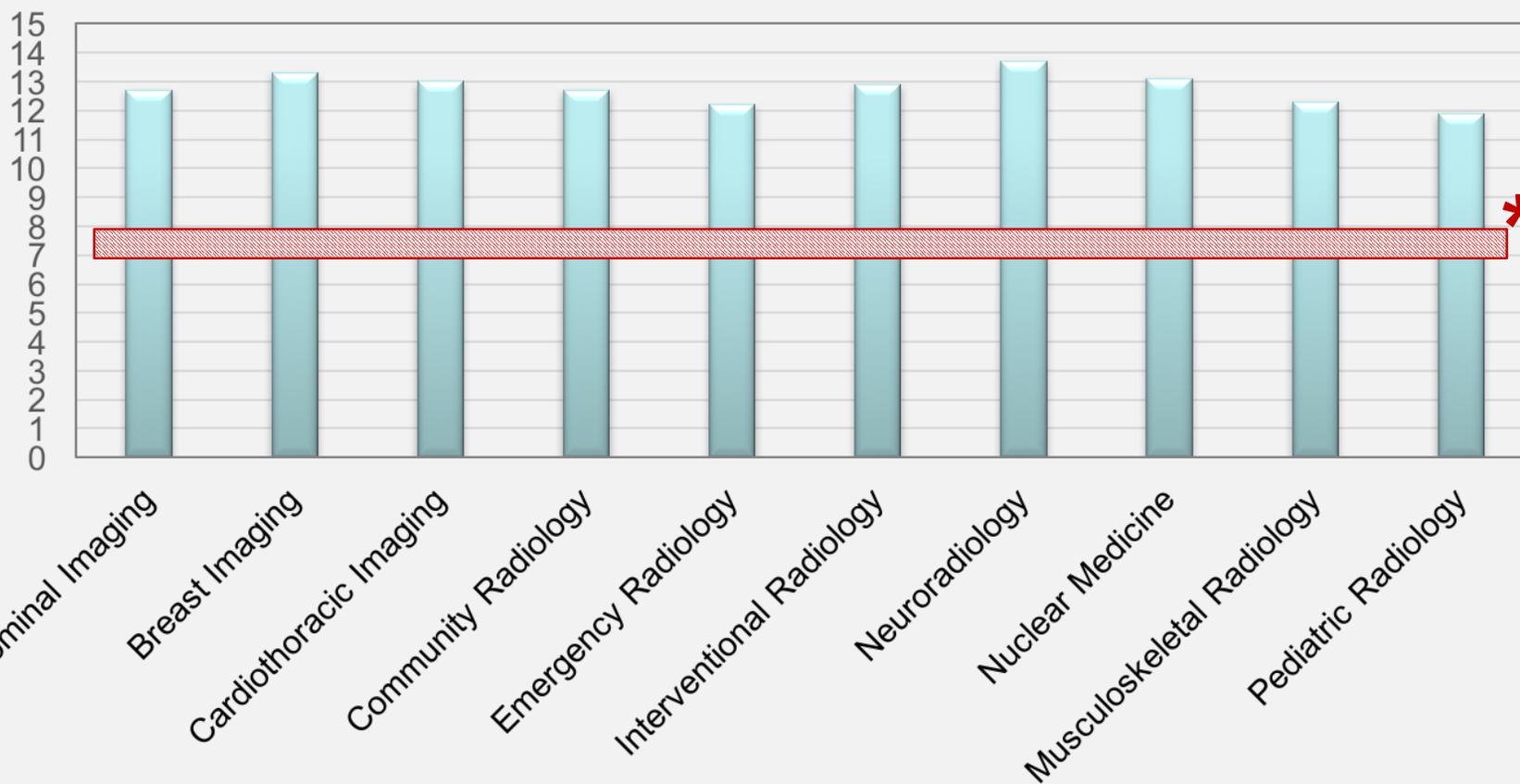
Results

Total number of analyzed radiology reports: 55,920



Results

Average Radiology Report Readability Grade Level
Segmented by Subspecialty



*The average adult literacy level in the U.S. corresponds to the 7-8th grade
[Clear Language. <http://www.clearlanguagegroup.com/readability>]

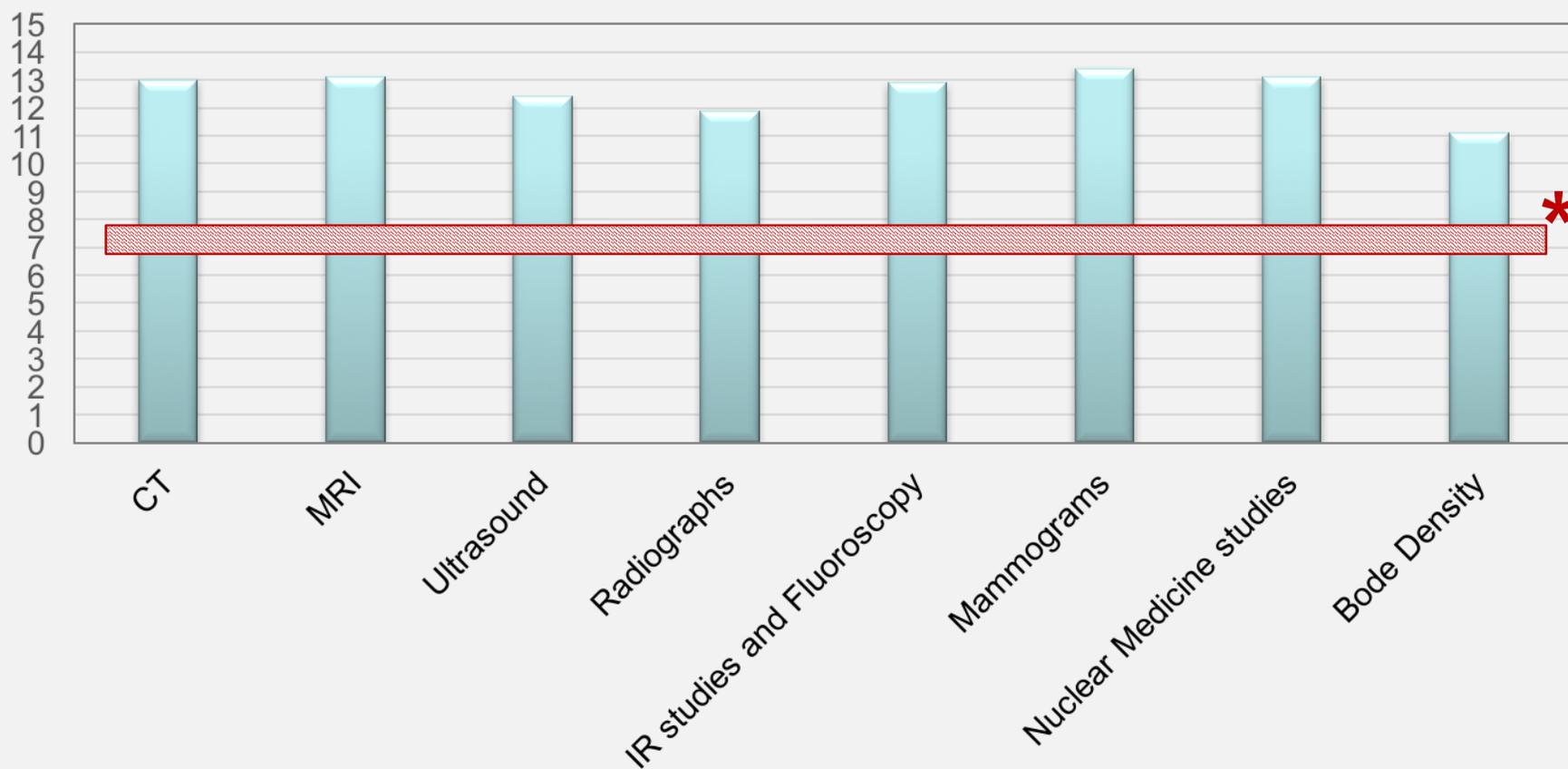


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Results

Average Radiology Report Readability Grade Level
Segmented by Imaging Modality



*The average adult literacy level in the U.S. corresponds to the 7-8th grade
[Clear Language. <http://www.clearlanguagegroup.com/readability>]



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Significance of high readability levels of radiology reports

For patients

For stakeholders



Precludes the majority of the U.S. adults from understanding the information



Multimedia reports with hyperlinked “lay” explanation and annotated images can improve comprehension



Nuanced granularity of radiology reports for imaging is important for comparison, clinical decision making and insurance coverage



Replacing terminology with simpler expressions can negatively affect coding, billing, research and teaching



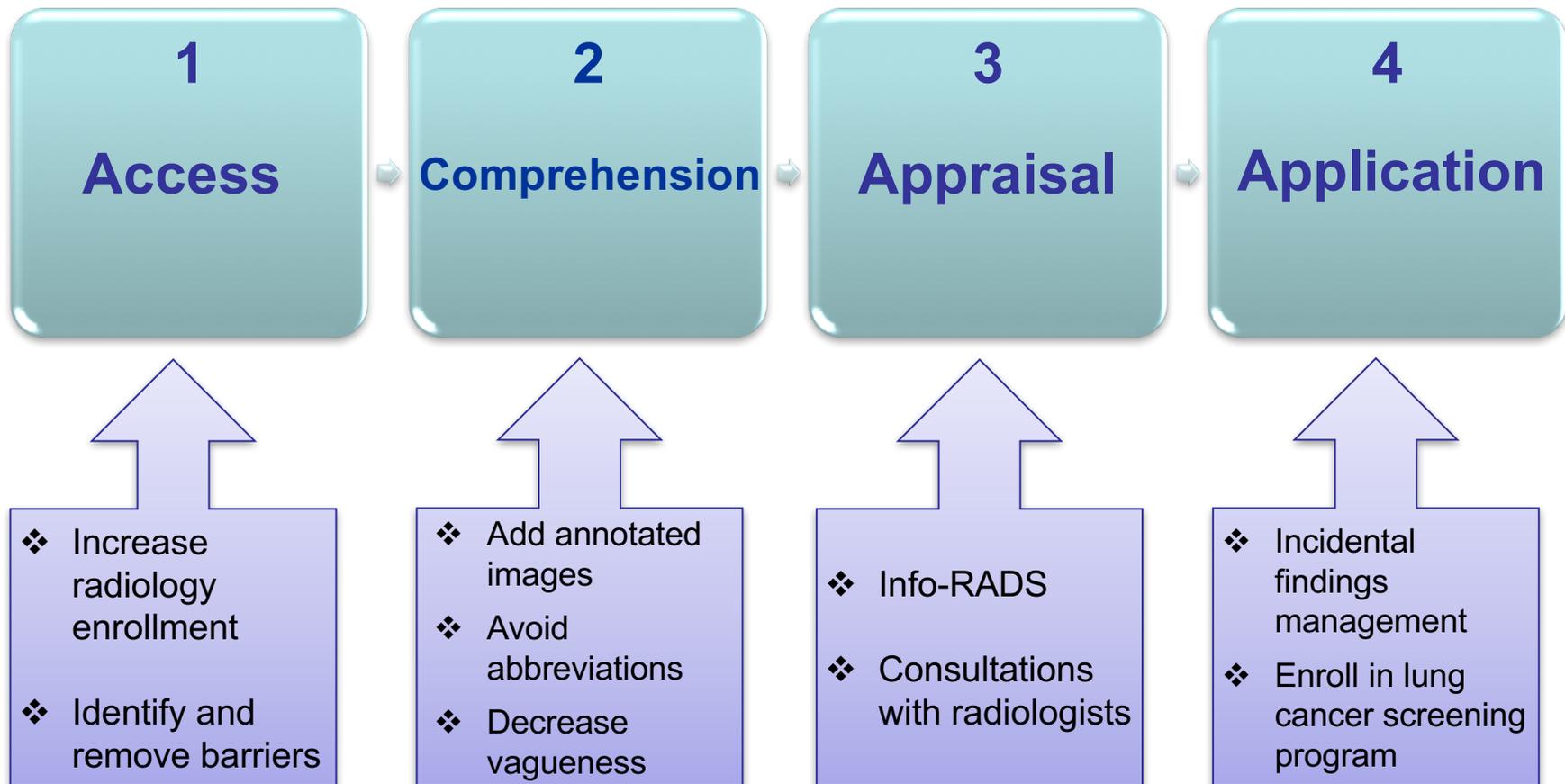
The initiatives to meet patients’ readability needs must be balanced so that interests of other stakeholders are not neglected



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Our initiatives to enhance the value of radiology reports



Conclusion

To become truly patient centered, radiologists must
move beyond traditional “business as usual” reports
and find new ways to help patients access,
comprehend, appraise and apply the valuable
information contained within our reports

Thank you!



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* Reference

Readability Metric	Information about this metric
Flesch-Kincaid Reading Ease	Mathematical formula using the average number of syllables per word and the average number of words per sentence for a 100-word block of text. Results range from 1 to 100 (1=very complicated to read, 100=very easy to read). Most readability resources recommend writing for the 60 to 70 range. The scores can be matched to school levels: 90-100= 5 th grade, 90-80=6 th grade, 70-80=7 th grade, 60-70=8 th grade, 50-60=10-12 th
Flesch-Kincaid Grade Level	Same formula as for Flesch-Kincaid Reading Ease, but expresses results in academic grade levels. 7-8 th grade is said to capture 80% of adults in the U.S.
FORCAST	In a sample text of 150 words the number of single syllabus words (N) is counted and then divided by 10 (N/10). The grade level is calculated by subtracting (N/10) from 20.
Gunning Fog	Takes into account words with three or more syllables. The formula omits proper nouns, jargon and compound words. The result is a grade-level score beginning at 1 with no upper bound. The ideal score is between 7 and 8, depending on the audience.
SMOG	To calculate the score, 10 sentences from the beginning, middle and end of the text are selected, then words with three or more syllables are counted, the square root of that number is calculated and rounded to the nearest perfect square, then add 3 to that number to get the corresponding reading grade. The recommended grade level for this score is 7 to 8, depending on the audience.

