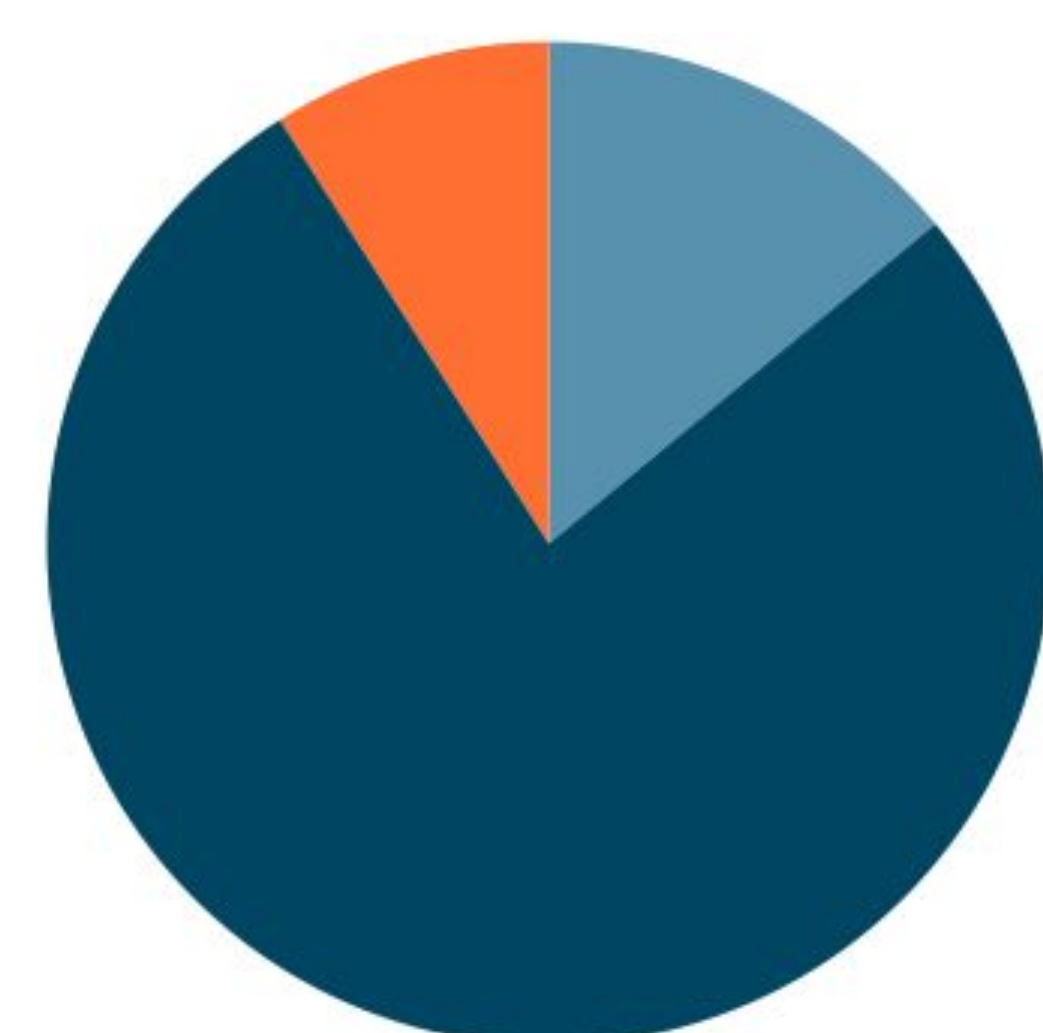


# Automating Sentiment and Emotion Recognition in Patient-Provider Interaction Transcripts for Improved Health Communication

## Introduction

- Detecting sentiment during a patient visit is important
- Sentiment is prevalent in most interactions, but missed 10-15% per of time
- Currently, sentiment detection is a manual process performed by researchers
- Can we automatically recognize sentiment in discourse?



- Emotional Cues; No Provider Acknowledgment
- Emotional Cues; Provider Acknowledgment
- No Emotional Cues



## Methods Cont.

- Investigated 3 transcripts developed by Debra Roter
- Transcripts tested MetaMap's detection of sentiment CUIs
- Detection of a sentiment CUI was compared to containment of sentiment in utterance
- A precision, recall, and F1 score was calculated

	Sentiment CUI Detected	Sentiment in Utterance
TP	✓	✓
FP	✓	□
FN	□	✓
TN	□	□

Predicted	Actual	
	Worried	Good
Worried	68	116
Good	75	1162

## Discussion

- MetaMap can automatically recognize most explicit emotions
- Not all synonyms or implicit sentiments detected
- Sentiment CUIs with non-sentimental meanings inflate false positives
- Investigate the impact of filler words
- Multiple researchers evaluate transcripts for sentiment
- Improvements to Whisper would lessen transcript mistakes
- MetaMap should expand its vocabulary
- Improvement allows for easier integration with automatic sentiment coding



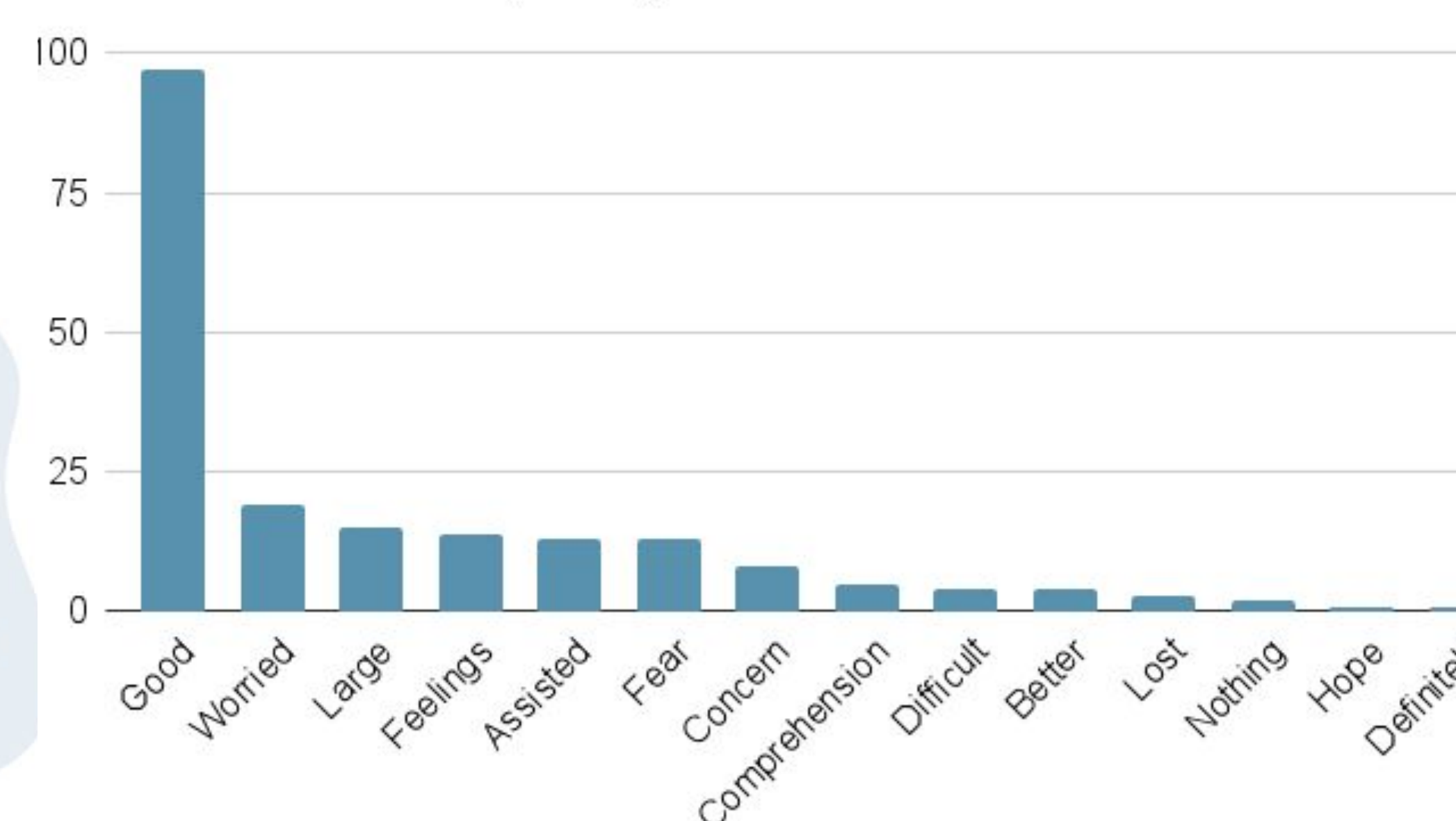
## Objective

The study's objective was to investigate current tools, specifically UMLS MetaMap, to determine their ability to automatically recognize words and phrases from text that contain sentiment

## Results

- MetaMap detected 21 CUIs from videos related to sentiment
- No CUIs were recognized for reassurance or distress
- Most frequent CUIs were Good and Worried
- Sentiment occurred in 10% of all utterances
- Precision of 0.37, ability to retrieve only relevant cases
- Recall of 0.48, ability to retrieve all cases including relevant ones
- Final F1 score was 0.42

Frequency of Sentiment CUIs



## Methods

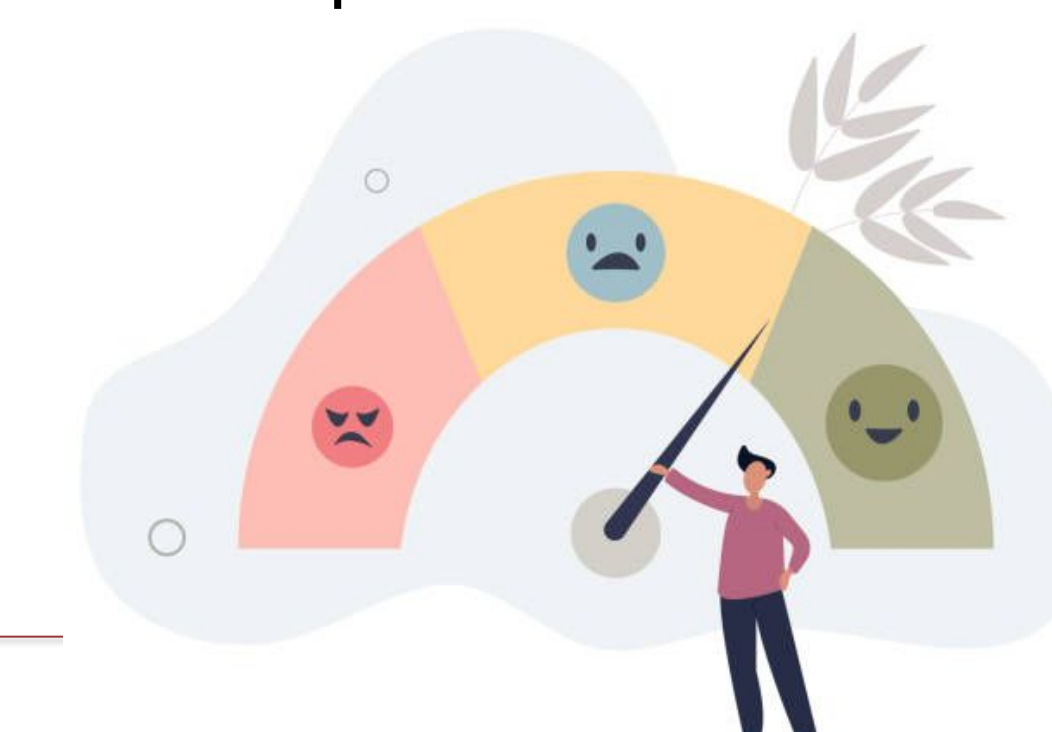
- Examined 8 interaction videos for sentiment occurrence
- Audio transcribed using Whisper
- Analyzed utterances with determined sentiment with MetaMap
- MetaMap returned clinical concepts per utterance, each connected to a Concept Unique Identifier (CUI)
- CUIs associated with sentiment were compiled
- Sentiment lines with no detected sentiment CUI were analyzed



C0233481: Worried; C2699424: Concern;  
 C0015726: Fear; C0205170: Good;  
 C1527305: Feelings

## Future Implications

- AI development and its role in healthcare
- Ensures emotional cues are detected and acknowledged
- Future tools that automatically develop provider responses to messages containing emotion
- Automating responses alleviates provider cognitive load
- Potential to lessen provider burnout



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Precision, Recall, and F1 Analysis of Roter Transcripts and MetaMap CUIs

	Transcript 1	Transcript 2	Transcript 3	Total
<b>Precision</b>	0.40	0.33	0.34	0.37
<b>Recall</b>	0.55	0.42	0.41	0.48
<b>F1 Score</b>	0.46	0.37	0.37	0.42