Voice Dictation Errors in Pediatric Radiology


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No Disclosures
Introduction

Replacement of transcription by voice dictation with speech recognition software in pediatric radiology has resulted in near simultaneous report dictation, review and approval.
Introduction: Voice Dictation and Errors

• Increased error rates with voice dictation have been identified in prior studies\(^1\).

• Radiologists underestimate the error frequency in their reports and the reports of others\(^2\).

• Errors can be categorized based on the grammatical mistake or the clinical significance.
  • Punctuation mistake versus non-sense phrase
  • Does or does not alter the meaning of the report
Purpose

• **Hypothesis:** Radiology reports generated by voice dictation are susceptible to multiple error types.

• **Purpose:**
  - Identify the frequency of voice dictation errors in a pediatric radiology group practice
  - Calculate the radiologist error rates
  - Categorize common error types
  - Compare error rates using different report types
Methods and Materials

• All radiology reports dictated on 3 randomly selected dates were reviewed by 2 staff radiologists. Reports were reviewed for:
  • Dictating radiologist name
  • Examination modality
  • Dictation template style*
  • Presence of errors

*Dictation template styles included: normal, structured, narrative
Methods and Materials

• Error classification:
  • **Type 1**: dropped or modified connecting words
  • **Type 2**: modified nouns or verbs
  • **Type 3**: nonsense words or phrases

• Error rates calculated for each radiologist dictating >30 studies

• Statistics: Fisher’s exact test (2-tailed) was used to
  • Determine the significance of different error rates by dictation style
  • Evaluate the significance of frequency of different error types.
### Methods and Materials

#### Report classification

<table>
<thead>
<tr>
<th>Report Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Template</td>
<td>Pre-populated text report for a normal examination. No modification is needed to complete.</td>
</tr>
<tr>
<td>Structured Reporting</td>
<td>Standardized report in an organized format with some modification needed to complete open fields.</td>
</tr>
<tr>
<td>Narrative</td>
<td>Individually created, free text report, usually in a paragraph format.</td>
</tr>
</tbody>
</table>

#### Error classification

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Dropped or modified connecting words</td>
<td>dropped “an” or “the” or missing punctuation</td>
</tr>
<tr>
<td>Type 2</td>
<td>Modified nouns or verbs that include sound alike words</td>
<td>“valgus” instead of “bowel gas”</td>
</tr>
<tr>
<td>Type 3</td>
<td>Nonsense phrases or terms or other significant alterations</td>
<td>In describing a coin in the esophagus, “The configuration of the harmonic suggests point.&quot;</td>
</tr>
</tbody>
</table>
Results

Total Number of Reports Reviewed in 3 days

- Computerized Radiography: 70%
- Ultrasound: 14%
- Computerized Tomography: 5%
- MRI: 4%
- Fluoroscopy: 4%
- Interventional Radiology: 2%
- Nuclear Medicine: 1%
- Bone Densitometry: 0%
Results: 229 errors in 209 (29%) studies

Total reports reviewed (768)

- Normal Template (83 reports): Errors: 0 (0%)
- Structured Reporting (57 reports): Errors: 7 (12%)
- Narrative (628) reports: Errors: 201 (32%)

Narrative dictation style accounted for >95% of errors. Type 1 errors were the most common. Error rates among 9 radiologists ranged from 14-41%.
Results: Error Rates and Statistics

<table>
<thead>
<tr>
<th>Report Type</th>
<th>Total Number of Reports</th>
<th>Percentage of Errors in the Reports (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Template</td>
<td>83</td>
<td>0</td>
</tr>
<tr>
<td>Structured Reporting</td>
<td>57</td>
<td>12</td>
</tr>
<tr>
<td>Narrative</td>
<td>628</td>
<td>32</td>
</tr>
</tbody>
</table>

Narrative report style had significantly more errors than structured reports (p 0.0014).

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Number of Reports</th>
<th>Number of Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>123</td>
<td>129</td>
</tr>
<tr>
<td>Type 2</td>
<td>71</td>
<td>74</td>
</tr>
<tr>
<td>Type 3</td>
<td>26</td>
<td>26</td>
</tr>
</tbody>
</table>

Type 1 errors significantly more frequent than Type 2 errors (p 0.0001). Type 2 errors significantly more frequent than Type 3 errors (p 0.0001).
Conclusion

• Voice dictation errors were common, but varied widely in frequency among the radiologists.
• Type 1 errors (dropped or modified connecting words and missing punctuation unlikely to change the meaning of the report) were the most common error type.
• Normal templates and structured reporting significantly reduce the number of errors.
Clinical Relevance/Application

• Radiology reports are the primary means of communication between radiologists and ordering providers.
  • Errors can adversely impact patient care.
  • Errors can be confusing to the clinician and leave an unfavorable impression of radiology.
  • Patient access to radiology reports through patient portals is increasing and errors can lead to patient dissatisfaction.
Clinical relevance/application

• Solutions:
  • Increased awareness of common errors can help radiologists identify and correct them before final report approval.
  • Increased use of structured reporting and templates can reduce errors.
  • Further advances in technology are likely to improve voice dictation accuracy and further reduce error rates.
References


