

# Clinical Implementation of DIGEST as an Evidence Based Practice Tool to Assess Pharyngeal Dysphagia Using Videofluoroscopy in Oncology: A Six-year Single Institution Implementation Evaluation

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## Introduction

- Pharyngeal dysphagia is a common, and challenging complication that affects a wide variety of oncology patients due to surgical or radiation sequelae, tumor burden, or other cancer treatments.
- The modified barium swallow study (MBS) is a dynamic x-ray study that is commonly used in oncology (Fig. 1-2).
- The MBS is widely accepted as a best practice method to allow speech-language pathologists (SLP) to view the patient's anatomy and physiology to assess dysphagia.<sup>1,2</sup>
- The DIGEST tool (Fig. 3) measures a patient's swallow function through safety (how well food/liquid are kept out of the lungs) and efficiency (how well food/liquids are cleared out of the throat).
- DIGEST fills a practice gap by providing a summative, CTCAE aligned grade that fits the needs of investigators and clinicians.<sup>3</sup>
- Feasibility of routine use of DIGEST in the clinic needs to be examined further.

## Purpose

- The goal of this implementation evaluation was to estimate the rate of clinical reporting of DIGEST in MBS studies as a marker of feasibility and to describe the sources of missing DIGEST grades.

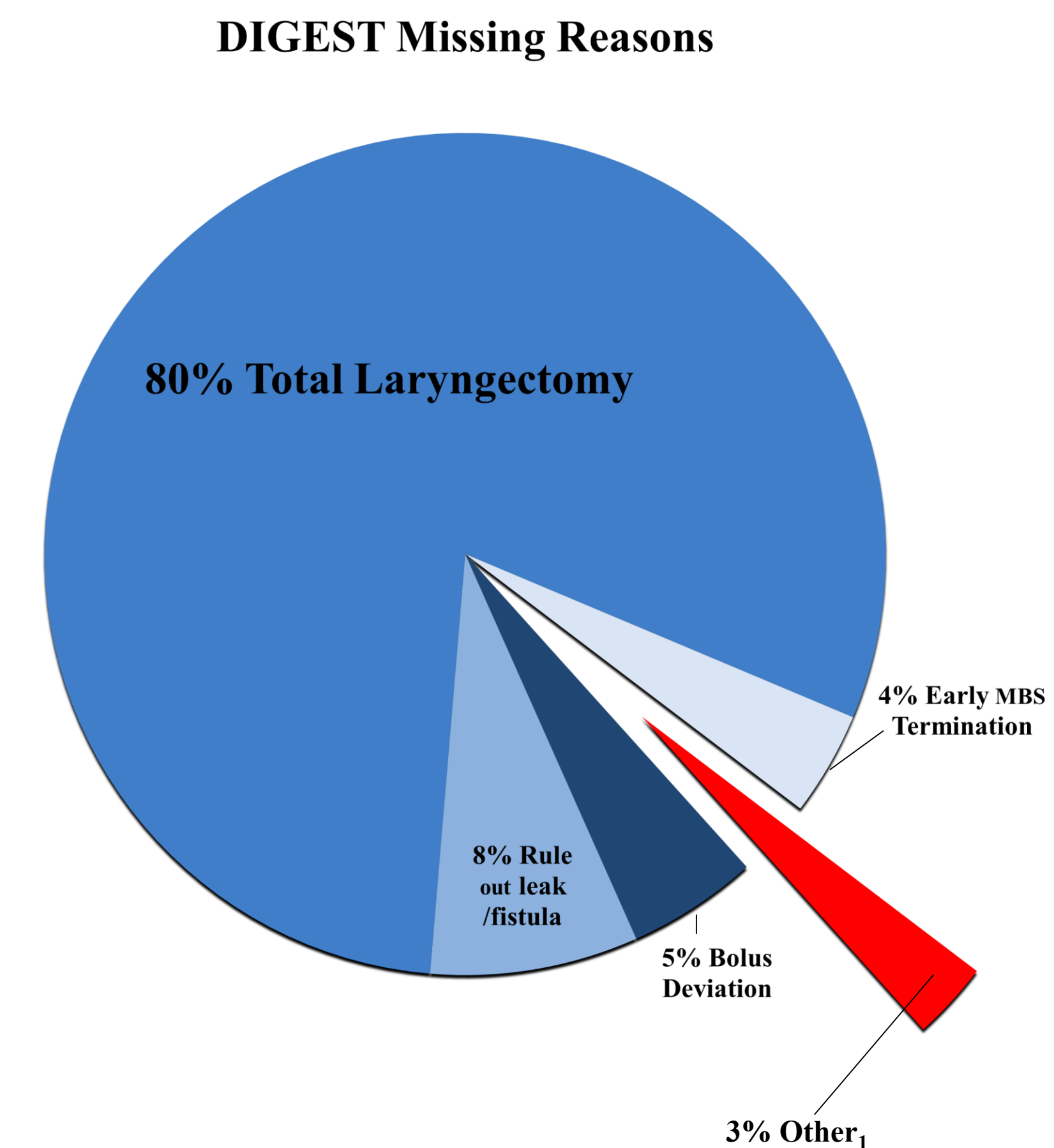
## Methods

- This implementation evaluation followed STARI framework. The retrospective data review included consecutive MBS studies conducted at a single comprehensive cancer center over six years (2016-2021).
- DIGEST was the EBP tool.
- DIGEST reporting in the electronic health record (EHR) was the implementation outcome.
- 13,670 MBS records were identified with flowsheet data (Fig. 4) exported from Epic EHR, then chart abstracted to identify the presence of DIGEST grade and sources of missingness (Table 1).

## Results

- MBS were conducted in diverse cancer populations, in both outpatient (90%) and inpatient (10%) setting. (Table 2)
- Overall reporting rate of DIGEST was 93% in the 6-year period (Fig. 5) and remained fairly steady year over year.
- The most common reason for missing DIGEST in EHR record was a history of total laryngectomy (TL) (80%), followed by leak/fistula resulting in an incomplete MBS study (8%), and severe deviation from the standard bolus protocol (5%) (Fig. 6).

**Figure 6.** Reasons for missing DIGEST scores in MBS notes from years 2016-2021 (n=949 MBS)



<sup>1</sup> Other includes UADT obstructing FOV, degree of oral dysphagia, and unknown.

## Conclusions

- DIGEST proves to be feasible in the clinical setting.
- Further research is needed for standard measures to evaluate dysphagia severity in the TL population.
- A deeper analysis of DIGEST implementation should evaluate the accuracy of clinical reporting as an important component of fidelity of clinical adoption.
- Given feasibility of using DIGEST oncology wide, beyond the HNC population in which it was validated, argues for validation of the tool in diverse cancer populations.
- Educational opportunities are identified to further facilitate dissemination and implementation of DIGEST into clinical practice.

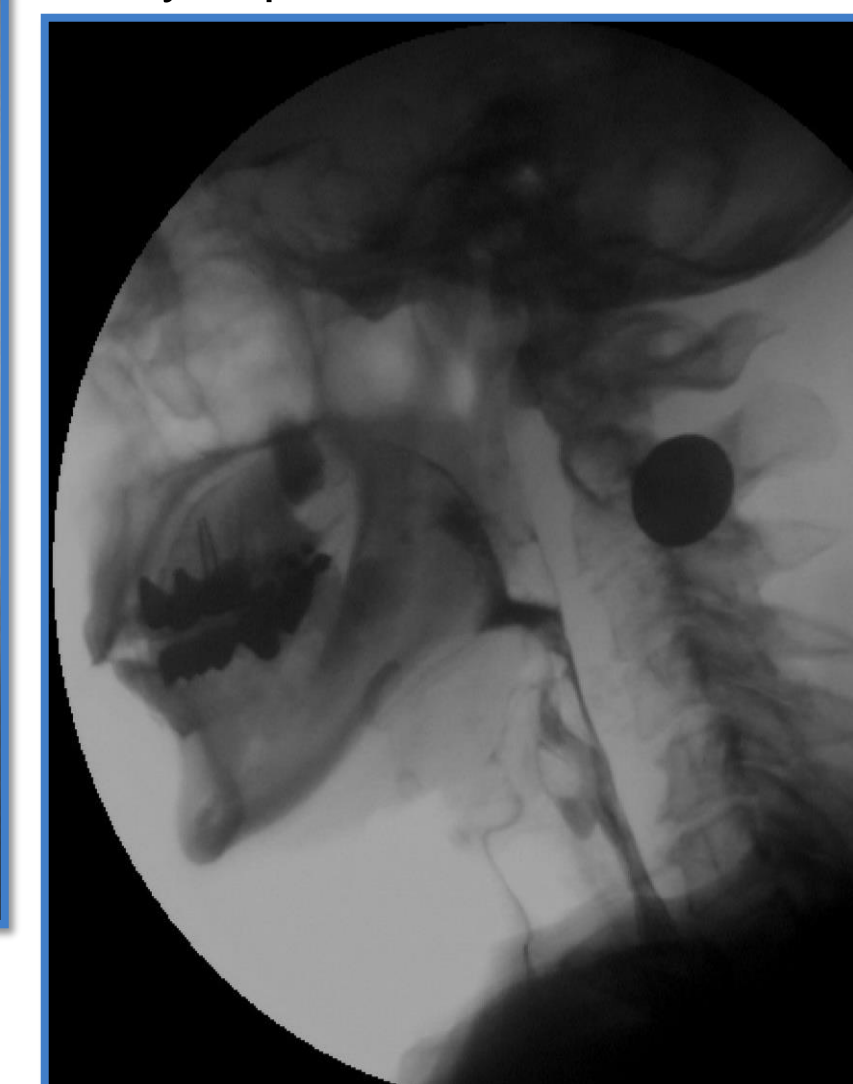
## References

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- Martin-Harris B, Bonilha HS, Brodsky MB, et al. The Modified Barium Swallow Study for Oropharyngeal Dysphagia: Recommendations From an Interdisciplinary Expert Panel. *Perspectives of the ASHA Special Interest Groups*. 2021;6(3):610-619
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**Figure 1.** Lateral Scout View



**Figure 2.** Silent Aspiration, safety impaired



**Figure 4.** DIGEST grade reporting using flowsheets and note templates in Epic Electronic Health Record

DIGEST (summary grade of pharyngeal dysphagia): Grade 3: severe  
DIGEST S: 2  
DIGEST E: 3

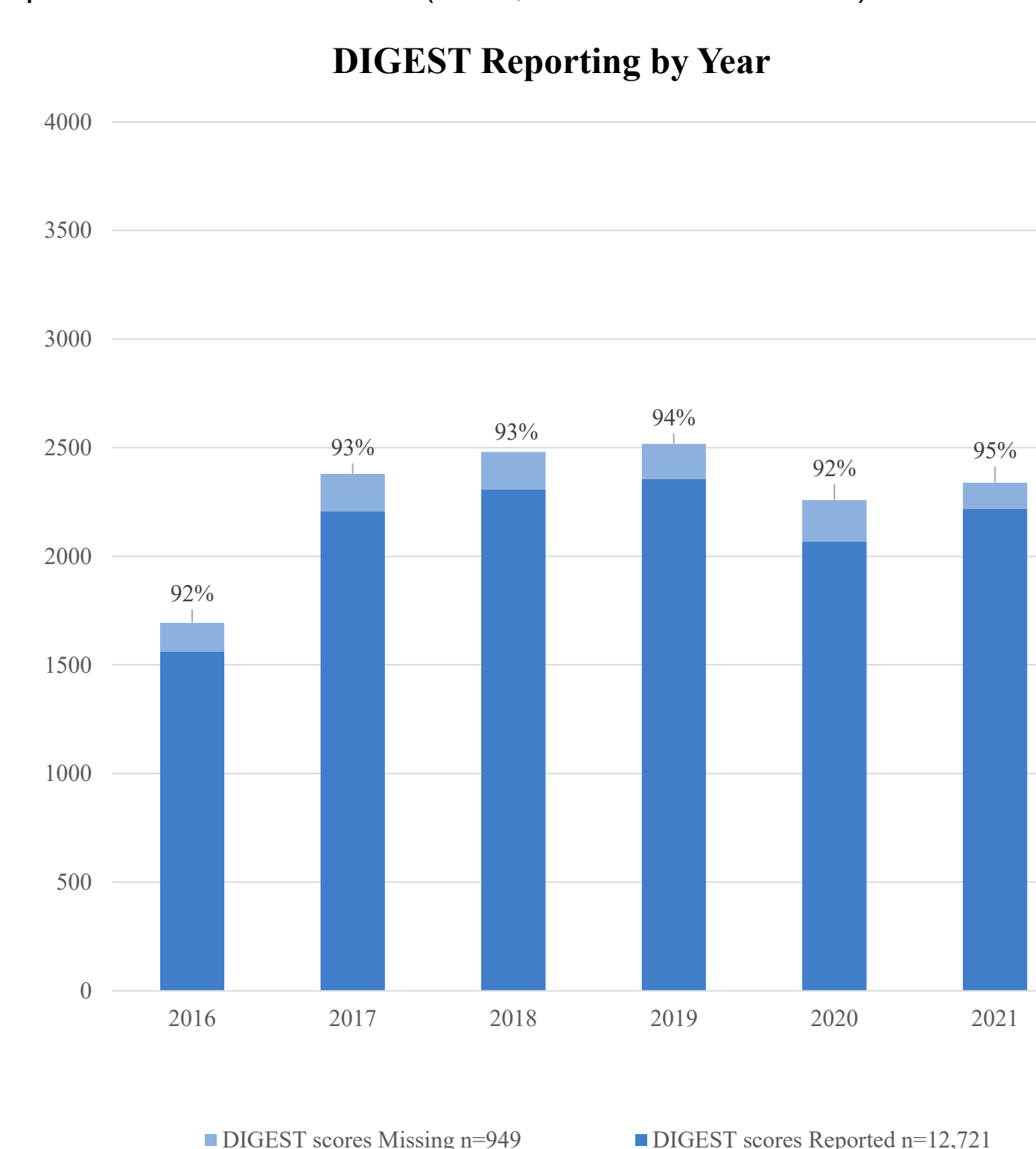
**Table 1.** Thematic coding of reasons DIGEST grade could be missing in EHR

Reason	Description
Total Laryngectomy	Patient had a total laryngectomy.
Bolus Protocol Deviation	Severe deviation from the standard bolus protocol.
Rule out leak/fistula	MBS identified a leak or fistula.
Early MBS Termination	An MBS study was terminated before a DIGEST grade could be rendered.
Degree of Oral Dysphagia	Degree of oral phase dysphagia precluded the SLP from deriving DIGEST grade.
UADT Obstructing FOV	A medical device in the upper aerodigestive tract is obstructing the field of view.

**Table 2.** Cohort characteristics/demographics (n=13,670 MBS)

Demographics	All MBS n=13,670	DIGEST Completion Rate
<b>Sex</b>		
Male	10,005 (73%)	9,278 (93%)
Female	3,665 (27%)	3,443 (94%)
<b>Age</b>		
Q1 Range	1-56	1-56
Q2 Range	57-64	57-64
Q3 Range	65-71	65-71
Q4 Range	72-96	72-96
<b>Cancer Type</b>		
HNC	8,496 (62%)	7,812 (92%)
Thoracic	487 (4%)	469 (97%)
Neuro	256 (2%)	252 (98%)
Blood	466 (3%)	453 (97%)
Endocrine	681 (5%)	627 (92%)
Pediatric	74 (1%)	68 (92%)
Other solid tumors	526 (4%)	514 (97%)
No cancer history	21 (0.2%)	17 (81%)
Other	2663 (19%)	2490 (96%)
<b>Status at MBS</b>		
Inpatient	1,322 (10%)	1,208 (91%)
Outpatient	12,348 (90%)	11,513 (93%)
<b>MBS Indication</b>		
Rule out leak	1501 (11%)	1054 (70%)
Swallow surveillance pathways	2495 (18%)	2462 (99%)
Baseline	2039 (15%)	2036 (99%)
Tracheoesophageal (TE) speech	36 (0.3%)	0 (0%)
Symptomatic	7071 (52%)	6694 (95%)
Other (no indication)	528 (4%)	475 (90%)

**Figure 5.** DIGEST Reporting rate by year (2016-2021) after clinical implementation of DIGEST (n=13,670 MBS encounters)



**Figure 3.** DIGEST decision tree

