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# Using the RE-AIM Framework for Implementation of Electronic Patient Reported Outcomes in Head-Neck Cancer Patients Treated with Radiation Therapy

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# Background

- Radiation therapy (RT) for head and neck cancers (HNC) can be associated with moderate-severe toxicities (1)
- Patient-reported outcomes (PROs) can be used for symptom monitoring and management (2)
- Despite the effectiveness of PROs, they are challenging to implement in clinical practice (3)

Organisations implementing PROMs need to invest time and resources in 'designing' the PROMs strategy and 'preparing' the organisation to use PROMs. Focusing on these earlier stages may prevent problems arising when PROMs are used in practice.

## Context

### Key Objective

To evaluate response rates for electronic patient-reported outcome (PRO) tools in routine care within a large integrated health care system in a population of newly diagnosed patients with head and neck cancer.

### Knowledge Generated

PRO surveys can be successfully integrated into the electronic medical record with high response rates provided there is strong participation from a dedicated member of the care team. High response rates can be maintained over time across demographic and socioeconomic subgroups with the use of multimodality PRO tools, although further work is needed to overcome barriers in certain subsets of patients with head and neck cancer.

### Relevance

Our findings demonstrated that validated PRO instruments can be used effectively in the electronic medical record in clinical practice, leading to timely reporting of symptoms and prompt interventions.



# Background

- Formal implementation frameworks exist, such as RE-AIM (4,5)
- RE-AIM has five dimensions:
  - Reach (the representativeness of individuals participating in the initiative)
  - Effectiveness (impact of the intervention)
  - Adoption (settings/individuals willing to adopt the intervention)
  - Implementation (consistency of delivery)
  - Maintenance (long-term effects of the intervention).
- The objective of this study is to evaluate the implementation of an ePRO program in HNC patients treated with RT using the RE-AIM framework.



# Methods

- **Selected PRO tool:** MD Anderson Symptom Inventory – Head and Neck Module or MDASI-HN (6,7)
  - 28 item instrument surveying about symptoms and quality of life in a 24 hour recall period
  - Sent to all HNC patients treated with radiation therapy
  - Scored from 0 (not present) to 10 (worst)
- **ePRO launch date:** January 28, 2021
- **All Staff Meeting:** February 9, 2023

Core MDASI Symptoms	Head and Neck Cancer Symptoms	MDASI Interference
Pain	Mucus in the mouth or throat	Relations with other people
Fatigue	Difficulty swallowing or chewing	Enjoyment of life
Nausea	Choking or coughing	Mood
Disturbed sleep	Difficulty with voice or speech	Walking
Distress (feeling upset)	Skin pain, burning, or rash	Activity
Shortness of breath	Constipation	Work (including housework)
Difficulty remembering	Problems with tasting food	
Lack of appetite	Mouth or throat sores	
Drowsiness	Problems with teeth or gums	
Dry mouth		
Sadness		
Vomiting		
Numbness/tingling		



# Methods: Additional Surveys

- **Patient-Centered Communication in Cancer – 6 Survey**
  - Patients surveyed on the quality of the communication with their care team
  - Surveyed before (pre) and after (post) implementation of eMDASI-HN
- **Provider / Clinical Staff Survey**
  - Sent to all clinical staff in the Head and Neck Radiation Oncology department (schedulers, mid-level providers, physicians)
  - Questions asked their opinions on the clinical impact of paper PROs versus ePROs
- **Statistical Analysis:**
  - Descriptive statistics on patient socio-demographics; time series analysis of ePRO completion rates; and Mann-Whitney U Test to compare PCC-Ca-6 mean scores.
  - Qualitative analysis of RE-AIM Framework measures



# Results

## Demographics of Patients assigned to ePROs (both responders and non-responders)

Note: This is non-unique patient data

Characteristic	Overall (19,157)	Responders (10,118, 53%)	Non-responders (9,039, 47%)	p-value
<b>Gender</b>				0.633
Female	5,231 (27%)	2,778 (28%)	2,453 (27%)	
Male	13,926 (73%)	7,340 (72%)	6,586 (72%)	
<b>Age (Med, R)</b>	64.0 (11-99)	64.0 (11-99)	65 (13-99)	.001
0-30	372 (2%)	205 (2%)	167 (2%)	
31-40	63 (0.3%)	39 (0.4%)	24 (0.3%)	
41-50	740 (4%)	386 (4%)	354 (4%)	
51-60	2107 (11%)	1097 (11%)	1010 (11%)	
61-70	4701 (25%)	2624 (26%)	2077 (23%)	
71-80	6723 (35%)	3722 (37%)	3001 (33%)	
81-90	3726 (19%)	1744 (17%)	1982 (22%)	
91+	725 (4%)	301 (3%)	424 (5%)	
<b>Primary Language</b>				.001
Arabic	116 (0.6%)	19 (0.2%)	97 (1%)	
English	18,558 (96%)	9,935 (98%)	8,623 (95%)	
Spanish	320 (2%)	107 (1%)	213 (2%)	
Other	163 (0.9%)	57 (0.6%)	106 (1%)	
<b>Employment Status</b>				.001
Disabled	581 (3%)	249 (3%)	332 (4%)	
Full Time	7,865 (40%)	4,377 (43%)	3,308 (37%)	
Not Employed	1,107 (6%)	527 (5%)	580 (6%)	
Part Time	214 (1%)	133 (1%)	81 (0.9%)	
Retired	7,823 (41%)	3,996 (40%)	3,827 (42%)	
Student	58 (0.3%)	31 (0.3%)	27 (0.3%)	
Unknown	1,689 (9%)	805 (8%)	884 (10%)	

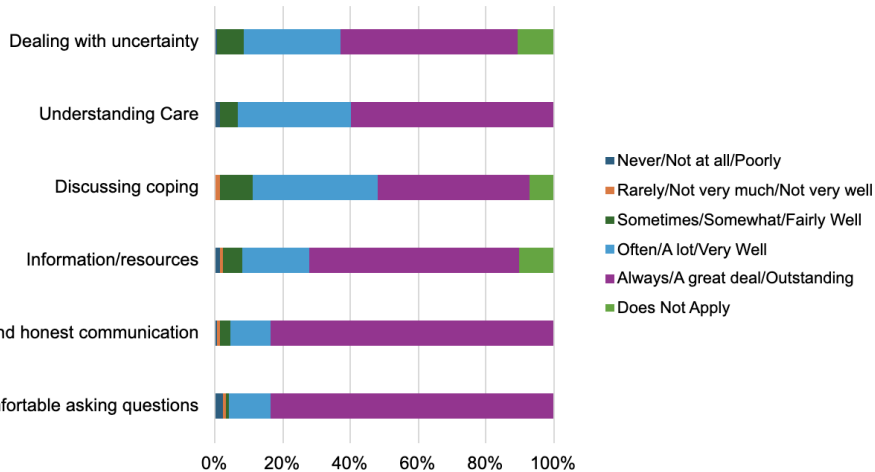


# Results

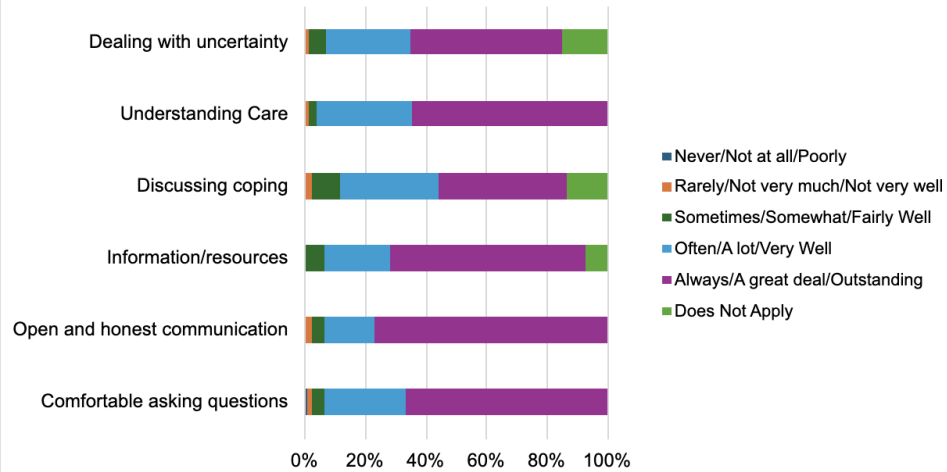
## Analysis of the PCC-Ca-6 Survey

- Mean PCC total score: 4.55 (Pre) vs. 4.23 (Post) ( $p < 0.001$ )
- Driven by a decline in patient comfort with asking questions (4.77 vs 2.97) ( $p < .001$ )
- Other measures remained high and stable ( $p = \text{NS}$ )

Responses to Patient Centered Communication Survey (Pre)

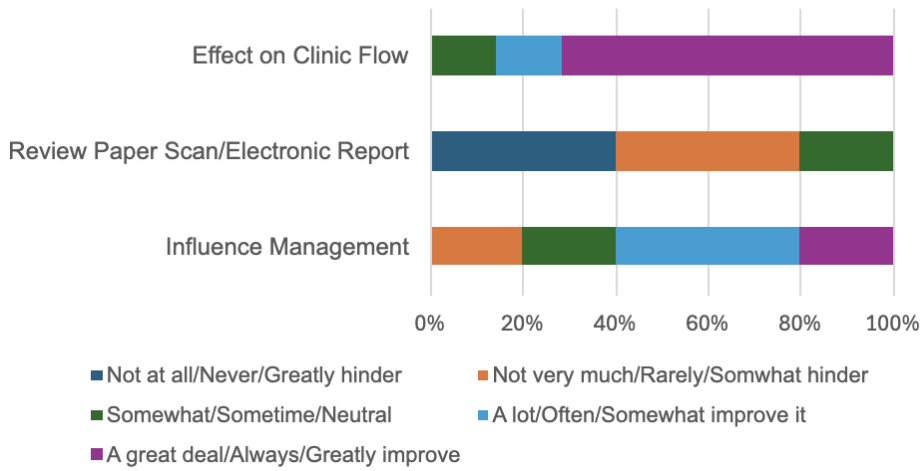


Responses to Patient Centered Communication Survey (Post)

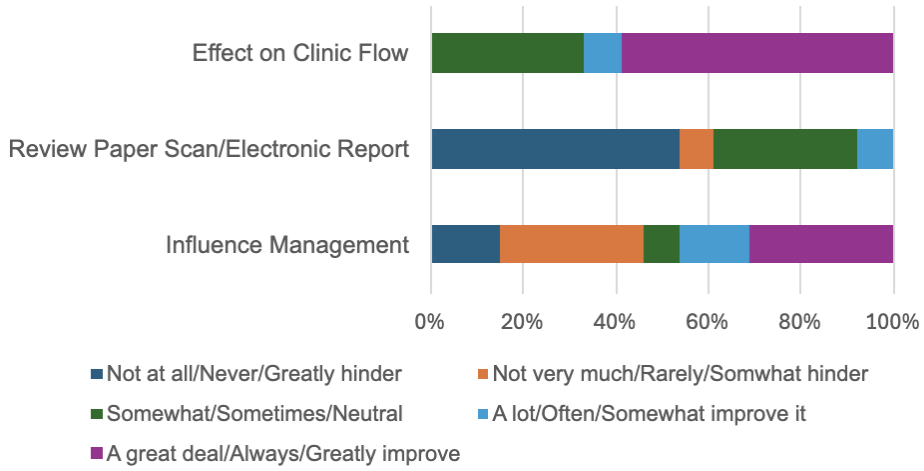


# Results Analysis of the Provider Survey

## Provider Survey Responses (Pre)



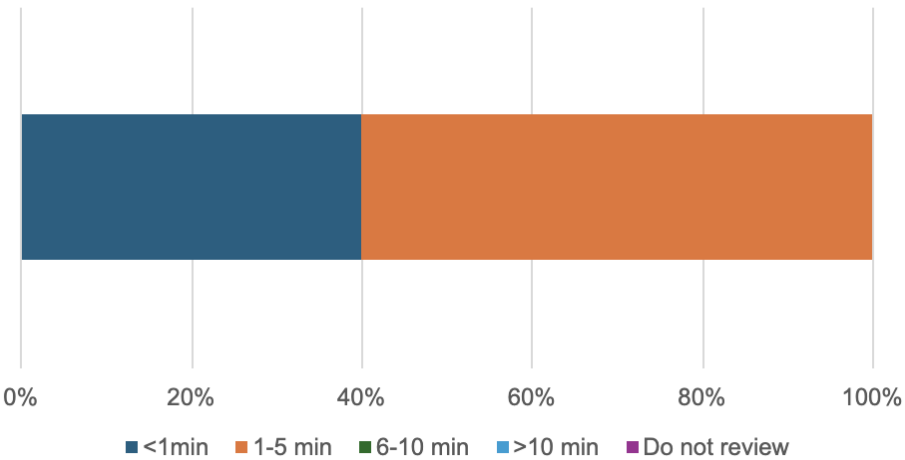
## Provider Survey Responses (Post)



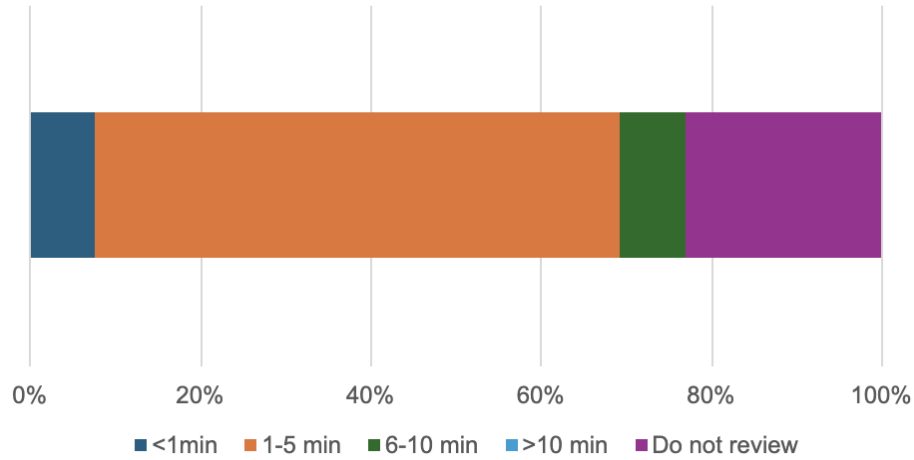


# Results Analysis of the Provider Survey

### Time Spent Reviewing PROs (Pre)



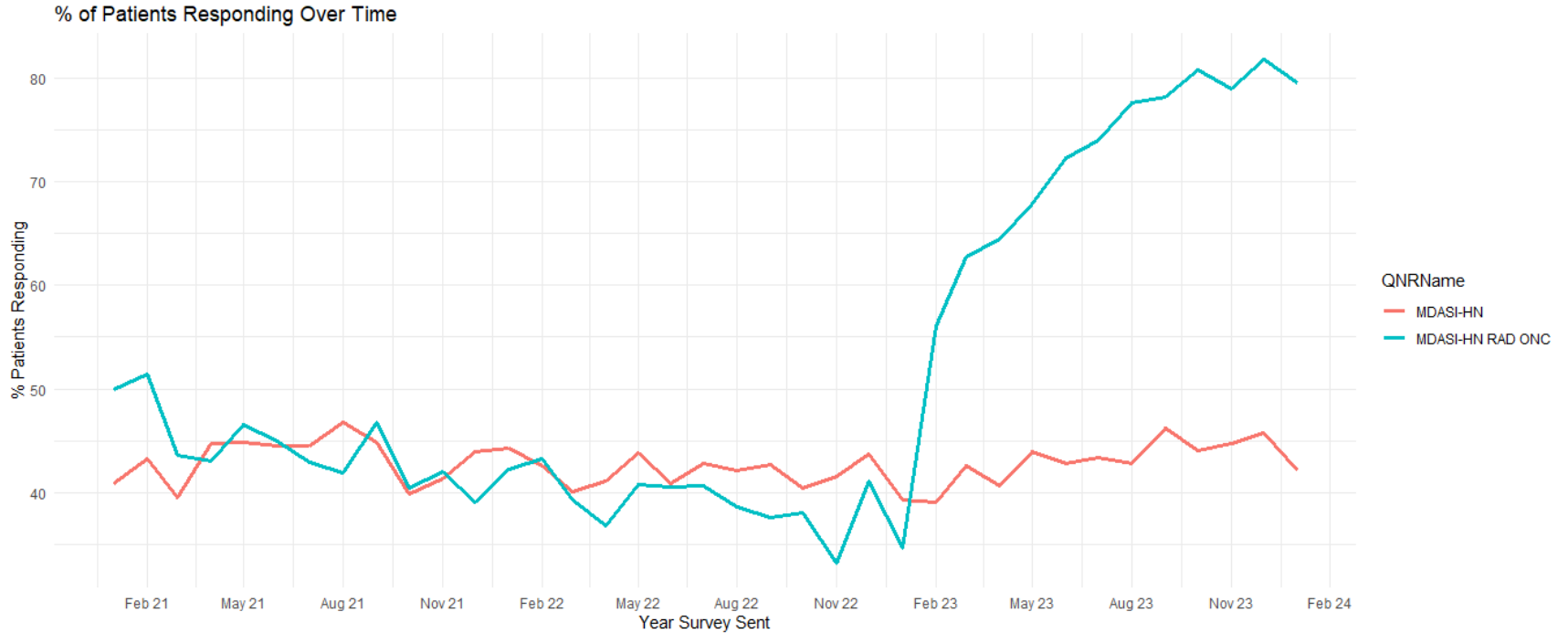
### Time Spent Reviewing PROs (Post)



# Results

## Time Series

- Increase in completion rates (50% to 80%)



# Discussion/Conclusion

- The use of the RE-AIM evaluation framework resulted in increased and maintained ePRO response rates among HNC patients treated with RT
- Greater variation was observed in non-responders for primary language, age, and employment status
  - This could be addressed by offering the survey in other languages and assisting patients who may have a technology barrier
- 5 out of 6 communication domains remained high and stable
  - Addressing the decline in comfort in asking questions can be done through additional formative evaluation and provider training
- Provider responses demonstrate positive opinions on clinic workflow and review of PROs
  - Next steps to manage this include a workflow optimization study
  - Further analysis is underway for comparing responses by staff role
- Response rates over 75% were maintained for ~9 months
  - Future directions: calculating overall response rates that include tablet-based entered ePROs or clinical staff-entered ePROs at the time of check-in for each visit (separate flowsheets)

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