Artificial Intelligence in Performing Landscape Review and Linguistic Analysis for Curative Intent in Prostate Cancer

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INTRODUCTION

- Emerging treatments for early-stage prostate cancer (PC) have increased the possibility of achieving cure, even in high-risk disease
- Stakeholders may define and perceive cure differently, but this has yet to be evaluated
- Understanding how the concept of cure is perceived and/or defined is important for effective communication across stakeholders, including academic researchers, healthcare professionals (HCPs), policymakers, and the general public

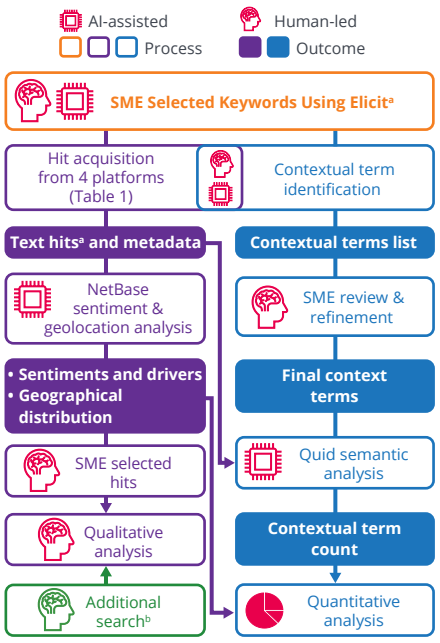
OBJECTIVE

- To perform landscape review and linguistic analysis of the concept of cure in PC using artificial intelligence (AI). We sought to assess the definition of cure, the preferred terminology to describe cure and related terms, and the value of using cure and related terms

METHODS

- We developed an innovative methodology involving subject-matter experts (SMEs) and AI-powered tools to understand how cure is conceptualized in PC (Figure 1, Table 1, Supplementary Figure 1, Supplementary Tables 1-3)

FIGURE 1: Methods flowchart



Elicit, the semantic search engine.[1] NetBase, social media analytics platform. Quid, AI-driven text analytics platform.
[a]May have >1 keyword and/or disease area.
[b]Manual search for clinical guidelines and health technology assessments.

TABLE 1: Platforms used for keyword search

Platform (stakeholder) and document types	Timeframe
MEDLINE (academic researchers)	
Published, peer-reviewed literature	5 years
Sermo (HCPs)	
Closed discussion forum for registered HCPs	2 years
Overton (policymakers)	
Policy documents (eg, healthcare technology assessments, guidelines)	5 years
Social media (general public)	
Twitter, Reddit, blogs, etc, by the general public (patients, caregivers, HCPs, and patient advocates)	27 months

PROSTATE CANCER

RESULTS

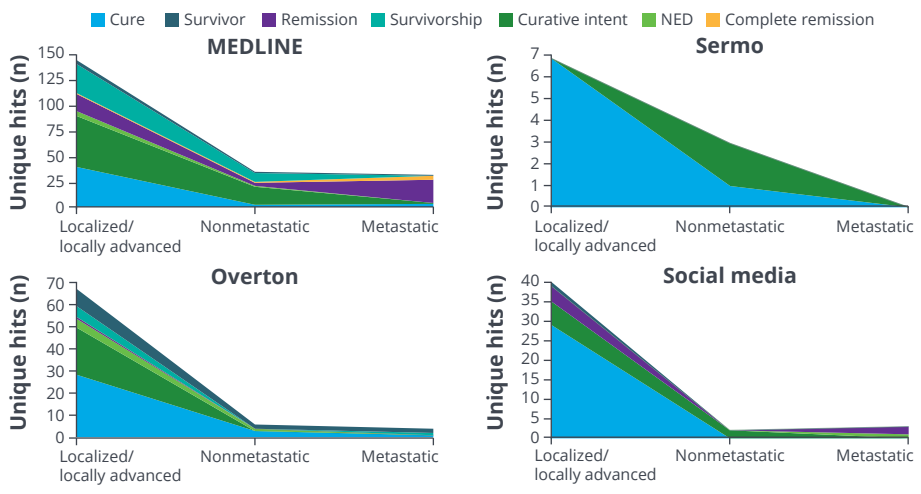
Identified keywords and hits

- SMEs identified 7 keywords that returned an estimated number of hits across the platforms:
  - Cure – 12,429
  - Survivor – 6063
  - Remission – 1904
  - Survivorship – 1179
  - Curative intent – 432
  - No evidence of disease (NED) – 381
  - Complete remission – 83
- In the Cure subset, SMEs reviewed 2452 (general public), 232 (literature), 206 (HCPs), and 153 (policymakers) hits (Supplementary Figure 2)

Keyword findings

- The most common keywords were Cure among the general public (11,815 hits) and HCPs (224 hits), Survivorship in the academic literature (378 hits), and Survivor among policymakers (378 hits) (Supplementary Figure 2)
- In hits that mention disease stage, Cure and Curative intent were discussed mainly in early-stage PC (Figure 2)

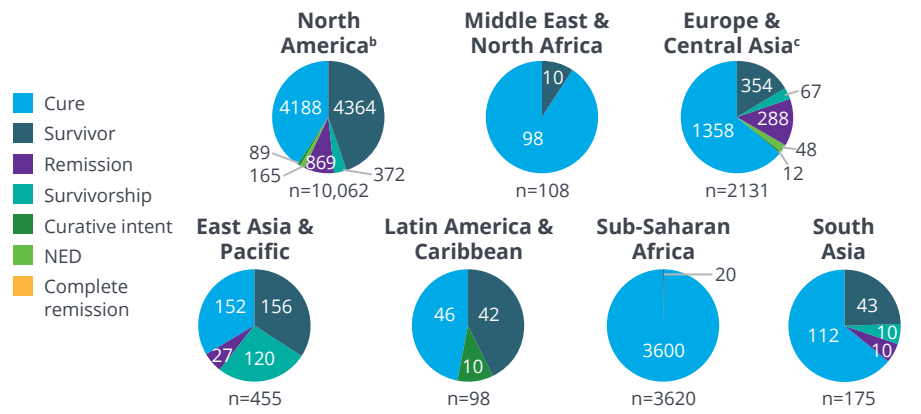
FIGURE 2: Stakeholders discussed Cure primarily in early-stage PC[a]



[a]Unique mentions of Cure in hits that also mention disease stage.

- Cure was mentioned most frequently by the general public worldwide, followed by Survivor (Figure 3)
- No consistent definition of cure in PC was found across stakeholder platforms

FIGURE 3: Cure and Survivor were mentioned most frequently in social media worldwide[a]

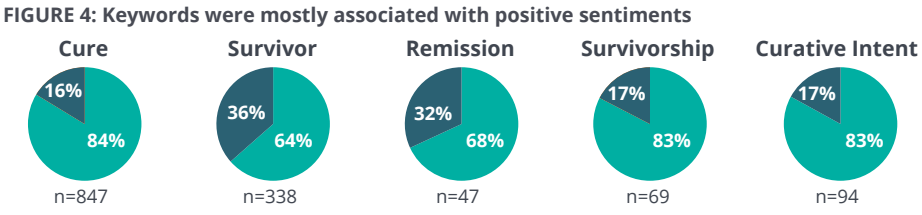


[a]Hits with available metadata. [b]15 hits for Complete remission are not shown. [c]4 hits for Complete remission are not shown.

Insights and sentiments associated with cure

- Stakeholders utilized various terms to describe the concept of cure:
  - *Academic researchers*: Disease progression measurements, such as prostate-specific antigen, NED, biochemical, or surgery, implying surgery is done with curative intent
  - *General public*: Cure and Survivor
  - *HCPs*: Cure rates
  - *Policymakers*: Potential cure and Survivor/Survivorship when discussing curative-intent treatment
- Cure, Curative intent, Survivorship, Remission, and Survivor were associated with positive sentiments (Figure 4)

FIGURE 4: Keywords were mostly associated with positive sentiments



NED and Complete remission had <10 mentions and were therefore not included. A single mention may have both positive and negative sentiments
[a]Examples of emotional drivers include enjoy, thankful, look forward to, proud, good. [b]Examples of emotional drivers include worse, bad, poor, shame.

REFERENCE:
1. Analyze research papers at superhuman speed. https://elicit.com. Accessed October 16, 2023.

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KEY TAKEAWAYS

AI instruments can be successfully used in qualitative language-based research involving large databases

Academic researchers, clinicians, policymakers, and the general public actively discuss cure in PC, especially in early-stage disease, but define it differently

Awareness of differences in the perception of cure across stakeholder groups should be taken into account when communicating about cure in early-stage PC

CONCLUSIONS

Our innovative approach, which went beyond the traditional literature review, allowed us to leverage AI to assess large-scale databases, including social and professional media resources, to explore the concept of cure in PC

The 4 assessed stakeholder groups, representing academic researchers, HCPs, policymakers, and the general public, defined cure differently and contextually adapted its meaning when communicating about cure

Although defined differently, Cure was one of the most common keywords stakeholders used to discuss and/or refer to early-stage PC

Cure and cure-related keywords had a positive value for all stakeholders

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