

# Digital Health Revolution in Cancer Care: The Current Landscape and Future Horizons

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## ABSTRACT

Cancer care presents multifaceted challenges influenced by factors such as cancer type, stage, and patient demographics. With the increasing cancer burden and rising care costs, there is a pressing need for innovative healthcare solutions.

Digital Health Technologies (DHTs) have transformed care delivery, empowering patients to actively engage in their treatment journey. In addition to treatment provision, DHTs also significantly contribute to clinical research, aid in financial navigation, and enhance palliative care services.

This poster presents findings from a landscape research conducted by HITLAB focused on understanding the digital health cancer care landscape, stakeholders involved, and their respective needs. Our analysis revealed major challenges, including technical obstacles such as fragmented data systems and user-centric barriers like reliability and accessibility, which hinder the adoption of AI tools. The proliferation of similar solutions and a lack of clear evidence further complicate decision-making for patients and providers alike.

To navigate the increasingly saturated market, future digital health innovation should prioritize solutions that offer distinct value. This necessitates a shift towards prioritizing user needs and embracing a collaborative design approach. Digital health innovators must conduct comprehensive assessments, considering the broader ecosystem and understanding interconnected needs, behaviors, and perceptions. By adopting this holistic perspective and fostering collaboration across the ecosystem, digital health innovators can develop solutions that resonate with users, drive meaningful impact, and distinguish themselves in a competitive market.

## OBJECTIVES

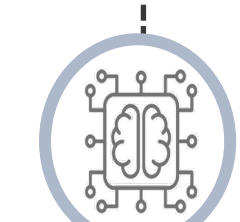
- Understand the landscape of cancer care, including the stakeholders involved, their respective roles and needs, and the current utilization of artificial intelligence (AI) tools.
- Identify the advantages and limitations of existing AI tools in cancer care.
- Derive considerations for guiding the development of future AI tools in cancer care.

## METHODOLOGY

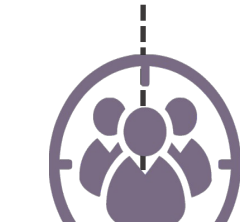
- Comprehensive review:** Conducted a multi-source review to understand



**The Current Status of Cancer Care:** Investigate the dynamic landscape marked by advancements in detection, treatment, and supportive services.



**Evaluation of AI Tools:** Evaluated existing AI tools used in cancer care to understand their functionalities, effectiveness, and limitations.



**Stakeholder Analysis:** Identified and assessed the needs of stakeholders involved in cancer care, including patients, healthcare providers, researchers, payers, and employers.

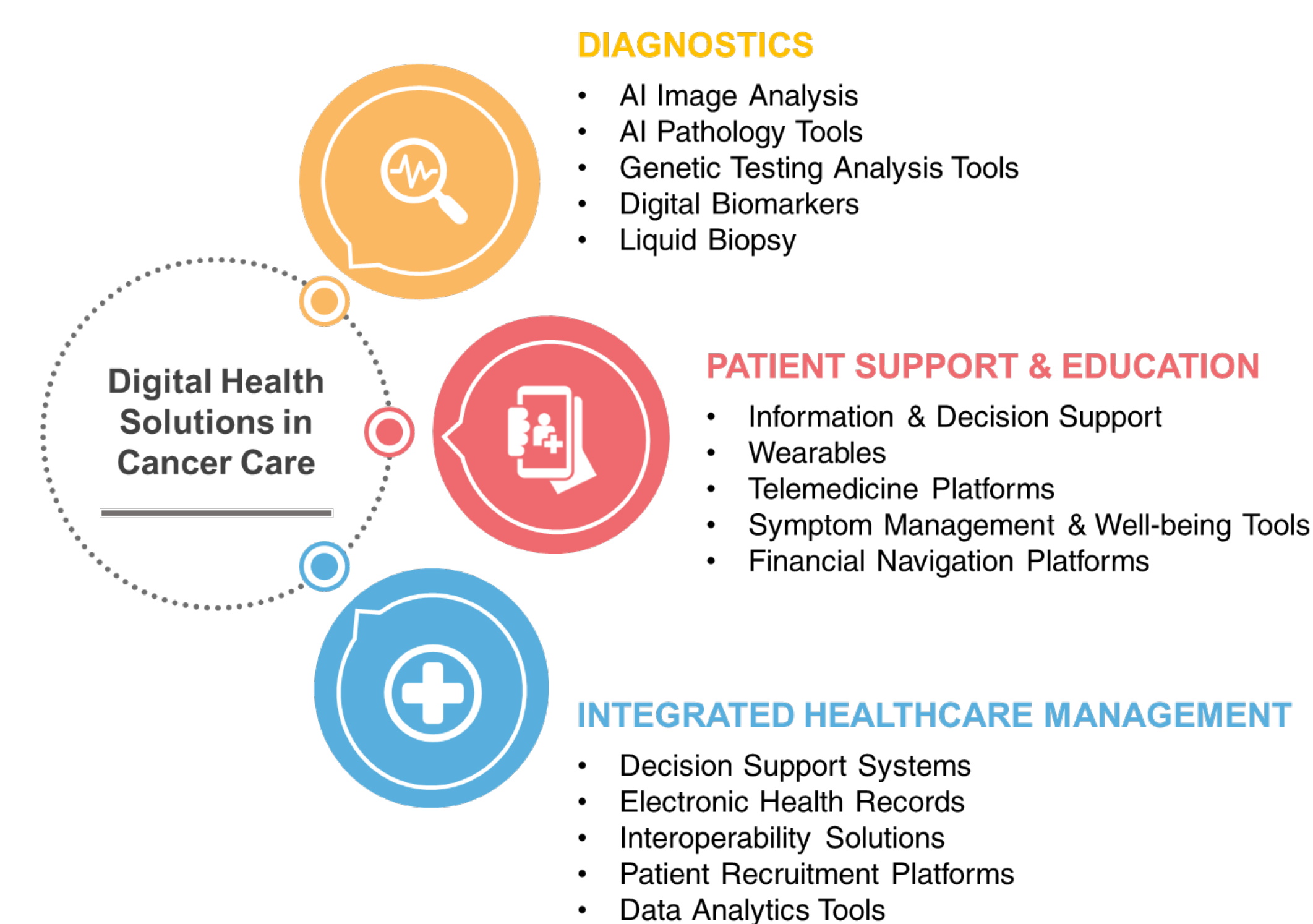


**Identification of Trends:** Identify emerging trends shaping the future of digital health in oncology.

- Synthesis of Insights:** Insights for future considerations of AI tools in cancer care, focusing on ecosystem-centric approach.

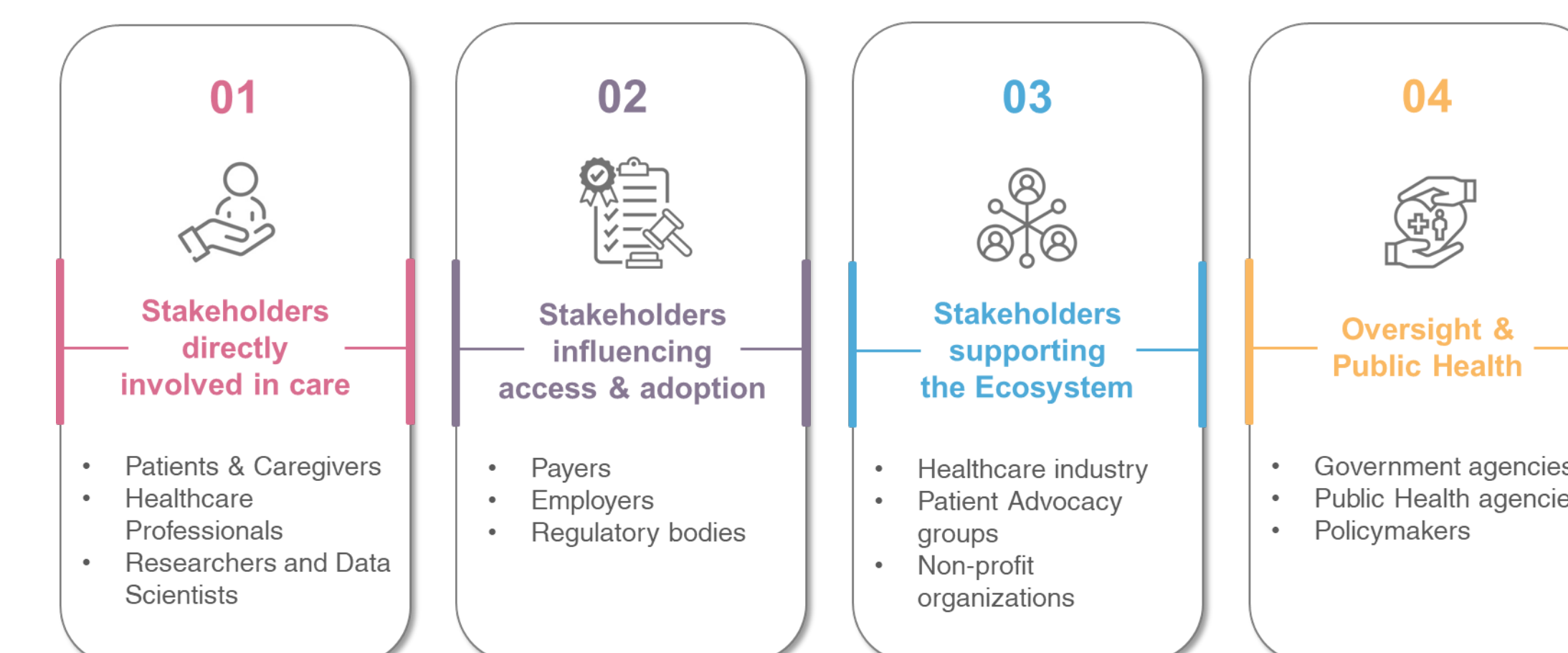
## RESULTS

### Digital Health Solutions in Cancer Care



- Research uncovered a variety of AI tools used in cancer care, including diagnostics, patient support, and integrated healthcare management.
- Integration of AI-powered diagnostics and wearables enhances early cancer detection and monitoring for improved outcomes.
- Personalized support through virtual assistants, VR, and gamification boosts patient engagement and treatment adherence.
- AI-driven financial navigation platforms aid in accessing financial assistance, alleviating financial toxicity and improving affordability.
- Integration of AI-driven decision support tools enhances clinical decision-making, research, and patient navigation, enhancing cancer care delivery efficiency.

### Key Stakeholders in Cancer Care



- Cancer care involves a multitude of stakeholders, each playing a distinct role and having unique needs.
- Understanding the multifaceted perspectives of these stakeholders is crucial for developing impactful solutions that address the challenges of the cancer ecosystem.
- AI technologies directly empower stakeholders involved in cancer care by enhancing diagnostics, treatment planning, and patient support.
- Indirect stakeholders, such as regulatory bodies and advocacy groups, are also influenced by AI advancements, shaping policy, and improving patient advocacy efforts.

### Advantages and Limitations of Digital Health Solutions Across Stakeholders

Stakeholder	Advantages	Limitations
<b>Patients</b>	<ul style="list-style-type: none"> <li>Empowered decision-making</li> <li>Improved communication with providers</li> <li>Access to information &amp; specialists</li> <li>Financial assistance</li> <li>Personalized support &amp; well-being</li> <li>Real-time health monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Tech skills needed</li> <li>Depersonalization</li> <li>Digital divide (access &amp; literacy) - Limited reimbursement</li> <li>Data privacy &amp; security concerns</li> <li>Reliability of digital solutions</li> </ul>
<b>Healthcare Professionals</b>	<ul style="list-style-type: none"> <li>Improved patient communication</li> <li>Time management &amp; efficiency</li> <li>Real-time data access</li> <li>Efficient care coordination</li> </ul>	<ul style="list-style-type: none"> <li>Additional training required</li> <li>Disruptions to workflow</li> <li>Data exchange &amp; interoperability issues</li> <li>Regulatory challenges</li> </ul>
<b>Researchers</b>	<ul style="list-style-type: none"> <li>Faster recruitment &amp; diverse populations</li> <li>Real-world data insights</li> <li>AI-driven data analytics</li> </ul>	<ul style="list-style-type: none"> <li>Secure data platform needed</li> <li>Regulatory hurdles</li> <li>Interoperability challenges</li> </ul>
<b>Payers</b>	<ul style="list-style-type: none"> <li>Streamlined communication &amp; applications</li> <li>Data-driven reimbursement decisions</li> <li>Regular member touchpoints</li> </ul>	<ul style="list-style-type: none"> <li>High upfront implementation costs - Stakeholder resistance to change</li> <li>Data security &amp; compliance</li> </ul>
<b>Employers</b>	<ul style="list-style-type: none"> <li>Early detection &amp; preventive care</li> <li>Access to high-value care</li> <li>Employee satisfaction with health plan</li> </ul>	<ul style="list-style-type: none"> <li>Identifying quality healthcare providers</li> </ul>
<b>Regulatory Bodies</b>	<ul style="list-style-type: none"> <li>Enhanced oversight &amp; monitoring</li> <li>Public health trend surveillance</li> <li>Track &amp; regulate healthcare interventions</li> </ul>	<ul style="list-style-type: none"> <li>Lack of comprehensive regulations</li> <li>Ethical considerations (privacy, bias)</li> <li>Training for regulatory workforce</li> </ul>

### Strategies to Address Diverse Stakeholder Needs

- To harness the full potential of digital health in oncology, a collaborative approach that considers the entire ecosystem rather than individual stakeholder needs is essential.
- This involves identifying and understanding diverse stakeholders and their roles, engaging them throughout the development process, and continuously adapting to evolving needs.

#### Understand the Ecosystem

- Identify and map diverse stakeholders
- Recognize their roles in solution selection, utilization, and management.
- Enables development of resonant, adoptable, and sustainable solutions.

#### Dynamic Stakeholder Needs

- Stakeholder needs evolve over time.
- Continuous engagement across pre- and post-launch phases ensures relevance and impact.

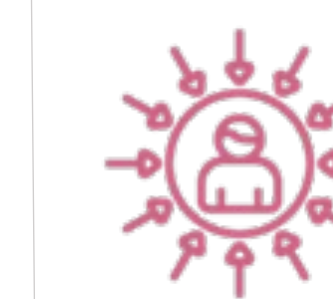
#### Strategic Targeting And Influence

- Prioritize key stakeholders.
- Identify unique motivations and expectations.
- Craft tailored strategies for behavior influence.

#### Equity Strategies

- Prioritize patients' preferences in marketing.
- Consider cultural context, language preferences, and form community partnerships.

### Key considerations for future digital health innovations in cancer



#### User-centered design

Involve users in the design and development process to ensure solutions address real-world challenges and preferences.



#### Reimbursement models

Develop sustainable reimbursement models that incentivize the adoption of effective digital health solutions.



#### Ecosystem-focused Approach

An ecosystem-focused approach reveals insights into diverse stakeholder needs and interactions. Be aware of dynamic stakeholder needs and preferences to keep the solution relevant and impactful.



#### Value Differentiation

Clearly articulate and demonstrate the unique benefits of the solution compared to existing options.



#### Strategic targeting

Prioritize key stakeholders for each solution, identify their unique motivations and expectations, and craft tailored strategies to influence their behavior.



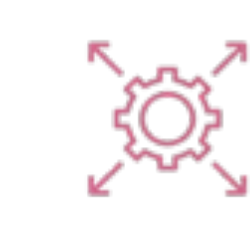
#### Seamless Integration

Develop solutions that seamlessly integrate across different care settings and providers, breaking down data fragmentation barriers.



#### Evidence generation

Conduct rigorous research and evaluation to demonstrate the effectiveness and value of digital health interventions



#### Scalable and Sustainable Design

Design scalable and sustainable solutions that consider long-term financial and environmental costs.

## CONCLUSIONS

- Early Detection and Prevention:** The digital landscape of cancer care is rapidly evolving, with a shift towards early detection and prevention. This signifies a proactive approach to healthcare, emphasizing prevention over cure.
- AI-Powered Transformations:** Artificial Intelligence (AI) has brought transformative changes to cancer diagnostics, treatment, and research. Innovations like "Cancer Twins" offer personalized treatment predictions, while AI-driven automated drug discovery promises breakthroughs in therapy development.
- Patient Empowerment through Technology:** AI-powered virtual companions and gaming apps are poised to play a pivotal role in patient empowerment, providing real-time symptom management, educational resources, and emotional support. Tools like PillCam exemplify the convenience and accessibility technology can bring to healthcare.
- Precision Medicine and Targeted Therapies:** AI's influence extends to the development of hyper-targeted therapies for specific cancer subtypes, advancing precision medicine. It also accelerates drug discovery processes, reducing time and resources required to bring efficacious therapies to fruition.
- Re-Bundling Towards Holistic Platforms:** While there's been a surge of "point solutions" in cancer care, the future landscape is likely to witness a re-bundling towards holistic platforms offering comprehensive care. These platforms integrate screening, education, navigation, treatment, pain management, and remote care for improved patient experience and value-based care models.
- Collaboration Among Stakeholders:** Collaboration among diverse stakeholders, including healthcare professionals, caregivers, and payers, is crucial for the success of holistic platforms. Seamless collaboration empowers stakeholders to work together effectively, leading to improved outcomes, affordability, and accessibility in cancer care.
- Emphasis on User Needs and Shared Design:** Future digital health innovation must prioritize user needs and adopt a shared design approach. This requires a thorough assessment of interconnected stakeholder needs, behaviors, and perceptions, ensuring solutions provide differentiated value in a saturated market. Recognizing the dynamic nature of these needs is essential for staying at the forefront of innovation in healthcare.

## ACKNOWLEDGEMENTS

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