THE EARLY DETECTION OF CANCER CONFERENCE 2024

CANARY CENTER AT STANFORD · KNIGHT CANCER Institute OHSU · CANCER RESEARCH UK

Improving the Faster Diagnostic Standard for Colorectal Cancer in the NHS: The Impact of C the Signs

NHS Somerset NHS Foundation Trust · NHS Somerset Integrated Care Board · the signs

B. Bakshi[1], S Dadhania[2], R Edgerley[3], R Bamford[3], M Payling[1]

1. C the Signs, Cambridge, MA
2. Clinical Oncologist and Cancer Research UK Research Fellow, Computational Oncology Group, Institute for Global Health Innovation, Imperial College London
3. Somerset NHS Foundation Trust

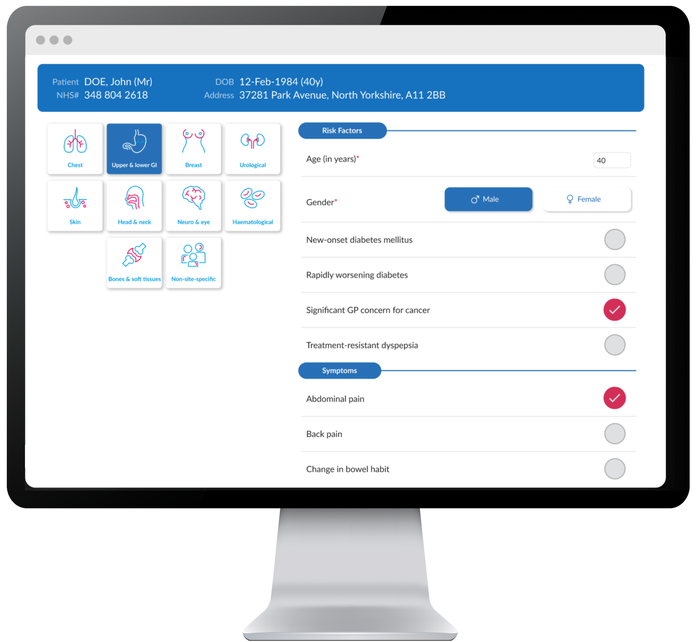
Introduction

Colorectal cancer (CRC) is one of the most common malignancies globally and a leading cause of cancer-related death. Early detection is pivotal in reducing mortality, as the prognosis for CRC is highly dependent on the stage at diagnosis.[1,2] According to Cancer Research UK, the five-year survival rate for CRC diagnosed at stage 1 is over 90%, compared to less than 10% for those diagnosed at stage 4.[1,2] Consequently, improving the timeliness and accuracy of diagnosis is a key public health priority.

The Faster Diagnostic Standard (FDS) was introduced by the NHS in 2021 as part of its Long Term Plan, which aims to achieve a world-class cancer care system in England by 2028.[3,4] The FDS sets a target for at least 75% of patients with suspected cancer to be diagnosed or have cancer excluded within 28 days of referral.[4] This standard is designed to reduce diagnostic delays, accelerate treatment initiation, and ultimately improve survival outcomes.[4,5] For example, even with a short delay of starting treatment by one month, mortality increases by up to 13%.[5] Despite its potential, the FDS has been challenging to achieve, particularly in the aftermath of the COVID-19 pandemic, which significantly disrupted cancer services.[6,7] Delays in diagnosis during the pandemic have been associated with worse outcomes, emphasizing the need for robust solutions to meet the FDS.[7]

Digital health technologies have emerged as promising tools to support the achievement of the FDS.[8,9] Among these, C the Signs (CTS) is a notable innovation. CTS is an AI clinical decision support system that uses artificial intelligence to assist primary care physicians in assessing cancer risk and making timely referrals. The system integrates into existing primary care workflows, providing a structured approach to referral that includes mandatory fields and automated decision support based on the latest clinical guidelines. By enhancing the accuracy and efficiency of the referral process,[10,11] CTS has the potential to significantly improve the FDS in colorectal cancer pathways.

The current study aims to evaluate the impact of CTS on the FDS within the colorectal urgent suspected cancer (USC) pathway at Somerset NHS Foundation Trust. By comparing data from before and after the implementation of CTS, this study provides insights into the effectiveness of digital health interventions in enhancing cancer diagnostic standards in the NHS.



Methods

Study Design:
A retrospective analysis was conducted using data from the Somerset Cancer Registry. The analysis focused on colorectal USC referrals and practices within the Somerset Integrated Care System that adopted CTS in October 2021.

Study Population:
The study included patients who underwent colorectal USC referral during two periods: May 1, 2019, to October 31, 2019 (pre-CTS implementation), and May 1, 2023, to October 31, 2023 (post-CTS implementation). Although the FDS was formally introduced in April 2021, the relevant data have been recorded in clinical practice since 2018, allowing for a comprehensive comparison across time periods.

Data Collection:
Data was extracted on several parameters, including the number of patients referred, the percentage of patients meeting the FDS, patient demographics, and the specific elements of the CTS intervention that were implemented. The primary outcome was the change in the percentage of patients achieving the FDS before and after the introduction of CTS.

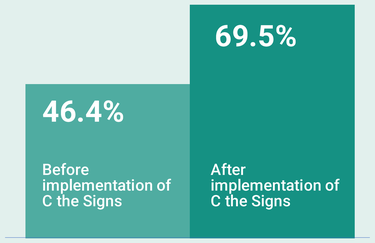
Statistical Analysis:
An independent t-test was performed to compare the proportion of patients meeting the FDS before and after the implementation of CTS. Statistical significance was set at a p-value of <0.05. Additional subgroup analyses were conducted to explore the impact of CTS on different patient demographics and referral patterns.

The Faster Diagnostic Standard (FDS) is the percentage of patients who have cancer diagnosed or excluded within 28 days of an initial suspicion of cancer by a clinician.

Results

A total of 1,282 patients were referred through the colorectal USC pathway before the implementation of CTS, with 46.4% meeting the FDS. After the introduction of CTS, 1,415 patients were referred, and the proportion achieving the FDS increased significantly to 69.5% ($p < 0.001$).

This equates to a **49.8% improvement in the FDS** since the introduction of C the Signs.



49.8% Improvement in the FDS following C the Signs implementation

Discussion

The significant improvement in the FDS following the implementation of CTS demonstrates the potential of AI-based digital health platforms to transform cancer care pathways. By ensuring that referrals are appropriate, accurate, complete, and timely, CTS addresses several of the key challenges that have prevented healthcare systems from meeting the FDS. The structured nature of the system reduces variability in care, minimizes the risk of missed or delayed diagnoses, and supports the timely initiation of appropriate investigations and treatments. This has important implications for cancer survival.

These findings are consistent with previous research indicating that AI can play a critical role in improving cancer diagnosis and care.[8,9] The integration of CTS into the NHS's colorectal USC pathway aligns with broader trends in digital health, where AI-driven tools are increasingly being adopted to enhance clinical decision-making and streamline workflows.[8,9] Furthermore, the success of CTS in improving the FDS underscores the importance of continued investment in digital health solutions as part of the NHS's strategy to achieve its long-term goals.

This evidence is also adding to the growing body of research supporting the impact of CTS on patient outcomes, from improvements in primary care cancer detection rates,[10,12] to the accuracy of its risk assessment module.[11]

Reference

1. Cancer Research UK. (2022). Colorectal Cancer Statistics. Retrieved from Cancer Research UK
2. Siegel, R. L., Miller, K. D., & Jemal, A. (2020). Cancer statistics, 2020. *CA: A Cancer Journal for Clinicians*, 70(1), 7-30.
3. NHS England. (2019). NHS Long Term Plan. Retrieved from NHS Long Term Plan
4. National Health Service. (2021). Faster Diagnostic Standard for Cancer. Retrieved from NHS UK
5. Hanna TP, King WD, Thibodeau S, et al. Mortality due to cancer treatment delay: systematic review and meta-analysis. BMJ. 2020 Nov 4;371:m4087.
6. Rubin, G., et al. (2019). The impact of COVID-19 on cancer care. *The Lancet Oncology*, 21(5), 627-629.
7. Sud, A., et al. (2020). Collateral damage: the impact on outcomes from cancer surgery of the COVID-19 pandemic. *Annals of Oncology*, 31(8), 1065-1074.
8. De Vincentis, G., et al. (2020). Artificial intelligence in colorectal cancer screening. *Gastroenterology*, 158(3), 859-862.
9. Smith, R. A., et al. (2021). The role of digital health in cancer diagnosis and management. *Journal of Clinical Oncology*, 39(7), 1205-1212.
10. Bakshi B, Dadhania S, Holloway P, et al. Using an artificial intelligence platform to enhance cancer detection rates in primary care.. *JCO* 42, 1560-1560(2024).
11. Bakshi B, Payling M. Accuracy of an AI prediction platform in predicting tumor origin: A real-world study. *JCO Oncol Pract* **19**, 74-74(2023).
12. Bakshi B, Payling M. The role of clinical decision support systems in reducing cancer diagnosis disparities from patients with socio-economic deprivation. 4th National Cancer Institute Symposium on Cancer Health Disparities. April 2023.

Conclusion

The implementation of C the Signs within the colorectal USC pathway has led to a significant 49.8% improvement in the achievement of the NHS's Faster Diagnostic Standard. As the healthcare system continues to recover from the disruptions caused by the COVID-19 pandemic, digital health innovations like CTS are critical to ensuring that patients receive timely and accurate diagnoses, which are essential for improving survival outcomes.

Scan here for Real-world Evidence paper