HealthManagement
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Developing Artificial Intelligence to Help Prioritise Patient Portal Messages

In recent years, the use of patient portals for communication between healthcare providers and patients has surged, driven by the increasing adoption of electronic health records (EHRs) and the demand for more accessible healthcare. The COVID-19 pandemic further accelerated this trend, highlighting the need for efficient, timely responses to patient inquiries. However, the sheer volume of messages, some requiring urgent attention, has placed a significant burden on healthcare providers. To address this challenge, researchers at NYU Langone Health developed and implemented an artificial intelligence (AI)-based workflow to prioritise patient portal messages, ensuring that high-acuity cases receive prompt attention. A recent article in JAMIA Open explores the development, implementation, and impact of this AI system on patient care.

The Need for AI in Patient Portal Management

The proliferation of patient portal usage has created an environment where healthcare providers must manage a growing number of messages. Many of these messages are routine, but a small percentage require urgent attention due to the severity of the patient's symptoms. Traditionally, triaging these messages has been a manual process, often leading to delays in addressing critical cases. The introduction of AI into this workflow aims to automate the prioritisation of messages, enabling healthcare providers to focus on the most urgent cases first.

At NYU Langone Health, a significant portion of patient portal messages is managed by a team of registered nurses working in a structured environment to triage and respond to patient inquiries. With messages arriving 24/7, there is a need to ensure that those which indicate serious health issues are reviewed and acted upon as quickly as possible. The AI system NYU Langone Health developed uses a Bidirectional Encoder Representations from Transformers (BERT) model to identify language patterns in messages that suggest high acuity, thereby flagging them for immediate review.

Implementation and Integration of the AI System

Integrating the AI system into the existing EHR workflow involved several key steps. First, the research team developed the AI model using a dataset of over 40,000 patient messages. The model was trained to recognise specific phrases and symptoms typically associated with high-risk health issues, such as chest pain or difficulty breathing. These high-acuity messages were then flagged within the EHR system, allowing nurses to prioritise their review.

To facilitate the adoption of this new workflow, the AI system was integrated into the EHR as a new display column labelled "1st Msg Acuity." This column prominently displayed the messages flagged as high priority, enabling nurses to sort and address these messages first. Training and feedback sessions were conducted with the nursing team to ensure the new system was user-friendly and effectively integrated into their daily routines.

The system was piloted with a small group of users before being fully implemented across the network. Throughout this process, the research team worked closely with the nursing staff to refine the AI model and make adjustments based on real-world usage and feedback. This collaborative approach ensured that the AI system was technically sound and aligned with healthcare providers' practical needs.

Impact on Patient Care and Workflow Efficiency

The implementation of the AI-based workflow has had a significant impact on the efficiency of patient care at NYU Langone Health. One of the primary measures of success was the reduction in the time it took for high-acuity messages to be read and addressed. Before the AI system was implemented, messages sent outside business hours often sat unread until the next working day, leading to potentially dangerous delays. Post-implementation, the median read time for high-acuity messages during non-business hours dropped from 66 minutes to just 22 minutes—a 67% reduction.

In addition to faster response times, the AI system also improved the overall workflow for the nursing team. By automating the prioritisation process, nurses could focus their efforts on the most urgent cases without the need to manually sift through each message. This not only

reduced the cognitive load on the staff but also ensured that critical cases were less likely to be overlooked.

The success of the AI system at NYU Langone Health highlights the potential for AI to enhance patient care by streamlining communication processes and reducing the time to treatment for serious health issues. As healthcare providers continue to adopt AI technologies, similar systems are likely to become standard practice, particularly in environments with high patient messaging volumes.

Conclusion

The integration of AI into patient portal management at NYU Langone Health represents a significant advancement in the use of technology to improve healthcare delivery. By prioritising high-acuity messages, the AI-based workflow has not only reduced the time to treatment for critical cases but also optimised the overall efficiency of healthcare providers. This case study underscores the importance of aligning AI solutions with human workflows to maximise their impact and suggests a promising future for AI in healthcare. As this technology continues to evolve, it has the potential to transform how patient inquiries are managed, ultimately leading to better outcomes and more responsive care.

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Published on : Mon, 2 Sep 2024