Short Communication

Antimicrobial Stewardship Through Digital Innovation: Insights from the Hidoc Initiative

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ABSTRACT

Antimicrobial resistance (AMR) represents a critical global health crisis, threatening the efficacy of essential antimicrobial therapies and significantly contributing to increased morbidity, mortality, and healthcare costs. Addressing this challenge necessitates robust antimicrobial stewardship (AMS) programs designed to optimize antimicrobial prescribing practices. The Hidoc Initiative, a leading digital health platform, leverages artificial intelligence (AI)-driven strategies to equip healthcare professionals (HCPs) with real-time, evidence-based guidance on antimicrobial use. This article examines the core digital interventions employed by the Hidoc Initiative, evaluates its impact on clinician engagement, and explores the broader role of AI-driven digital platforms in advancing AMS efforts.

Keywords: Antimicrobial Resistance (AMR), Antimicrobial Stewardship (AMS), Digital Health, Artificial Intelligence (AI), Hidoc, AI-Driven Education.

INTRODUCTION

Antimicrobial resistance (AMR) is a growing global health threat, with projections estimating that by 2050, AMR could be responsible for up to 10 million deaths annually if left unaddressed [1]. The World Health Organization (WHO) has identified AMR as a critical priority, emphasizing that injudicious antimicrobial use, combined with the stagnation of novel antimicrobial development, has accelerated resistance and compromised infection control efforts. Implementing effective antimicrobial stewardship (AMS) programs is paramount in mitigating AMR by promoting rational antimicrobial prescribing and reducing the emergence of resistant strains. [2]

The integration of digital health technologies, particularly AI-driven platforms, offers scalable solutions to enhance AMS interventions. These platforms provide real-time, evidence-based antimicrobial guidance, enabling healthcare professionals (HCPs) to optimize prescribing decisions [3]. This article critically evaluates the strategic interventions of the Hidoc Initiative, its measurable impact, and the broader implications of digital transformation in AMS.

METHODOLOGY
Study Design
A structured digital AMS campaign was implemented on the Hidoc platform over 14 weeks, targeting healthcare professionals (HCPs) across various specialties. The initiative focused on antimicrobial resistance awareness, prescribing optimization, and infection control.
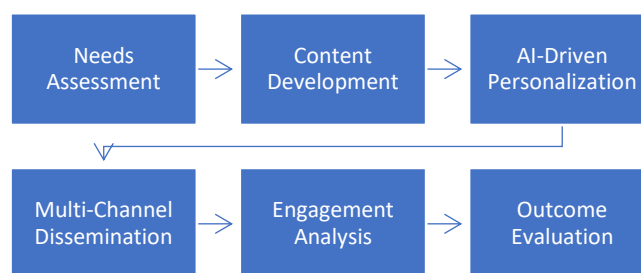
Diagram 1 – methodology steps

A comprehensive approach was taken to enhance antimicrobial stewardship (AMS) among healthcare professionals (HCPs). The process began with a needs assessment to identify key AMS knowledge gaps. Based on these insights, expert-led educational materials and evidence-based clinical guidelines were curated to ensure high-quality content development. To enhance learning effectiveness, AI-driven personalization was implemented, tailoring modules to individual prescribing patterns. The content was then disseminated through a multi-channel strategy, including videos, webinars, and real-time updates, ensuring wide accessibility. Engagement analysis was conducted by tracking digital interactions, click-through rates (CTR), and participation metrics to gauge HCP involvement. Finally, outcome evaluation was performed to assess the impact of these efforts on AMS knowledge retention and prescribing behavior, ensuring continuous improvement in antimicrobial stewardship practices.

RESULTS

Engagement Metrics

The AMR Video Campaign effectively reached 85,411 healthcare professionals (HCPs), generating 384,551 digital impressions and achieving an 8% click-through rate (CTR). The initiative successfully engaged critical care specialists, microbiologists, nephrologists, urologists, pulmonologists, infectious disease experts, and surgeons across India.

HCP Engagement by Specialty

HCP engagement was diverse, with a strong representation from specialists in critical care, microbiology, nephrology, urology, pulmonology, infectious diseases, and surgery. The campaign successfully fostered awareness and knowledge-sharing among these key groups, ensuring that AMR-related content reached professionals directly involved in patient management and infection control. This targeted approach helped drive meaningful interactions and reinforced best practices in antimicrobial stewardship (AMS)

A detailed breakdown of HCP engagement is visualized in the pie chart below:
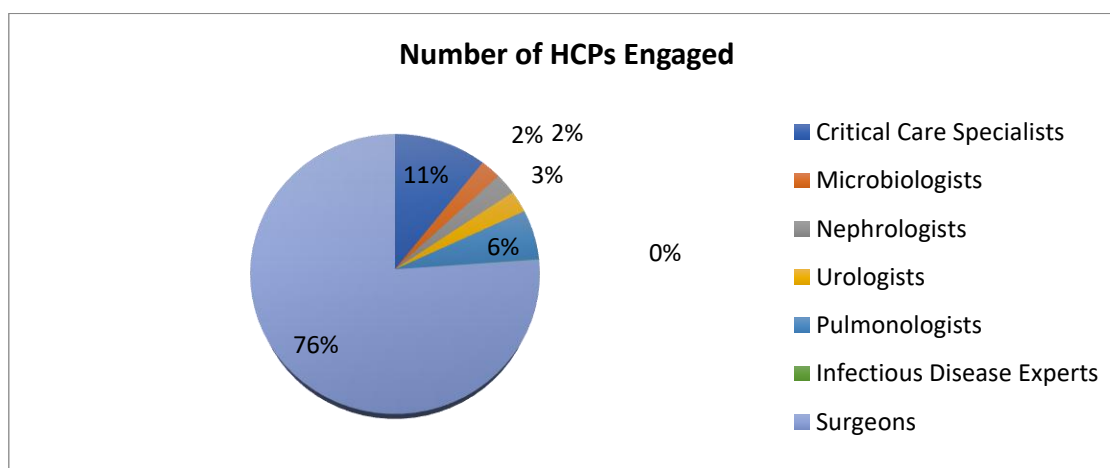
Pie Chart 1 – Number of HCPs engagement

Key Findings

The AMR Video Campaign demonstrated significant reach and engagement within the healthcare community. The 8% CTR reflects strong interest in AMR-related content, while the omni-channel approach—leveraging the Hidoc app, website, email, SMS, and WhatsApp—ensured comprehensive dissemination. The campaign successfully aligned with key focus areas, including antimicrobial stewardship (AMS), AMR prevention, and infection control, reinforcing its impact over the three-month duration.

Metric	Outcome
HCPs Engaged	85,411
Digital Impressions	384,551
Click-Through Rate (CTR)	8%
Program Duration	3 months (July - September 2024)
Key Focus Areas	AMS, AMR Prevention, Infection Control
Omni-Channel Strategy	Hidoc app, website, email, SMS, WhatsApp

Table 1. Impact of the Hidoc Digital AMS Initiative

DISCUSSION

AI-Driven Insights and Optimization of Antimicrobial Prescribing

Integrating AI-driven analytics within AMS initiatives significantly enhances prescribing accuracy, resistance surveillance, and clinical decision-making. Digital health platforms, such as Hidoc, utilize predictive modeling and real-time monitoring to:

- Identify emerging resistance patterns based on regional antimicrobial use data
- Provide personalized AMS recommendations for HCPs
- Reduce inappropriate antimicrobial prescriptions through AI-driven decision support

Interdisciplinary Collaboration and AMS Enhancement

Digital AMS interventions facilitate interdisciplinary collaboration, fostering real-time knowledge-sharing among infectious disease specialists, microbiologists, clinical pharmacologists, and primary care physicians. This approach strengthens coordinated AMS efforts, ensuring adherence to updated antimicrobial prescribing guidelines [4]. Additionally, AI-driven personalization tailors educational content to specific clinical settings, improving engagement and reinforcing evidence-based prescribing practices.

CONCLUSION & FUTURE DIRECTIONS

The Hidoc Initiative exemplifies the potential of AI-driven digital platforms to enhance AMS efforts through real-time clinical decision support, predictive analytics, and targeted HCP engagement. By integrating AI-driven surveillance, interdisciplinary collaboration, and digital education strategies, the initiative has demonstrated measurable success in enhancing AMS knowledge dissemination and optimizing antimicrobial prescribing patterns [5].

Future directions for AMS should focus on:

- Expanding AI-driven AMS initiatives to improve real-time antimicrobial prescribing guidance
- Enhancing resistance surveillance by integrating machine learning models into AMS frameworks
- Strengthening collaborations between digital health platforms, regulatory agencies, and healthcare institutions to promote standardized AMS interventions

Advancing digital AMS strategies is imperative to ensure sustainable antimicrobial use, thereby preserving the efficacy of existing antimicrobial agents. The Hidoc Initiative serves as a model for AI-powered AMS frameworks, emphasizing

the crucial role of digital health innovation in combatting AMR on a global scale.

Declaration by Authors

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