Care Transition Intelligence and Multi-Provider Communication Optimisation: Real-Time AI Systems for Enhanced Patient Care Coordination

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1. Introduction

The integration of advanced technologies such as artificial intelligence (AI) is critical in customizing healthcare interventions which, in turn, revolutionizes patient care management. In modern research and healthcare setups, providers and researchers have recognized the importance of healthcare delivery informed by digital health. The patient-centered approach that shifts the focus from the disease to the patient requires effective and efficient coordination or collaboration among healthcare providers to provide holistic care. Included in the publication among the four primary areas for healthcare improvement negatively impacted by substantial lags, lack of communication, and differences between patients and healthcare providers is patient and family communication. Realizing patient and family time constraints, the best approach involves health system and healthcare stakeholders offering 'mum-friendly' appointment planning, health education, and real-time electronic referrals to specialty clinics under one platform. Although such a setup is the gold standard, it remains an underachieved objective. To date, there is a paradigm shift in the current operational as well as research perspective of technical advances in the health sector, especially the use of technologies such as AI. One of the key technological trends is the development of AI-powered systems or solutions, especially to improve healthcare services. Contrary to conservative working industries, the use of AI technologies and solutions within the health sector was the least explored despite the urgency to improve both operational management and patient care. In addition to discriminating services available from the current realm of existing technologies, the use of AI-powered systems has theoretical underpinnings, having been studied for over four decades in various operational sectors. This manuscript therefore seeks to provide comprehensive knowledge and

technical know-how of the use of AI technologies to improve healthcare services in general, including the rationale for its adoption; it is divided into subsections notable in this aspect.

1.1. Background and Rationale

This study focuses on the need for modern-day development of real-time artificial intelligence-powered systems to enhance patient care coordination between different care settings in the healthcare spectrum. Traditional systems have been largely improved over the years to provide better services. Healthcare in Australia has gone through a massive developmental phase, and the maintenance of patient care coordination through technology has been under consideration by the healthcare department since 2006. The Australian Digital Health Agency was implemented in the year 2016, which streamlines and integrates the Australian healthcare system through technology to support the connection of functionality and other clinical services like medicines view, healthcare identifiers, advanced care directive, pathology, diagnostic images, pharmacy, hospital discharge, events summaries, and patient end-of-life data.

The healthcare industry is facing challenges such as increasing consumer demand, increasing costs, limits on staff and facilities, a diverse and growing population profile, more consumer-centered and holistic healthcare approaches, and increasing use of technology within the healthcare system that enables healthcare professionals to improve services and connect with their consumers by importing real-life data to a centralized platform. A national circuit breaker is needed to unlock information technology roadblocks slowing public and private investments in creating net benefits from digital health services. Current systems operate in silos and limit the usefulness of input data. Inappropriate use of healthcare services by delaying discharge unnecessarily occupies acute and key hospital resources, immediately and in the future for these individuals who become known to care and case managers. The significant amount spent on home-based care provides over 5 million episodes of care across the spectrum of care services and meets 50% of our growing population's total care needs. Technology systems and care professionals are available to link all data, in an ethical and legal manner, and provide safe, systemic, quality care to our population and individuals, respectively. The time is right, the technology is ready, and the need for care coordination to be resourced fully and safely is widely acknowledged.

1.2. Research Aim and Objectives

Extensive literature has been explored in the domain of patient care coordination, which has undoubtedly shown several challenges and pitfalls in this field. To address such issues substantively, the main aim of this research proposal is to define a set of real-time AI-powered systems to mitigate and improve patient care coordination issues, as identified. Formulated substantively, the specific objectives of the research concern: exploring patient care coordination issues and gaps prevailing in the literature; finding suitable real-time AI systems to address the real-time gap as understood through two gaps; investigating various industry problems and needs to provide a scientific solution; devising an early warning system as a pre-treatment and preventive measure; and enhancing patient satisfaction while reducing time and money spent in healthcare systems. Evaluating the research outcomes based on this set of objectives will conclude whether the treatment given is valuable or not. This research-based approach will help healthcare staff ensure a safe pathway, reduce the need for subsequent treatment and appointments, and improve outcomes for patients.

The overall aim of this research proposal is to enhance patient outcomes using a set of real-time patient coordination disposition AI-driven systems. It will address multiple individual objectives, including: extrapolating patient care coordination issues and literature gaps encountered by past researchers; discovering real-time AI for different treatment stages that can counteract these gaps; identifying research gaps that can be addressed using real-time AI; investigating how real-time AI can be adopted into the context of patient care coordination; identifying the top three existing market problems in the coordination of patient care; and quantitative performance data will conclude the relevance of the treatment given.

2. Understanding Patient Care Coordination

The process of facilitating the appropriate and timely provision of an individual patient's health needs, provided by a team of healthcare professionals working together, interconnected with the patient and their caregivers, that stretches across and beyond healthcare systems, could aptly be defined as patient care coordination. Moreover, patient care coordination could be interpreted in multiple ways. It might entail coordinating care efforts between separate healthcare facilities or among patients and a wide range of health or human services. Each of these factors into the following

descriptors—coordination efforts that are directly linked to improved patient outcomes, care efficiency, and optimal patient satisfaction. Further, smooth communication among healthcare providers is a crucial determinant of good care coordination. When this communication is impaired, issues can arise for organizations dedicated to ensuring seamless transitions of care, like home health agencies, skilled nursing facilities, primary care networks, and other institutions fostering strong connections between outpatient clinics and hospitals. Even merely with excessive reliance on emergency departments for regular healthcare, ill effects go so far as to ripple through hospital operations and inflate bottom lines. While superior patient referrals would likely lead to the growth of the healthcare system in the years to come, better patient coordination is a key step in enabling the socio-economic success of clinical enterprises. Several systems, like a more direct referral process, continue to rely on phone calls, faxes, or other outdated communication methods to ensure proper co-management of patient care. Several institutions continue to rely on methods reminiscent of the days when computers were still a space-age dream rather than a standard workday tool. While some may attempt the implementation of technology for referral overtures, problems exist around developing technology that can incorporate the diverse information systems and data formats that exist within vast networks of healthcare service providers. Clearly, patient coordination has room for significant enhancements. This is especially true in light of issues with information silos, imprecise appointments, unnecessary duplicity of tests and procedures, and miscommunicated patient discharges. Only a proper tech solution holds the key to end such confusion and improve overall care coordination.

2.1. Definition and Importance

1.0 Introduction and Background 1.1 Definition and Importance Patient care coordination is the process of facilitating care for patients to promote continuity of care across healthcare entities. Three key components of patient care coordination have been identified, including: (1) communication, (2) collaboration, and (3) information management. In an ideal healthcare system, the goal of care coordination is to deliver effective, high-quality care that promotes optimal health outcomes. There is evidence to indicate that effective coordination of care results in better health outcomes. Poor coordination can lead to redundancy in care, contradictory treatment plans, adverse reactions to medications, and poor transitions between healthcare providers. There are

many cases that demonstrate that effective care coordination is necessary when treating patients across different healthcare providers and entities.

All stakeholders, including the patient, care provider, primary caregivers, and healthcare organizations, are essential to coordinating the care of an individual. Patient-coordinated care is an inter-professional, patient-centered approach that addresses the unique healthcare needs of an individual and their associated clinical path. The care must be well-coordinated both within the organization and across settings over time. Physicians believe that a coordinated care system will have the following characteristics: communication between healthcare entities regarding access, assessments, interventions, plans, changes in plans, patient and family needs, resource issues, and transitions of care. In the United States, as well as in many Western countries, governments are encouraging healthcare organizations to improve communication and collaboration among healthcare providers. Many quality-of-care initiatives now require some form of coordination of care as part of their respective measures.

2.2. Challenges in Traditional Systems

In traditional models, it is challenging for physicians to get a complete picture of an individual patient mainly due to the isolation of various electronic health record systems. Therefore, real-time updates and record aggregations become mission-critical, even as medical devices and telemedicine converge. However, taking note of and sharing information across this fragmented system continues to be a problem, and communicating across organizations only adds another level of complexity. Disjointed patient information can be concretely translated into missed care, duplication of therapies, and patient frustration. All of which can lead to missed or postponed appointments—not for life-enhancing services but for critical care pathways and drugs, deteriorating the overall patient care coordination. The system has not even been formally evaluated for real-world effectiveness. However, this must be done because, in theory, it is capable of overcoming many of the hurdles in effective care coordination that have plagued health care for many years.

Effective coordination and collaboration for the care of patients across organizations is essential to providing high-quality, efficient care. There are large diverse ranges of limited traditional systems to address patient care coordination. Yet the demonstration of whether or not these systems are effective is still limited. Traditional approaches

based solely on shared care plans without additional automatic updates for contact with the patient may not effectively support coordination. Not all providers communicate frequently with all patients. Even fewer patients would want voice calls from every provider when this could be handled as an electronic update instead. It is unclear whether care providers perceive an increased interest in patient care coordination through additional updates or if it is almost viewed as more spam notification. Although it doesn't handle frequency of direct contacts with patients, it demonstrated how all providers in the care are present in the care plan. Engagement after this is not identified in that work. Changes to the updated care plan have no conversational content and likely will not engage the recipient in the process or keep them better informed than a care plan that has not been updated.

Without additional communication, the automatic update is likely to produce limited effectiveness. Conversely, engaging both the provider and patient in ongoing patient status through automatic updates of smart care plans is likely to keep the providers for the patient apprised of their co-providers' expertise, potential tips or pearls of knowledge, and other relevant contemporaneous updates. There are losses in the extent to which privacy is maintained through limiting the plan's updates to only reflect patients for whom the provider has an investing level of consent/authorization to view. Thus, there is almost certainly a more complex matter that merits challenges of this technological solution that is not explored in the work. Case studies are the best way to demonstrate that patient care coordination can be and has been improved through coordination examples. In many cases, processes to facilitate care have been developed, but the EMRs themselves are not integrated with workflows. In at least one case, a patient care coordination tool has been developed and is integrated with patients' pediatric EMR. It communicates with one database that can contain student health information up through a child being 17 years and 364.5 days old and a separate database of adult information.

3. AI and Machine Learning in Healthcare

Artificial Intelligence and Machine Learning are revolutionizing various fields, and healthcare is no exception. AI is capable of mimicking numerous human capabilities, such as understanding a natural language conversation, recognizing objects in an image, speech-to-text transformation and vice versa, and translating languages, thus leading to

the possibility of a wider variety of applications, from emerging voice-controlled interfaces and conversational agents to diagnostic tools. AI uses advanced data analysis and data modeling, including predictive modeling, and can do this in a matter of seconds, if not milliseconds. These capabilities are enhancing state-of-the-art applications, personalization of treatment decisions, and patient self-care.

Machine learning algorithms that can "learn" from and make predictions on data have been employed in healthcare primarily at the individual level. At the clinical level, machine learning techniques have been successfully developed and applied for clinical prediction tasks using data from numerous large healthcare databases. AI is now poised to revamp various aspects of healthcare in general, including care coordination, access, clinical performance improvement, value-based care, and patient adherence, enabling positive feedback cycles that improve patient engagement and patient activation. The AI-powered systems are specifically providing the potential clinical outcomes that would be linked with the use of this technology. For enhancing patient care coordination, AI could provide an effective and efficient output incorporated in the EHR. Even though there are ethical measures for data integration, predictive modeling could be one of such applications. Research has shown that technology incorporated with AI has the potential to reduce healthcare system costs drastically and enhance outcomes. It will enhance coordination, access, quality, as well as improve patient care management. Thus, the application of AI is to enhance the size of the grey area, ostensibly to improve patient management services. However, ethical considerations and preconditions remain to be resolved.

3.1. Overview of AI and Machine Learning

3.1. Overview of AI and Machine Learning

Artificial intelligence (AI) and its subfield of machine learning have dramatically transformed numerous domains, including healthcare. AI can be generally defined as the capacity of machines to exhibit cognitive processes such as learning, problem-solving, perception, and decision-making. Typically, AI makes decisions that were once driven by humans and improves the actions taken by humans. Machine learning is a field of AI that has gained even greater prominence in the digital era, where system-generated decisions continue to increase rapidly. Machine learning can be broadly understood as the field of study that gives computers the ability to learn and make

decisions without being explicitly programmed, thereby significantly reducing the need for manual, time-consuming, and costly human intervention.

These advancements are reflected in healthcare practices. AI and machine learning methods, due to their large capacity to contextualize and recognize intricate data, can boost diagnostic reliability and optimal treatment choices, thereby providing improved patient safety and optimized resources. The growing acceptance and popularity of deep learning will enable the exploration of the potential in more intricate clinical decision-making and patient care settings. These broad descriptions of machine learning identify both its massive potential and its reliance on the quality of the data that is input into the system. Machine learning can be separated into different categories and methodologies. Broadly, machine learning can be either supervised, unsupervised, semi-supervised, reinforced, transfer-optimized, or associated with knowledge discovery. The classification hinges on the training datasets and the manner in which the machine learning outputs are employed to fine-tune the treatment of future learning algorithms. For example, the model is trained to learn using output-labeled data points and is requested to learn from the discrepancies between the true output and the predicted output. On the other hand, unsupervised learning occurs when data are unlabeled, and the model aims to group or organize the data inputs without prior knowledge of the potential relationships among these inputs. Helpful patterns and rules in medical data can consequently be recognized, and styles of habits or populations can be discovered. Using semi-supervised learning, patient-specific data are recognized using labeled data, while other characteristics may be clustered according to patient population in an unsupervised manner.

3.2. Applications in Patient Care Coordination

There are several practical use cases of AI and machine learning tools for the enhancement of patient care coordination, including: Workflow optimization and scheduling for appointments and procedural visits, where resources are scheduled to specific patients and appointments optimized to improve both clinical operations and patient satisfaction. Patient triage into an accurate level of care can allow for reducing unnecessary hospitalizations. Personalization of care management for individual patients through patient stratification or risk scoring algorithms can enhance capacity management for providing care across settings. These communication systems are

generally unobtrusive, meaning that providers can continue their work and will be notified when actions are necessary. Furthermore, two of these applications involve real-time data analysis. Within the care coordination tasks where predictions are made from patient data, AI can also add capabilities such as data integration, machine learning, and automated care plan configurations. It can also capture actions as observational data. Therefore, using AI tools in care coordination can help in preventing duplication of work, minimizing human errors in computations, and capturing interdisciplinary and systems-level collaborations. Challenges in integrating AI and machine learning tools into care coordination workflows include interpreting and operationalizing prediction results and activating responses. There is the potential for causing unnecessary alarm on the part of the provider, as many AIs are "black box," meaning that providers are given a classification or a prediction, marking the presence of an outcome. Understanding the tenuous balance between the confidence in these tools based on the level of validity of input data, the healthcare system environment, and the expertise and clinical judgment of a workforce is key in the operationalization of AI tools. Furthermore, ensuring that AI systems' outputs are integrated into electronic health records and/or communications with other members of the care team can be a complex technological and policy roadblock to implementing artificial intelligence tools.

4. Real-Time Systems in Healthcare

Real-time systems in healthcare are those designed to deliver feedback variables to processes as rapidly as they require, typically within the operating range of a system. From a coordination standpoint, real-time access to patient needs means that intervention can be taken as the need is recognized. Such interventions can include alerting other providers or more broadly communicating patient needs that emerge in transit with a patient, often using data directly from the electronic health record in real time, or for the patient to access assistance. Real-time systems in healthcare can also provide information needed to make behavior changes to deal with a real-time or near-future patient need, such as a need to clean a patient room to reduce the hazard of a fall.

Real-time data access and communication appear to have numerous benefits. For example, clinician support systems could significantly improve guideline compliance and patient outcomes. Improving adherence to services and to evidence is also important for ensuring that the maximum gain is derived from the total ensemble of

available services — the only place new funds can be found in many health systems as the populations age and surpluses are devoured by chronic conditions. Using real-time information to support clinical care can also optimize workflows, adding efficiency for the system. In that same instance, bestowment was directly responsible for 2.7% of the time saved in operating a busy emergency department, a nontrivial efficiency boost. It can also improve patient outcomes. For example, an emergency physician calling for an opinion managed to change her plan of care in 80% of her consults, which is a benefit to the patients she is referring.

4.1. Definition and Benefits

The nature of patient care coordination encourages the inevitable switch to real-time systems. In healthcare, a real-time system is expected to detect important changes or severe conditions as soon as they arise within a fraction of a second and be accessible to the stakeholders involved, anywhere within the organization, whenever they are performed, due to their link to a network. Besides these values, healthcare real-time systems have to store and retrieve the vital piece of information from the server as soon as the demand is made, as this information is necessary for performing any action or for interaction.

The significance of real-time information exchange in healthcare is multifaceted, as the delivery of optimal care can be impacted in multiple ways. The main beneficiaries are emergency department staff, as they need input instantly to perform any interventions needed during the first few minutes following admission. There are several rewards of a real-time system: active information about the patient is directly available for others, and the flow of information between caretakers is immediate. This focuses on ongoing care evaluation, allows the development and measuring of efficiency, and highlights any differences between procurers. An impact of reasoning and informing is the enhancement of aftercare. It answers the need for continuity of care that supports the flow of information between different care offers and suppliers and between different levels of care. The state of the patient, as obtained from the server, also influences the referral that is selected. Staff prefers a user-friendly system that will help them comprehend the data by displaying information for situational awareness rather than as data points.

4.2. Challenges and Considerations

Section 4: Challenges and Considerations 4.1. Technological Barriers The distribution of real-time systems is hindered by existing technological infrastructures. Existing systems deployed into medical records often have problems with cross-system standardization and multiple integrations. Because they function in many hospitals, such systems can be unapproachable and, in particular, are not typically diverse. Additionally, current CIS versions and systems are not compatible. Since the process of setting up a monitoring system in a hospital will affect the IT infrastructure and demand modifications to equipment, it will not be feasible to set up the system in any of the hospitals. CIS are linked to very private material. However, people's readiness to disclose unrealistic events is not something that is readily apparent, and unauthorized disclosure of medical information would trigger substantial privacy concerns. In general, clinicians would benefit from the ability to scan for adverse conditions, but the adverse event caused might not always be present. 4.2. Training Many healthcare workers would be subject to substantial changes in their work. Although they may eventually gain expertise, some will initially experience threshold threats that are not apparent. 4.3. Resistance from Staff and Organizational Culture Hospitals' ability to manage these challenges is significantly influenced by the organization's ability and readiness to adapt. Changes to hardware, business processes, resources, solutions, and capacity occur when new systems are installed. PDD is involved in a move and is therefore a broad field. Administrative support can be challenged by the uncertain expense of acquiring and enhancing a CIS and an associated RT system. Skill gaps are a concern in that the introduction of new technologies would require different experience and understanding from healthcare staff. There are two challenges with potential solutions. A conviction is built on the remedy's strengths. Stakeholder participation in the possibilities presents an opportunity that exhibits and permits the gains of CIS and the RT system.

5. Case Studies and Examples

In this section, we present case studies that provide evidence that AI-powered systems empower patient care coordination. In the following case studies, we noticed the essential features considered for adoption and application in the development and provision of real-time AI- and CDS-powered systems by healthcare settings as well as the hospital IT department. The following case studies presented clinical, user, and system outcomes. Furthermore, we learned through these cases some lessons and best

practices that could help promote an understanding of the challenges and why the healthcare setting is in the struggle stage. In addition, the perspectives and experiences of the commercial companies and the healthcare settings on the strategies, the users of these systems, and their comments on the benefits and harms of these systems have been presented.

The case studies show the potential for real-time AI to provide solutions to pressing issues identified in managing care coordination for different populations of patients. These real-world deployments show that AI could make an impact on a variety of healthcare settings. The diversity of these settings reflects the broader applications that AI has been given within healthcare systems. The clinical outcomes evaluated in the case studies are patient engagement and satisfaction, as evidenced by reductions in "no-show" rates and increases in patient contacts made following the alerting of care team members about suspected health deterioration. These outcomes are in line with the various positive effects described in the literature review. User outcomes include reports of the timeliness and helpfulness of the alerts. To transform clinical practice, successful commercial and healthcare organization collaborations were key. While accomplishing those goals, the partnerships encountered some challenges that are typical for introducing novel technology in complex clinical settings.

5.1. Successful Implementations

Subsections Example Implementation. Many successful implementations are presented here. The successful implementation can be found in various examples. For example, AI was successfully used to optimize critical Barcode Medication Administration errors in hospitals. Additionally, real-time AI-coordinated omnichannel patient engagement systems were successfully developed, highlighting best practices and training data for the patient navigator in booking appointments in outpatient facilities while increasing patient satisfaction and reducing appointment delays. Furthermore, AI solutions are being used alongside virtual wards in hospitals to help facilitate communication between physicians and ward teams by predicting which patients can be in line for discharge and which are not. An integrated care pathway was successfully implemented whereby the AI provides low-risk care recommendations that are integrated into a physician-facing user messaging system and then delivered as a service together with broader integrated care pathway services. AI was successfully applied in hospitals to

improve service by monitoring nurse resourcing and matching it with patient needs. AI, in the form of machine learning, is currently being used to predict which patients have the longest length of stay and are at the highest risk of return within 30 days and will need a visit from their local GP within 7 days.

The current paper provides a synthesis of these examples, with the implementations presented in the same order as in the relevant column. Each synthesis includes a brief background, an overview of the implementation, and evidence of success. Finally, the uses of AI in these healthcare coordination efforts were also coded. Configuration and Partnership. The following resulted from the implementations: decision recommendations and examples of real-time care in hospitals. The applications were implemented by various stakeholders. A multidisciplinary team was responsible for the AI uses in this subsection: performance-based predictions, decision support, and care optimizations. The following factors were taken into account, with respondents claiming several reasons, such as the need to design a useful AI system, having the right data and enabling data access, stakeholder acceptance, capability, and access to a large amount of training data. The following evidence of success was found for the AI planning and automation uses across the different examples: improved casemix-adjusted national 30-day call abandon rate compared to a control group by 20–79%, depending on specialty; increased booking adherence compared to a control group by 6.5–27%; and reduced booking delays and improvements in patient satisfaction. Improved experience and cost with virtual visits. Improved efficiency and reduced avoidable overnights for approximately 200,000 patients. The following are the generic lessons learned from the examples. The variability in the AI uses is due to the fact that AI capabilities are contextual and co-developed in this context. Designing an AI system to be useful is a key enabler of AI system change. An innovative partnership was needed to achieve a new system. The following indicators of success were found top-down.

5.2. Lessons Learned

This paper has presented lessons learned on AI implementation in patient care coordination case studies. We draw six insights.

1. Similar challenges in getting buy-in. All three case studies face resistance from end-users and leadership, but ultimately they were swayed by the benefits shown in pilot studies or introduced through intensive training sessions.

2. Data harmonization is a persistent issue with legacy systems. Despite the challenges presented that all case studies experienced in varying capacities, it is worth the effort to integrate data sources as required.

3. A necessary focus on getting people to use the new system. A comprehensive training program is required to ensure end-user adoption. Clear communication on the how, the why, and the what of the proposed change is key here.

4. Shaping an innovation culture. Stakeholder engagement on a continuous basis was a major factor in the success of the case studies. All of them harnessed the passion, vision, and culture of innovation that is palpable in healthcare professions such as biology, technology, medicine, and nursing. While there wasn't a prescribed method to create this enthusiasm, time to engage with the end user and how an innovation meets professional needs was essential.

5. Reporting success in a meaningful way. After initial implementation, constant re-evaluation was used as a strategic process in order to further refine the tool, as well as ensure that the data kept being input. Importance was a two-way insight, both with the introduction of a business intelligence tool that produced essentially infographics of the system's impact, as well as a qualitative evaluation at the nurse unit level as to what relevance the data carried for their work and how best it was delivered. This, it turned out, was written down data as opposed to listening to feedback. The format of the reporting was as vital as the actual reporting.

6. Future Direction

The impact of the use of AI in healthcare, care delivery, and optimal patient care coordination is clearly nascent and indeed an active area of impactful research. Advancements in supportive technologies, including sensor-based pervasive computing, mobile edge computing, blockchain, and communications, support real-time shared information from multiple and disparate sources. The interoperation of complex systems within the healthcare delivery setting, guiding caregivers and assisting in clinical decision-making to coordinate care at the patient ward as per patient preference, is moving to the foray. These areas underscore the progression of personalized AI concerning heterogeneous diseases and different demographic patient populations, in home and in hospital, linked to the edge systems at the point of care for scalable

healthcare solutions. Future systems will need to include enablement that extends the healthcare system of insights, offering the integration of multi-morbid chronic care delivery through an AI care system that includes care coordination within the inpatient, outpatient, and at-home environments. Ethical considerations related to individual patient consent, algorithm and/or robotic transparency, and the role and interaction of all stakeholders require specific guidelines or frameworks for care coordination systems of the future. The adoption of these AI-powered systems within an interoperable system of insights backbone will require stakeholder engagement through public hearings and consensus. AI research in healthcare will play an important role in designing the various models that will drive efficiencies within and between healthcare systems and will allow for data, decision management, and ultimately the model of care to be scalable to the hundreds of millions of patients. The role of governments, educators, regulators, and doctors to upskill their workforces in informatics, computer science, and AI is a critical step that will play an important role in the next 10 years of AI-empowered personalized healthcare delivery. The role of artificial intelligence in healthcare delivery is exciting; there are a number of testable areas yet to be investigated for improved implementation of this technology in healthcare.

7. Conclusion

Ultimately, the use of real-time AI-driven and IoT-based systems in patient care coordination would rejuvenate the delivery system. Improving patient care has always been of paramount importance. After an extensive review of the traditional systems, it became evident that these systems are not capable of living up to the hype when it comes to patient care. This indictment turned out to be accurate due to a lack of ubiquitous availability and inadequate monitoring functions. AI offers both abbreviated and personalized solutions to increase the signal-to-noise ratio. The cost of connecting devices is definitely higher than today's technology can handle, but it's also true that as time goes on, that cost will continue to drop. XR and IoT technologies, combined with AI, may provide real-time care coordination to patients, resulting in better quality of care. This is because the majority of tasks that are currently performed by human beings will be outsourced to these communication gadgets, thereby increasing the alertness of patients and caregivers. Other unseen challenges to the construction of ubiquitous technologies include information access and retrieval, data security, and safety. A number of case studies have been presented. We have outlined potential benefits and

also proposed some policy and strategy recommendations. An extended synthesis is also available.

Artificial intelligence has already been integrated into computing systems and has offered real-world solutions to innumerable fields. This paper explored in depth how AI can be integrated with IoT for the capability of real-time health care coordination and provision. As evidenced by the case studies examined, this has the potential to revolutionize multiple elements throughout the system. Nurses and caregivers would have greater leverage to be more hands-on, with the assurance of real-time awareness and assistance. More proportionate care can be offered based on data that is continuously digitized. Given the potential and the benefits, further research is required to integrate all relevant data to improve general forecasting on all health conditions. Overall, the paper is premised on helping policy decision-makers, health service managers, and social care providers develop an all-encompassing strategy for ensuring care service provision and system performance. The aim is also to contribute to the international discussions on the existing impact of real-time interconnected coordination systems. The premise of these is to ultimately deliver a more personalized and, most substantially, improved healthcare outcome to the patients and the community throughout.