



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

# IJDR

*International Journal of Development Research*  
Vol. 09, Issue, 04, pp. 27338-27341, April, 2019



ORIGINAL RESEARCH ARTICLE

OPEN ACCESS

## TRANSFORMING PATIENT CARE: A CRITICAL ANALYSIS OF INNOVATIONS IN MEDICAL CLINIC DEVELOPMENT

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### ARTICLE INFO

#### Article History:

Received 10<sup>th</sup> January, 2019  
Received in revised form  
03<sup>rd</sup> February, 2019  
Accepted 17<sup>th</sup> March, 2019  
Published online 30<sup>th</sup> April, 2019

#### Key Words:

Medical Clinic Development, Healthcare Innovation, Patient Care, Technological Advancements, Regulatory Compliance.

### ABSTRACT

The evolution of medical clinics is pivotal to the transformation of healthcare landscapes worldwide. This article provides a critical analysis of the innovations in medical clinic development, emphasizing how these changes not only enhance patient care but also ensure operational efficiency and sustainability. By dissecting the integration of technological advancements, architectural innovations, financial strategies, and regulatory compliance, this review highlights the multidimensional approaches necessary for successful clinic development. This comprehensive examination aims to illustrate best practices and emerging trends that are setting new standards in healthcare.

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**Citation:** Hamoud Qaryan AL Ruwaili, Badr Naji Al-Sharari, Obaid Eid Alharbi, Yosaf Mohamad Alshammari, Sami Mallah Alenazi, Fahad Saleem Alrewaili and Ibrahim Mohammed Alyamani 2019. "Transforming patient care: a critical analysis of innovations in medical clinic development", *International Journal of Development Research*, 09, (04), 27338-27341.

## INTRODUCTION

The landscape of healthcare is continually evolving, and the development of medical clinics is an integral part of this transformation. Medical clinics serve as vital access points for primary and specialized care, and their development has a significant impact on the quality and efficiency of healthcare delivery. In recent years, innovations in medical clinic development have shifted the focus toward patient-centered care, technological integration, and sustainable design, reflecting broader trends in healthcare. The concept of patient-centered care has become a cornerstone of modern healthcare practices. Patient-centered care focuses on providing care that is respectful of, and responsive to, individual patient preferences, needs, and values (Epstein & Street, 2011). This approach has influenced the design and operation of medical clinics, leading to innovations that enhance patient experience and satisfaction. Clinics are now being designed with the aim of creating a healing environment, incorporating elements such as natural light, quiet spaces, and comfortable waiting areas to improve patient well-being (Ulrich et al., 2008). Technological advancements have also played a critical role in transforming medical clinics. The integration of electronic health records (EHRs), telemedicine, and AI-driven diagnostic tools has enhanced the efficiency and effectiveness of healthcare services. EHRs, for instance, facilitate the seamless sharing of patient information among healthcare providers, improving coordination and continuity of care (Jha et al., 2009). Telemedicine has expanded access to care, particularly in underserved areas, by allowing patients to consult with healthcare providers remotely (Wootton, 2012). Sustainable design is another emerging trend in medical clinic development. Sustainable design focuses on creating healthcare environments that are environmentally responsible and resource-efficient.

This includes the use of renewable energy, water conservation, and the reduction of waste. Sustainable healthcare facilities not only reduce environmental impact but also create healthier environments for patients and staff (Stevenson et al., 2013). Moreover, the development of medical clinics is often influenced by regulatory and financial considerations. Healthcare regulations impact the design and operation of clinics, ensuring patient safety and care quality. Financial constraints can limit the scope of clinic development, but innovative funding models, such as public-private partnerships, have been developed to address these challenges (Porter & Guth, 2012). In conclusion, innovations in medical clinic development are transforming patient care, driven by trends such as patient-centered design, technological integration, and sustainable practices. The evolving nature of healthcare presents both challenges and opportunities for medical clinic development, requiring ongoing innovation and strategic planning to meet the needs of patients and communities.

### Section 1: Overview of Current Medical Clinic Development Initiatives

The evolution of medical clinic development has been marked by innovative approaches aimed at improving patient care, enhancing operational efficiency, and fostering sustainable practices. The following section provides an overview of key initiatives that have shaped the current landscape of medical clinic development.

**Patient-Centered Care Initiatives:** The shift toward patient-centered care has become a defining feature of modern medical clinics. This approach emphasizes providing care that aligns with individual patient needs and preferences, leading to the design and operation of clinics that enhance the patient experience. For example, clinics have begun to incorporate

healing environments, which include features such as natural lighting, soothing color schemes, and spaces designed for comfort and privacy. These design elements have been shown to improve patient satisfaction and outcomes (Ulrich *et al.*, 2008). Furthermore, patient-centered care has influenced operational practices, encouraging clinics to adopt flexible scheduling, streamlined appointment processes, and enhanced communication channels (Epstein & Street, 2011).

**Technological Integration:** Technological advancements have also been at the forefront of medical clinic development initiatives. The widespread adoption of electronic health records (EHRs) has revolutionized patient data management, improving communication among healthcare providers and enhancing the continuity of care (Jha *et al.*, 2009). Telemedicine has expanded access to care, particularly in rural and underserved areas, by enabling remote consultations and follow-ups. This technology not only increases convenience for patients but also reduces the burden on healthcare facilities (Wootton, 2012). Additionally, the use of AI-driven diagnostic tools has enhanced the accuracy and efficiency of clinical decision-making (Topol, 2019).

**Sustainable Design:** Sustainable design is an increasingly important focus in medical clinic development. This initiative emphasizes environmentally friendly building practices, energy efficiency, and the use of sustainable materials. Clinics are incorporating features such as solar panels, rainwater harvesting systems, and green roofs to minimize their environmental impact. These sustainable practices not only contribute to environmental conservation but also create healthier environments for patients and staff (Stevenson *et al.*, 2013).

**Integrated Care Models:** Another significant initiative in clinic development is the adoption of integrated care models. These models aim to provide comprehensive, coordinated care by bringing together different healthcare services under one roof. Integrated care models enhance the patient experience by reducing the need for multiple appointments and facilitating better communication among healthcare providers. This approach has been particularly effective in managing chronic conditions and complex health issues (Porter & Guth, 2012). Current initiatives in medical clinic development reflect a commitment to improving patient care, enhancing efficiency, and promoting sustainability. By embracing patient-centered care, technological integration, sustainable design, and integrated care models, medical clinics are better equipped to meet the evolving needs of patients and communities.

## Section 2: Technological Innovations in Clinic Development

Technological innovations have drastically altered the landscape of medical clinic development, offering new ways to enhance patient care, improve efficiencies, and manage healthcare operations. This section examines key technological advancements that have been pivotal in reshaping medical clinics.

**Electronic Health Records (EHRs):** One of the most significant technological advances in medical clinic development is the widespread adoption of Electronic Health Records (EHRs). EHRs provide a digital version of a patient's medical history, which is maintained by the healthcare provider over time. They facilitate better data management, improve patient care by enabling quick access to patient records, and enhance communication among different healthcare providers. Studies have shown that EHRs can significantly reduce errors and improve clinical decision-making (Jha *et al.*, 2009).

**Telemedicine:** Telemedicine has emerged as a critical technology, particularly in extending healthcare services to remote and underserved areas. By allowing patients to receive care via digital communication tools, telemedicine reduces the need for travel and provides access to medical expertise that might not otherwise be available locally. This technology has proven effective in managing chronic diseases, mental health, and follow-up visits, significantly enhancing patient convenience and adherence to treatment protocols (Wootton, 2012).

**Artificial Intelligence (AI) and Machine Learning:** AI and machine learning are becoming integral in clinical settings, revolutionizing diagnostic procedures, patient monitoring, and treatment personalization. AI algorithms are capable of analyzing vast amounts of data from imaging, genetic information, and medical records to assist in diagnosis and predict patient outcomes. This technology not only supports healthcare providers in making more informed decisions but also predicts disease trends within populations (Topol, 2019).

**Health and Wearable Technology:** Mobile health (mHealth) applications and wearable technology have become increasingly popular, providing patients and healthcare providers with tools for health monitoring and management. Wearables, like smartwatches and fitness trackers, monitor vital signs, physical activity, and other health metrics in real-time. mHealth apps facilitate medication reminders, health education, and patient-provider communication, all of which play a crucial role in chronic disease management and preventive care (Steinhuyl *et al.*, 2015).

**Interoperability and Data Integration:** Achieving interoperability between various health information technologies remains a crucial challenge and goal. Effective data integration enhances the ability to deliver coordinated care and conduct comprehensive health analyses. Standards and protocols for interoperability facilitate seamless communication across different healthcare systems, improving response times and the continuity of care (Halamka *et al.*, 2019). The rapid integration of technology into medical clinic development is fundamentally changing how healthcare is delivered. These technological innovations offer tremendous potential to improve patient outcomes, optimize clinic operations, and extend healthcare services to broader populations. As these technologies continue to evolve, they promise even greater advances in healthcare efficiency and patient care quality.

## Section 3: Architectural and Design Innovations in Clinic Development

The architecture and design of medical clinics significantly impact both patient experiences and clinical outcomes. Innovations in this field have been driven by an increasing understanding of how the physical environment affects health, healing, and healthcare delivery efficiency. This section explores critical architectural and design innovations that have transformed medical clinics.

**Patient-Centered Design:** The concept of patient-centered design focuses on creating environments that enhance the comfort and well-being of patients. Such designs consider aspects like natural light, which has been shown to have therapeutic effects, reducing depression and improving sleep and circadian rhythms (Ulrich *et al.*, 2008). Moreover, patient-centered designs often incorporate elements that reduce noise, which can decrease stress and contribute to better outcomes for patients and smoother workflows for staff.

**Healing Environments:** Related to patient-centered design, the development of healing environments involves integrating natural elements, soothing colors, and art that promotes relaxation and stress reduction. The layout of these spaces also considers privacy and dignity by offering private rooms or carefully designed communal spaces that provide a sense of security and calm (Ulrich *et al.*, 2008).

**Sustainable Architecture:** Sustainability has become a key focus in the construction and design of medical facilities. Sustainable practices in healthcare architecture not only consider the environmental impact, such as energy efficiency and the use of renewable materials but also aim to create spaces that are economically and socially sustainable. For example, using materials with low volatile organic compounds (VOCs) improves indoor air quality, which is beneficial for patient health and the environment (Guo *et al.*, 2010).

**Flexible and Modular Design:** The healthcare industry faces constant changes due to technological advancements and evolving patient needs. Flexible and modular designs in medical clinics allow for spaces to be adapted or expanded with minimal disruptions. This adaptability can be crucial in rapidly integrating new technologies or accommodating shifts in healthcare practices (Kirk Hamilton, 2003).

**Integrating Technology with Architecture:** The integration of technology into the physical infrastructure of medical clinics is also a significant aspect of modern healthcare architecture. This includes the design of spaces that accommodate telemedicine technologies, allowing for virtual consultations that expand access to care. Moreover, advanced architectural designs incorporate systems for better data connectivity and the integration of electronic health records into daily operations, ensuring that facilities can support the latest medical technology (Zimring *et al.*, 2009). Architectural and design innovations in medical clinic development play a crucial role in transforming patient care. By focusing on creating patient-centered, healing, and sustainable environments that are flexible and technologically integrated, healthcare facilities can significantly enhance patient satisfaction and health outcomes. These

innovations not only benefit patients but also improve the work environment for healthcare providers, leading to increased job satisfaction and productivity.

#### Section 4: Regulatory and Financial Challenges in Clinic Development

The development of medical clinics is a complex process influenced by various regulatory and financial factors. Navigating these challenges is crucial for ensuring that new facilities not only meet legal and health safety standards but also remain financially viable. This section delves into the key regulatory and financial challenges that healthcare organizations face during the development of medical clinics.

**Regulatory Challenges:** Medical clinics must comply with a myriad of health care regulations that ensure patient safety, privacy, and quality of care. For example, in the United States, clinics must adhere to standards set by the Health Insurance Portability and Accountability Act (HIPAA) for patient data protection and the Affordable Care Act (ACA) for healthcare services and operations. These regulations can vary significantly not just by country but also within regions and states, adding layers of complexity to clinic development (Kraemer *et al.*, 2019). Furthermore, building codes and safety standards are critical in healthcare facility construction. These codes ensure that buildings are safe, accessible, and capable of supporting the high demands of healthcare operations. Compliance with the Americans with Disabilities Act (ADA) and local safety codes requires meticulous planning and often incurs additional costs (Field, 2017).

**Financial Challenges:** Funding the development of medical clinics is a major challenge, particularly as the costs associated with advanced medical technologies and sustainable building practices rise. Healthcare organizations often struggle to secure adequate funding from traditional sources such as bank loans or private investors due to the high-risk nature of healthcare investments (Bazzoli *et al.*, 2018). Moreover, the return on investment (ROI) in healthcare can be uncertain and long-term, making it difficult to attract investment. Public funding can be a solution, but it is frequently subject to political changes and budget constraints, which can introduce delays and uncertainty into clinic development projects (Herzlinger, 2017).

**Strategies to Overcome Challenges:** To manage these regulatory and financial challenges, healthcare organizations are increasingly turning to innovative strategies. Public-private partnerships (PPPs) have become popular, allowing the public sector to leverage private sector efficiency and capital while sharing risks. These partnerships can facilitate the construction and operation of healthcare facilities by combining resources and expertise from both sectors (Savage *et al.*, 2017). Additionally, healthcare organizations are adopting more strategic financial planning and risk management practices. This includes the use of financial modeling to predict costs and returns accurately and engaging in risk-sharing arrangements to mitigate potential financial losses (Kumar & Feachem, 2018). Regulatory and financial challenges are significant hurdles in the development of medical clinics, but they are not insurmountable. Through strategic planning, innovative financing, and rigorous compliance efforts, healthcare organizations can navigate these challenges effectively. Overcoming these obstacles is essential for ensuring that new clinics can provide high-quality, accessible healthcare services while maintaining financial health.

#### Section 5: Impact on Community Health and Accessibility

The development of medical clinics significantly impacts community health and accessibility. By expanding healthcare infrastructure and integrating innovative care models, clinics play a vital role in enhancing the overall health landscape of the communities they serve. This section explores how medical clinics improve health outcomes and access to healthcare, particularly in underserved areas.

**Enhancing Community Health:** Medical clinics are often at the forefront of providing preventive care, chronic disease management, and acute care services, which are crucial for improving community health outcomes. Studies have shown that access to primary care facilities can lead to early detection of health issues, better management of chronic illnesses, and overall reductions in hospital admissions and emergency room visits (Starfield *et al.*, 2005). By offering comprehensive healthcare services, clinics not only treat illnesses but also promote wellness and disease prevention.

**Addressing Health Disparities:** Medical clinics play a critical role in reducing health disparities, particularly in underserved and marginalized communities. By strategically locating clinics in areas with limited access to healthcare, developers can directly address geographical disparities in health services. Moreover, clinics that offer services on a sliding fee scale or accept a wide range of insurance plans, including Medicaid, make healthcare more accessible to low-income populations (Andrulis, 2007).

**Facilitating Health Education and Community Engagement:** Beyond providing medical services, clinics often serve as centers for health education and community engagement. Educational programs about nutrition, exercise, mental health, and disease prevention can empower community members to take charge of their health. Furthermore, clinics that engage with the community through outreach programs and partnerships with local organizations foster trust and can lead to higher utilization of healthcare services (Lewin *et al.*, 2008).

**Overcoming Barriers to Access:** Despite their potential, numerous barriers can hinder the effectiveness of clinics in improving community health. These include language barriers, cultural differences, and transportation issues, which can limit accessibility for certain populations. To overcome these challenges, clinics are increasingly offering multilingual services, employing culturally competent staff, and providing transportation services or telemedicine options to ensure broader access (Flores, 2005).

**Evaluating Impact:** To measure the impact of medical clinics on community health and accessibility, continuous evaluation is essential. Metrics such as patient satisfaction surveys, health outcome measurements, and rates of healthcare utilization help clinics adjust their strategies to better meet the needs of the community. Regular assessments ensure that clinics not only maintain high standards of care but also adapt to changing community demographics and health needs (Shi & Singh, 2012). The development of medical clinics has a profound impact on community health and accessibility. By providing essential healthcare services, addressing disparities, and actively engaging with the community, clinics enhance public health and contribute to more equitable healthcare systems. Continuous evaluation and adaptation to community needs are crucial for sustaining this positive impact.

#### Section 6: Case Studies and Real-World Applications

To illustrate the practical implications of medical clinic development initiatives, this section presents several case studies from around the world. These examples highlight the benefits of integrating technological advancements, thoughtful design, and strategic financial planning in actualizing clinics that meet contemporary healthcare needs.

##### Case Study 1: Telemedicine in Rural Alaska

In rural Alaska, where many communities are isolated and difficult to reach, telemedicine has been effectively used to improve healthcare access. The Alaska Native Tribal Health Consortium has implemented a telemedicine program that connects patients in remote areas with specialists in urban centers. This program not only reduces the need for travel but also significantly speeds up diagnosis and treatment for chronic conditions and emergencies (Gomez & Demaio, 2013).

##### Case Study 2: Community Health Workers in Urban Brazil

In Brazil, the Family Health Strategy has been employed to enhance primary care services in densely populated urban areas. This program utilizes community health workers to bridge the gap between communities and healthcare facilities. These workers conduct home visits, provide basic healthcare, and educate residents about disease prevention, leading to improved health outcomes and increased engagement with the healthcare system (Rocha & Soares, 2010).

##### Case Study 3: Sustainable Clinic Design in South Africa

The Khayelitsha Hospital in South Africa was designed with sustainability in mind. The hospital uses solar panels and a water recycling system to reduce its environmental footprint. Its design includes natural ventilation to combat the area's high tuberculosis rates. These features have made the hospital a model of sustainable design in resource-limited settings, demonstrating that eco-friendly practices can be integrated even in areas with severe budget constraints (Patel & Phillips, 2013).

#### Case Study 4: Integrated Care Clinic in Singapore

Singapore's polyclinics serve as a prime example of integrated care facilities. These clinics provide a wide range of services including primary care, dental care, and diagnostics under one roof. The polyclinics are strategically located to be easily accessible by public transportation. They utilize electronic health records to streamline patient information management across different services, enhancing the efficiency and continuity of care (Cheah, 2014). These case studies provide valuable insights into the diverse approaches to medical clinic development across different contexts and geographies. Each example demonstrates the importance of adapting strategies to local needs and conditions, whether through technology, sustainable practices, community involvement, or integrated care models.

#### CONCLUSION

The development of medical clinics is a critical endeavor that intersects with technological advancements, architectural innovations, and pressing societal needs. This review has illuminated the multifaceted nature of clinic development, revealing the complexity and necessity of considering a broad spectrum of factors to effectively enhance healthcare delivery. From technological innovations such as telemedicine and electronic health records to architectural and design principles that prioritize sustainability and patient comfort, the landscape of clinic development is evolving rapidly. These advancements are not merely enhancements but are essential to addressing the challenges posed by an ever-growing and diverse patient population. The case studies presented from various parts of the world underscore the practical application and profound impact of these initiatives, demonstrating successful integration in different healthcare systems and environments. However, the journey is not without its obstacles. Regulatory hurdles and financial constraints continue to challenge the expansion and modernization of healthcare facilities. Navigating these challenges requires not only innovative solutions but also a commitment to ongoing evaluation and adaptation to meet changing healthcare needs and expectations. Ultimately, the goal of medical clinic development should be to provide accessible, high-quality, and sustainable healthcare. This can be achieved through a concerted effort from all stakeholders involved, including healthcare professionals, architects, policymakers, and community leaders. By continuing to prioritize patient-centered approaches and embracing innovative technologies and designs, the future of medical clinic development looks promising. The insights gained from this comprehensive review should serve as a guiding framework for future projects, aiming to enhance the effectiveness of healthcare delivery and improve the health outcomes of communities worldwide. The development of medical clinics, therefore, is not just a matter of constructing buildings but a crucial element in the broader narrative of advancing global health.

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