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Healing Ecosystems: Establishing Medical Hubs in India



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PREFACE

India stands at the cusp of a transformative era in healthcare. With a rapidly growing population exceeding 1.4 billion, the demand for high-quality, accessible, and affordable healthcare is increasing exponentially. Despite notable progress in medical infrastructure and services, disparities persist, highlighting the urgent need for systemic reform and innovation.

It is in this context that NITI Aayog, in collaboration with the Federation of Indian Chambers of Commerce and Industry (FICCI) and Ernst & Young LLP, is proud to present this knowledge paper titled "Healing Ecosystems: Establishing Medical Hubs in India." This document serves as a strategic blueprint to guide the creation of integrated medical hubs across the country—an initiative that seeks to address critical healthcare gaps, foster innovation, and advance India's position as a global leader in healthcare delivery and medical tourism.

Medical hubs, as conceptualized in this paper, are comprehensive ecosystems that bring together hospitals, research centers, educational institutions, residential facilities, and wellness services within a single geographic location. These hubs are not merely physical infrastructure but catalysts for economic growth, capacity building, and equitable healthcare delivery. They are envisioned to serve as centers of excellence, capable of delivering advanced, multidisciplinary care, supporting cutting-edge research, enabling skill development, and attracting investment in both modern and traditional systems of medicine.

Crucially, this initiative also embraces India's rich heritage in traditional medicine. Systems like Ayurveda, Yoga & Naturopathy , Unani, Siddha, Sowa-Rigpa, and Homeopathy (collectively known as Ayush) offer holistic approaches that complement modern medical science. The proposed hubs will provide space for integrative care models creating a healthcare ecosystem that is not only technologically advanced but also spiritually rooted and patient-centric.

The role of health-tech startups and digital innovation is pivotal in this transformation. Artificial intelligence, telemedicine, data analytics, and robotics have the potential to revolutionize diagnosis, treatment, and healthcare access, particularly in remote areas. Medical hubs, supported by IT-enabled services and smart infrastructure, can ensure seamless healthcare delivery, improved patient outcomes, and increased efficiency.

This knowledge paper offers a comprehensive analysis of the strategic, operational, and infrastructural elements required to establish successful medical hubs. It outlines the collaborative roles of healthcare providers, policymakers, regulators, technology partners, and academic institutions in making this vision a reality. Furthermore, it emphasizes the importance of international partnerships in fostering innovationand elevating India's global standing as a healthcare destination.

As we move toward 2030 and beyond, medical hubs will be instrumental in achieving several national objectives—bridging healthcare disparities, promoting inclusive growth, advancing the Sustainable Development Goals (SDGs), and supporting the vision of a 'Healthy India.' By centralizing services, enabling medical value travel, and enhancing training and employment opportunities, these hubs will serve as foundational pillars for a resilient and responsive healthcare system.

This paper is not just a vision; it is an invitation—to goveranment bodies, private stakeholders, global investors, and civil society—to collaborate in shaping the future of healthcare in India. We hope that the insights and recommendations presented here will inspire meaningful action and contribute to the realization of a robust, inclusive, and globally competitive medical ecosystem.

We are confident that this initiative will mark a defining chapter in India's healthcare journey—one that will resonate not only across our own nation but also serve as a model for countries across the world.

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List of Abbreviations

AAI	Airport Authority of India
AB-PMJAY	Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana
AI	Artificial Intelligence
APCRDA	Andhra Pradesh Capital Region Development Authority
AYUSH	Ayurveda, Yoga, Unani, Siddha, and Homeopathy
CAGR	Compound Annual Growth Rate
CRC	Clinical Research Centre
DHCA	Dubai Healthcare City Authority
DHCC	Dubai Healthcare City
EHR	Electronic Health Records
EIA	Environmental Impact Assessment
ENT	Ear Nose Throat
ER	Emergency Room
ETP	Effluent Treatment Plant
EV	Electric Vehicle
EY LLP	Ernst and Young LLP
FICCI	Federation of Indian Chambers of Commerce & Industry
FSTP	Faecal Sludge Treatment Plant
FTA	Foreign Tourist Arrival
GoI	Government of India
GoJ	Government of Jharkhand
ICU	Intensive Care Unit
IMD	Illinois Medical District
IoT	Internet of Things
IT	Information Technology
IVF	In Vitro Fertilization
JCI	Joint Commission International
JMCCL	Jharkhand Medicocity Corporation Limited
MLCP	Multilevel Car Parking
MoU	Memorandum of Understanding
MRT	Mass Rapid Transit
MSL	Mean Sea Level
MVT	Medical Value Travel

NABH	National Accreditation Board for Hospitals
NCID	National Centre for Infectious Diseases
NGO	Non-Governmental Organization
NH	National Highway
NHCS	National Heart Centre Singapore
NHG	National Healthcare Group
NNI	National Neuroscience Institute
NSC	National Skin Centre
O&M	Operations and Maintenance
PPP	Public Private Partnership
RINPAS	Ranchi Institute of Neuropsychiatry and Allied Sciences
ROI	Return on Investment
SDG	Sustainable Development Goals
SH	State Highway
SPV	Special Purpose Vehicle
STP	Sewage Treatment Plant
TMC	Texas Medical Centre
UIC	University of Illinois at Chicago
UN	United Nations
US	United States
USD	United States Dollar
VGF	Viability Gap Funding
WHO	World Health Organisation
WTP	Water Treatment Plant

Executive Summary

The development of Medical Hubs in India is essential to address the growing demand for high-quality healthcare services in the face of rapid urbanization and population growth. These integrated healthcare hubs provide a comprehensive solution to the challenges posed by fragmented healthcare infrastructure, ensuring accessible, efficient, and advanced medical care for all. Medical hubs can play a pivotal role in driving medical value travel, advancing research and innovation and creating economic opportunities through job creation and private investments.

Need for Medical Hubs:

Rising Healthcare Demand: With an increasing population and growing incidence of chronic diseases, there is a pressing need for advanced medical facilities.

Bridging Healthcare Disparities: Medical hubs ensure that high-quality healthcare services are accessible to all, including underserved and rural populations.

Addressing Workforce Shortages: Medical hubs can help address the workforce shortage by educating, training, and employing a larger number of healthcare workers and ensure a more equitable distribution of medical professionals.

Fostering Innovation and Research: These cities can become centres for medical research, and innovation, enhancing the overall quality of healthcare products and services.

Boosting Medical Value Travel (MVT): A well-established medical hub can significantly boost medical value travel by offering state-of-the-art healthcare services, specialized treatments, and highly skilled medical professionals.

Impact of Medical Hubs:

Improved Healthcare Services: Integrated facilities provide a wide range of medical services, improving patient outcomes satisfaction and improved quality of life.

Economic Benefits: By attracting medical tourists, creating more job opportunities, increased private investments, medical hubs can contribute significantly to the local and national economy.

Sustainable Development: Incorporating sustainable practices ensures long-term viability and environmental responsibility.

Examples of such medical cities in developing countries include Dubai Healthcare City in the United Arab Emirates, King Abdullah Medical City in Saudi Arabia, Health City Novena in Singapore, among others. Several national-level initiatives are also referenced to gain insights into the overall development framework and envisioned vision for medical hub facilities. The case study findings suggest that India has substantial potential to transform its healthcare ecosystem through the establishment of medical hubs nationwide. These integrated hubs will enhance access to high-quality medical services, foster medical innovation and improve overall healthcare outcomes for the population.

Going forward, the medical hub components are derived with respect to the international and national case studies and initiatives. A medical hub is an integrated facility that encompasses a wide range of healthcare services, research and development facilities, educational institutions and residential accommodations at a single location. At the heart of a medical hub are state-of-the-art hospitals and specialty clinics. These facilities provide a wide array of medical services, encompassing general healthcare, specialized treatments, emergency care, and diagnostic services.

It is essential to provide high-quality medical education facilities to ensure an increased availability of trained and qualified healthcare professionals in the country. Medical hubs also incorporate educational institutions, such as medical colleges, nursing colleges, paramedical schools, and allied health training centers; all equipped with the latest technology and state-of-the-art equipment.

Research centers within medical hubs are pivotal centers of innovation and advancement in healthcare. They act as catalysts for scientific discovery, driving progress in medical knowledge, technology, and patient care.

Wellness centers emphasize preventive care and holistic health, offering services such as fitness programs, nutrition counselling, and mental health support.

Rehabilitation centers provide therapies and assistance to patients recovering from surgery, illness, or injury, aiding them in regaining independence and enhancing their quality of life. Allied services surrounding hospitals are essential for supporting healthcare delivery and improving patient care.

Procedure for Development:

- **Site Selection and Market Assessment:** Identify suitable locations with favourable topography, infrastructure, and market potential.
- **Planning and Designing:** Develop a comprehensive master plan, incorporating energy efficiency, renewable energy, water conservation, and waste management.
- **Regulatory Compliance:** Ensure adherence to healthcare, zoning, and environmental regulations.
- **Financial Structuring:** Secure funding through public-private partnerships, venture capital and other private investment sources.
- **Phased Development Strategy:** Implement a phased approach to manage resources and accommodate future expansions.
- **Stakeholder Engagement:** Involve government bodies, private investors, healthcare professionals and the community in the planning process.
- **Construction and Development Management:** Oversee project execution, ensuring quality, safety and regulatory compliance.
- **Operational Planning:** Develop a robust plan for the operation and maintenance of facilities.
- **Promotion and Branding:** Establish a strong brand identity to attract patients, healthcare professionals and investors.

In conclusion, the development of Medical Hubs in India is a strategic initiative to enhance healthcare delivery, drive economic growth, and ensure sustainable development, ultimately improving the quality of life for all citizens.

1. Introduction

1.1. Background

A medical hub is a specialized urban area designed to integrate a wide range of healthcare services, research facilities, educational institutions, and associated industries within a single geographic location. It aims to create a synergistic environment where healthcare professionals, researchers, and educators can collaborate closely, thereby enhancing the quality of care, advancing medical research, and fostering innovation in the healthcare sector.

Medical hubs are strategically developed to serve as areas for cutting-edge medical treatments, comprehensive healthcare services, and pioneering research. It often includes hospitals, specialized clinics, research centres, medical and nursing schools, biotechnology firms, medical devices companies, pharmaceutical companies, and other related entities. These hubs are designed to attract top-tier medical talent and offer advanced healthcare solutions to both local and international patients.

The development of medical hubs aligns with the 6 key components of Sustainable Development Goals (SDGs). They promote good health and well-being (SDG 3) by offering advanced healthcare services and fostering research. Quality education (SDG 4) is nurtured through medical schools and training centres. Cutting-edge facilities and technologies within these cities drive sustainable infrastructure and innovation (SDG 9). Medical hubs also emphasize partnerships (SDG 17) between governments, private sectors, and research institutions. Furthermore, medical hubs often incorporate sustainable practices, contributing to responsible consumption and production (SDG 12) and sustainable cities and communities (SDG 11), ensuring long-term environmental and social well-being.

Aim of Developing Medical Hub

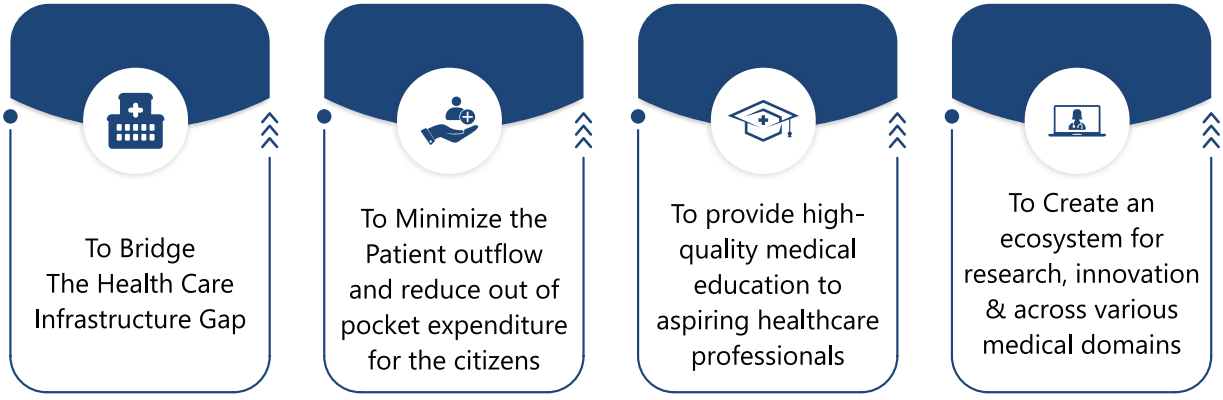


Figure 1: Aim of Developing Medical Hub

Need for development of medical hub

India's vast population and unique challenges necessitate a robust healthcare infrastructure. Following are the reasons crucial for development of medical hubs:

High Population Density: India has over 1.4 billion[1] people placing immense strain on existing healthcare facilities. Medical hubs can provide concentrated expertise and resources, improving access to quality care.

Ayushman Bharat- Pradhan Mantri Jan Arogya Yojana: AB-PMJAY stands as a important pillar in India's pursuit of Universal Health Coverage (UHC). Launched under the Ayushman Bharat initiative and emerged from the National Health Policy 2017, PM-JAY has revolutionized access to healthcare for the most vulnerable populations. Aiming to cover over 12 crore families—around 55 crore people—it is the world's largest health assurance scheme, providing up to ₹5 lakh annually per family for secondary and tertiary hospital. It has increased the demand of healthcare services.

Doctor-to-Patient Ratio: Assuming 80% availability of registered allopathic doctors and AYUSH doctors, the doctor-to-population ratio in the country stands at around 1:836, against the WHO's recommended norm of 1:1000.[2] Medical hub can further improve the doctor-to-population ratio in the country.

Hospital Bed Availability: India has only about 1.6 hospital beds per 1,000[3] people significantly below the WHO recommendation of 3.0 beds per 1,000. Medical hubs can increase bed capacity and reduce overcrowding in existing facilities.

Out-of-Pocket Healthcare Expenditure: Indians spend over 39.4%[4] of their healthcare expenses out-of-pocket a significant burden on households. Medical hubs, with potentially lower operational costs, can offer comparatively more affordable healthcare options.

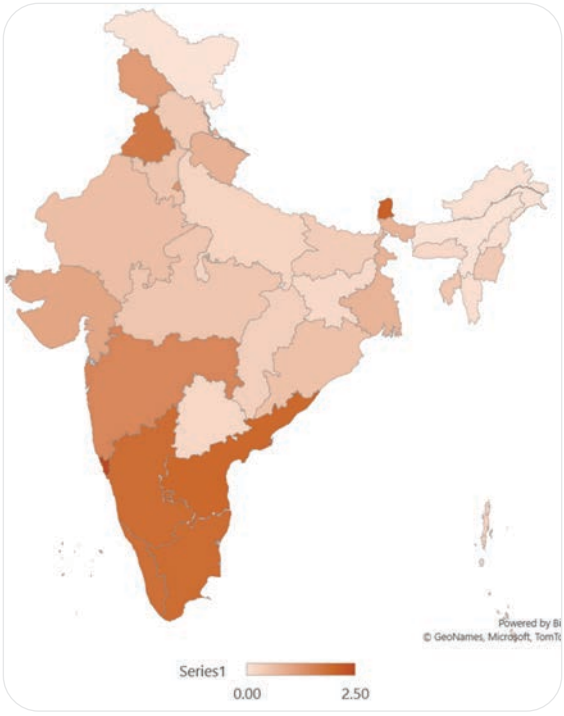


Figure 2 :Doctors to Patient Ratio

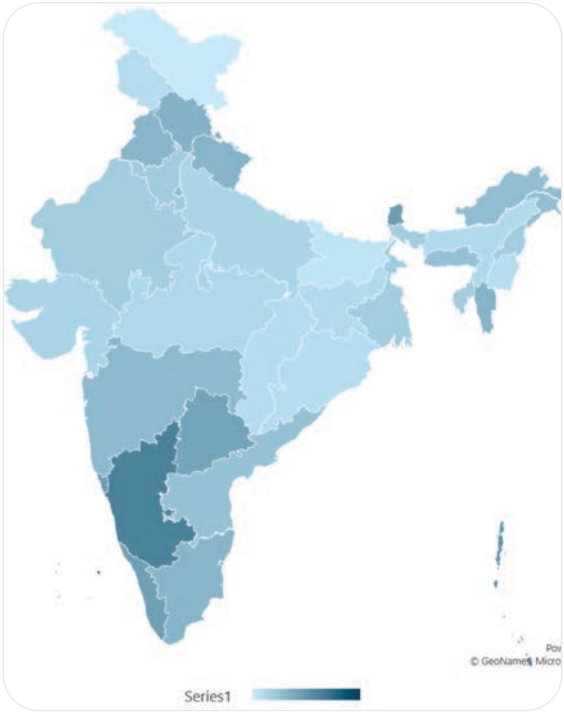


Figure 3:Hospital Bed Availability

[1]https://www.worldometers.info/world-population/india-population
[2](Source:https://sansad.in/getFile/loksabhaquestions/annex/182/AU1887_XrGu06.pdf?source=pqals)
[3]https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?locations=1W
[4]Hospital beds (per 10 000 population) (who.int)

Growth in Ayush Sector: The Ayush sector has seen rapid growth and increased demand in last few years, with its manufacturing market size expanding significantly—from USD 2.85 billion in 2014 to USD 23 billion in 2023—reflecting strong economic momentum and government support. The Ayush market has also experienced remarkable growth, expanding from USD 2.85 billion in 2014 to USD 43.4 billion in 2023. During the same period, exports also doubled, rising from USD 1.09 billion to USD 2.16 billion.[5]

Medical Value Travel:

India has the potential to become a global leader in medical value travel, attracting patients seeking high-quality, affordable care. Here's a breakdown of the global medical value travel landscape and India's relevance in this sector. Currently, India is known for its medical tourism typology, which includes meditation, yoga, and Ayurveda Wellness. However, the country can expand to include several other components of medical value travel, offering a broader range of medical services and treatments at competitive price making, establishing India as a potential country for medical value travel.

Global Medical Value Travel Market[6]: The global MVT market size was valued at **USD 115.6 billion in 2022** and it is expected to reach around USD 286.1 billion by 2030. It is poised to grow at a compound annual growth rate (CAGR) of 10.8% during the forecast period from 2022 to 2030[7]. ***India has become a lucrative MVT destination, holding 10th place out of 46 destinations as per the MTI 2020-21 overall ranking. In Asia, India holds 3rd position, following Singapore and Japan.***[8]

In 2022, a total of 6.43 million inbound tourist arrived in India of which 7.4% visited India for medical purposes.[9] and Bangladesh emerged as the top source country to India followed by Maldives, Afghanistan, Iraq, Oman, Yemen, Sudan, Kenya, Nigeria, and Tanzania. Further, in totality 22.7% of arrivals from countries of West Asia were related to medical purposes.[10]

In India, Chennai is considered as "India's health capital" due to its state-of-the-art medical infrastructure and services. As per various estimates, it attracts approximately 30-40% of domestic patients from all over the country and around 45% of medical tourists from international countries[11]. The other major metro cities that witnessed the highest number of FTAs for medical purposes are Delhi, Mumbai, Bangalore, Hyderabad, and Kolkata. These cities are known for their advancement, and increased knowledge, talent, and expertise. The major Tier- 2 MVT destinations with huge potential are Cochin, Trivandrum, Coimbatore, Vishakhapatnam, Ahmedabad, Jaipur, Chandigarh, Pune, etc.

[5](Sourcehttps://pib.gov.in/PressReleasePage.aspx?PRID=2106735#:~:text=Ayush%20sector%20demonstrated%20exponential%20economic,USD%2023%20billion%20in%202023.&text=India%20has%20established%20itself%20as,now%20hosting%20over%2043%2C000%20studies
https://pib.gov.in/PressReleasePage.aspx?PRID=2079777)

[6] Medical Value Travel (MVT)

[7]Medical Tourism Market- Global Industry Analysis, Size, Share, Growth, Trends, Regional Outlook, and Forecast 2023 - 2032" Precedence Research Website, www.precedenceresearch.com,

[8]The Medical Tourism Index 2020-21

[9]India Tourism Statistics 2023 by Ministry of Tourism, Govt of India.

[10]India Tourism Statistics 2023 by Ministry of Tourism, Govt of India.

[11]Which is the best State for Medical Treatment in India?," Vaidam.com Website, www.vaidam.com

India's Strength:

Cost Savings: Medical procedures in India are up to 70% - 80%[12] cheaper compared to developed countries like the US or UK. This price advantage makes India highly attractive to cost-conscious patients.

Medical Expertise: India boasts a large pool of qualified doctors and surgeons, many trained in the US, UK, and other leading medical institutions[13].

Focus on Traditional Medicine: India's rich tradition of Ayurveda and other holistic therapies provides patients with a wider range of healthcare options.

[12]https://www.medicaltourism.com/destinations/india
[13]https://www.medicaltourism.com/destinations/india

1.2. Core attributes of Developing Medical hubs in India

At the core is patients and their families. The core attributes of a medical hub include:

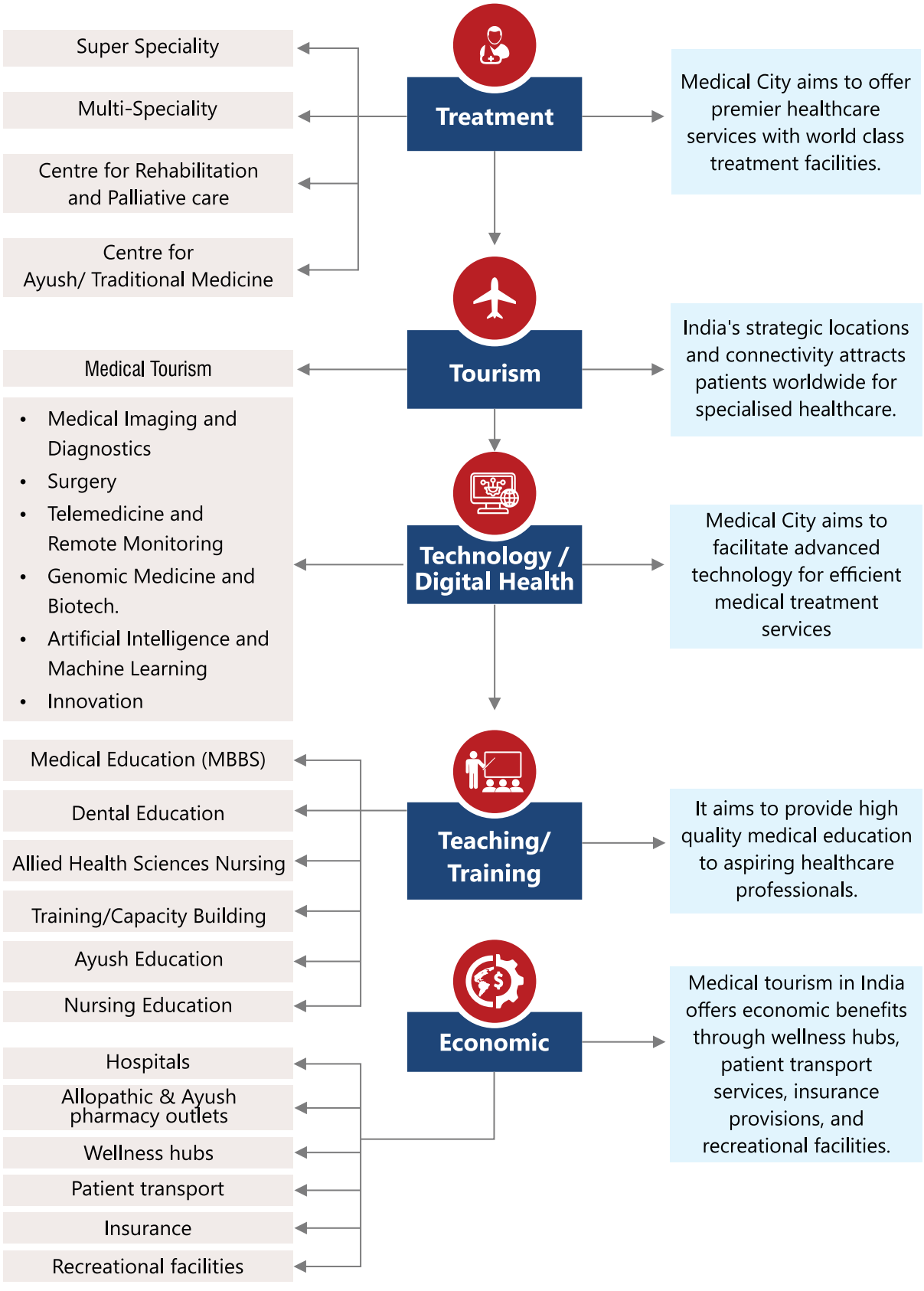


Figure 4: Core Attributes of Developing Medical Hubs

2. Case Studies: Benchmarking

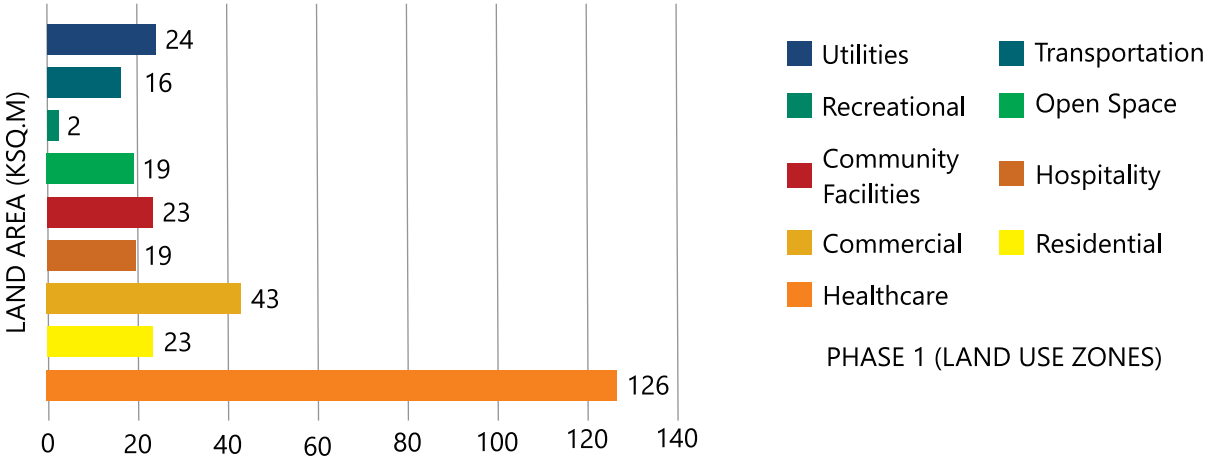
2.1. Dubai Health Care City, Dubai

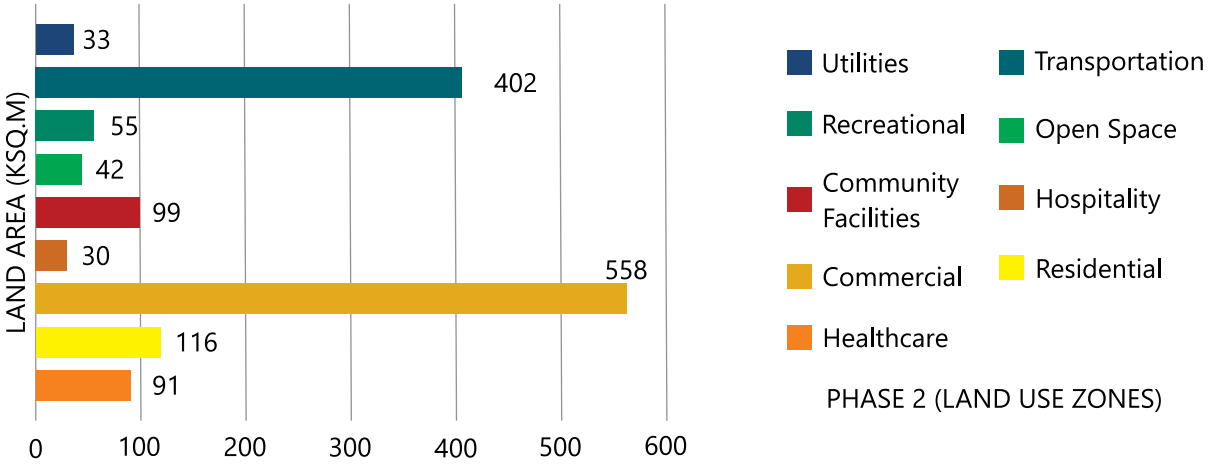
Dubai Healthcare City	
Background	• The Dubai Healthcare City (DHCC) free zone, established in 2002, is a leading prominent healthcare hub in the region known for its medical excellence and advanced healthcare facilities. • DHCC is designed to be a comprehensive healthcare ecosystem, integrating healthcare services, medical education, and research facilities. • It comprises two phases: ○ **Phase 1:** Focuses on providing a comprehensive range of healthcare services, education, and research facilities, along with residential and commercial amenities. ○ **Phase 2:** Expands these offerings with additional healthcare services, advanced medical treatments, integrated community living, and a focus on becoming a hub for medical tourism and innovation. • DHCC hosts over 168 clinical facilities, 10 hospitals,36 recreational facilities and 4425 Healthcare Professionals.[14] • DHCC is governed by Dubai Healthcare City Authority (DHCA) which provides an enabling ecosystem that facilitate business set-up.
Size/Site Area	~500 acres (Phase -1: 72.89 ac, Phase-2:432.43)
Key activities	• Hospitals and clinics • Pharmacies and medical equipment suppliers • Laboratories and research centers • Educational institutions • Consulting and training services • Wellness and fitness centers • Medical tourism and healthcare marketing

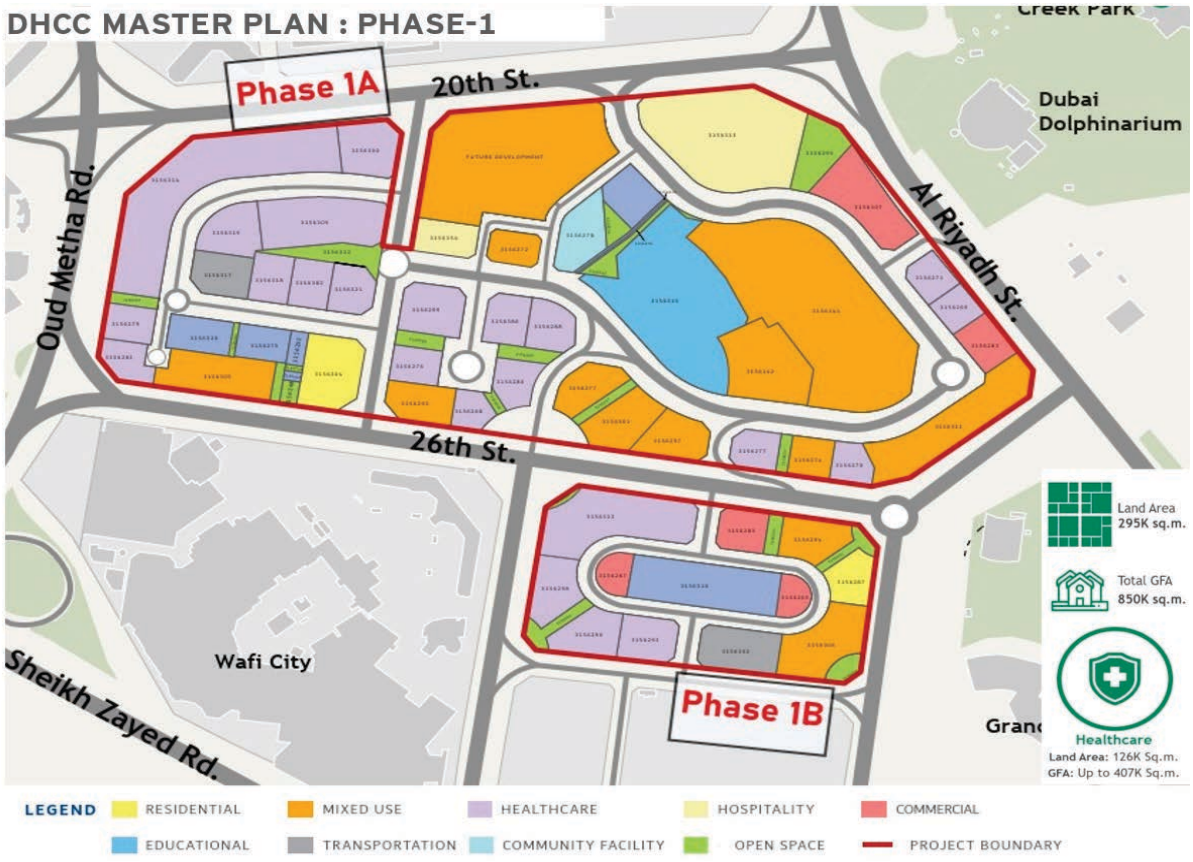
[14] https://dhcc.ae/

Infrastructure Facilities	**Phase 1** Location: Oud Metha, near the Dubai Creek Broadly Classified into 4 Zones: Health care, Hospitality, Healthcare-Education, Mixed use **Healthcare Facilities:** hospitals and clinics offering, Home to internationally renowned healthcare providers like Mediclinic City Hospital, Moorfields Eye Hospital, Dubai Dental Clinic, and Dr. Sulaiman Al Habib Hospital. **Education and Research:** Mohammed Bin Rashid University of Medicine and Health Sciences (MBRU), offering undergraduate and postgraduate medical education. Al Jalila Foundation Research Centre, focusing on medical research and innovation. **Wellness and Therapy:** Dedicated wellness centres offering alternative and complementary therapies. Various rehabilitation centres providing physical and occupational therapy. **Residential and Commercial Facilities:** Mixed-use developments with residential apartments, hotels, and retail spaces. Convenient access to dining, shopping, and recreational options. **Phase 2** **Location:** Al Jaddaf area, adjacent to Dubai Creek and close to Phase 1 Broadly Classified into 5 Zones for 2A: Health care, Residential, Wellness and Hospitality, Education and Mixed use. Broadly Classified into 5 Zones for 2B: Health care, Residential and Hospitality **Expansion of Healthcare Services:** Additional hospitals and specialized clinics to accommodate growing demand. Facilities designed to offer advanced and specialized medical treatments. **Healthcare providers:** King's College Hospital Dubai, Emirates Specialty Hospital, and expansions of existing facilities like Mediclinic and American Hospital Dubai. **Medical Education and Research:** Further development of educational institutions and research centres. Enhanced focus on medical innovation and research collaborations. **Integrated Community Living:** Development of residential communities for healthcare professionals and their families. Inclusion of schools, parks, and community centres to create a holistic living environment. **Medical Tourism Hub:** Development of amenities and services tailored for international medical tourists. Strategic partnerships with global healthcare providers and travel agencies. **Commercial and Retail Spaces:** Increased commercial and retail areas to support the healthcare ecosystem. Offices for healthcare-related businesses and organizations.

Planning Principles	• Integrated Infrastructure: Integration of healthcare, education, research, and wellness facilities for seamless patient care and medical advancements. • Quality Care: Ensuring high-quality patient-centric care through advanced medical technologies, skilled professionals, and international standards. • Innovation Hub: Fostering healthcare innovation, research, and development to drive advancements in treatments, technologies, and healthcare delivery. • Education Excellence: Providing medical education, training, and continuous professional development to nurture talent and enhance healthcare expertise. • Sustainability: Incorporating sustainable practices and green initiatives for environmental responsibility and long-term healthcare resilience.
Number of Beds	• ~5000-5500 (Phase:1-~3000, Phase:2-~2000)
Connectivity	• **Proximity: 7 km (15 minutes by car) from Dubai International Airport.** • **Transport: Accessible via taxis, ridesharing, and Dubai Metro Green Line.** • **Shuttle Services: Available from some hotels and facilities.** • Roads: Major highways ensure seamless travel.






DHCC MASTER PLAN : PHASE-1
Phase 1A
20th St.
Dubai Dolphinarium
Oud Metha Rd.
Al Riyadh St.
26th St.
Wafi City
Sheikh Zayed Rd.
Phase 1B
Land Area 295K sq.m.
Total GFA 850K sq.m.
Healthcare
Land Area: 126K Sq.m.
GFA: Up to 407K Sq.m.
LEGEND
RESIDENTIAL
MIXED USE
HEALTHCARE
HOSPITALITY
COMMERCIAL
EDUCATIONAL
TRANSPORTATION
COMMUNITY FACILITY
OPEN SPACE
PROJECT BOUNDARY

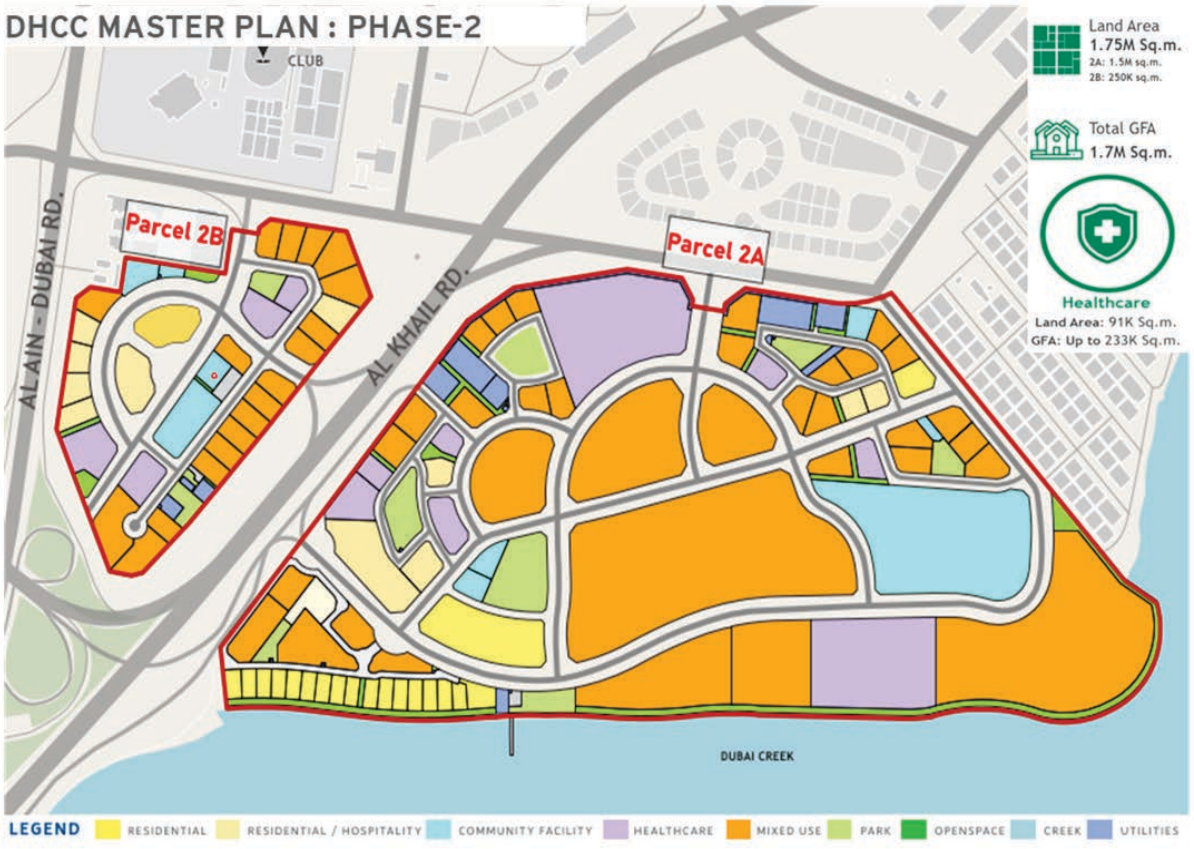

DHCC MASTER PLAN : PHASE-2
CLUB
AL AIN - DUBAI RD.
Parcel 2B
AL KHAIL RD.
Parcel 2A
DUBAI CREEK
Land Area 1.75M Sq.m.
2A: 1.5M sq.m.
2B: 250K sq.m.
Total GFA 1.7M Sq.m.
Healthcare
Land Area: 91K Sq.m.
GFA: Up to 233K Sq.m.
LEGEND
RESIDENTIAL
RESIDENTIAL / HOSPITALITY
COMMUNITY FACILITY
HEALTHCARE
MIXED USE
PARK
OPENSPACE
CREEK
UTILITIES



Figure 5:Phase:1 Development, DHCC



Figure 6: Phase:2 Development, DHCC

Table 1: Case study of Dubai Health care City, Dubai

2.2. Illinois Medical District, Chicago

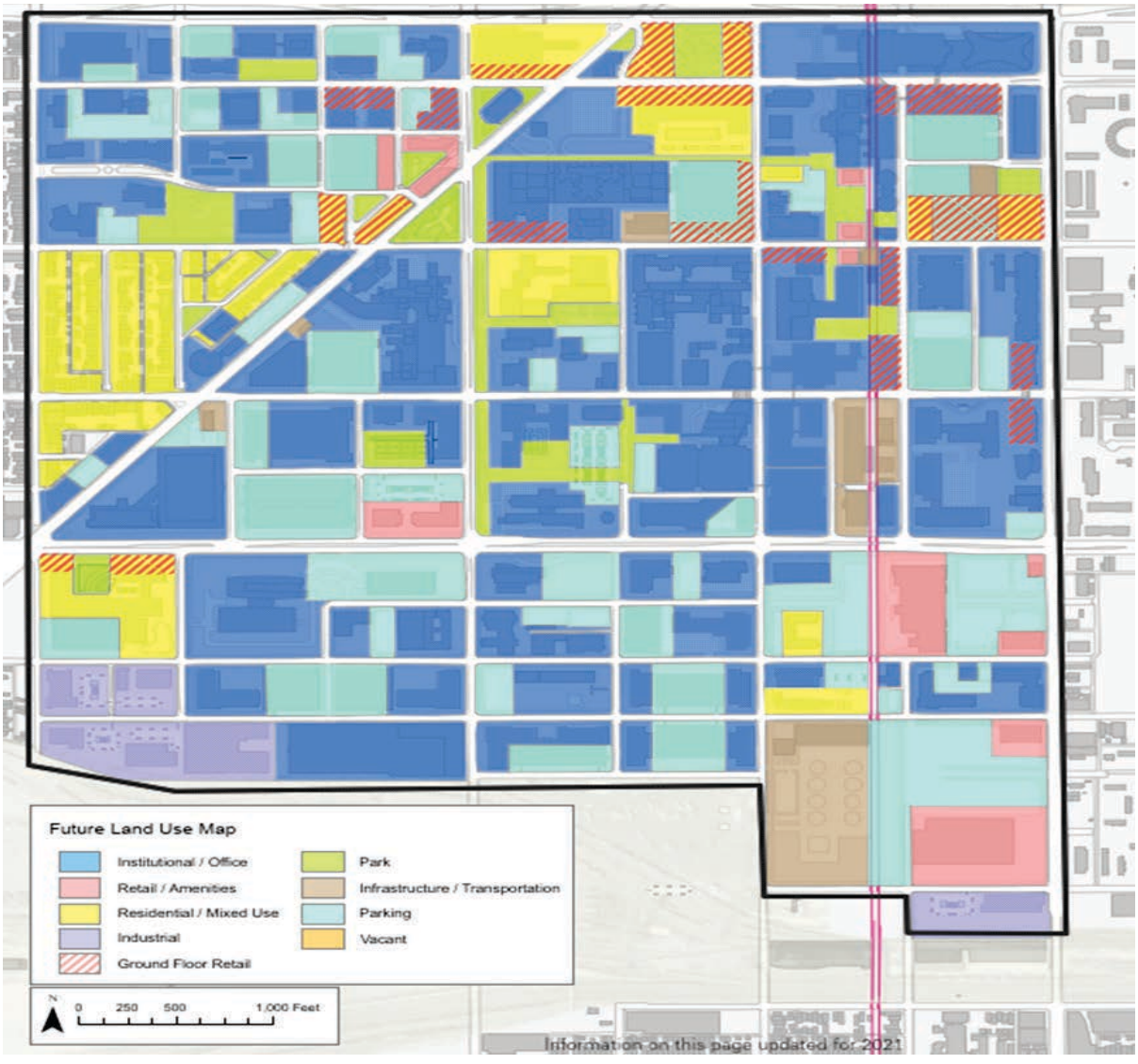
Illinois Medical District, Chicago	
Background	The Illinois Medical District (IMD), situated on the Near West Side of Chicago, is a major urban medical district that spans 500 acres and includes over 40 healthcare institutions, research facilities, and educational organizations. Established in 1941, the IMD focuses on improving public health through advanced research, education, and clinical services. The IMD has more than 30,000[15] employees and 50,000[16] daily visitors and generates $3.4 billion in economic opportunity.
Size/Site Area	560 acres[17]
Key Activities	• Healthcare Services • Medical Research and Education • Biotech and Pharmaceutical Companies • Community Engagement and Services • Innovation and Technology

[15]https://scb.com/project/illinois-medical-district-master-plan/
[16]https://en.wikipedia.org/wiki/Illinois_Medical_District
[17]Medical District Commission (illinois.gov)

Infrastructure Facilities	**Major Healthcare Facilities:** • Rush University Medical Center (~700 Beds[18]) • University of Illinois Hospital & Health Sciences System (445 beds[19]) • John H. Stroger Jr. Hospital of Cook County (450 beds[20]) • Jesse Brown VA Medical Center (200[21] beds) **Educational Institutions:** • The University of Illinois at Chicago (UIC) College of Medicine • Rush University • Medical and Nursing Schools • IMD Innovation Center **Research Centres and Laboratories:** • UIC Research Centers • Rush Research Centers **Support Services and Infrastructure:** • Clinical and Translational Science Institutes • Incubators and Innovation Hubs **Residential and Commercial Facilities:** • Residential Complexes • Commercial and Retail Spaces **Transportation and Accessibility:** • Public Transportation • Parking Facilities
Planning Principles	• Healthcare Excellence: Develop world-class medical facilities and services. • Research and Innovation: Foster cutting-edge medical research and technological advancements. • Education and Training: Enhance educational opportunities for healthcare professionals. • Community Engagement: Address health needs of the local community and promote health equity. • Sustainable Development: Implement environmentally sustainable practices and promote green spaces.

[18]https://www.rush.edu/about-us/about-our-system
[19]https://hospital.uillinois.edu/about-ui-health
[20]https://cookcountyhealth.org/about/
[21]https://www.visn12.va.gov/locations/Jesse_Brown_VA_Medical_Center.asp

	• Economic Growth: Attract biotech startups and research institutions to drive economic development. • Integrated Infrastructure: Ensure cohesive, accessible infrastructure and connectivity. • Collaboration and Partnerships: Encourage partnerships between public and private entities. • Quality of Life: Enhance quality of life with amenities, safety, and security.
Number of Beds	~2200 beds
Connectivity	• Airport situated 12.7 kms away • The IMD is accessible via major highways like I-290, W Taylor st and public transportation options including CTA buses and trains • Bike lanes and bike-sharing programs promote environmentally friendly transportation options



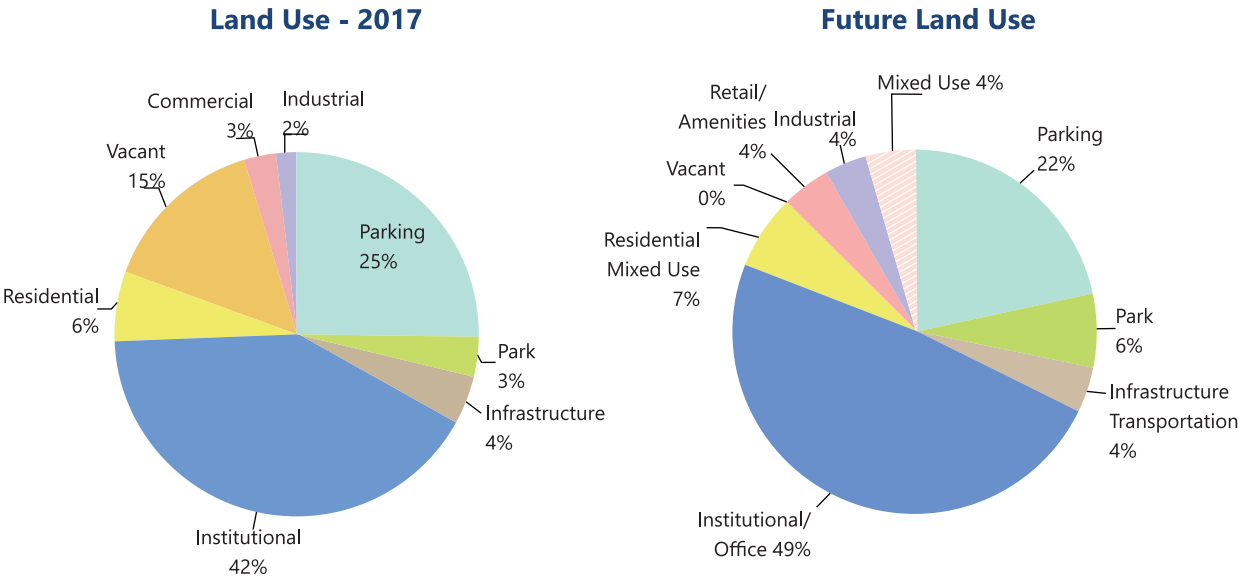




Table 2 Case study of Illinois Medical District, Chicago

2.3.Texas Medical Center, Texas, US

Texas Medical Center[22]	
Background	The Texas Medical Center (TMC), situated in Houston, Texas, is the world's largest medical complex, comprising over 60 institutions focused on patient care, research, and education. Established in 1925, TMC is a premier hub for medical innovation and health sciences. The TMC Emergency Room (ER) generates an annual revenue of $750,000 and employs over 120,000 individuals. TMC attracts a total patient footfall of 10 million annually.
Size/Site Area (In acres)	1147[23]
Key Activities	• Delivering medical services • Pioneering treatments • Medical Education, research, and Training • Innovation and Technology • Community Health Initiatives
Infrastructure Facilities	**Healthcare Facilities:** • Houston Methodist Hospital (~2,165 beds) • MD Anderson Cancer Center (~700 beds) • Texas Children's Hospital (~695 beds) • Memorial Hermann Hospital (~1,000 beds) • Baylor St. Luke's Medical Center (~ 850 beds) • Ben Taub Hospital (~578 beds) **Specialized Centers:** • Texas Heart Institute • Lyndon B. Johnson General Hospital • Menninger Clinic Research and Education Institutions **Major Research Institutions:** • Baylor College of Medicine • UT Health (University of Texas Health Science Center at Houston) • The University of Texas MD Anderson Cancer Center **Educational Facilities** • University of Houston College of Pharmacy • Texas Woman's University Institute of Health Sciences • Prairie View A&M University College of Nursing

[22]https://www.tmc.edu/about-tmc/

	Support Facilities • Diagnostics and Laboratories, Rehabilitation and Therapy, Pharmacies and Medical Supply • Residential and Commercial Facilities, Housing for Healthcare Professionals, Retail and Dining • Transportation and Accessibility • Public Transport, Parking Facilities • Green Spaces and Wellness • Parks and Gardens, Fitness and Wellness Centers Innovations and Technology • Rice University Bioscience Research Collaborative • Research and Innovation Hubs
Planning Principles	• Integration and Connectivity: Ensure seamless integration of medical, research, and educational facilities, promoting collaboration and connectivity through efficient transportation and pedestrian pathways. • Patient-Centric Design: Prioritize patient care and experience by designing accessible, comfortable, and healing environments within medical facilities. • Sustainability: Implement sustainable practices in building design, energy use, and resource management to minimize environmental impact and promote long-term viability. • Innovation and Technology: Foster a culture of innovation by incorporating state-of-the-art technologies and flexible spaces that accommodate future advancements in medical science and healthcare delivery. • Community Engagement: Engage with the local community through outreach programs, health initiatives, and accessible healthcare services to improve public health and well-being. • Economic Development: Support economic growth by attracting biotech companies, startups, and industry leaders, creating job opportunities, and fostering a thriving healthcare economy. • Safety and Resilience: Design resilient infrastructure to withstand natural disasters and ensure the safety and security of patients, staff, and visitors.
Number of Beds	9,200
Connectivity	• The nearest airport to Texas Medical Center is Houston Hobby Apt (HOU) 30 km. • Bus from Hobby Airport to Fannin South Transit Center every 15 minutes

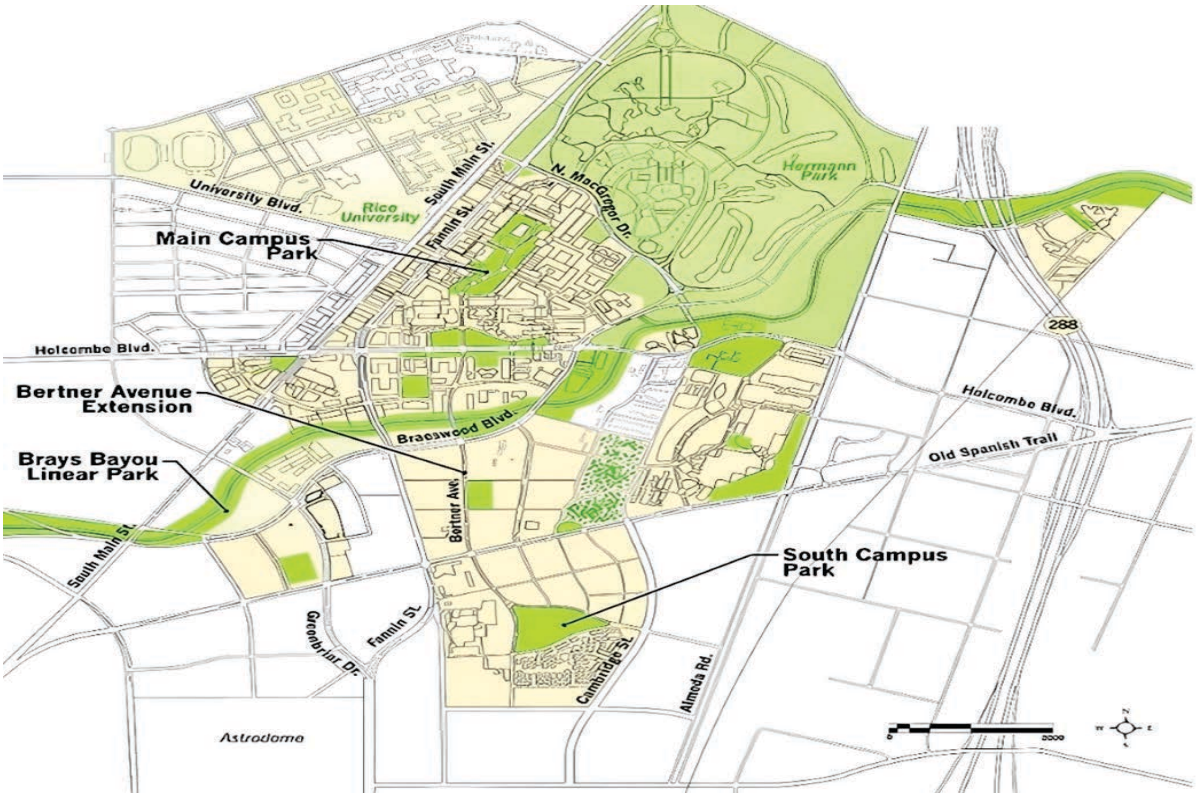


Figure 7: Master Plan of Texas Medical Center, Texas, US



Figure 8: Birds eye View of Texas Medical Center, Texas, US

Table 3 Case study of Texas Medical Center, Texas, US

2.4. Health city Novena, Singapore

Health City Novena, Singapore	
Background	Health City Novena, located in Singapore, is an integrated healthcare complex that combines medical, educational, and research facilities. Spanning 17 hectares, it is slated for completion in 2030 and aims to enhance patient care by creating a synergistic environment for healthcare professionals and researchers. It includes Tan Tock Seng Hospital and other specialty centers, positioning itself as a major medical hub in Asia.
Site Area (In acres)	~42 [23]
Key activities	• Patient care • Research and innovation • Community health and wellness • Integrated care models • Innovation and Technology • Emergency and specialized care • Education and Training
Infrastructure Facilities	**Healthcare Institutions:** • Tan Tock Seng Hospital , National Centre for Infectious Diseases (NCID), Mount Elizabeth Novena Hospital, National Skin Centre (NSC), Ren Ci Hospital. **Medical Education and Research:** • Lee Kong Chian School of Medicine, Clinical Research Centre (CRC), National Healthcare Group (NHG) Headquarters **Specialized Centers:** • National Neuroscience Institute (NNI), National Heart Centre Singapore (NHCS) **Support Services:** • Novena Medical Centre, Novena Specialist Center, Retail and Dining **Residential and Commercial Spaces:** • Oasia Hotel Novena, Office Spaces
Planning Principles & Key Highlights of the Masterplan [24]	Planning Principles • **Integration: Seamlessly integrate healthcare services, research, and education within a single precinct to foster collaboration and innovation.**

[23] https://www.sth.com.au/Projects/Health-City-Novena.aspx
[24] https://www.ttsh.com.sg/About-TTSH/Pages/Corporate-Profile.aspx

	• **Accessibility: Ensure easy access to medical services through efficient transportation links and patient-friendly infrastructure.** • **Sustainability: Incorporate green building practices and sustainable design to minimize environmental impact and promote health.** • **Patient-Centered Care: Design facilities to enhance patient experience and comfort, ensuring high-quality, personalized care.** • **Community Engagement: Engage with the community through health promotion and preventive care initiatives, enhancing overall public health outcomes.** key highlight of the Master plan: • **Phase 1 (2018-2020):** **Description:** This phase included the initial integration of existing healthcare facilities, most notably Tan Tock Seng Hospital. **Key Developments:** • **Establishment of a shared campus for healthcare, education, and research.** • **Development of supporting infrastructure and amenities.** • **Phase 2 (2020-2030):** **Description:** Focuses on expanding healthcare capacity and integrating new facilities. **Key Developments:** • **Construction of new medical buildings.** • **Expansion of clinical services and facilities.** • **Additional bed capacity planned, but specific numbers are subject to ongoing planning and requirements.** **Future Phases (Beyond 2023):** **Description:** Continual expansion and enhancement of Health City Novena. **Key Developments:** • **Further increases in bed capacity.** • **Development of advanced medical research and education facilities.** • **Integration of innovative healthcare technologies and sustainable practices.**

	Other Infrastructure Development of the Health city: • **Singapore's largest medical complex, spanning 15[25] integrated buildings, including 9 new developments.** • **Emphasizes care, continuous learning, and innovation.** • **Features 8.5 hectares of greenery, fitness, and heritage amenities, alongside a network of bridges and linkages for safe access**
Number of Beds	~2000-2200[26]
Connectivity	• **Situated about 21.3 kilometres from the airport** • **North-South Line of the MRT system connects directly to Novena MRT station**

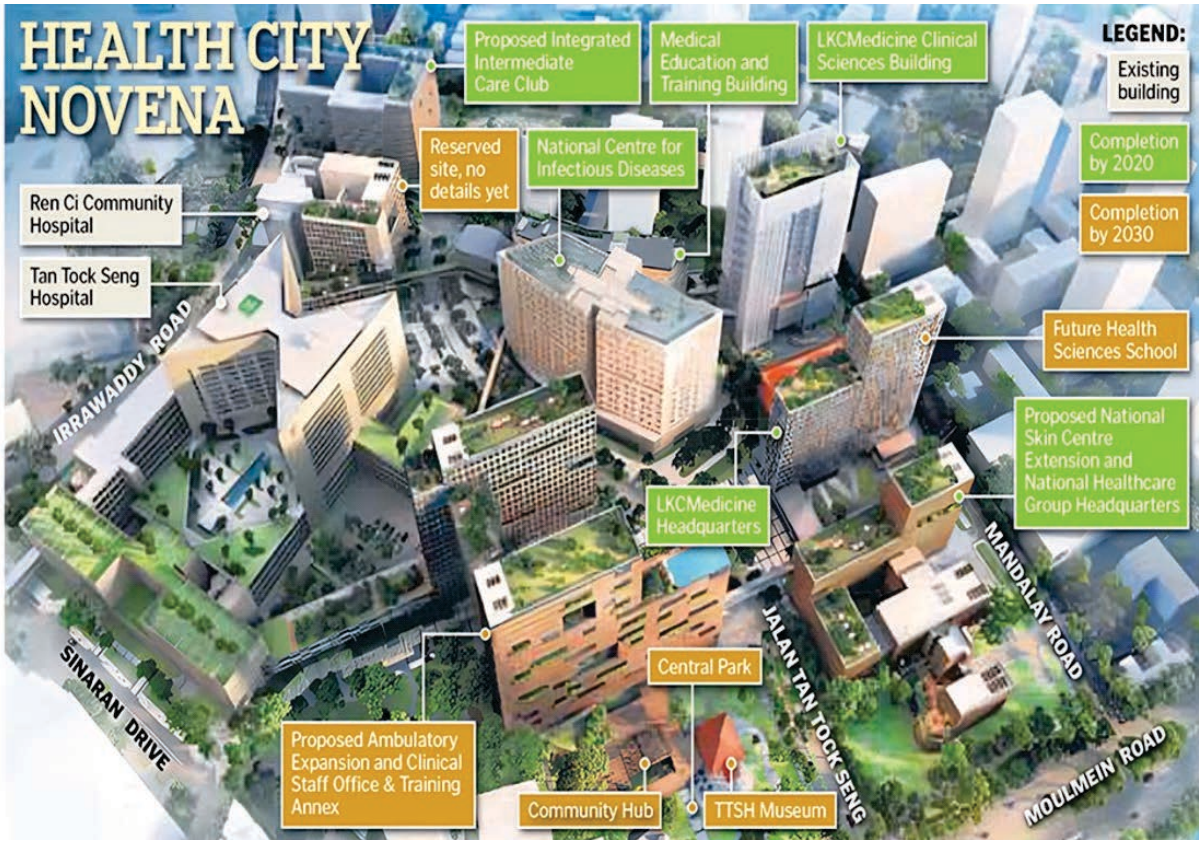


Figure 9: Aerial view of the health care city Novena

[25]https://www.ttsh.com.sg/About-TTSH/healthcitynovena/Pages/default.aspx#:~:text=tomorrow's%20healthcare%20today.-,HealthCity%20Novena%2C%20where%20Healthy%20Life%20is%20Central.,Irrawaddy%20Road%20in%20central%20Singapore.
[26]Health City Novena | Singapore | Broadway Malyan (worldlandscapearchitect.com)

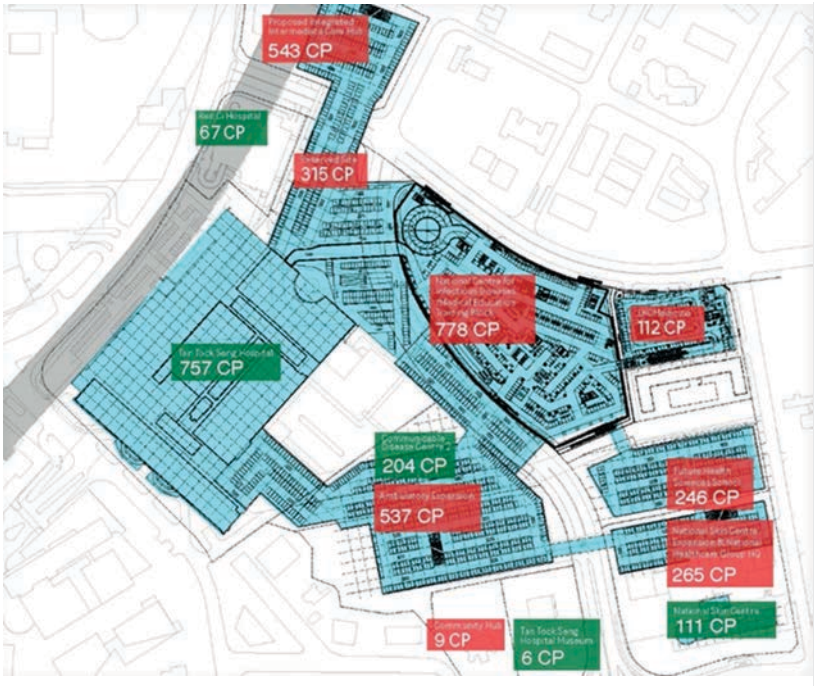


1. Proposed Integrated Health care hub
2. Ren Ci Community Hospital
3. Reserved Site
4. National Center for Infectious Disease
5. Medical Education training Block
6. LKC Medicine
7. Future Health science school
8. Proposed National Skin center expansion and health care group HQ
9. Ambulatory Expansion
10. Tan Tock Seng Hospital
11. Central Park

LEGEND Inpatient Outpatient Learning

Figure 10 :IN Patient , Outpatient Learners Flow

Table 4: Case study of Health city Noena, Singapore



LEGEND Basement Car Park Area · Existing Car Park Provision · Future Car Park Provision

Integrated Car Parks Connection

Visitors who travel by car to Health city Novena will be encouraged to enter the interconnected basement car parks immediately upon arrival to keep the streetscape as pedestrian-friendly as much possible. Carpark lots will be made available in the total development by the time the project is completed. Access from one part of the health city to another will be invariably easy, safe, and pleasant because of the focus on the connectivity.

2.5. Bilkent Integrated Healthcare Campus, Turkey

Bilkent Integrated Healthcare Campus	
Location	The Bilkent Integrated Healthcare Campus in Turkey, inaugurated in 2017, spans 1.2 million square meters encompasses 8 hospitals .The campus is equipped with advanced medical technologies, serving as a hub for healthcare, education, and research, providing comprehensive services to patients locally and internationally. The total project cost is USD 2,200,000,000[27].
Size/Site Area	325[28] acres
Key Activities	• **Infrastructure development** • **Operational management** • **Clinical care** • **Technology integration and compliance** • **Community engagement** • **Training and education**
Infrastructure Facilities	• Main hospital (66 beds)[29] • General hospital (562 beds) • Cardiovascular surgery hospital (441 beds) • Neurology and Orthopedy Hospital (506 beds) • Children's hospital (599 beds) • Maternity Hospital (542 beds) • Oncology hospital (588 beds) • Physical medicine and rehabilitation Hospital (300 beds) • High security Forensic psychiatry Hospital (100 beds) 1. Diagnosis and treatment centre 2. Technical services building & car park 3. Clinic hotel 4. Research & Development Centre 5. Commercial Areas 6. New main administrative centre for the Republic of Turkey's Ministry of Health
Planning Principles	• Patient-Centric Care: Prioritize patient comfort, safety, and quality of care. • State-of-the-Art Facilities: Equip with advanced medical technologies and infrastructure. • Integrated Services: Provide comprehensive healthcare services under one roof.

Table 5: Case study of Bilkent Integrated Healthcare Campus, Turkey

[27]Bilkent Integrated Health Campus – NKY
[28]https://en.wikipedia.org/wiki/Ankara_Bilkent_City_Hospital
[29]https://en.wikipedia.org/wiki/Ankara_Bilkent_City_Hospital

	• Research and Innovation: Foster medical research and technological advancements. • Education and Training: Offer educational programs for healthcare professionals. • Sustainability: Implement environmentally sustainable practices in design and operations. • Community Engagement: Address local health needs and promote health awareness. • International Standards: Adhere to global healthcare quality and accreditation standards.
Number of Beds	~3,704
Connectivity	• **Public buses** • **Ankara Metro** • **Shuttle services** • **Airport in 12.9 km radius**



1 Main Hospital
Main Hospital Core
General Hospital
Cardiovascular Hospital
Neurological Hospital
Children's Hospital
Woman's Hospital
Oncology Hospital
Carpark
2 High-Security Psychiatric Hospital
3 Physical Therapy and Rehabilitation Hospital
4 The Ministry of Health Building
5 Clinic Hotel
6 Technical Services Building
7 Temporary Waste Disposal Building





2.6. Key Take aways of the case studies

Attribute	Dubai Healthcare City (DHCC)	Health City Novena	Illinois Medical District (IMD)	Bilkent Integrated Healthcare Campus	Texas Medical Center (TMC)
Location	Dubai, UAE	Singapore	Chicago, Illinois, USA	Ankara, Turkey	Houston, Texas, USA
Established	2002	2012	1941	2015	1925
Size (Acres)	500	42	560	325	1147
Number of Major Hospitals	5+ and numerous clinics (Phase:2 Under Construction)	5	4	9	20+
Number of Beds	5000-5500	2000-2200+	2,200	3,704	9,200+
Major Research and Education	MBRU, Al Jalila Foundation	Lee Kong Chian School of Medicine	University of Illinois College of Medicine	Research and educational facilities included	Baylor College of Medicine, UT Health
Special Features	Medical tourism hub, wellness centres, Sustainability	Integrated care model, and sustainability	Nation's largest urban medical district Quality of Life	Largest healthcare investment in Turkey and Sustainability.	Largest medical complex in the world, Economic development, safety, and resilience
Innovation and Technology	Cutting-edge medical technology	Advanced healthcare technologies	Numerous biotech and pharma companies	State-of-the-art medical technology	Advanced robotic surgery, telemedicine
Residential Facilities	Mixed-use developments, residential apartments	Novena Lifestyle and Wellness Hub	Housing for staff and students	Staff housing included	Residential complexes for professionals
Public Transport Accessibility	Well-connected by Dubai Metro	Connected by MRT	Accessible by bus and train	Accessible by public transportation	Connected by Metrorail, buses, shuttles

Table 6: Key Take aways of the case studies

Notes:

- **Dubai Healthcare City (DHCC):** Focus on medical tourism and wellness, home to internationally recognized institutions.
- **Health City Novena:** Emphasizes integrated care and advanced healthcare technologies, part of Singapore's health infrastructure.
- **Illinois Medical District (IMD):** Largest urban medical district in the USA, significant research funding and numerous biotech firms.
- **Bilkent Integrated Healthcare Campus:** Largest healthcare investment in Turkey, advanced medical facilities.
- **Texas Medical Center (TMC):** Largest medical complex globally, extensive research and educational infrastructure, significant healthcare, and medical research hub.

3. National-level Initiatives

3.1. Setting up a Medico City in Jharkhand

The Department of Health Medical Education and Family Welfare, Government of Jharkhand envisages to develop a premier healthcare hub and first of its kind Medico City in India. The total site area is ~90 acres (project spread across in ~76 acres) and is proposed to be designed as a unique, integrated, and sustainable world class medical facility. The site has a capacity to develop up to 5,000 bedded Multi/Super Speciality Hospitals on available RINPAS land at Ranchi.

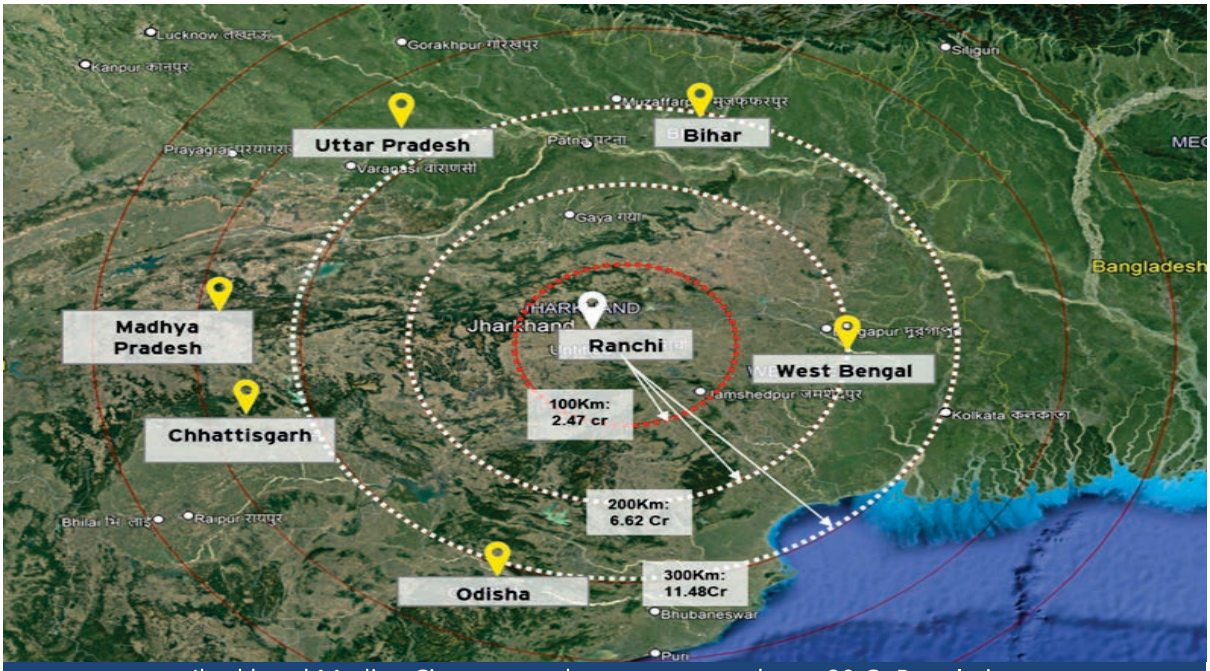
The Medico City will redefine the standards of excellence in healthcare delivery by bringing together the best of infrastructure, technology, and medical intelligentsia for the people of Jharkhand. This project is envisioned to position Jharkhand as the leading medical tourism hub in Eastern India.

OBJECTIVE

- To Bridge the health care infrastructure gap in the state
- To minimize the patient outflow and reduce out of pocket expenditure for citizens of the state
- To create ecosystem for absorbing latest development in medical care (technology AL,ML etc)

3.1.1. Site Location Analysis

Site Location, Connectivity and Prevailing Infrastructure



Jharkhand Medico City expected to serve more than ~20 Cr Population

Figure 11: Site Location and Connectivity

Expected Regions to be served		
0-100 Sq.km	**100-200 Sq.km**	**200-300 Sq.km**
~2.47 Cr Population	**~6.62 Cr Population**	**~11.48 Cr Population**
Jharkhand, West Bengal	Jharkhand, West Bengal, Bihar, Odisha, Chhattisgarh	Jharkhand, West Bengal, Bihar, Odisha, Chhattisgarh, Uttar Pradesh

Table 7 Expected Regions to be served by the Proposed Site

The proposed site for Jharkhand Medico City is situated at the prime location of Ranchi city.

The site is well connected with all modes of transport- railways, roadways, airways, and waterways. The road connectivity to the proposed site is well connected by Jharkhand SH2, major district roads, village roads and at proximity to NH23 of the region. The site and its surroundings are predominately fertile farmland. There are no environmentally sensitive zones within the project area. However, water bodies and orchards prevail within the Site. Out of ~90 acres of land, ~76 acres of land (identified as Parcel A in the image below) shall be utilised for the development of Medico City. The topographic level of the project area varies from 634m to 644 m from MSL.





Figure 12: Project Site Location

Components	Potential sources /Relevant location	Distance in Km
Water Supply	**Kanke Dam**	**7.2**
Sewage	**Kanke Dam (Gonda)**	**7.2**
Solid Waste Management	**Jhiri Land Fill site**	**15**
Electric Sub station	**Kanke substation**	**Abutting to the project area.**

3.1.2. Market Assessment/ Needs Assessment

Ranchi as a region is growing and expanding at a rapid pace through increased economic activities through trade commerce and business, mineral and natural resources, and growing advent of industries. The city facilitated by external transportation linkages for better access and connectivity from neighbouring cities/states. Despite tremendous growth potential along with the economic activities, the Ranchi region is still deprived of healthcare facilities to meet the growing demand for quality healthcare infrastructure. To avail diagnosis and quality treatment facilities, most of the population travels to states such as Vellore and Delhi.

Overall, the following factors necessitate the development of Jharkhand Medico city:

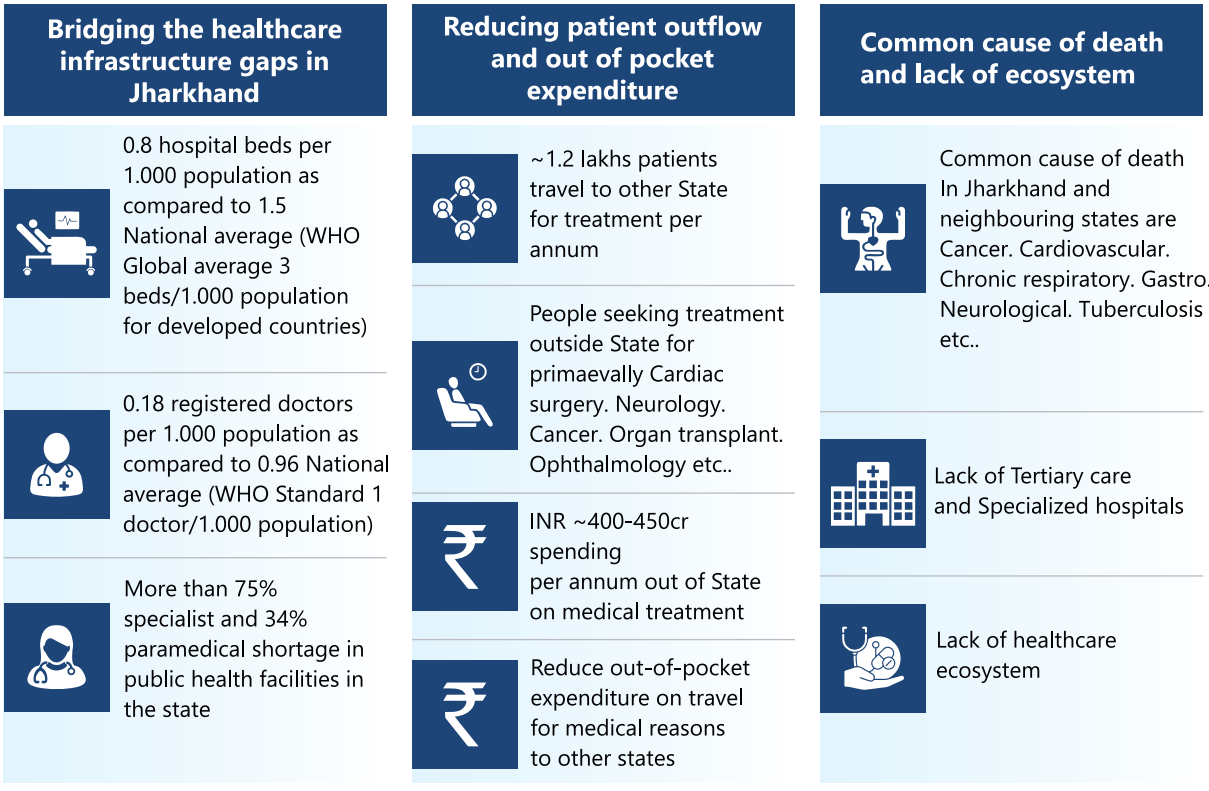


Figure 13 Need of Jharkhand Medico City

3.1.3. Proposed Conceptual Plan

The proposed Medico City is a green field development envisaged to provide various multispecialty healthcare services with close to 3,500 - 5,000 beds in multiple hospital buildings, physical therapy and rehabilitation services, diagnostic centre, research & development centre, green spaces, service apartments and other accommodation facilities for the staff and patients.

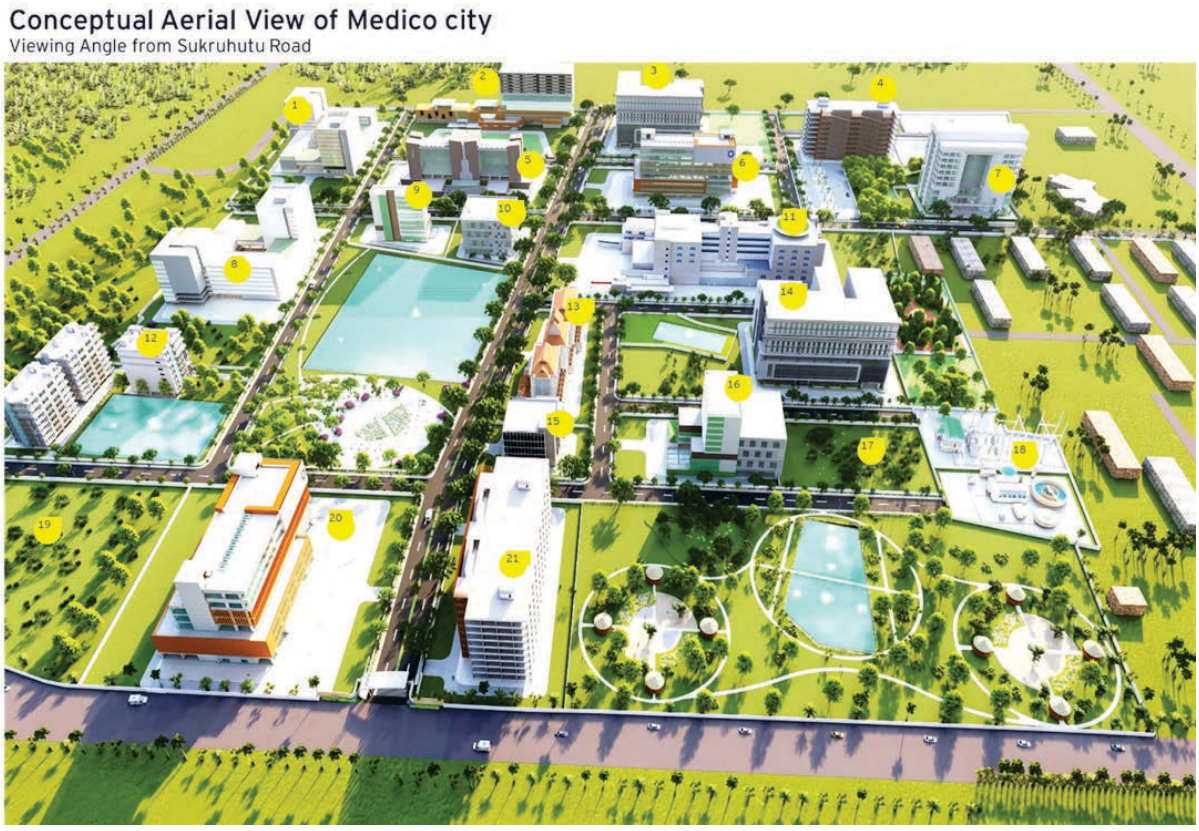




Figure 14: Conceptual View of Medico city Entrance.

The detailed components of the managed, allied and hospital blocks along with service mix and for the Medico City is provided below.

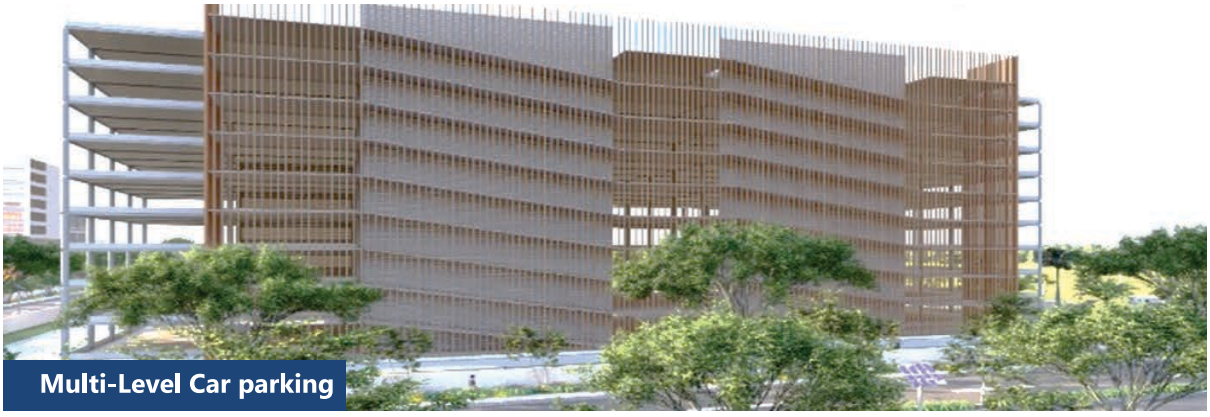
S. No.	Component	Proposed Specialties
1.	Multi-Specialty Hospital with focus on Gastroenterology and Hepatobiliary	Liver and Biliary Sciences, Gastroenterology
2.	Multi-Specialty Hospital with focus on Advance Center for Pediatric, Gynecology and IVF	Women & Reproductive Health IVF Centre, and Pediatric Surgery
3.	Multi-Specialty Hospital with focus on Infectious Diseases and Pulmonology	Pulmonary / Respiratory
4.	Multi-Specialty Hospital with focus on Neuroscience	Neurology and Neurosurgery
5.	Multi-Specialty Hospital with focus on Orthopaedics, Sports, and pain management	Orthopedics, Joint replacement, Spinal surgery, Sports medicine
6.	Multi-Specialty Hospital with focus on Organ Transplant	Organ Transplantation, Urology, Nephrology
7.	Multi-Specialty Hospital with focus on Plastic and Reconstructive Surgery	Plastic and Reconstructive Surgery
8.	Multi-specialty Hospital	Hematology, Internal Medicine, General Surgery, Ophthalmology, ENT, Skin VD, Emergency and Critical Care, Burn, Rheumatology, Endocrinology
9.	Multi-Specialty Hospital with focus on Ophthalmology	Ophthalmology
10.	Multi-specialty Hospital with focus on Advance Cardiology and Cardiothoracic Surgery	Cardiology, Cardiovascular, Cardio Thoracic Surgery and advanced cardiac care
11.	Centre for Physical therapy & rehabilitation	Physiotherapy, Yoga, Naturopathy, Integrated Wellness/Rejuvenation Centre with Tribal Healing
12.	Medical Mall and Diagnostic Centre	Diagnostic block, Pharmacy block, Surgical and Rehab equipment block, Food Court, E-ICU, Holographic Scan, Robotic Surgery, Augmented Reality solutions, Digital Pills, Precision Medicines
13.	Research & Development Centre	Integrated Research Lab
14.	Managed Services Block {Technical services building & car park (Multi Level)}	STP, ETP/FSTP, Mechanised Laundry, MLCP Capacity of ~3500ECS
15.	Administrative Office with Air Ambulance Service	Administrative Building, EV Charging

16.	Budget Hotel	Approx. 300-350 rooms
17.	Service Apartment	Approx. 200-250 rooms
18.	Future Expansion	Hospital/other relevant facility
19.	Future Expansion:2	Hospital/other relevant facility
20.	Managed Services (WTP, ESS)	WTP, ESS
21.	Manged Services (Multi Level Car Parking)	Capacity of ~5000ECS
Notes: The total bed capacity of Medico City ranges from 3500 to 5000 beds.		

Table 8 Detailed Breakup of Facilities (Component, Specialities)

Proposed Conceptual Aerial View of Hospital and Allied Services:











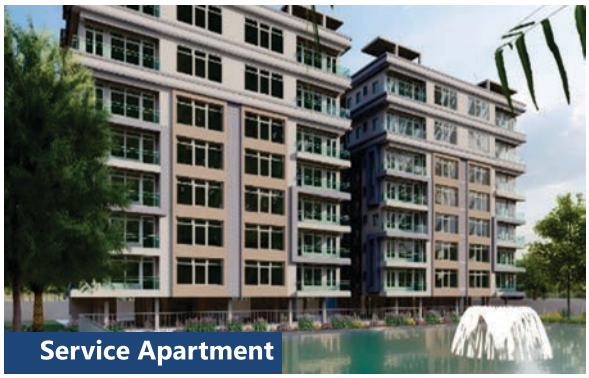






Figure 15: Conceptual Views of Medico City

Proposed organized green spaces in Jharkhand Medico City- It entails patient centric landscaping elements, such as the healing park, reflexology therapy, gazebo for meditation and outdoor gym.



Gazebo for Mediation/Yoga

- **Location:** Proposed at the prevailing green spaces(Orchard) located at the southern part of the project area.
- Outdoor yoga leads to independence and the cultivation of an inner strength that allows to deepen the practice and engage more fully to **focus your mind, minimizing distractions and concentrating on maintaining poses,** while strengthening the muscles and improving the balance.



Reflexology Therapy

- **Location:** Proposed at the Prevailing green spaces(Orchard) both at southern and western part of the project area.
- Walking on uneven pathways exercise has the effect of acupressure on the feet, resulting in stimulating the nervous system. All this results in pain **alleviation, Better sleep and other health benefits.**



Healing Park

- **Location:** Proposed at the prevailing green spaces (Orchard) both at the southern and western part of the project area.
- Any environment can promote healing, but gardens are particularly able to do so because humans are hard-wired to find nature engrossing and soothing. All this results in **Stress and Anxiety reduction, improvement in overall sense of wellbeing and Hopefulness.**



Outdoor Gym Facilities

- **Location:** Proposed at the Prevailing green spaces located at the western part of the project area.
- Outdoor Gymnasium helps in accumulating **Fresh outdoor air and natural light invigorate** to mind and body.

Figure 16: Landscape Elements of Medico City



Figure 17: Landscape Elements of Medico City



Figure 18: Birdseye View of Landscape Elements

3.1.4. Project Structuring and Financing Estimates

Phase 1: Planning and Development of Common Infrastructure facilities

- **Concept Master Plan & Detailed Project Report:** This phase envisages to develop a comprehensive plan outlining the medical hub's vision, facilities, and functionalities.
- **Common Infrastructure Development:** Phase 1 activity will include building the basic infrastructure for the medico city, such as roads - utilities, communication networks and other utilities. This phase will be funded by the government or a Special Purpose Vehicle (SPV) using state finances.
- **Operation & Maintenance:** A plan is to be established for operation and maintenance of the common infrastructure facilities at phase 1 stage.

Phase 2: Development of Healthcare Facilities, Allied Infrastructure Services and Management

- **Private Sector Involvement:** The second phase involves private players or Public-Private Partnerships (PPPs) developing Health care facilities and allied infrastructure facilities like Budget Hotel, Service Apartment and Medical mall.
- **Financing Options:** For PPP models, the Viability Gap Funding (VGF) program by the Department of Economic Affairs is to be considered to bridge any financial gaps in the project.
- **Operation and Maintenance:** The private entity /PPP player will manage the facilities, equipment and human resource.

The details are illustrated below:

Development Activities (~ Rs. 5850 Cr of investment envisaged)

JMCCL

Development of Common infrastructure Facilities for Medico city

Phase 1:- 300 Cr

A. Corporation formation
B. Land transfer to corp.
C. Site development

Managed and Allied services:

- Road, WTP, STP
- Electric Sub station
- Manage Services Block: Mechanised Laundry, BMWM, SWM, Parking with EV charging, Fire station, Medical Gas Services network.
- Administrative Office with Air ambulance Service
- Organised Green Spaces
- Multilevel car parking(~800-1000 ECS for Phase:1) it will be operated & maintained by PPP/private player

PRIVATE INVESTOR/PPP MODE

Development of Private Hospitals, and Allied services

Phase 2: 5550 Cr

- Bid Process for Hospitals
- Land Allocation for Hospital Plots and Allied Services
- Channelising for statutory approvals.
- Initiation of construction Activities.
- 850 Multi-specialty Hospital
- Research and Development centre

- 400 Super-specialty Hospital-3 (Ophthalmology)
- 450 Bedded Centre for Orthopaedics and Pain Management
- 500 Bedded Women's and Child Hospital (Advance centre for Women and Child Health
- 500 Super-specialty Hospital-5 (Advance Cardiac Care)

- Budget Hotel
- 400 Institute for Neuroscience
- 450 Centre for Infectious Diseases and Pulmonology
- 600 Super-specialty Hospital-1 (Hepatobiliary)
- Medical Mall and Diagnostic Centre
- Service Apartment

- 600 Super-specialty Hospital-2 (Organ Transplant)
- 150 Super-specialty Hospital-4 (Plastic and Reconstructive Surgery)
- Centre for Physical therapy & rehabilitation
- Med Tech Tower
- Multi-level car parking (~4000 ECS, Phase:2) will be developed by the state government and operated & maintained by PPP/private player

Notes: The financial modelling of Phase2. (hospital blocks and allied services) shall be finalised based on the stakeholder consultation..

Figure 19: Phase wise Development Activities

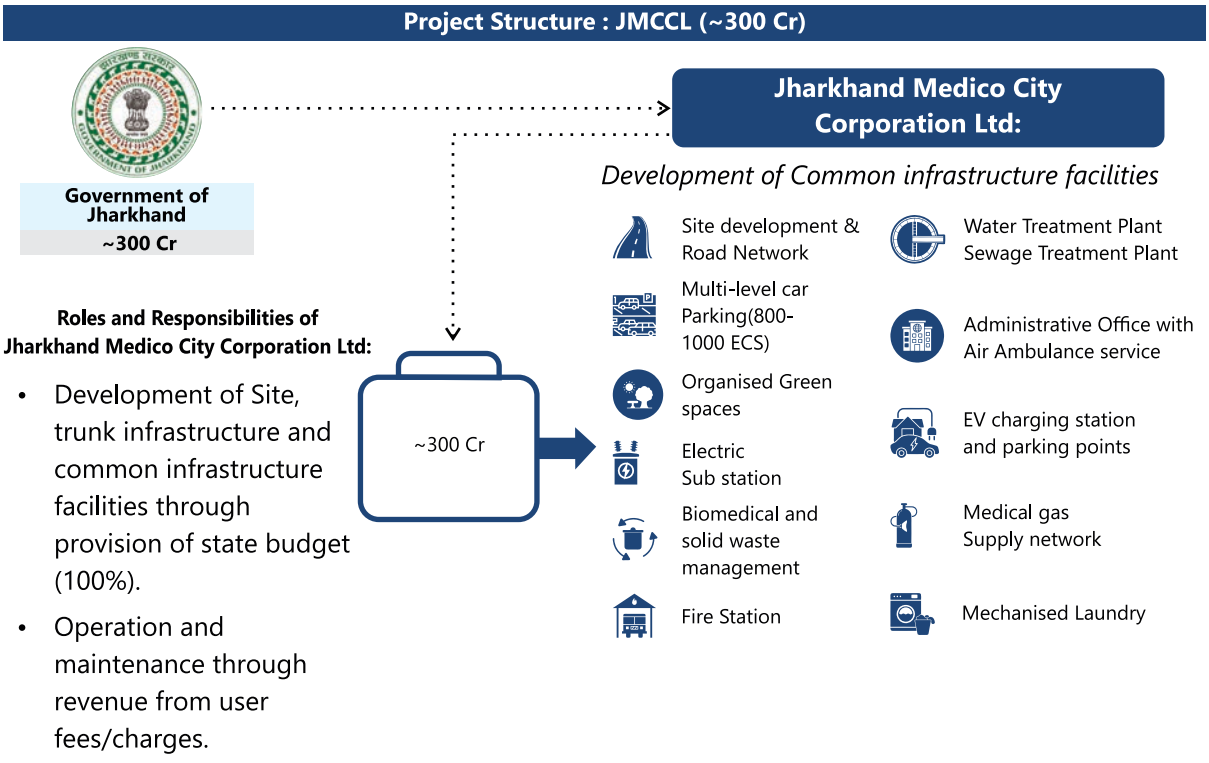


Figure 20: Project Structure for Phase :1 Development

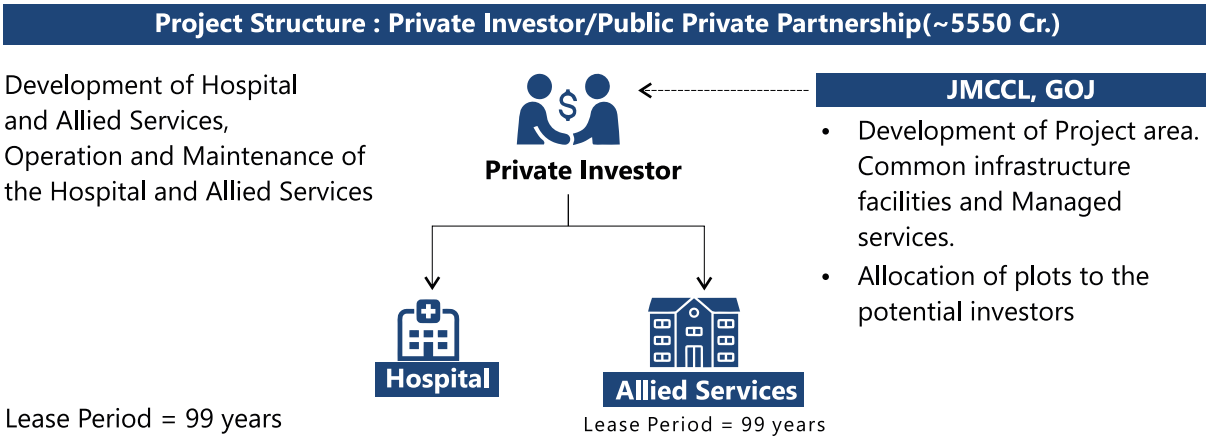


Figure 21: PPP/Private Investor Project Structuring for Phase:2 Development

3.1.5. Land Allocation to Private Partner

Ranchi Smart City Model	• Kanke Kadma Circle rate is proposed to be considered as the base price (reserve price) • Prioritising the health sector, the reserve price would be provided as 0.50x (circle rate/Acre) of the base price. Note: x is the Base Price • The land will be auctioned to the highest bidder H1 over and above the reserve price, the price of which will be considered as Auction Price. • The auction price to be recovered within one year in two instalments (40% in 3 months and 60% in 9 months) • 0.5% of auction price will be considered as annual lease rent for the entire lease duration. • Lease period – 99 years.

The Department of Health, Medical Education, and Family Welfare, GoJ, has finalized the Ranchi Smart City Model. This model offers lower upfront and annual rental costs, making it more beneficial for private players.

3.1.6. Government Stakeholders envisaged for Jharkhand Medicocity Corporation Limited (JMCCL) *

Table 9: Government stakeholders envisaged

SL. NO.	Government Stakeholders envisaged
1.	Department of Health, Medical Education and Family Welfare
2.	Department of Finance
3.	Department of Revenue, Registration and Land Reforms
4.	Department of Urban Development and Housing Department
5.	Department of Industries
6.	Ranchi Regional Development Authority
7.	Ranchi Smart City

*The project is yet to be approved by the cabinet, this no update on private players yet.

3.1.7. Potential Impact and Benefits

With an of ~300 sq. km radius from the proposed project area, the Medico city is expected to serve more than ~20 Cr population of the Jharkhand and the neighbouring states like West Bengal, Odisha, Bihar, Uttar Pradesh, Chhattisgarh, and Madhya Pradesh. The project is envisaged to provide people access to over 10+ specialties through over 1,100 doctors and specialists. It is expected to decrease a cumulative OOPE of INR 400-450 Cr. The strategic location of the Medico City will also promote medical tourism and is expected to generate a total revenue of over INR 2,000 Cr. annually.

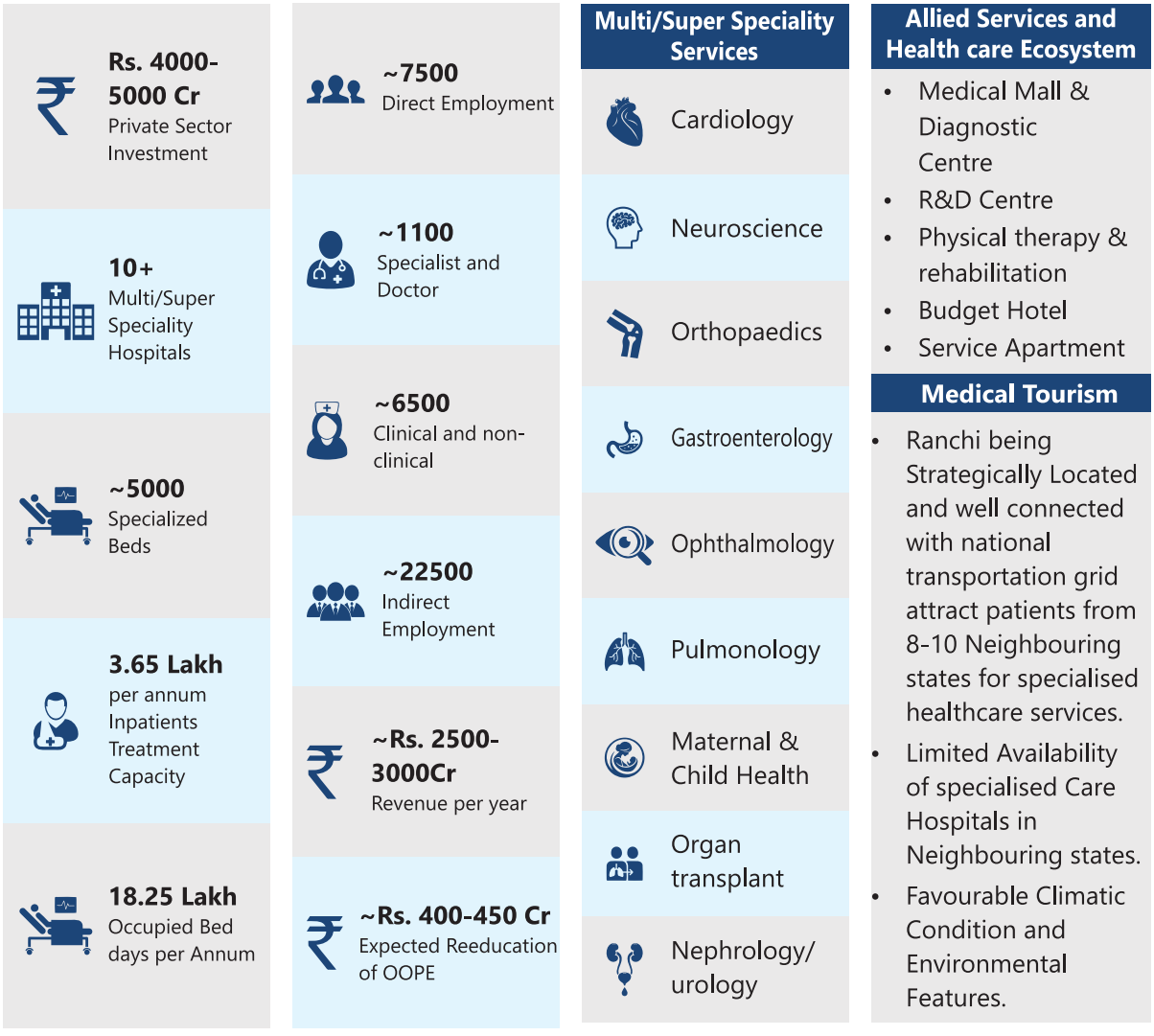


Figure 22: Potential Impacts and Benefits of Medico hub

3.2. Setting up health city at Amaravati, Vijayawada [32]

3.2.1. Proposed vision for the Amaravati Health City

The proposed vision for Amaravati as a health city by 2036 is to become one of the top three healthiest cities globally and a leading medical and wellness tourism destination.



Figure 23: Vision for Amaravati Health City

3.2.2. Pillars of Amaravati Health City

The foundational pillars of the proposed Amaravati Health City are a strategic initiative aimed at establishing Amaravati as a leading global health destination. The vision is to position Amaravati among the top three healthiest cities worldwide and a premier medical and wellness tourism hub, grounded in excellence in health, research, innovation, and education.

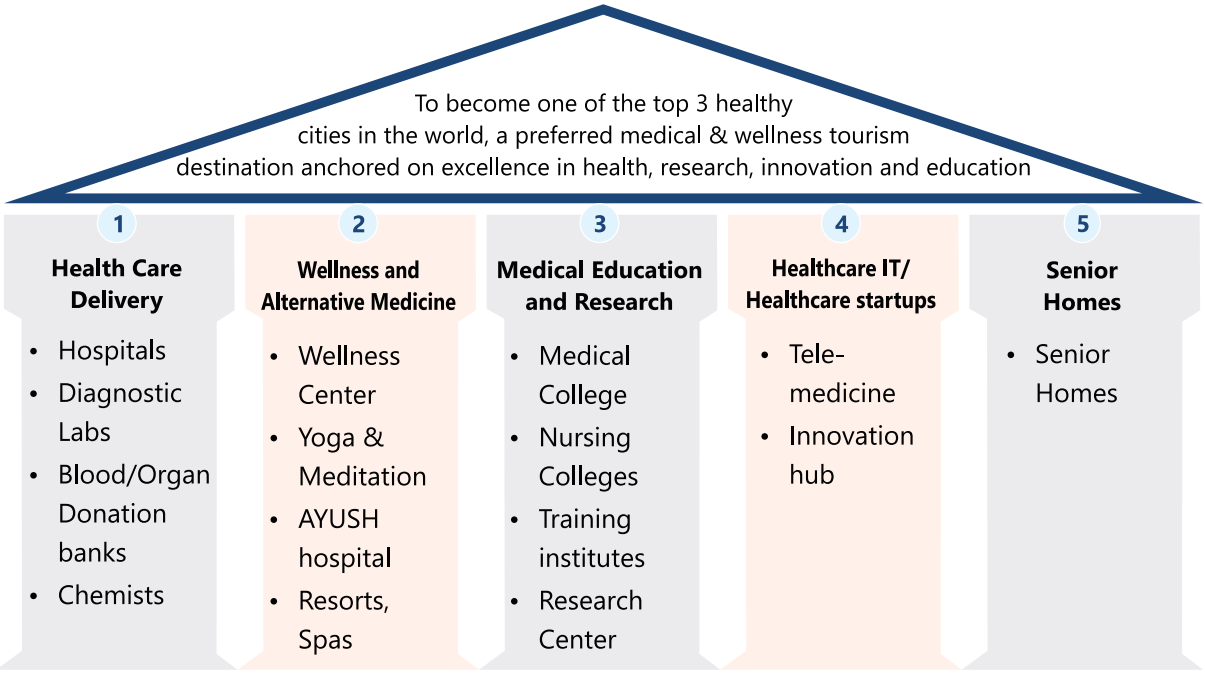


Figure 24: Pillars of Amaravati Health City

The key Pillars of Development are as follows:

- **Health Care Delivery:** This pillar establishes the core medical infrastructure, encompassing hospitals, diagnostic laboratories, blood and organ donation banks, and pharmacies. The objective is to ensure comprehensive and accessible healthcare services for both residents and visitors, addressing immediate medical needs and forming a robust foundation for the health city.
- **Wellness and Alternative Medicine:** Emphasizing a holistic approach, this pillar integrates wellness centers, yoga and meditation facilities, AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy) hospitals, and resort and spa facilities. This aims to address both physical and mental well-being through diverse healthcare modalities.
- **Medical Education and Research:** This pillar focuses on knowledge advancement and innovation, incorporating medical colleges, nursing colleges, training institutes, and research centers. By fostering education and research, Amaravati seeks to become a hub for medical advancements and talent development, ensuring continuous improvement in healthcare services.
- **Healthcare IT / Healthcare Startups:** This pillar leverages technology to enhance healthcare delivery, including telemedicine services and innovation hubs. The promotion of technological innovation aims to improve efficiency, accessibility, and quality of healthcare services.
- **Senior Homes:** Addressing the growing need for elderly care, this pillar includes senior homes that provide specialized care and support, demonstrating a commitment to comprehensive care across all age demographics.

In addition to these core pillars, the development plan emphasizes the facilitation of a healthy lifestyle through cycling and access to organic food, as well as the prevention of disease and accidents through clean air and safe road infrastructure.

Amaravati's strategic initiative is to leverage the expanding medical tourism sector within India. The initiative outlines a comprehensive plan to establish Amaravati as a prominent destination in this market.

The Indian medical tourism market is projected to reach USD 8 billion by 2020, presenting a substantial opportunity for Amaravati. Given that medical tourists predominantly seek tertiary and super-specialty treatments, Amaravati's strategy is aligned with providing high-caliber, specialized medical services. The stated objective of capturing 5-10% of this market reflects a pragmatic and ambitious target.

To achieve its objectives, Amaravati proposes the development of a "Single Collaborative Ecosystem" within a unified campus. This integrated approach aims to provide a seamless and comprehensive experience for medical tourists. The ecosystem is structured around four core components: Academic, Business, Clinical, and District.

- **Academic Component:** This includes medical, nursing, and training colleges, alongside research laboratories. The emphasis on education and research seeks to establish Amaravati as a center of medical excellence, attracting both patients and medical professionals.

- **Business Component:** This focuses on fostering innovation and entrepreneurship, incorporating start-ups, incubators, innovation hubs, and health insurance services. This aims to create a dynamic environment conducive to the development of novel healthcare technologies and solutions.
- **Clinical Component:** This provides essential medical services, including super-specialty treatments, diagnostics, blood and organ banks, pharmacies, and AYUSH hospitals. This ensures the availability of a wide spectrum of medical treatments and facilities.
- **District Component:** This focuses on creating a holistic and supportive environment for patients and their families, incorporating convention centers, fitness parks, gyms, yoga studios, organic and natural food outlets, wellness spas, resorts, retreats, and senior homes. These amenities aim to enhance the patient experience and promote overall well-being.

The integration of these diverse components within a single campus aims to create a unique and appealing destination for medical tourists. This approach not only streamlines patient experience but also facilitates collaboration and innovation among stakeholders.

3.2.3. Strategic Development of Amaravati as a Tertiary Care Hub

The strategic plan outlined for Amaravati to establish itself as a prominent hub for tertiary care focuses on attracting leading healthcare providers and facilitating accessible, low-cost treatments. The plan is structured around a series of key initiatives designed to create a comprehensive and attractive ecosystem for both healthcare providers and patients.

Core Strategic Initiatives:

1. **Attraction of Leading Tertiary Care Hospitals:** A central component of the strategy involves the proactive invitation of leading tertiary care hospitals to establish a presence in Amaravati. To facilitate this, the plan proposes the creation of a dedicated zone spanning approximately 200-250 acres. This zone will be developed as a single campus encompassing all necessary facilities, aiming to create a streamlined and efficient environment for medical service delivery. Furthermore, the plan suggests offering land at subsidized prices and providing tax rebates, such as exemptions on stamp duty and registration, to incentivize hospitals to establish operations within Amaravati.
2. **Demand Generation and Governmental Support:** Recognizing the importance of stimulating demand, the plan outlines several governmental support measures. These include the establishment of a dedicated immigration center and facilitating desk at Vijayawada airport for medical tourists visiting Amaravati. This initiative aims to streamline the arrival process and enhance the overall patient experience. The plan also emphasizes the necessity of ensuring direct flight connectivity to countries identified as key sources of medical tourists, thereby enhancing accessibility. Additionally, the government is encouraged to establish Memorandums of Understanding (MOUs) with international governments, drawing inspiration from the successful MOUs established by Chennai with African nations. These collaborations aim to foster international cooperation and facilitate patient flow.

3. **Quality Assurance and International Credibility:** To ensure the delivery of high-quality care and establish international credibility, the plan proposes incentivizing hospitals to pursue accreditation from recognized bodies such as the Joint Commission International (JCI). This accreditation not only assures quality but also enhances Amaravati's reputation as a reliable medical destination.

4. **Promotion of Research and Innovation:** Finally, the plan advocates for the promotion of research and innovation in the development of new technologies for high-quality treatment and low-cost alternatives. By positioning Amaravati as a hub for research and innovation, the plan aims to improve treatment outcomes and reduce costs, thereby enhancing Amaravati's competitiveness in the global medical tourism market.

5. **Development of a Comprehensive Medical Tourism Ecosystem:** A primary strategy involves the creation of an integrated ecosystem for medical tourism, leveraging existing tourism infrastructure and resources. This includes:

    - **Language Accessibility:** Addressing language barriers through the training of local translators, facilitated by partnerships with initiatives such as the National Translation Mission (operated by the Central Institute of Indian Languages).

    - **Enhancement of Tourism Infrastructure:** Development of travel agents, tourism agencies, and tourist attractions as integral components of the tourism strategy, aimed at enhancing the overall visitor experience and creating a strong pull factor.

6. Integrated Marketing Campaign: The implementation of a comprehensive marketing campaign, promoting Amaravati as a "Healthy, Happy City," is a critical component of the strategy. This campaign aims to position Amaravati as a holistic medical tourism destination.

1. **Medical Tourism Portal:** The establishment of a government-operated medical tourism portal, modelled after successful examples such as Dubai's, is recommended. This portal would offer functionalities including:

    Appointment scheduling for comprehensive medical packages across a wide range of specialties.

    1. An events calendar featuring conferences, meetings, and workshops.

    2. Detailed travel information, including hotel, dining, and transportation options.

    3. Facilitation of travel arrangements through linkages with travel agencies.

7. **Joint Commission International (JCI) Accreditation:** The report acknowledges the financial implications of pursuing JCI accreditation, noting the average fee of $46,000 for a full hospital survey, along with additional expenses for surveyor travel, accommodation, and living expenses. This highlights the significant investment required to achieve international accreditation and establish credibility in the medical tourism sector.

3.2.4. Development of a Holistic Medical Education System in Amaravati

The core of the proposed plan centers on the establishment of a robust Medical Education framework, segmented into three key domains:

- **Core Medical:** This domain focuses on the foundational education of medical professionals, encompassing disciplines such as Medicine and Surgery, Dental, Nursing, and Pharmacy.
- **Allied Health Sciences:** This segment addresses the training of support personnel essential to core medical services, including Para Medical staff, Laboratory Technicians, Radiation Therapists, Physiotherapists, Nutritionists, and Dieticians.
- Ancillary Medical Education: This domain focuses on the development of professionals in the management and administration of healthcare institutions, covering areas such as Health Management and Hospital Administration, Public Health, and Health Information Management.

The framework acknowledges the diverse range of disciplines that must be incorporated into the medical education system, including Medicine and Surgery, Dental, Nursing, and Pharmacy.

The proposed implementation plan outlines several key strategies:

- **Incentivization and Financial Support:** The plan recommends providing incentives, scholarships, and awards to attract and support students pursuing medical education.
- **Institutional Collaboration and Development:** The plan suggests exploring the integration of medical education programs with existing universities and the establishment of dedicated stand-alone training centers.
- **Synergistic Development with Knowledge City:** The plan proposes exploring the integration of medical education initiatives with the broader Knowledge City concept, aiming to foster a synergistic approach to development.

The Gujarat model of providing free medical education for girls, suggesting that the Andhra Pradesh government could consider regulating fee structures to balance attracting high-caliber students while ensuring the financial viability of educational institutions. This highlights the importance of a balanced approach to financing medical education.

3.2.5. Growth Trends in the Wellness and Alternate Medicines Sector



	Ayush Therapy	Health & Fitness	Beauty	Enhancement
Services	• Ayurveda • Homeopathy	• Fitness • Spas	• Salon • Skin treatments	• Hair transplant • Slimming • Cosmetic surgery
Personal products	• Skin care • Hair care • Skin care		• Colour cosmetics • Fragrance • Slimming	
Medicines	• Ayush medicines		• Herbal and other supplements	
Foods	• Low fat dairy • Fortified foods • Organic		• Better for you • Naturally healthy • Food intolerance	

Figure 25: Offerings of wellness and alternative medicines sector

The offering in Amaravati is structured around four key categories:

1. **Ayush Therapy:** This category incorporates traditional Indian systems of medicine, specifically Ayurveda and Homeopathy, providing natural and holistic treatment options.
2. **Health and Fitness:** This segment focuses on promoting physical well-being through fitness services and spas, addressing the growing demand for preventive healthcare.
3. **Beauty:** This category encompasses salon services and skin treatments, catering to aesthetic needs and enhancing personal appearance.
4. **Enhancement:** This segment offers advanced treatments, including hair transplants, slimming procedures, and cosmetic surgery, targeting specific aesthetic and health goals.

The plan includes a range of supporting components to enhance the wellness offering:

- **Services:** A comprehensive suite of services is proposed, including Ayurveda, Homeopathy, fitness programs, spa treatments, salon services, skin treatments, hair transplants, slimming procedures, and cosmetic surgery.

- **Personal Products:** A diverse range of personal care products is included, covering skin care, hair care, color cosmetics, fragrances, and slimming products.
- **Medicines:** The offering includes Ayush medicines, as well as herbal and other dietary supplements.
- **Foods:** A focus on healthy dietary options is emphasized, including low-fat dairy products, fortified foods, organic products, "better-for-you" options, naturally healthy foods, and products catering to food intolerances.

The strategy emphasizes the importance of attracting reputable brands within the wellness industry. The three potential partners: Somatheeram, a well-established Ayurvedic resort; B.K.S. Iyengar Yoga, representing a renowned yoga tradition; and Ananda in the Himalayas, a luxury wellness retreat. These partnerships suggest a focus on integrating traditional Indian wellness practices with high-end, established brands, aiming to attract a diverse clientele seeking authentic and reputable wellness experiences.

Key Strategic Initiatives:

- Leveraging Scenic Beauty and Attracting Established Brands: Amaravati plans to leverage its existing scenic beauty and invite well-known trusted names in Phase 1 of its development. This phased approach aims to build credibility and draw initial interest by associating with established brands.
- **Developing Tourism and Sports Activities:** The city aims to develop tourism and sports activities, such as water rafting and hiking, drawing inspiration from successful destinations like Uttarakhand. These activities are intended to attract wellness tourists by offering a holistic experience that combines physical activity with natural beauty.
- **Developing Supporting Infrastructure and Companies:** The strategy includes developing supporting companies, such as travel agents, and infrastructure, such as hotels. This aims to create a comprehensive ecosystem that caters to the needs of wellness tourists, ensuring a seamless and comfortable experience.
- **Establishing Intergovernmental Collaborations:** Amaravati plans to enter collaborations with other State governments as well as international governments to exchange knowledge, expertise, and training in various areas. This suggests a collaborative approach to development, aiming to learn from best practices and build international partnerships.

3.2.6. Transformative Impact of Healthcare IT

Strategic Initiatives:

1. **Needs-Driven Innovation:** A core component of the strategy is the identification and articulation of needs from patients, payers, and providers to generate relevant innovation. This involves:
    - Organizing conferences, workshops, and meetups to facilitate the identification and discussion of problems and unmet needs within the healthcare ecosystem, thereby inspiring the development of targeted products.
    - Introducing an annual hack-a-thon with awards encompassing mentorship and funding, providing a platform for rapid prototyping and innovation.

2. **Capital Access:** To ensure startups have access to necessary resources, the plan emphasizes securing capital through:
    - Government co-investment in startups alongside leading venture capitalists, leveraging private sector expertise and resources.
    - Government funding of prize money for competitions organized in collaboration with leading educational institutions, focusing on specific strategic objectives.
3. **Business Environment Facilitation:** The plan recognizes the importance of a conducive business environment, advocating for:
    - The establishment of a dedicated facility to house startups, fostering collaboration and growth, and serving as an innovation hub.
4. **Market Access:** Addressing the critical issue of market access, the plan proposes:
    - Situating the entire healthcare environment within a single campus, providing healthcare startups with real-time access to the market, facilitating rapid testing, feedback, and adoption of new products and services.

3.2.7. Senior Homes segment in Amaravati Health City

The Amaravati project is an "upcoming and untapped opportunity" projected to reach $7.7 billion by 2030, driven by the dramatic rise in the number of senior citizens (above 60) from 76 million in 2001 to an estimated 240 million by 2050. This growth underscores the growing need for specialized senior living facilities. It is further emphasized by key trends such as approximately 63% of Indian households being nuclear families and the current inadequate supply of senior living projects, with only about 35 projects accommodating a mere 0.0001% of India's senior citizens (compared to 10% in the US and 4% in Australia).

The core opportunity for Amaravati lies in **its ability to integrate healthcare services seamlessly into senior living facilities.** Recognizing that healthcare is a paramount need for senior homes, the city aims to leverage its existing and developing healthcare ecosystem to provide best-in-class services. This integration would not only enhance the quality of life for senior residents but also differentiate Amaravati from other potential locations. To capitalize on this opportunity, the "Way forward" plan focuses on attracting developers through strategic incentives. **The primary incentive proposed is ease of land acquisition, which includes allocating land specifically for senior home development and providing exemptions on stamp duty.** This aims to reduce the initial investment burden for developers and make Amaravati a more attractive location for building senior living facilities.

A key initiative proposed is the introduction of a **single-window mechanism** for the elderly. This aims to streamline access to essential services, allowing seniors to obtain life insurance, health insurance, and information about senior living apartments under one roof. This integrated approach simplifies administrative processes and enhances convenience for elderly residents.

The plan also highlights the need to develop dedicated human resources for the senior living sector. Amaravati aims to leverage vocational training programs and existing institutes, or establish new ones, to ensure a skilled workforce capable of providing quality care and support to seniors.

A central aspect of Amaravati's strategy is to position itself as one of the healthiest and livable cities. This positioning is built on several key factors:

- **Healthcare Accessibility:** Ensuring easy access to healthcare services is crucial for senior residents. Amaravati aims to provide comprehensive healthcare facilities and services tailored to the needs of the elderly.
- **Social Ecosystem:** Creating a vibrant social environment is essential for the well-being of seniors. This includes access to temples, malls, entertainment and recreation facilities, clubs, and societies, fostering social interaction and engagement.
- **Connectivity:** Well-connected transportation networks are vital for seniors to maintain their independence and access essential services. Amaravati aims to ensure seamless connectivity to city nodes, activity hubs, and workplaces.
- **Aesthetic Ecosystem:** The physical environment plays a significant role in the quality of life for seniors. Amaravati aims to create an aesthetically pleasing environment with well-maintained public parks, roads, water bodies, and controlled density, ensuring cleanliness and visual appeal.

3.2.8. Government Action Plan - 2021 for Amaravati's Healthcare and Related Sectors

- **International Collaborations:** A primary focus of the plan is to establish international collaborations through Memorandums of Understanding (MoUs) or Agreements with countries such as Bangladesh, Afghanistan, and African nations. This aims to secure government-sponsored medical treatments in Amaravati, positioning the city as a preferred healthcare provider for these nations.
- **Accreditation Incentives:** To enhance the quality and credibility of healthcare facilities, the plan proposes to reimburse the cost of accreditation for hospitals seeking international accreditations like Joint Commission International (JCI) and national accreditations like National Accreditation Board for Hospitals (NABH). This financial incentive aims to encourage hospitals to meet high standards of care, attracting both domestic and international patients.
- **Marketing and Promotion:** Recognizing the importance of marketing, the plan emphasizes developing a cohesive marketing campaign to promote Amaravati as a preferred destination for medical and wellness tourism. This campaign will be complemented by the launch of a medical tourism portal, designed to enhance travel convenience and access to information for potential medical tourists.
- **Infrastructure Development for Medical Tourism:** To streamline the arrival process for international patients, the plan proposes sending a proposal to the Government of India (GoI) to establish separate immigration centers and facilitating desks at Vijayawada airport. This dedicated infrastructure will cater specifically to medical tourists, ensuring a smoother and more efficient experience.
- **Research and Innovation Promotion:** The plan focuses on promoting research and innovation by establishing a dedicated research fund. This fund will support research in areas such as genome, cancer, and diabetes, and will also be used to develop research infrastructure, including laboratories. Additionally, a co-investment fund will be established to support healthcare startups, fostering entrepreneurship and innovation in the sector.

- **Senior Living Development:** The plan aims to attract top developers to build senior homes in a dedicated land parcel of 20-30 acres identified by the Andhra Pradesh Capital Region Development Authority (APCRDA). This initiative aims to address the growing demand for senior living facilities and establish Amaravati as a preferred destination for elderly residents.

4. Medical Hub Components

A Medical hub is an integrated facility that offers a diverse array of healthcare services, research and production facilities, educational institutions, and residential facilities at a common location. The section below provides a holistic overview of the key components of a Medical Hub. The key departments and services mentioned under each component are indicative and may vary subject to the project location, market needs, demand assessment and project feasibility.

4.1. Healthcare Facilities

At the core of a Medical Hub are cutting-edge hospitals and specialty clinics. These facilities offer a comprehensive range of medical services, including general healthcare, specialized treatments, emergency care, and diagnostic services. The diverse specialty clinics ensure patients receive focused care for specific health issues such as cardiology, oncology, orthopaedics, neurology, and various other services and consultations at one convenient location. Some key departments and services are mentioned below:

Multi/Super Specialty Hospital Services

Specialty	Services
Anaesthesiology	Anaesthesia Administration, Pain Management, Preoperative Evaluation
Paediatrics	Paediatrics (Hospital), Paediatric (Clinic), Neonatology, Neonatology Clinic, Paediatric Surgery, Paediatric Surgery Clinic
Burn Care Facility	Burn Care Unit (Hospital)
Plastic Surgery	Plastic Surgery (Hospital), Plastic Surgery (Clinic)
Cardiology	Cardiology (Hospital), Cardiology Services (Clinic), Cardiac Diagnostics, Interventional Cardiology, Electrophysiology, Cardiac Surgery, Rehabilitation
Dental Care	Dental Set Up - Stand Alone/Hospital Set Up
Dermatology & STD Services	Dermatology (Hospital), Dermatology (Clinic), STD Clinic
Gastroenterology	Gastroenterology (Hospital), Gastroenterology Services (Clinic), GI Surgery (Hospital), GI Surgery (Clinic)
General Surgery	General Surgery (Hospital), General Surgery (Clinic)
Medicine and Geriatrics	Medicine and Geriatric (Hospital), Medicine and Geriatric (Clinic), Geriatric Assessment, Chronic Disease Management, Memory Care

Endocrinology	Endocrinology (Hospital), Endocrinology (Clinic), Diabetes Management, Thyroid Disorders, Metabolic Bone Disorders
Neurology & Neurosurgery	Neurology (Hospital), Neurology (Clinic), Neurosurgery (Hospital), Neurosurgery Services (Clinic)
Obstetrics & Gynaecology	Gynae and Obstetrics Indoor Services (Hospital), Gynae and Obstetrics (Clinic), IVF Clinic (ICMR Norm)
Orthopaedics	Orthopaedic (Hospital), Orthopaedic Services (Clinic), Joint Replacement, Spine Care, Sports Medicine
ENT (Otorhinolaryngology)	ENT (Hospital), ENT Services (Clinic), Deaf and Dumb Clinic
Psychiatry	Psychiatry Services (Hospital), Psychiatry Services (Clinic), Deaddiction Centre
Ophthalmology	Ophthalmology (Hospital), Ophthalmology Services (Clinic), Optometrist Services
Urology & Nephrology	Urology (Hospital), Urology Services (Clinic), Nephrology (Hospital), Nephrology (Clinic), Dialysis Centre, Dialysis Centre Checklist
Cardiothoracic and Vascular Surgery (CTVS)	CTVS (Hospital), CTVS (Clinic)
Radiotherapy	External Beam Radiation, Brachytherapy, Radiotherapy Facilities
Medical Diagnostic Laboratories	Diagnostic Laboratories, Minimum Standards of Collection Centres
Imaging Centers	X-Ray Clinic, Cathlab, DSA, OPG & Dental Imaging, DEXA Scan, Sonography (Color Doppler) Clinic, CT Scan Center, PET CT Scan, MRI
Rheumatology	Rheumatology (Hospital), Rheumatology Clinic Polyclinic
Pulmonology	Pulmonology (Hospital), Pulmonology Clinic, Chronic Respiratory Care, Critical Care
Oncology (Cancer Care)	Medical Oncology Clinical Haematology (Hospital), Medical Oncology Clinical Haematology Clinic Polyclinic, Gynaecological Oncology (Hospital), Gynaecological Oncology Clinic Polyclinic, Surgical Oncology (Hospital), Surgical Oncology Clinic Polyclinic
Physical Medicine and Rehabilitation (PMR)	PMR Clinic
Palliative Care	Pain and Symptom Management, End-of-Life Care

Other Services

Specialty	Services
Outpatient Department	- Consultation rooms - Patient registration desk - Diagnostic testing services - Follow-up care - Preventive services - Health screenings

Diagnostic Services	- Radiology (X-rays, CT scans, MRI) - Laboratory (Blood tests, Urinalysis, etc.) - Ultrasound - ECG and other cardiac diagnostics - Pathology and microbiology
Emergency Care	- Triage area - Resuscitation equipment - Immediate care for injuries and illnesses - Ambulance services - Trauma care - Emergency surgery if needed
Pharmacy	- In-house pharmacy for dispensing medications - Over-the-counter (OTC) medications - Prescription medications - Pharmaceutical counseling - Inventory management
Inpatient Care	- Hospital rooms (Private, Semi-private) - Nursing services - Intensive care unit (ICU) - Monitoring and medical equipment - Long-term care facilities (if applicable) - Patient meal services
Surgical Care Unit	- Operating rooms - Anesthesia services - Surgical staff (surgeons, nurses) - Post-surgical recovery rooms - Sterilization and infection control

Ayush or Traditional Medicine Services	
Ayush or Traditional Medicine Services	- Ayurveda - Homoeopathy - Unani - Yoga - Naturopathy - Siddha - Sowa-Rigpa

Table 10: Indicative List of Facilities offered by Speciality and Super speciality hospitals.

4.2. Educational institutions and Training Center

It is important to provide high quality medical education facilities to ensure increased availability of trained and qualified human resources in the country. Medical hubs also offer educational facilities through medical colleges, nursing colleges, paramedical colleges and allied health profession training centers equipped with the latest technology and equipment.

Medical College	Allied Health School	Dental College	Nursing College	Skill Development Centres*
Undergraduate • MBBS • BAMS • BHMS • BUMS • BSMS **Postgraduate Specializations** • MD • MS • DM • Mch	**Undergraduate (B.Sc./Diploma)** • Medical Laboratory Technology • Radiology and Imaging • Technology • Operation Theatre Technology • Emergency Medical Technology • Physiotherapy • Occupational Therapy • Optometry • Nutrition & dietetics • Audiology and Speech-Language Pathology **Postgraduate (M.Sc.)** • Physiotherapy • Occupational Therapy • Optometry • Nutrition & dietetics • Audiology • Speech- Language Pathology	**Undergraduate** • Bachelor Of Dental Surgery **Postgraduate** • Master of Dental Surgery in specialization s such as Oral and Maxillofacial Surgery, Orthodontics, Periodontology, etc.	**Undergraduate** • B.Sc. Nursing • Post Basic B.Sc. Nursing • Diploma in • General Nursing & Midwifery **Postgraduate** • M.Sc. Nursing in specializations such as Surgical Nursing, Pediatric Nursing, etc. • Nurse Practitioner	• Critical Care Professionals. • Caregivers program. • Panchakarma Technician. • Sanitary Health Inspector Course • Diabetic Educator • Home Health Aid General Duty Assistant • First Responder

*Source:https://www.niphtr.mohfw.gov.in/course/view/RmNjRkM4R2tYcjJhZTdvNFpQMGdydz09

4.3. Research Centers

Research centers within medical hubs are crucial hubs of innovation and advancement in healthcare. They serve as catalysts for scientific discovery, driving progress in medical knowledge, technology, and patient care. Through cutting-edge research projects, these centers address pressing health challenges, explore novel treatment approaches, and contribute to the development of new therapies and interventions. By fostering a culture of inquiry and collaboration, research centers not only elevate the academic reputation of medical colleges but also play a pivotal role in improving health outcomes and shaping the future of medicine.

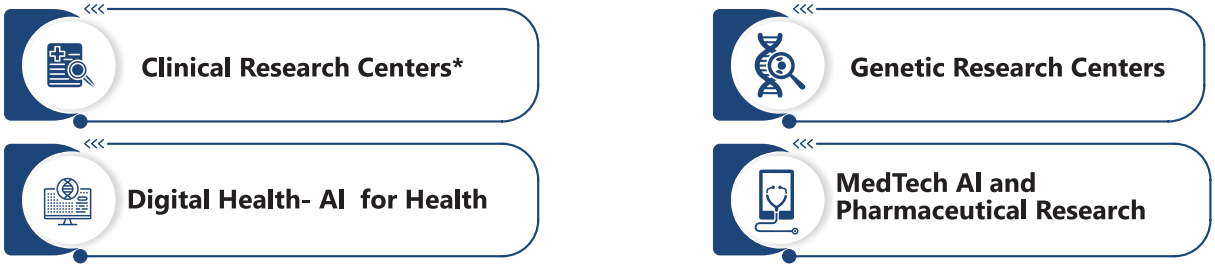


*Figure 26: *Research Centres*
**Including Integrative Medicine Research*

4.4. Wellness and Rehabilitation Centres

Wellness centers focus on preventive care and holistic health, offering services such as fitness programs, nutrition counselling, and mental health support. Rehabilitation centers provide therapies and support for patients recovering from surgery, illness, or injury, helping them regain independence and improve quality of life. They provide a wide array of services and facilities designed to promote overall health, well-being, and recovery such as:



Figure 27: List of Wellness and Rehabilitation Centre

4.5. Ancillary Infrastructure

Allied services around hospitals are essential for supporting healthcare delivery and enhancing patient care.



* WTP- Water Treatment Plant, STP- Sewage Treatment Plant, ETP- Effluent Treatment Plant, BMWM- Bio-Medical Waste Management, MLCP- Multilevel Car Parking

Figure 28: List of Allied infrastructure facilities

5. Key considerations for developing Medical Hubs

The key considerations for developing medical hubs from the preliminary stage to project completion are classified into eight broad categories. Each category addresses essential elements to ensure the successful creation and management of medical hubs, providing comprehensive, high-quality healthcare services and fostering a supportive environment for all stakeholders. Following are the details of the broad categories:

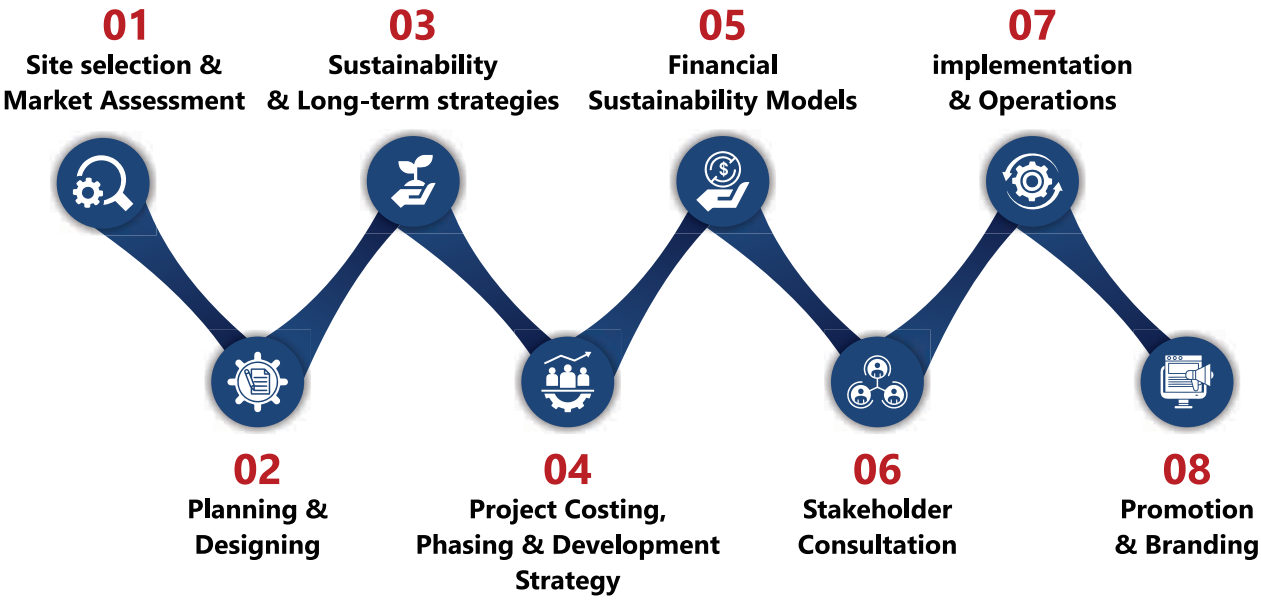


Figure 29: Key elements for developing medical hubs

5.1. Site Selection and Market Assessment

Site Selection

Accessibility and Connectivity

- Proximity to major highways, airports, and public transportation.
- Easy access for patients, healthcare professionals, and supplies.

Locations with Existing Health care hubs

- Leveraging Existing Infrastructure: Locations with established medical colleges, hospitals, and research centres.
- These locations offer a strong foundation for expansion and attract talent more readily.

Locations with Emerging Health care hubs

- Identify regions with growing populations and a lack of access to quality healthcare.
- These locations can bridge healthcare gaps and attract patients seeking advanced care.

Infrastructure and Utilities

- Existing Infrastructure: Assess the current state of roads, utilities, and public services.
- Future Infrastructure Plans: Consider proposed infrastructure projects that could benefit the medical hub.

Land Availability and Suitability

- Site Configuration and Free from land discrepancy: The site should have an even geometry in its configuration, and the land must be free from disputes or legal issues to ensure clear ownership without any encumbrances.
- Topography: Evaluate topography for construction feasibility and future expansion.
- Land Use and Zoning Regulations: Verify compatibility with existing land use and zoning laws. Ensure the land is zoned for healthcare use and the land is not under Environmental sensitive zones.

Economic and Financial Viability

- Cost of Land Acquisition: Assess the cost of purchasing or leasing the land, Consider potential incentives or subsidies from the government.
- Economic Environment: Evaluate the local economic conditions, including workforce availability and cost of living. Analyze potential for attracting healthcare professionals and support staff.

Government Support

- Identify locations where government initiatives and policies actively promote the development of Health infrastructure.

Market Demand Assessment

Demographic Analysis

- Population Size and Growth: Study population trends, including growth rates and projections.
- Age Distribution: Analyse the age demographics to understand the healthcare needs of different age groups.
- Urban vs. Rural Distribution: Determine the urban and rural population split to tailor services accordingly.

Epidemiological Assessment

- Disease Prevalence: Identify prevalent diseases and health compliances, conditions in the region.
- Health Indicators: Evaluate key health indicators such as infant mortality rate, maternal mortality rate, and life expectancy.
- Health Risk Factors: Assess risk factors like pollution, lifestyle diseases, and genetic predispositions.

Healthcare Utilization Profile

- Patient Volume: Analyse patient volumes at existing facilities.
- Treatment Patterns: Understand the most common treatments and services utilized.
- Referral Patterns: Study referral patterns for specialized care and tertiary treatments.

Economic and Social Factors

- Income Levels: Analyse income levels and economic status of the population to gauge affordability.
- Insurance Coverage: Assess the penetration of health insurance and government health schemes.
- Education Levels: Consider the educational background of the population as it influences health awareness and service utilization.

Economic and Social Factors

- Income Levels: Analyse income levels and economic status of the population to gauge affordability.
- Insurance Coverage: Assess the penetration of health insurance and government health schemes.
- Education Levels: Consider the educational background of the population as it influences health awareness and service utilization.

Competitive Landscape

- Competitor Analysis: Identify existing and upcoming healthcare providers in the region.
- Service Gaps: Determine gaps in the current healthcare services that the medical hub can fill.
- Benchmarking: Compare with successful medical hubs in other regions or countries to understand best practices and standards.

Technological and Innovation Trends

- Telemedicine and Digital Health: Evaluate the adoption and potential of telemedicine and digital health solutions.
- Medical Research and Development: Consider opportunities for medical research and innovations in healthcare delivery.
- Advanced Treatments and Technologies: Identify demand for advanced treatments like robotics, precision medicine, and personalized healthcare.

Government Policies and Initiatives

- Healthcare Policies: Study national and state healthcare policies, compliances. Incentives, and subsidies.
- Public Health Programs: Analyse existing public health programs and their impact.
- Regulatory Environment: Understand the regulatory framework governing healthcare infrastructure and services.

Market Surveys and Stakeholder Consultations

- Patient Surveys: Conduct surveys to understand patient needs, preferences, and satisfaction levels.
- Healthcare Provider Feedback: Gather insights from doctors, nurses, and healthcare administrators.
- Community Consultations: Engage with community leaders and local organizations to understand their healthcare priorities. Planning and Design

Future Demand Forecasting

- Population Projections: Use demographic data to project future population and healthcare needs.
- Health Trends: Predict future health trends and emerging healthcare challenges.
- Service Demand Forecast: Estimate the future demand for various healthcare services and specialties.

SWOT Analysis

- Strengths: Identify strengths such as strategic location, existing infrastructure, and healthcare talent pool.
- Weaknesses: Recognize weaknesses like regulatory hurdles, funding challenges, or skill shortages.
- Opportunities: Highlight opportunities in medical tourism, telemedicine, and specialized care.
- Threats: Assess threats such as competition, economic instability, and potential regulatory changes.

Financial and Economic Analysis

- Cost Analysis: Estimate the costs involved in developing and operating the medical hub.
- Revenue Projections: Project potential revenue streams from patient care, medical research, and allied services.
- Economic Impact: Assess the broader economic impact on the region, including job creation and local business growth.
- Financial Feasibility: Evaluate the financial viability of the project by evaluating costs, revenue forecasts, economic impact, and potential returns to ensure its long-term sustainability and feasibility.

5.2. Master Planning and Infrastructure Development

5.2.1. Accessibility and Connectivity

Strategic Location:

- Position the medical hub near major transportation hubs such as airports, highways, and public transit systems for easy regional and international access.

Internal Connectivity:

- Design the layout to ensure smooth movement between hospitals, research facilities, and educational institutions within the medical hub.

Parking and Pedestrian Pathways:

- Provide ample parking facilities and pedestrian-friendly pathways to facilitate convenient access.

Vehicular Services:

- Implement Vehicular services to enhance connectivity within the medical hub, ensuring easy transportation for patients, visitors, and staff.

5.2.2. Patient-Centric Design and Amenities

The master plan for developing medical hubs should place a strong emphasis on patient-centric design, ensuring that every aspect of the facility is focused on the comfort, convenience, and overall well-being of patients and their families. This approach involves creating an environment that promotes healing and provides a positive experience for all who visit or reside within the medical hub. Key attributes to consider in developing patient-centric medical hubs include:

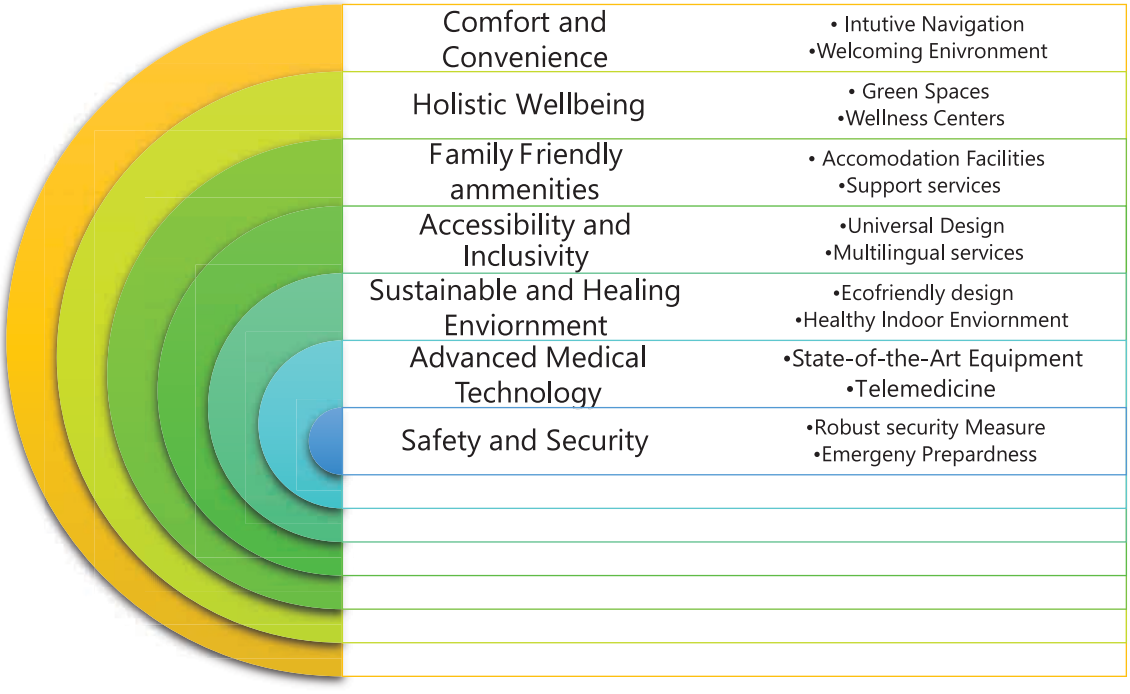


Figure 30: Key components of patient centric design and Amenities.

Indicative project components entailing Sustainable, SMART technologies and Optimum Space utilization:



Figure 31: Proposed Project elements (Sustainable, SMART technologies and optimum space utilisation)

5.2.3. Integrated Planning Approach

- Multi-disciplinary Collaboration: Involve a range of professionals including urban planners, architects, healthcare experts, and engineers in the planning process.
- Holistic Development: Plan for a balanced mix of healthcare facilities, residential areas, commercial spaces, and recreational zones.
- Sustainability: Incorporate sustainable design principles such as energy-efficient buildings, water conservation systems, and waste management solutions.
- Community Integration: Ensure that the medical hub integrates seamlessly with the surrounding community, offering benefits such as employment opportunities and improved healthcare access.
- Futureproofing: Design the medical hub to be adaptable to future technological advancements and healthcare needs.

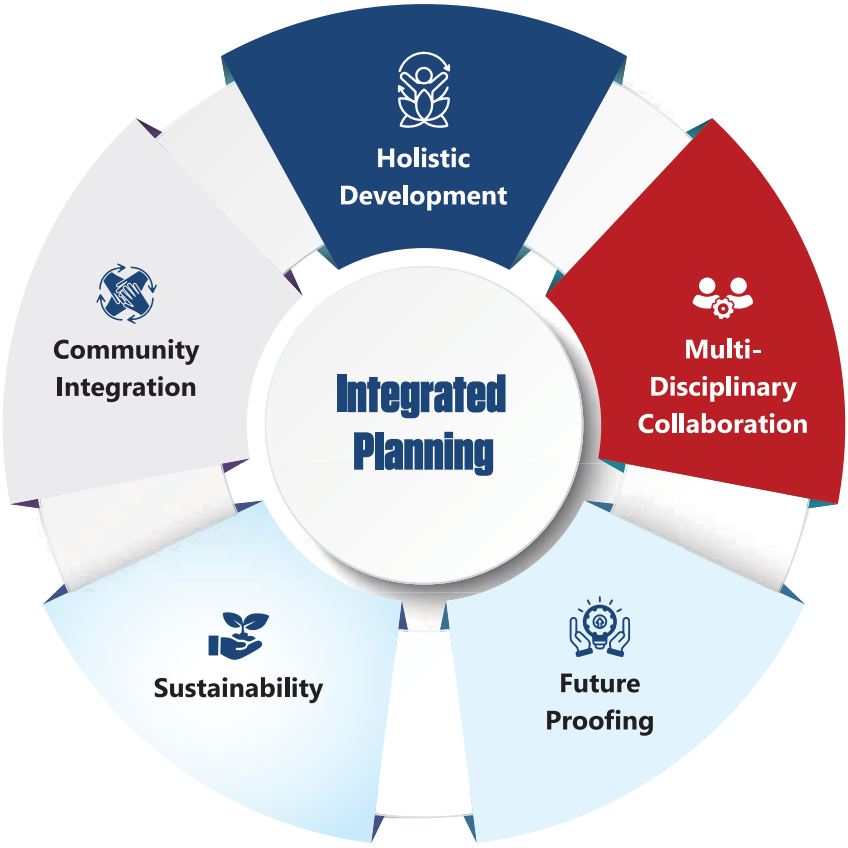


Figure 32: Integrated Planning approach for Development of Medical Hubs

5.2.4. Existing Infrastructure and Future Growth Potential

Leveraging Existing Assets: Identify existing healthcare facilities, research institutions, and educational institutions in the area for potential partnerships or integration with the medical hub.

Land Acquisition and Development: Secure land at a reasonable cost with the potential for future expansion to accommodate growing healthcare needs.

Scalable Infrastructure: Design infrastructure that can be easily adapted and expanded to accommodate future advancements in medical technology and evolving healthcare needs.

Economic Viability: Ensure the financial feasibility of the project, including a sustainable business model and potential revenue streams.

Regulatory Compliance: Ensure that the development complies with all relevant regulations and standards, including environmental and health regulations.

Sustainability & disaster Considerations: Integrate sustainable practices like green building principles, energy-efficient systems, waste management solutions and disaster mitigation plan for a long-term practice.

Figure 33: Existing Infrastructure and Future growth Potential

5.2.5. Regulatory Frameworks and Approvals

Adhering to national and state health regulations and obtaining the necessary approvals and permits from health and urban development authorities are crucial steps in the development of medical hubs in India. Below are the key areas of statutory approvals required:

Zoning and Land Use:

- Comply with zoning laws and land use regulations.
- Align with city master plans and regional development strategies.

Building Codes and Safety Standards:

- Adherence to National Building Codes and State Building Byelaws.
- Ensure compliance with fire safety and disaster management guidelines.

Environmental Clearances:

- if necessary, Conduct Environmental Impact Assessments (EIA).
- Secure environmental clearance from the Central/ state Pollution Control Board, Ministry of Environment, Forest, and Climate Change

Aviation Clearances:

- If the proposed building falls within the funnel zone of an airport, obtain clearance from the Airport Authority of India (AAI) based on the permissible limits outlined in the state building byelaws.

Labor Laws and Safety Regulations:

- Adhere to labor laws and workplace safety regulations during the construction and operation phases to ensure the safety and well-being of workers.

5.3. Sustainability and Long-Term Growth Strategies

Environmental Sustainability:

Energy Efficiency:

- Green Building Design: Incorporate energy-efficient designs and materials to reduce energy consumption.
- Renewable Energy Sources: Utilize solar panels, wind turbines, and other renewable energy sources to power the medical hub.
- Energy Management Systems: Implement advanced energy management systems to monitor and optimize energy use.

Water Conservation:

- Efficient Water Use: Install low-flow fixtures and efficient irrigation systems to minimize water usage.
- Rainwater Harvesting: Develop systems to collect and store rainwater for non-potable uses such as irrigation and cooling.
- Water Recycling: Implement greywater recycling systems to reuse water for landscaping and other non-potable purposes.

Waste Management:

- Segregation and Recycling: Set up comprehensive waste segregation systems to facilitate recycling and reduce landfill use.
- Medical Waste Disposal: Ensure proper disposal and treatment of medical waste to prevent environmental contamination.

- Composting: Develop composting facilities for organic waste to reduce landfill use and create nutrient-rich soil.

Green Spaces:

- Landscaping and Green Areas: Incorporate parks, gardens, and green roofs to enhance air quality and provide recreational areas.
- Biodiversity Preservation: Preserve and enhance local flora and fauna through thoughtful landscaping and conservation efforts.

Sustainable Transportation:

- Public Transit and Biking: Encourage the use of public transportation, biking, and walking by providing adequate infrastructure.
- Electric Vehicles: Promote the use of electric vehicles by installing charging stations and offering incentives.

Building Materials:

- Sustainable Materials: Use eco-friendly and sustainable building materials to reduce the environmental impact of construction.
- Local Sourcing: Source materials locally to reduce transportation emissions and support the local economy.

Pollution Control:

- Air Quality Management: Implement measures to monitor and improve air quality within the medical hub.
- Noise Reduction: Design buildings and infrastructure to minimize noise pollution.

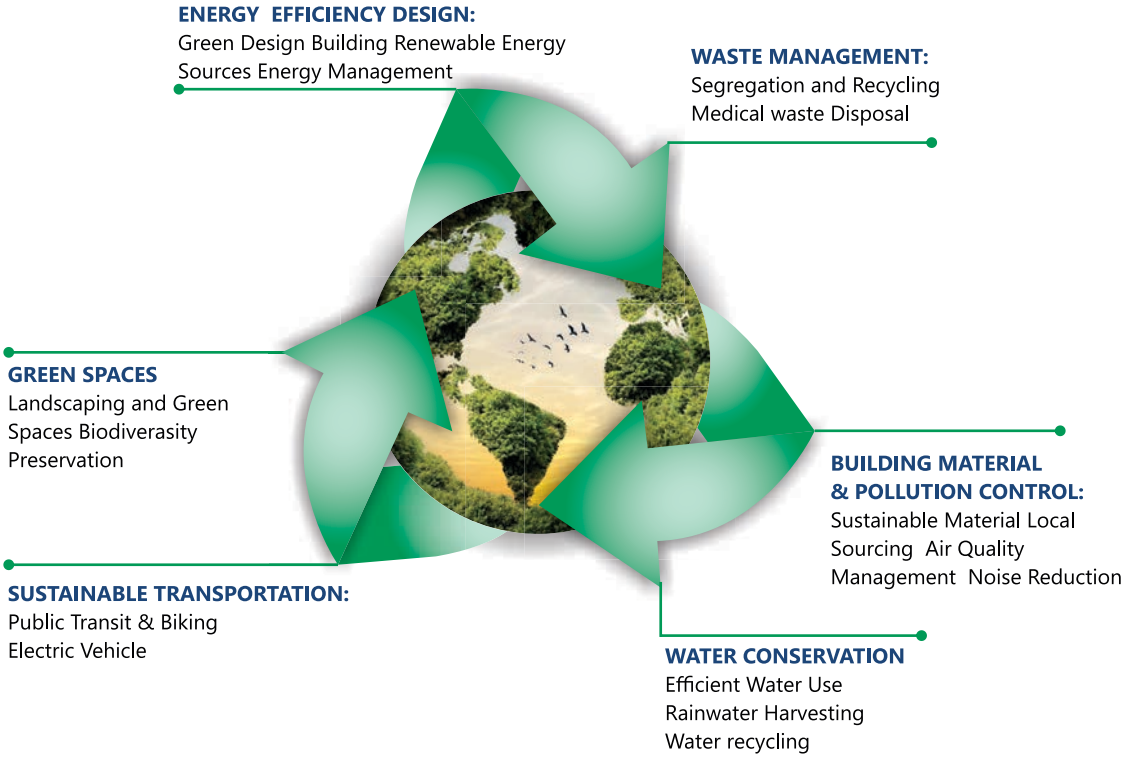


Figure 34: Environmental Sustainability and long-term growth Strategies

Social Sustainability:

Inclusive Healthcare Access:

- Ensure that healthcare services are accessible to all segments of the population, including underserved and marginalized communities. Offer subsidized services for low-income groups to promote equitable healthcare access.
- The medical hub will promote inclusive healthcare by offering Divyang, elderly, child, and gender-friendly infrastructure, ensuring accessibility and comfort for all sections of society.
- The medical hub will include dedicated PMJAY kiosks along with facilities for Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) and other government/private insurance schemes, streamlining the registration and claim process to ensure hassle-free, cashless treatment for beneficiaries.
- It will incorporate Jan Aushadhi Kendra, AYUSH retail, AMRIT Store, and affordable food outlets to ensure access to low-cost medicines, holistic healthcare options, and affordable nutritious meals for all visitors and patients.
- Medical Hubs will provide free transport services within its premises, ensuring easy, convenient and sustainable mobility for patients, attendants, and staff across various facilities.
- Hospitality Stays and Classification within Medical Hub:

The medical hub will include a range of hospitality facilities to accommodate diverse user groups. The classification is as follows:

- Dharamshala / Guest House Low-cost stay for patients' attendants and low-income visitors; basic shared/private rooms with basic facilities.
- Studio Apartment / Rental Housing/ Budget Hotel Mid-level stay for middle-income visitors, long-stay patients, doctors, or staff; self-contained units with standard amenities.
- Premium Hotel Comfortable stay for high-income visitors, medical tourists and visiting professionals; private rooms with premium services.

Community Engagement and Participation:

- Involve local communities in the planning and development process through consultations, grievance redressal and feedback mechanisms. Foster a sense of ownership and partnership with the community to ensure the medical hub meets local needs and priorities.



Figure 35: Social sustainability Strategies

Employment and Skill Development:

- Create job opportunities for residents by prioritizing hiring from the surrounding community. Invest in training and skill development programs to enhance the local workforce's capacity and employability in the healthcare sector.

Health Education and Awareness:

- Conduct regular health education and awareness programs to promote preventive healthcare practices and improve public health literacy. Collaborate with schools, community centers, and local organizations to reach a broader audience.

Supportive Social Infrastructure:

- Develop supportive infrastructure such as affordable housing for staff, educational facilities, recreational areas, and childcare services to improve the quality of life for employees and their families. This also includes signage/ citizen charter in regional / foreign languages. This holistic approach ensures a stable and motivated workforce.

Cultural Sensitivity and Inclusivity:

- Design healthcare services and facilities that respect and accommodate the cultural and linguistic diversity of the population. Provide interpretation services and culturally appropriate care to enhance patient comfort and satisfaction.

Collaborations with NGOs and Community Organizations:

- Partner with non-governmental organizations (NGOs) and community groups to extend healthcare services, conduct outreach programs, and address social determinants of health such as nutrition, hygiene, and environmental health.

- **Economic Sustainability:** Develop a diversified revenue model and explore innovative financing mechanisms to ensure long-term financial viability.

5.4. Project costing and Project Phasing

Project costing:

- Estimate costs for land acquisition, site preparation, construction, equipment, staffing, and operations.

Project Phasing:

- The project phasing will be strategically planned based on the projected capital expenditure and the operational requirements of the project components. This phased approach ensures that each stage of development aligns with budgetary constraints and operational needs, enabling smooth and efficient progress.
- In scenarios where the project involves brownfield development, where the site is already fully operational, the phasing strategy must be carefully designed to minimize disruptions to existing operations. This involves a meticulous planning process that considers the continuous functioning of current facilities while new components are being developed.

5.5. Technology Integration in Health care

- Electronic Health Records (EHRs): Implement a secure EHR system to streamline patient care, improve data collection and management, and enhance communication between healthcare providers. Furthermore, establish HIE networks to facilitate secure sharing of patient information among different healthcare providers, ensuring continuity of care and reducing redundancies.
- Telemedicine, Teleradiology and e-ICU: Offer telemedicine and teleradiology services to expand access to healthcare for remote areas and improved patient convenience. e-ICUs can offer remote monitoring, timely interventions, and specialist consultations for critically ill patients to enhance care quality and accessibility. A single e-ICU can be utilized to monitor units at multiple locations.

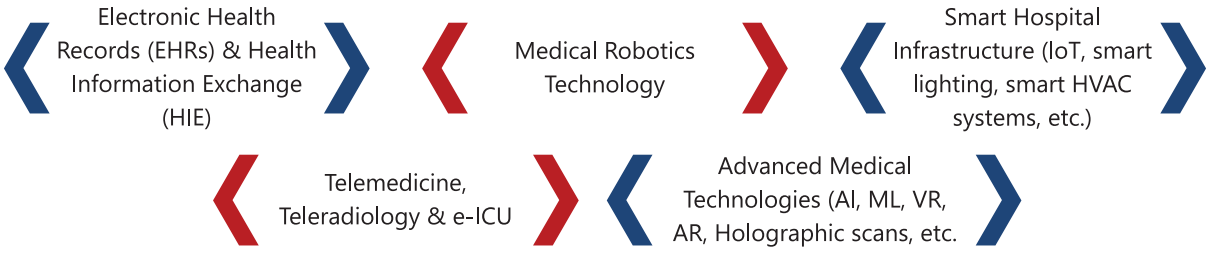


Figure 36: Technological integration in healthcare

- Medical Robotics Technology: Invest in state-of-the-art medical technology for robotics to enable advanced diagnostic and treatment options, improving precision and patient outcomes. For example, using robotic-assisted surgery to allow for minimally invasive procedures with greater accuracy and reduced recovery times, utilizing augmented reality enabled equipment to project 3D representations of the patient's anatomy in the surgeon's field of view, etc.

- Advanced Medical Technologies: Invest in cutting-edge medical technologies and equipment to enhance diagnostic and treatment capabilities. For Example: Utilizing AI for diagnostics, and personalized medicine, producing 3-D holographic scans of radiology scans, etc. Furthermore, adopt VR and AR for medical training, patient education, and therapeutic interventions, such as pain management and rehabilitation exercises. With more advancements, AI and ML algorithms can be used for predictive analytics, early disease detection, personalized treatment plans for patients.

- Smart Hospital Infrastructure: Integrate IoT devices and smart systems for facility management, optimizing energy usage, and ensuring efficient operation of hospital equipment and infrastructure.

5.6. Medical Value Travel Promotion

High-Quality Healthcare Services:

- Ensure the medical hub offers state-of-the-art healthcare facilities and services, including specialized treatments, advanced diagnostic equipment, and highly skilled medical professionals. This enhances the city's appeal to international patients seeking top-tier medical care.

Accreditation and Certification:

- Obtain international accreditations such as JCI (Joint Commission International) and NABH (National Accreditation Board for Hospitals & Healthcare Providers) to build credibility and trust among foreign patients. These certifications assure patients of the highest standards of healthcare quality and safety.

Comprehensive Patient Services:

- Provide a seamless experience for international patients, including services like visa assistance, travel arrangements, accommodation, translation services, and post-treatment care. Creating a hassle-free environment encourages patients to choose the medical hub for their healthcare needs.

Competitive Pricing:

- Offer high-quality medical services at competitive prices. Cost-effectiveness is a significant factor in attracting medical tourists, especially from countries where healthcare is expensive. Transparent pricing and package deals can further entice patients.

Marketing and Branding:

- Develop a robust marketing strategy to promote the medical hub as a premier destination for medical value travel. Utilize digital marketing, social media, medical tourism platforms, and participation in international health conferences to reach a global audience.

Collaborations and Partnerships:

- Establish partnerships with international insurance companies, healthcare facilitators, and travel agencies to create a reliable network for referring patients. Collaborating with renowned global healthcare institutions can also enhance the medical hub's reputation.

Cultural Sensitivity and Patient Experience:

- Design healthcare services that are culturally sensitive and inclusive. Providing multi-lingual staff, culturally appropriate food, and religious accommodations can significantly improve the patient experience and attract a diverse patient base.

Continuous Improvement and Innovation:

- Invest in continuous improvement of healthcare services and infrastructure. Keeping up with the latest medical advancements and integrating innovative technologies can maintain the medical hub's competitive edge and appeal to international patients seeking cutting-edge treatments.

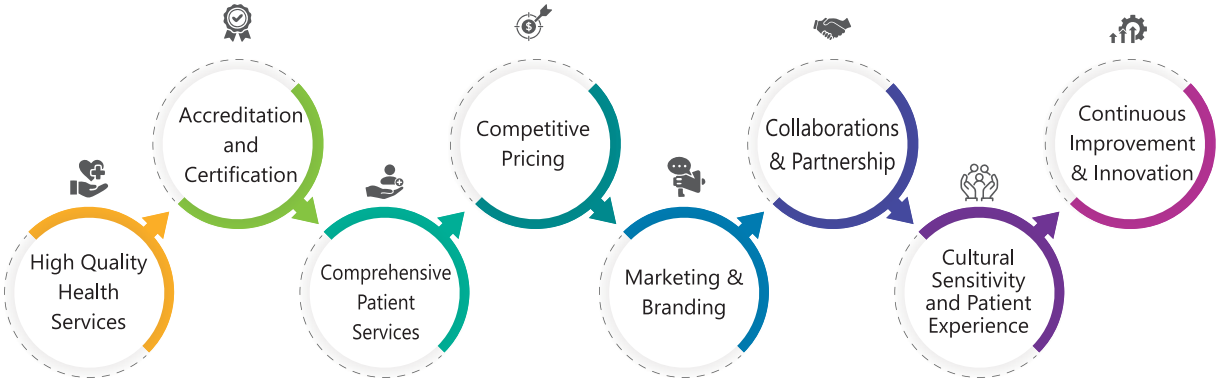


Figure 37: Medical Value Travel Promotion

By focusing on these aspects, the medical hub can position itself as a leading destination for medical value travel, attracting patients from around the world and contributing to its economic growth and global reputation.

5.7. Safety and Security

- Security Infrastructure: Develop a comprehensive security plan, including surveillance systems, access control, and emergency response protocols.
- Patient Safety: Implement stringent patient safety protocols, including infection control measures and emergency preparedness plans.
- Workplace Safety: Ensure a safe working environment for staff through regular safety training and risk assessments.

5.8. Sustainable Models

Developing a financially sustainable medical hub in India requires a diversified funding approach and a focus on revenue generation. Here's a breakdown of key components:

5.8.1 Initial Funding and Investment Sources

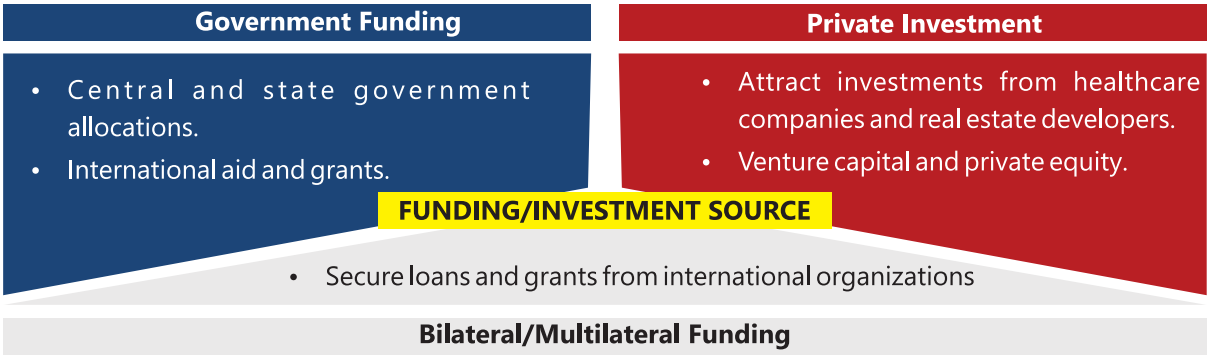


Figure 38: Initial funding and Investment sources.

Components	Mode-A	Mode-B
Description	Government (common and allied infrastructure facilities)	Government / Private Sector (common and allied infrastructure facilities)
Land	Land on subsidised rate (~50% of the land value) + annual lease rental	Land on INR ~ 1
Common Infrastructure (Trunk Infrastructure, WTP, STP, STP, ESS etc)	Developed and O&M by Govt.	Developed by Govt./Private and Maintained by Govt./Private
Allied Infrastructure (Accommodation, Medical mall, Parking, Med tech, Parks etc.)	Developed and O&M by Govt.	Developed by Govt./Private and Maintained by Govt./Private
Healthcare Facilities/Educational Institutions/wellness centre.	Private Player	Private Player

Figure 39: Funding Model (component wise)

5.8.2. Government Grants, Subsidies and Schemes

Healthcare Sector Grants from Central and state Governments:

- Utilize grants specifically aimed for healthcare infrastructure development.

Incentive Programs:

- Take advantage of tax breaks and incentives for healthcare projects.
- Some of the programmes /schemes that provide Grants, Subsidies by Government of India for development of Health care infrastructure projects:

VGF Subscheme-1

- Social Sectors (Wastewater Treatment, Water Supply, Solid Waste Management, Health & Education sectors etc.) with at least 100% Operational Cost recovery.
- Centre – Max. of 30% of Total Project Cost
- State - may provide additional support up to 30% of TPC.

VGF Subscheme-2

- Demonstration/pilot social sectors projects; maybe from Health & Education sectors with at least 50% Operational Cost recovery.
- Centre- max. 40% of the TPC & max. 25% of Operational Costs in first 5 years of commercial operations.
- Centre & State - up to 80% of capex together & up to 50% of O&M costs for first 5 years

5.8.3. Private Investments

Private investment is essential for developing medical hubs, significantly contributing to both capital and operational expenditures. Private entities and venture capital can invest in infrastructure, services, and innovative healthcare technologies, while private equity can support large-scale projects. Additionally, healthcare conglomerates and real estate developers can invest in constructing and managing medical facilities. These investments enhance financial sustainability, drive technological advancements, and ensure the efficient operation and maintenance of medical hubs.

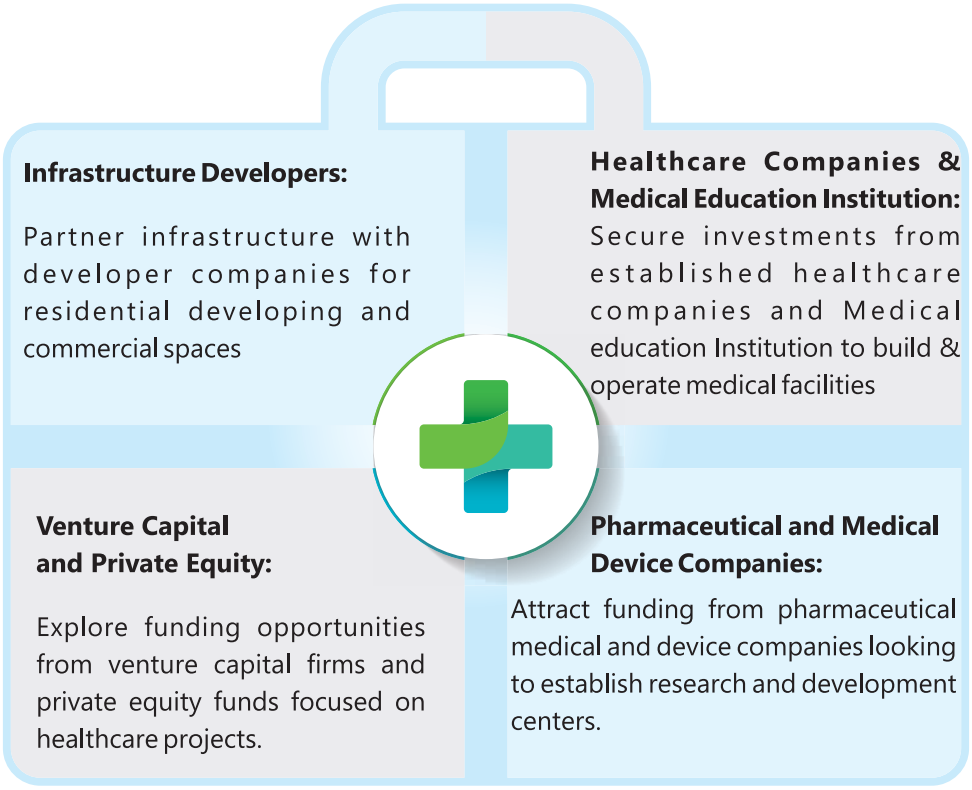


Figure 40: Private Investments sources

5.8.4. Public-Private Partnerships (PPPs)

Public-Private Partnerships (PPPs) hold significant potential for the development of medical hubs in India. They can mobilize resources, share risks, and combine the strengths of both sectors to create world-class healthcare infrastructure. Here are some specific partnership possibilities:

5.8.4.1 PPP for Development of Health care, educational Institutions, and allied infrastructure facilities

Public-Private Partnerships (PPPs) are instrumental in developing healthcare, educational institutions, and allied infrastructure for medical hubs in India.

- Establish joint ventures between government and private entities for hospital and Medical educational Institutional construction. This approach leverages the efficiency and innovation of the private sector with the regulatory and financial support of the public sector.
- Share capital costs and operational expenses between public and private partners. This sharing model reduces the financial burden on any single entity and ensures sustained investment in high-quality infrastructure and service.

5.8.4.2. Collaboration with Research Institutions

Research and Development:

- Collaborate with leading universities and research institutions to conduct cutting-edge medical research. These partnerships can attract top talent, enhance the city's reputation as a research hub, and potentially secure significant research grants.

Innovation Hubs:

- Develop dedicated innovation hubs within the medical hub to foster research and development. These hubs can focus on emerging medical technologies, pharmaceutical research, and advanced treatment methodologies, driving continuous improvement and innovation in healthcare.

5.8.4.3. Collaboration with Travel and Tourism Agencies

Medical Value Travel Packages:

- Promotion and Attraction: Partner with travel agencies to develop and promote medical tourism packages. These packages can attract international patients seeking advanced medical care, combining healthcare services with travel and accommodation arrangements for a seamless experience.

Enhanced Patient Experience:

- Comprehensive Services: By collaborating with travel and tourism agencies, medical hubs can offer comprehensive services that include visa assistance, travel bookings, local transportation, and cultural acclimatization, ensuring a comfortable and stress-free experience for international patients.

By leveraging these Public-Private Partnership opportunities, medical hubs in India can enhance their infrastructure, attract a diverse patient base, and ensure long-term sustainability and growth.

5.8.5. Revenue Streams

By implementing a combination of the following funding and revenue generation strategies, medical hubs in India can achieve long-term financial sustainability and contribute to the overall healthcare landscape of the country:

- Patient Fees: Fees for diagnosis, treatment, surgeries, and other medical services are the primary revenue source.
- Ancillary Services: Revenue can be generated from pharmacies, laboratories, diagnostic services, and other healthcare-related facilities.
- Research Grants: Participation in clinical trials and research collaborations with institutions can yield grants and research funding.
- Educational Programs: Medical colleges and training programs can provide tuition fees and other revenue streams.
- Real Estate Leases and Rentals: Leasing space within the medical hub to other healthcare providers, pharmacies, or restaurants can generate income.
- Medical Value Travel: Attracting international patients for specialized treatments can be a significant revenue source.



List of Streams

5.9. Checklist for Private Players to invest in the project

Table 11: Checklist for private players

Factor	Justification
Site Context	
Location	Proximity to target population, accessibility, and infrastructure support.
Environmental Impact	Assessment of environmental implications.
Infrastructure and Utilities	**Existing Infrastructure: Assess** the current state of roads, utilities, and public services. **Future Infrastructure Plans:** Consider proposed infrastructure projects that could benefit the Project.

Land Availability and Suitability	Site Configuration and Free from land discrepancy, Topography, Land Use and Zoning Regulations
Economic and Financial Viability	Cost of Land Acquisition Economic Environment
Government Support	Area's locations where government initiatives and policies actively promote the development of Health infrastructure
Project Design	
Master Plan	Comprehensive planning to integrate various medical facilities and services.
Technological Integration	Implementation of advanced medical technology and IT systems.
Regulatory Compliance	
Health Regulations	Adherence to local and national health standards.
Construction Codes	Compliance with building and safety codes.
Licensing Requirements	Necessary permits and licenses for medical operations.
Financial Viability	
Capital Investment	Availability of funds for initial investment and future expansions.
Revenue Model	Clear strategy for revenue generation, including services and pricing.
Return on Investment (ROI)	Expected ROI and financial sustainability of the project.
Partnership Dynamics	
Risk Sharing	Equitable distribution of risks between public and private partners.
Roles and Responsibilities	Defined roles and responsibilities for each stakeholder.
Governance Structure	Establishment of a robust governance and management framework.
Formation of SPV	SPV will be formed by the state government to maintain and manage the medical hub: • The SPV will be governed by the Board, comprising of various members Chaired by Secretary / Principal Secretary/Additional Chief Secretary, Health. • The SPV shall exercise powers and functions delegated to it by State Government with regards to planning, developing, constructing, establishing, commissioning, setting up, financing, operating, monitoring and maintaining health care establishment such as development of Common infrastructure facilities. • SPV shall allocate the developed land to the potential private player in a nominal cost for a lease period.

Operational Efficiency	
Facility Management	Expertise in managing healthcare facilities effectively.
Service Quality	Commitment to high standards of medical care and patient services.
Human Resources	Skilled workforce and continuous professional development programs.
Community Engagement	
Stakeholder Involvement	Inclusion of community and stakeholder feedback in planning and operations.
Social Responsibility	Initiatives to address community health needs and promote public health.
Innovation and Research	
R&D Capabilities	Commitment to research and development in medical sciences.
Technological Advancements	Adoption of cutting-edge medical technologies and practices.
Sustainability	
Environmental Sustainability	Incorporation of eco-friendly practices and sustainable resource use.
Long-term Planning	Strategies for future-proofing the project and ensuring long-term viability.
Strategic Purchasing	The establishment of medical hubs will significantly enhance strategic purchasing within the health sector. By centralizing healthcare services and providers, these hubs create an environment conducive to targeted needs assessments, informed provider selection, and streamlined contract management. This concentration of resources and information empowers more efficient, equitable, and data-driven healthcare spending, aligning resource allocation with population health needs and provider performance.

5.10. Stakeholder Consultation

Engaging stakeholders is crucial to the successful development of medical hubs. Key stakeholders include government bodies, healthcare professionals, investors, community representatives, and potential patients. The consultation process should involve:

- Regular Meetings and Workshops: Conduct frequent meetings and workshops with stakeholders to gather input, address concerns, and ensure alignment with project goals.
- Feedback Mechanisms: Establish mechanisms for continuous feedback from stakeholders to refine and improve project plans.
- Collaboration: Seek partnerships with local healthcare providers, universities, and research institutions to leverage existing expertise and resources.

5.11. Implementation and Operation

5.11.1.Construction and Project Management

- Timelines and Milestones: Establish clear timelines and milestones to track progress and ensure timely completion.
- Project Management: Employ a professional project management team to oversee the construction and development phases.

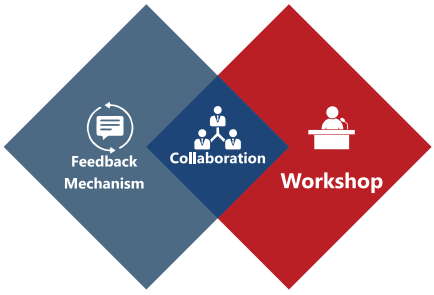


Figure 41: Stakeholder Consultation for Development of Medical Hubs

- Quality Control: Implement strict quality control measures to ensure construction standards and safety regulations are met.
- Resource Management: Efficiently manage resources, including labor, materials, and equipment, to avoid delays and cost overruns.



Figure 42: Components of Construction and Project Management

5.11.2. Recruitment and Human Resource Management

- Staffing Plan: Develop a comprehensive staffing plan to recruit skilled healthcare professionals, administrative staff, and support personnel.
- Training Programs: Implement ongoing training and development programs to ensure staff are up to date with the latest medical practices and technologies.
- Employee Retention: Foster a positive work environment and offer competitive compensation packages to retain top talent.

5.11.3. Quality Assurance and Monitoring Systems

- Accreditation: Seek accreditation from recognized national and international healthcare quality organizations.
- Performance Monitoring: Implement robust quality assurance and performance monitoring systems to ensure high standards of patient care and continuous improvement.
- Patient Feedback Mechanisms: Establish mechanisms to gather patient feedback and use it to improve services and address concerns.

5.12. Promotion and Branding

- Brand Identity: Develop a strong brand identity that reflects the medical hub's mission, values, and unique selling points.
- Targeted Marketing Campaigns: Develop targeted marketing campaigns to reach potential patients, both domestically and internationally, based on the medical hub's specialties.
- Community Engagement: Foster strong relationships with the local community through outreach programs, health camps, and educational initiatives.
- Events and Conferences: Host medical conferences, seminars, and health expos to position the medical hub as a leader in healthcare innovation and research.
- Digital Presence: Establish a robust digital presence through a user-friendly website, social media platforms, and online advertising.
- Road shows: It is an essential part of the stakeholder consultation for the medical hub projects. These events will engage key stakeholders, provide project updates, gather feedback, and build support, ensuring transparent communication and collaborative development.



Figure 43: Digital Promotion and Branding for Medical Hubs

6. Conclusion – Challenges, Opportunities and Key Findings

The concept of modern medical hubs has been established for some time, but it has recently gained renewed interest, especially in rapidly developing economies. These medical hubs are designed to be comprehensive in scope, incorporating advanced technologies and medical practices. They provide a full range of clinical service lines, encompassing the complete spectrum of diagnostic and therapeutic treatments. Examples of such medical cities in developing countries include Dubai Healthcare City in the United Arab Emirates, the King Abdullah Medical City in Saudi Arabia, and the Health City Novena in Singapore. India has immense potential to revolutionize its healthcare ecosystem by developing medical hubs nationwide. These integrated hubs will enhance access to high-quality medical services, foster medical innovation, and improve overall healthcare outcomes for the population.

6.1. Challenges and Opportunities for the development of Medical Hubs in India

The establishment of medical hubs in India is poised to have a significant impact on the country's healthcare landscape, offering cutting edge medical services and bridging the gap in healthcare access between urban and rural areas. However, certain challenges such as land acquisition, infrastructure development and regulatory hurdles to ensuring equitable access and sustainable financing, must be addressed to successfully implement medical hubs across the country.

Funding and Financial Sustainability
Securing initial investment ensures land acquisition, construction success, and sustainable financial growth.

Regulatory Compliance
Complying with regulations, obtaining necessary permits, and adhering to healthcare and zoning standards positively.

Economic Viability and Market Dynamics
Assessing economic impact and financial sustainability while ensuring robust demand for medical city services.

Infrastructure Development
Secure suitable land proactively, monitor construction progress, and ensure optimized activities.

Community and Cultural Acceptance
Promoting community engagement, crafting culturally sensitive services, & ensuring social equity create positive outcomes

Connectivity and Logistics Management
Enhancing transportation infrastructure and supply chains to ensure reliable delivery of medical essentials.

Environmental Sustainability and Flexible Scalability
Promoting green building practices, optimizing resource management, and ensuring scalable infrastructure for sustainable growth.

Co-ordination and Collaboration
Optimizing administrative processes and fostering coordination with stakeholders to eliminate delays.

Human Resource Management
Securing and keeping talented healthcare professionals, researchers, and administrative staff ensures our success.

Figure 44: Challenges for Development of Medical Hubs in India

Funding and Financial Sustainability emphasizes the importance of securing initial investment to ensure land acquisition, construction success, and sustainable financial growth. Regulatory Compliance underscores the need to navigate the complex regulatory landscape, including obtaining necessary permits and adhering to healthcare and zoning standards. Economic Viability and Market Dynamics focuses on assessing the economic impact and financial sustainability of the project while ensuring robust demand for the medical services offered.

Coming to the operational and community-related aspects, the Infrastructure Development stresses the importance of proactive land acquisition, monitoring construction progress, and ensuring optimized activities. Community and Cultural Acceptance highlights the need for promoting community engagement, crafting culturally sensitive services, and ensuring social equity to create positive outcomes. Connectivity and Logistics Management emphasizes enhancing transportation infrastructure and supply chains to ensure reliable delivery of medical essentials.

Furthermore, while looking at the long-term sustainability and human capital, the Environmental Sustainability and Flexible Scalability promotes green building practices, optimizing resource management, and ensuring scalable infrastructure for sustainable growth. Human Resource Management underscores the importance of securing and retaining talented healthcare professionals, researchers, and administrative staff to ensure the project's success.

Despite these challenges, establishing medical hubs—integrated healthcare complexes with hospitals, research centres, educational institutions, and residential facilities—presents a transformative. Such infrastructure can concentrate resources. It can foster innovation and ensure high standards of care and has the potential to drive economic growth. The infrastructure will enhance healthcare quality with advanced facilities and technologies. It can attract medical tourism, improve education and training and bridge urban-rural healthcare gaps. Additionally, it can promote environmental sustainability. This growth requires a digital transformation across healthcare providers, medical professionals, travel facilitators, regulatory agencies, insurers, and the hospitality sector, partnering with IT service providers to enhance efficiency.

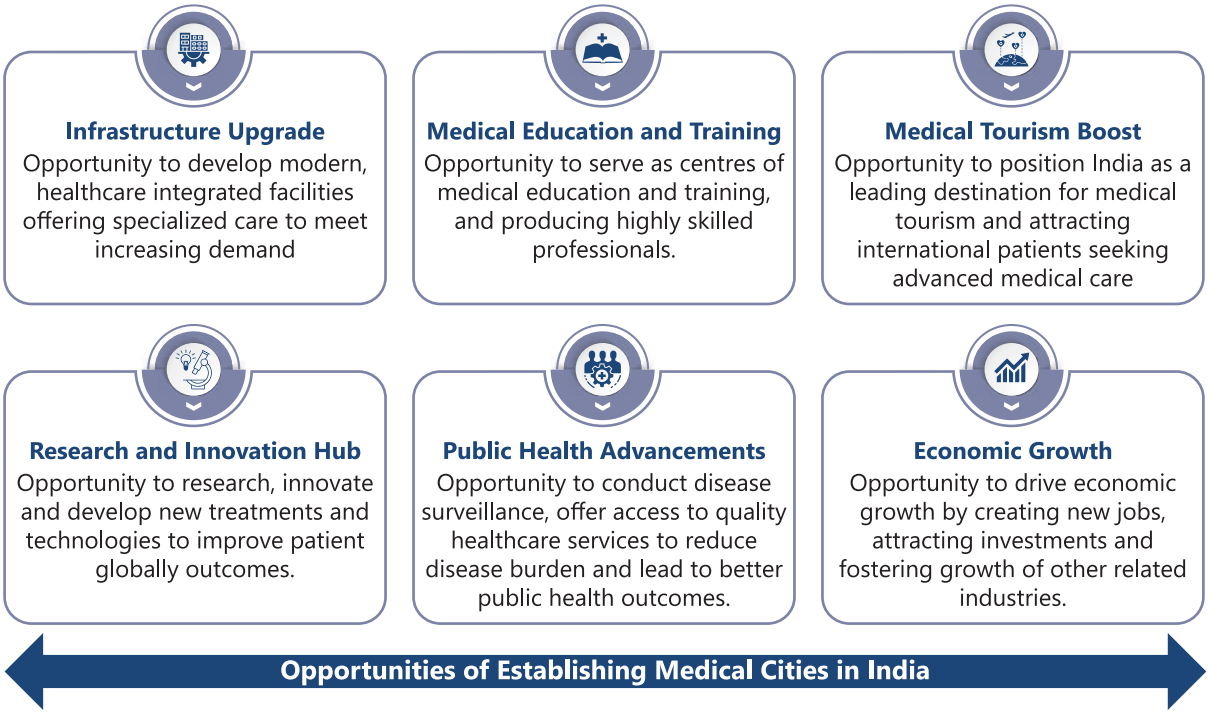


Figure 45: Opportunities for Development of Medical Hubs in India

The foundation of this development is laid upon infrastructure upgrade, emphasizing the creation of modern, integrated healthcare facilities to meet the increasing demand for specialized care. This upgrade is not merely about physical structures but also about enhancing the overall healthcare ecosystem. Parallel to infrastructure development is the focus on Medical Education and Training, recognizing the importance of establishing centres of excellence to produce highly skilled healthcare professionals. These institutions not only contribute to the workforce but also elevate the standard of medical practice within the country. A significant opportunity is an expected boost in Medical Value Travel, aiming to position India as a leading destination for international patients seeking advanced medical care. This not only generates revenue but also fosters a reputation for India's medical expertise on a global scale. The establishment of a Research and Innovation Hub is crucial for advancing medical knowledge and technology. This hub would facilitate research, innovation, and the development of new treatments and technologies, ultimately improving patient outcomes globally. Furthermore, medical cities offer Public Health Advancements by providing opportunities to conduct disease surveillance, offer access to quality healthcare services, and reduce disease burden. This leads to better public health outcomes and contributes to the overall well-being of the population. Finally, the development of medical cities is seen as a catalyst for Economic Growth, creating new jobs, attracting investments, and fostering the growth of other related industries. This economic impact extends beyond the healthcare sector, contributing to the overall development of the region.

6.2. Private sector involvement

- Either the government or the Special Purpose Vehicle (SPV) set up by the government works on to create basic infrastructure for the project. The government sector will also be responsible for other investments that includes setting up the civil infrastructure for the labs and other similar components of the Medical Hub. These services will be offered on Operations and Maintenance (O&M) basics. The benefit of this model is that the government or the SPV formulated by the government, will act as the primary stakeholder and thereby create lower entry barriers for the private partners to get into the project. This will help in working effectively towards the development of the entire ecosystem of the Medical Hub project.
- The Special Purpose Vehicle (SPV) may get into a partnership with the government and the private sector. Hence, the revenue risks associated with project is shared among the two parties.
- Private sector can invest as the anchor player landlord and furthermore attract other key players into the project.
- Risk sharing framework: The risk factor for the government or the SPV and the private players involved in the project depends on the percentage of project capital shared between the various stakeholders who are part of the project. This will include both market as well as project-specific risks depending on the stakeholder's ability to control the same.

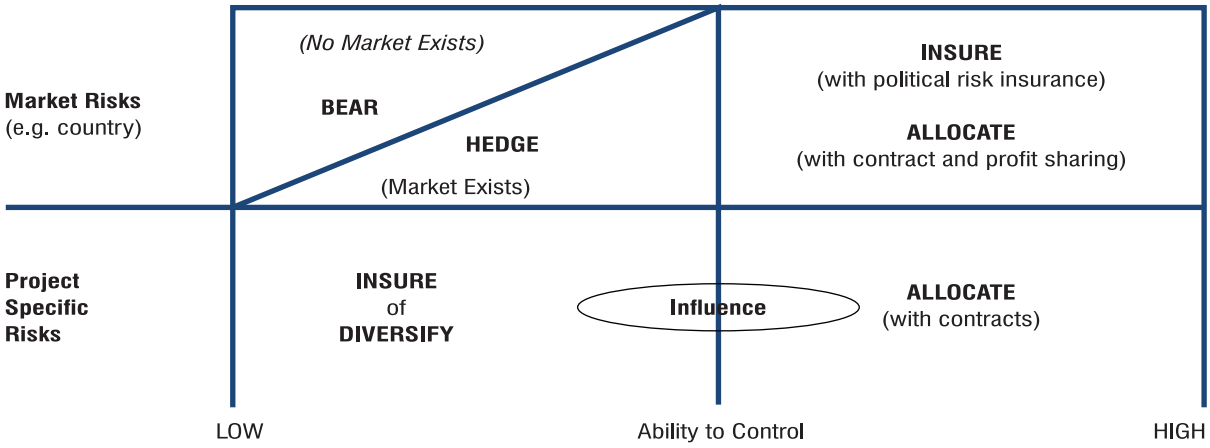


Figure 46: Risk Distribution

6.3. Key Findings

Need for Medical cities in India: The increase in population, fragmented healthcare infrastructure and gap in medical accessibility points to the need of medical cities in India. The increasing demand due to the newly discovered diseases and illness adds to the purpose. The background study conducted implies that the development of medical cities in India as a project has great potential.

Case study outcome: The case studies conducted provides an understanding of the medical facilities, its components, overall functioning of the facility, the size of the medical hubs, required infrastructure needs, phasing strategies etc. The case studies will help in implementing similar medical cities in selected sites in India.

Medical Hub Components: On the basics of the background research and case studies, the general component of a medical city is narrowed down. It can positively include healthcare facilities, educational institutions and training center, research centers, wellness and rehabilitation centers and allied infrastructure facilities.

Key considerations for developing Medical Hubs: The site selection and market assessment is crucial to understand the potentials and challenges for the project ahead. The master plan and infrastructure development strategies paves way to better understanding of the site usage and its planning approach. Other valuable areas discussed includes project costing and phasing, mode of funding and recommended sustainable models. Implementation and operation procedures are listed, followed by effective promotion and branding activities.

Potential implementation models in India: The implementation model is that of Medico city in Jharkhand with a total area of 90 acres overlooked by Department of Health Medical Education and Family welfare. The model discusses unique opportunities and challenges with respect to its location, type of medical hub and other relevant factors. The vision of Amaravati Heath City is to position Amaravati among the top three healthiest cities worldwide and a premier medical and wellness tourism hub, grounded in excellence in health, research, innovation, and education.

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