



KATHMANDU INSTITUTE OF CHILD HEALTH (KIOCH)

PROJECT PROPOSAL

*To make
quality
pediatric care
available,
accessible,
and affordable
in Nepal*

www.kioch.org.np



EXECUTIVE SUMMARY

Nepal has achieved tremendous success in reducing child mortality over the last two decades and significant progress has been made in the prevention and control of infectious diseases among children. In recent years, we have observed an epidemiological shift from communicable, maternal, neonatal, and nutritional (CMNN) diseases to non-communicable diseases (NCD). However, the unaffordability, inaccessibility, and lack of quality specialized care continues to pose a great threat to child health.

The availability of high-quality pediatric health care in Nepal is limited. There is only one government tertiary level hospital for children in the country and only about 1000 total beds exist to serve roughly 12 million children, falling far from the World Health Organization's (WHO) recommendation of 5 beds per 1,000 people. Furthermore, the facilities available do not offer the complete range of pediatric specialty services. These existing facilities are also concentrated in the Kathmandu Valley and operate primarily on their own with little collaboration between other facilities or health posts across the country. There is a substantial shortage of qualified healthcare professionals, and majority of pediatricians that do exist reside in urban areas. Despite higher salary incentives, the Government of Nepal has difficulty retaining physicians in remote, rural areas of Nepal. Lack of access to quality specialty care leads to premature deaths, increase in morbidity which in many cases progresses to chronic diseases, or disabilities due to untreated infections. A chronically sick child cannot go to school, pursue a fulfilling career, and results in a negative poverty cycle which is very hard to break. These are just examples of the impact on the child alone when care is not available, the impact on families and society as a whole must also be considered. Families experience their own hardships and a loss of wages because of the time spent taking care of their child.

There is currently no national health plan that outlines how to overcome the barriers described above. Nepal needs a breakthrough, innovative approach to transform the healthcare system. The Kathmandu Institute of Child Health (KIOCH) is our solution to fill the gaps in care and develop a child healthcare network system in Nepal. The goal is to provide patients with access to superior quality, personalized service, and greater affordability. Using a hub-and-spoke model that has proven successful in India and other geographically rural settings, we will make high-quality specialty care more accessible. Our purpose is to serve all children in Nepal: to provide a standard of care that will attract well-off patients to seek out specialty care in Nepal and keep costs low enough to reach patients with very low incomes. We have curated an effort to reduce neonatal and childhood morbidity and mortality and improve the quality adjusted life years of the Nepali children.

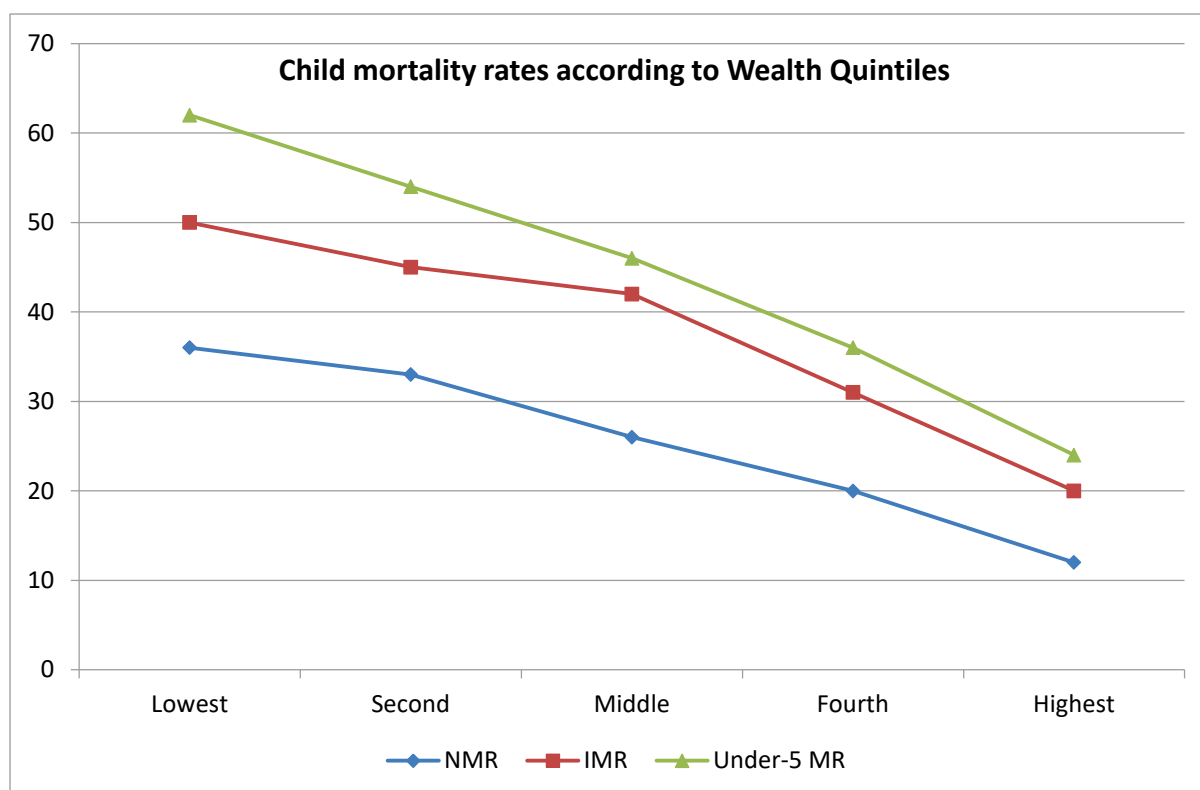
We have diligently assembled a board of directors consisting of leaders in medicine, public health, social work and the private sector, as well as established connections with the government, non-governmental organizations (NGOs) and international NGOs, and local and international medical and educational institutions. Leading our team is Prof. Dr. Bhagawan Koirala who is revered in Nepal for his contribution to the advancement of heart treatment. He is the first person to perform open-heart surgery in Nepal and established the first fully operational heart hospital in the country. He is also a key influencer in the government's humanitarian project, "Poor Patients Relief" program, which was launched in 2003 with the aim of providing free cardiac care. Dr. Koirala possesses a deep understanding of where our healthcare delivery system is failing children and is trying to bridge the gap in care with a new pediatric specialty care center, the **Kathmandu Institute of Child Health (KIOCH)**.

CURRENT SCENARIO

Over 40% of Nepal's current population (29.7 million in 2018) is below the age of 18 years, which amounts to almost 12 million children. These children are mostly treated in hospitals with little or no specialized pediatric services. With only one governmental children's hospital in the country, it is impossible to serve all children in need of care. Furthermore, the few private children's hospitals are too expensive for most families. Almost 25% of the population in Nepal lives in poverty.

The principle of 'access to basic healthcare services as a fundamental right of the people' is mandated in the Constitution of Nepal. It has guided actions to promote good health for all Nepali people. The Ministry of Health recognizes the progress but also highlights the need to ensure more equitable, good quality, and sustainable health services, and the need for greater linkage with other sectors including harnessing state and non-state partnerships. It is important to note that health outcome improvements are mainly among those who are privileged in socioeconomic spheres of our society. Disparities in health by gender, ethnicity, and geographical location still exist. Nepal has yet to progress in bringing equitable improvement among poor, urban poor, and people from remote areas and marginalized groups.

Figure 1. Mortality Rates by Wealth Quintiles in 2016¹



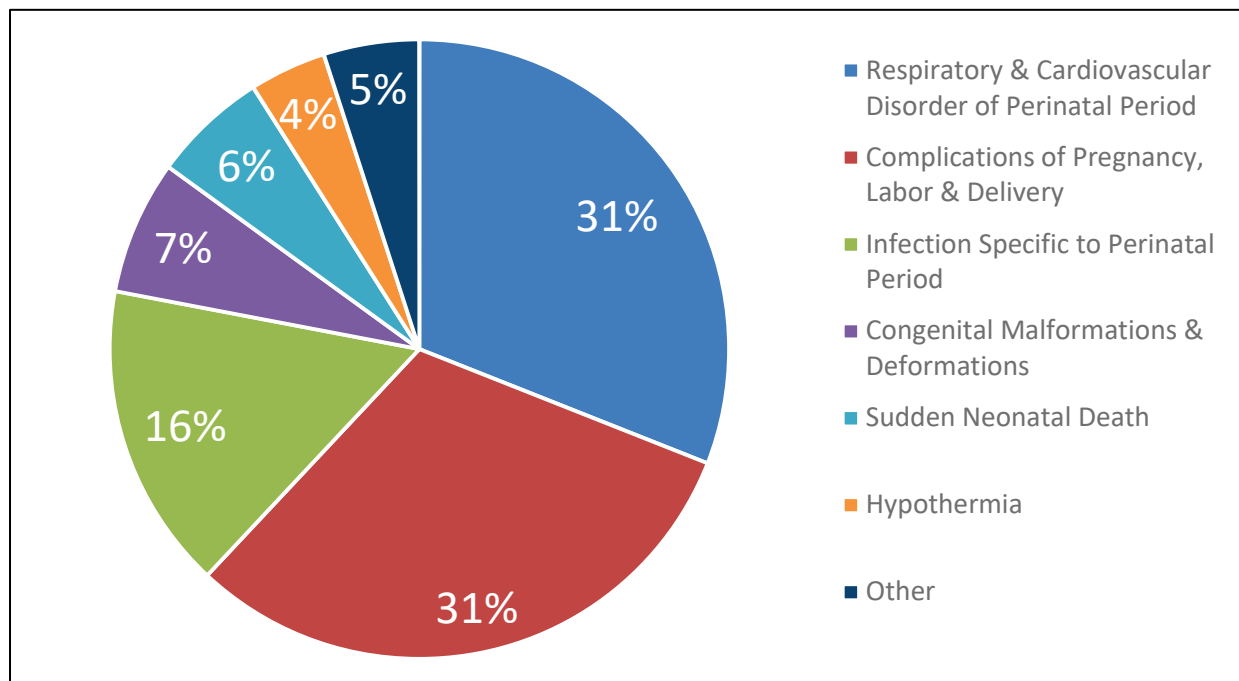
As the national health authority, the Ministry of Health and Population has a network of 4,118 health facilities in the country. These facilities range from the central level specialized hospitals to health posts in the villages and urban health centers in the municipalities. Additionally, Nepal has over 350 private sector health facilities nationwide to cater to the health care demands of the population as a whole. However, the referral system for child ailments is limited as Kanti Hospital is

¹ 2016. Nepal Demographic and Health Survey. <https://www.dhsprogram.com/pubs/pdf/fr336/fr336.pdf>

the only public referral hospital for children and is often overcrowded with children with less severe cases. As a result of the lack of children hospitals and the poor referral system, Kanti Children Hospital becomes the first point of contact for children’s treatment irrespective of the conditions.

The Nepal Demographic and Health Survey suggests that complications related to preterm births and infections, birth asphyxia, and hypothermia are the major causes of death in children in Nepal. Many of these deaths could be averted if the child is able to access specialized services in time. However, this care is available only in a few, mostly private hospitals in the country causing children in the remote areas of Nepal to succumb to death. Many of the untreated or complicated conditions need a hospital with specialized services under a single roof. However, there are only a few children hospitals and less than 1000 beds in the country for 12 million children in Nepal.

Figure 2. Main Causes of Neonatal Deaths in Nepal in 2016²



The figure above illustrates the proportion of different causes of neonatal deaths in Nepal. Unfortunately, data regarding other childhood disease burdens such as cancer is extremely limited, however, we know that cancer in children is one of the emerging non-communicable diseases in Nepal with significant morbidity and mortality. Many cases of childhood cancer are curable, but patients lack access to treatment because of financial hardships or distance. The latest published research reports a childhood cancer incidence rate of approximately 1-1.5/10,000 children per year.³

KATHMANDU INSTITUTE OF CHILD HEALTH (KIOCH)

The Kathmandu Institute of Child Health (KIOCH) is our solution to combat the poor health outcomes affecting millions of children in Nepal. KIOCH is a not-for-profit organization that was founded in

² 2016. Nepal Demographic and Health Survey. Retrieved from <https://www.dhsprogram.com/pubs/pdf/fr336/fr336.pdf>

³ 2014. Pediatric Oncology Services in Nepal. South Asian Journal of Cancer. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4236703/#!po=83.3333>

2017 by a group of professionals who all share a dream to improve the child healthcare delivery system and thereby improve child health in Nepal.

OUR BOARD OF DIRECTORS

Our KIOCH Board is comprised of people from different disciplines and backgrounds, medical field, private sector, public health, and social work whom are committed to improving the state of child healthcare delivery in Nepal. See Appendix A. for a more complete profile of each Board Member.

Figure 3. KIOCH Board of Directors



OUR MISSION

To make high-quality pediatric care available, accessible, and affordable in Nepal.

OUR CORE VALUES

To best understand who we are what we are trying to do, we must convey what is most important to us. Our core values define the foundational elements that bring us together and captures our philosophy that guides us in all that we do. The five E's: **Excellence, Equity, Efficiency, Ethical, Empathy** represent what we strive for in care and our guiding principles for how we operate. Each member of our team and our partners embrace these principles and integrate them into each decision. Then, at the root of everything we do is what we care about most: **Family, Community, Value, Team, Partners**. These elements provide us with direction and make up our identity. See Appendix B. for our KIOCH guiding principles and core values graphic.

EXCELLENCE. Provide the best quality of care and patient experience through pursuit of research and innovation. KIOCH believes in going the extra mile and caring for each child with a standard of excellence that we would wish for our own family to receive.

EQUITY. Make high-quality care accessible and affordable, minimizing disparities in health. Disease and illness disproportionately affect children from lower socioeconomic status backgrounds. At an institutional level, KIOCH finds ways to best allocate resources according to the need.

EFFICIENCY. Create the greatest benefit to the patient using innovation and process improvement with efficient use of resources. In a low resource environment like Nepal, efficiency is integral to our sustainability and future success. KIOCH allocates resources wisely while producing the best possible health outcomes. We strengthen and streamline work processes in the best interest of the patient.

ETHICAL. Treat each patient with absolute integrity and transparency and hold ourselves accountable for patient safety. Adherence to treatment is dependent on the trust a patient has in the members of the medical team and facility to always do the right thing. Our number one goal in providing ethical care is to protect our patients' human rights, welfare, and safety.

EMPATHY. Recognize and be responsive to what the family and child is experiencing, to remember the humanity of healthcare. Compassion in care is what we practice. We listen to our patients and their families and try our best to accommodate their needs and enhance their care experience accordingly.

FAMILY. Going beyond providing excellent care, we keep the child and their family at the center of each decision and always consider their perspective. Family-centeredness is deeply ingrained in how we design our services. We focus on building trust and advocating on behalf of the patient and family.

COMMUNITY. We work with the community, for the community. Improving child health is our duty and responsibility to the future health of our community and our country. Community outreach is one of the core pillars that KIOCH is founded on.

VALUE. We improve quality of life and achieve better health outcomes which matter most to children and their family, relative to the cost. We create value by improving our workflows so that the patient gets the most out of the care we provide.

TEAM. Our employees are at the core of our success, and we care about keeping our team engaged and motivated, focusing on staff well-being and development. There is a heightened risk of burnout among healthcare professionals in pediatric specialty care. KIOCH will continuously search for ways to improve well-being and resilience and encouraging mental and emotional stability.

PARTNERS. We nurture our relationships and partnerships that are meaningful in strengthening the way we deliver care and helping us grow. We rely on our partners in health care delivery, such as surrounding health facilities and providers, as well as our donors who help us remain focused on our mission and support our continued success.

OUR GOALS AND OBJECTIVES

The comprehensive picture of our goals and objectives for the future of KIOCH are as follows:

- To establish and run a multi-specialty care center in Kathmandu;
- To establish and run satellite centers in 6 provinces;
- To deliver high quality and affordable care to children across Nepal;
- To strengthen the referral system and care network;
- To conduct preventive, promotional, and rehabilitative services;
- To act as a resource center and provide training in pediatric specialty care; and
- To be leaders in innovative treatment research and child healthcare.

HUB-AND-SPOKE MODEL

KIOCH will begin accomplishing its mission and vision by establishing a multispecialty care hub in the nation's capital, Kathmandu. The effort of attracting high-quality medical professionals to remote areas of Nepal is tried and failed. Instead, we offer a solution that allows for concentration of talent and sophisticated equipment or treatment in the hub facility located in the capital city. First, we will focus on strengthening and improving the quality of pediatric specialty care, making it available in Nepal.

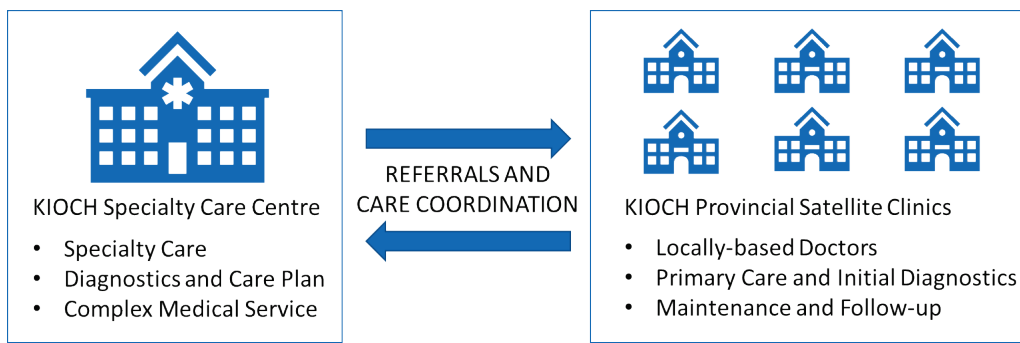
Next, the KIOCH "spokes" or satellite centers will be spread strategically throughout the country, one in each province. These spokes will act as gateways that channel patients to the main facility in Kathmandu, with an extremely coordinated approach. Initially, the KIOCH satellite centers will offer services that complement the main KIOCH hub facility, focusing mainly on initial diagnosis, routine treatment, and follow up care that has been prescribed by the main KIOCH hub facility. After further assessment of opportunities and barriers, we will expand service capabilities so that specialty care is made available in satellite centers.

This hub-and-spoke approach has proven to increase efficiency and efficacy of care for patients from rural, suburban parts of a country. It affords unique opportunities for health providers to maximize efficiencies and effectiveness. The use of telemedicine allows for care to be delivered over the phone or video so that patients can stay closer to their homes and receive more immediate consultation. This lowers the cost burden experienced by patients' families, such as lost wages, transportation expenses, and room and board in Kathmandu. Patients should only have to travel to the main facility when it is absolutely necessary or planned. Patient care coordinators from the main facility will communicate with satellite facility staff and plan the patient's visit to Kathmandu.

Posting and retention of experienced and senior physicians in remote areas has been a challenge in Nepal. With this hub-and-spoke model senior physicians will be posted in the hub hospitals in Kathmandu and they will travel to the spoke hospitals in regular intervals for certain duration which makes the availability of senior physicians possible in the remote area. Besides this, the spoke hospitals will coordinate with the peripheral public health facilities for systematic referral and feedback. This will make a broad functional network of KIOCH with the health facilities throughout the country.

Nepal needs the chance to build up expertise and specialization to be able to better serve the population. Having a central hub facility will bring in a large patient volume for specific types of conditions and therefore increase physician skill level. This will in turn increase physician productivity and more patients can be treated within a given amount of time, allowing KIOCH to achieve economies of scale. The ultimate goal is to create a child healthcare network that supports the needed specialties. Gradually, satellite centers will be built out to be able to provide more advanced care. In summary, the hub-and-spoke configuration suits the geographical challenges and economic conditions of Nepal and will make it possible for pediatric specialty care to be more available, accessible, and affordable.

Figure 4. Hub-and-Spoke Model



KIOCH PROJECT PLAN IMPLEMENTATION

We have developed a phased approach to improve child specialty healthcare delivery in Nepal. Phase 1 will begin with building a pediatric specialty care center with 200 beds in Kathmandu Valley. KIOCH will identify medical lead specialists and trainees or junior medical officers. In addition to attracting talent, KIOCH will become an active partner in serving the community. In Phase 2, services will be expanded to other needed specialties and capacity building. KIOCH will have developed mobile healthcare teams to screen and bring in new patients to receive care and build referral networks with local partners in each province. In Phase 3, KIOCH will build satellite centers in each of the six provinces. Each satellite center will be equipped with up to 50-beds and initial diagnostics capabilities. Specialty care will be extended to all other Provinces through the satellite centers. Please note that at this time, our Business Case is for Phase 1 of our plan and a separate business model will be developed for the future phases as new information and research is made available. Depending on the availability of required resources and active partner in the province, Phase 3 of the project may start in one or more province parallel with the main center in Kathmandu.

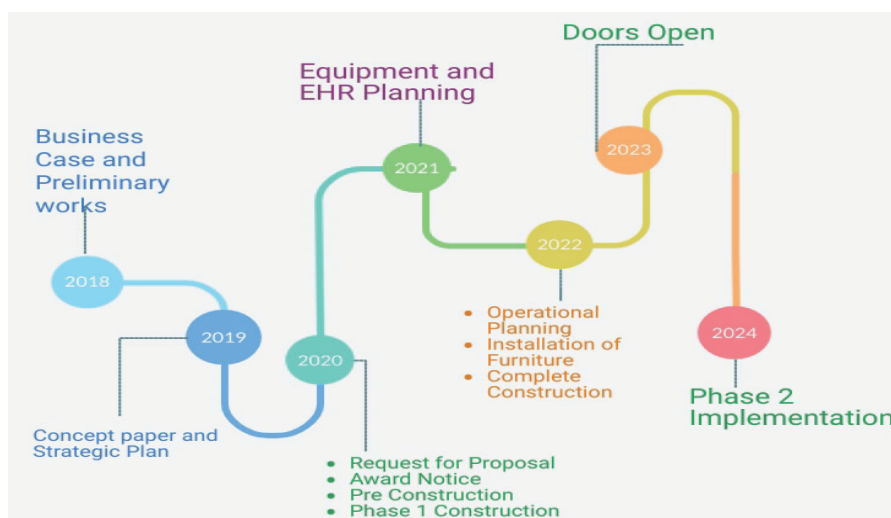
Figure 5. KIOCH Phased Approach



PHASE 1: PAEDIATRIC SPECIALTY CARE CENTRE

In its initial phase, KIOCH will open the main pediatric specialty care facility in Budhanilkantha Municipality, Ward No. - 7, Kathmandu. The Government of Nepal has leased 41-10-3 Ropani (5.2 acres) of land. The facility will initially consist of the following main specialties: 1) Cardiology and Cardiothoracic surgery 2) Oncology, and 3) Mental Health, 4) Emergency services for children 5) Critical care, 6) Orthopedics and Trauma services. These specialties were chosen both based on the population needs and financial viability. In phase II more specialties and services will be included, and service or bed capacity will be adjusted according to the actual demand.

Figure 6. Phase 1 High Level Implementation Timeline



N.B. covid-19 pandemic is likely going to delay the project by a year or so.

SPECIALTY RATIONALE

CARDIOLOGY AND CARDIOTHORACIC SURGERY

Rheumatic heart disease (RHD) is the most commonly acquired heart disease among children in Nepal. RHD is a chronic heart condition caused by acute rheumatic fever which can be prevented with proper treatment of throat/ear infections. RHD is among the top three reasons for admission into the cardiology department and second most common cause of cardiac surgery in Nepal. Congenital Heart Diseases (CHD) are prevalent in 1% of all live births and constitutes a significant volume of work for pediatric service.

ONCOLOGY

There are approximately 1-1.5 incidences of cancer per 10,000 children. Records from Kanti Children's Hospital show that the current cure rate for cancer is around 40%, with 35% abandonment of therapy due to financial burden, and 25% mortality. With the modern treatment facilities the cure rate of pediatric cancers is much higher in the developed world.

MENTAL HEALTH

In Nepal, the estimated suicide rate for people aged 15-29 years in 2012 was 25.8 per 100,000. Among students aged 13-17 years, 10% attempted suicide one or more times, 14% made a plan about how they would attempt suicide, and 13.7% seriously considered suicide. It should be noted that the problem may be significantly underestimated due to stigma, social taboos, and systems for reporting suicide.

ORTHOPEDICS AND TRAUMA: Trauma and orthopedic issues are common problems among the children. Trauma also has one of the highest impoverishment impact of the common people of Nepal.

CRITICAL CARE

Critical care is common ground of care for all types of illnesses. All complex problems of children need to be treated in an intensely monitored and optimized setting using hi-tech equipment and skilled manpower. There are very limited numbers of critical care beds for children in this country. We intend to set up a state of the art intensive care for the neonates and older kids with trained Human resource.

EMERGENCY SERVICES AND PEDIATRIC GENERAL SURGERY

Most hospitals in Nepal would have a common Emergency for both adults and children. Catering to the acute needs of children of the community 24/7 is of critical importance. Early diagnosis and introduction of treatment by trained personnel gives the best chance for improvement of any serious illness. Our Emergency unit shall have well equipped resuscitation room, procedure room, an operation room for casualties, beds for monitoring and isolation beds for kids with communicable disease. The emergency room shall have direct access to the diagnostic services and to critical care if necessary.

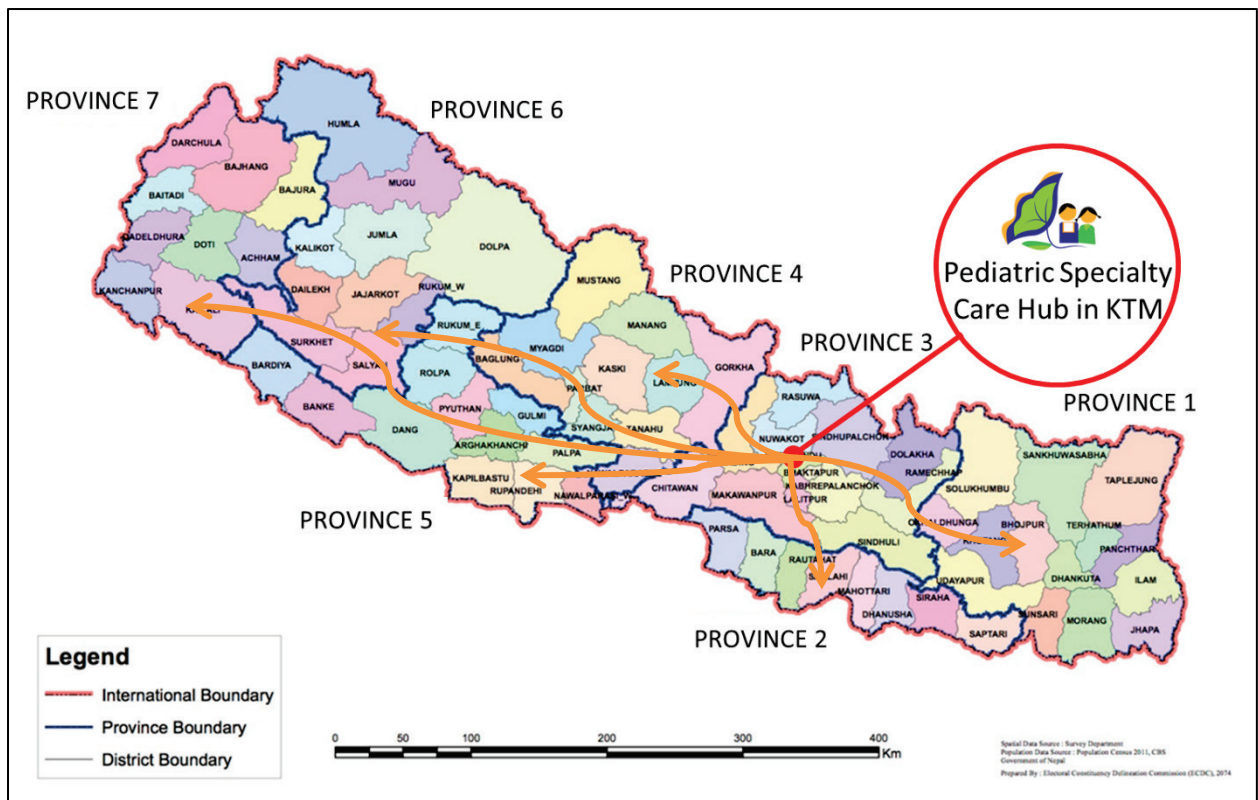
LOCATION RATIONALE

Kathmandu Valley is one of the fastest-growing metropolitan areas in South Asia, growing at 4 percent per year. With a population of more than 2.5 million registered people, of which approximately 1 million are children, the available services in the Valley and the referral points for those outside the Valley are not sufficient, with only 475 beds available for specialized children's care. Furthermore, the proximity to the Government, private sector, non-profit organizations will lead to better communication and collaboration. As KIOCH will be designed to become a model center of excellence, it needs interaction with other parties.

Doctors are unevenly distributed in Nepal. While the Kathmandu Valley has one doctor for 850 people, in rural areas of the country the ratio is one doctor for every 150,000 people. Nepal faces challenges in attracting more doctors and nurses to practice in rural areas and even stay in the country. Doctors feel that there are fewer opportunities for professional development in rural health facilities because of the inadequate equipment and training available. Therefore, most doctors either choose to practice in urban hospitals or migrate to other countries.

For these reasons described above, building the pediatric specialty care center in Kathmandu will prove to be more successful in attracting talented specialists, as well as connecting specialists to the distant rural areas of Nepal. Providers can continue to be based in Kathmandu and do occasional site visits to our satellite locations, and junior medical officers can complete away rotations in the satellite clinics. Additionally, the use of telemedicine will streamline all our care coordination efforts and bridge the gap in care even more. Our solution in Phase 1 allows for concentration of talent and sophisticated equipment or treatment in the hub facility located in the capital city. We can attract specialists as well as train or increase specialty skills because of the volume of cases.

Figure 7. Pediatric Specialty Care Centre in Province 3



SERVICES AND DESIGN

KIOCH will follow all mandated guidelines for a pediatric tertiary hospital as required by the Ministry of Health and Population Quality Standards and Regulation Division. In addition to this, we will look for other ways to provide the best care and care experience possible. This will include other designated areas or amenities that will make the patient feel comfortable. In the detailed design, we will map out the patient journey in a way that is easy and convenient for families to follow. We will also incorporate systems that make hospital operations more efficient. Appendix C shows a more detailed listing of what departments and amenities will be incorporated into the detailed design for Phase 1.

Figure 8. Phase 1 and Phase 2 Services



Type of Services



TOTAL BEDS

Phase 1 will include **200 total beds**. This includes Pediatric Intensive Care Unit (PICU), Neonatal Intensive Care Unit (NICU) Pediatric Surgical ICU (PSICU) with separate isolation rooms for infected patients or patients that are immunocompromised. The hospital will also have emergency department beds, general ward for patients, and private rooms. Special attention will be needed in creating the dedicated isolation rooms in the different departments as children are extremely susceptible to illness and infection. The exact ratio of beds per department will be finalized during the detailed design phase.

OPERATING THEATERS

A total of **5 operating theaters (OT)** will allow for maximum efficiency to increase patient throughput. Surgeons can cycle through operating theaters so that after they complete one surgery, they need only step into the next OT which will already be prepared for their next surgery. Meanwhile, the previous OT will be cleaned and prepared for the next patient. In a typical hospital surgery department, each surgeon is assigned an OT and works cases back to back with some

turnover time in between each case. Alternatively, each OT can have a customized set up for specific types of procedures. KIOCH will find ways to work efficiently using parallel processing or conveyor belt methods, so that more patients can be treated.

One of the Operating Theatres shall be dedicated for septic patients. One of the performance-based indicators we will continue to evaluate is our Healthcare Associated Infection (HAI) rate, also known as hospital-acquired infection. HAI is associated with health complications and death, and lead to significant financial losses for the institution. This can be largely avoided with best practices in sterilization, but a dedicated OT can minimize the risk.

EMERGENCY DEPARTMENT

The Emergency Department (ED) will cater to emergency cardiac, cancer, and psychiatric cases. However, basic lifesaving and stabilization procedures will be conducted as a part of our medical oath and responsibility. Initially, it will be important to emphasize to the public that KIOCH is a specialty care center for children, and the ED must be reserved for severe cases. Additionally, the ED will have its own entrance, so as not to disrupt the main operational flow.

OUTPATIENT DEPARTMENT AND DAYCARE

As a multi-specialty care center, we provide holistic care by having a good coordination of different departments. The patient in need of specialty care can avail the care by coming to the OPD or through referral. However, we will provide emergency management for general cases. The Outpatient Department (OPD) will include diagnostic and lab services with a sampling collection area and consultation or examination rooms. There will also be a room or OT room dedicated to any minor procedures.

Daycare for cancer patients will be located adjacent to the OPD but also accessible through a separate entrance from the outside. The concept behind this is to make it easy for the patient's family to go directly to Daycare, since some children may need to receive chemotherapy as frequently as every day. If the family wishes to check in with their doctor, they do not have to go through the main reception area and waiting process. Similarly, the doctor can easily check in with their patients in Daycare.

INPATIENT SERVICES

Each department will have inpatient services that will consist of a clinical ward, isolation rooms, and ICU (Neonatal and Pediatric). KIOCH will provide full-time inpatient coverage with specialists and medical staff rotating on and off service. We will have a quality performance team dedicated to measuring morbidity and mortality rates, infection rates, and patient satisfaction with inpatient services. KIOCH will also focus on performance measures such as Average Length of Stay (ALOS) to keep costs low for the patient and KIOCH. A sub-acute care ward is for patients who only need low-intensive care thereby freeing up more acute beds for those who need it. We will decide if the sub-acute care ward will be a separate block during the detailed design phase.

BLOOD BANK

Blood bank services will be essential to care provided by KIOCH. The blood bank will have the capability of producing different components using a separation technology. Cancer patients frequently require blood transfusions; therefore, inventory and stock of blood must be managed. Furthermore, having a blood bank serves as rapid response to urgent or emergency cases requiring blood or blood components. A blood bank can also serve the needs of hospitals nearby that cannot access Red Cross blood banks or in cases of blood type shortages.

OTHER SUPPORT SERVICES

This includes laboratory facilities and the radiology services. All other services, required by the Ministry of Health for the specialized hospital shall also be developed.

FINANCIAL VIABILITY AND SUSTAINABILITY

We understand that KIOCH must maintain financial viability in order to accomplish our mission. Therefore, we have considered a patient payment model that will allow the institution to meet financial requirements, public and private financing sources, and alternative revenue streams that make up our business case. Furthermore, our system of operations will adhere to the most efficient and effective practices. Philanthropic support or corporate social responsibility (CSR) will help in allowing us to reinvest revenue into operations or sponsor patient treatment for those who have financial hardship. Our financial goals are as follows:

1. Maintain financial viability;
2. Generate adequate revenues to continue to provide healthcare services;
3. Generate sufficient net asset value to invest in new medical technologies and services as they are developed and needed;
4. Diversify revenue sources so we do not only rely on the philanthropy program to fund operations;
5. Streamline reimbursement and claims processing systems; and
6. Strive to bring the out of pocket costs to a minimum.

PREMIUM VS. REGULAR RATES

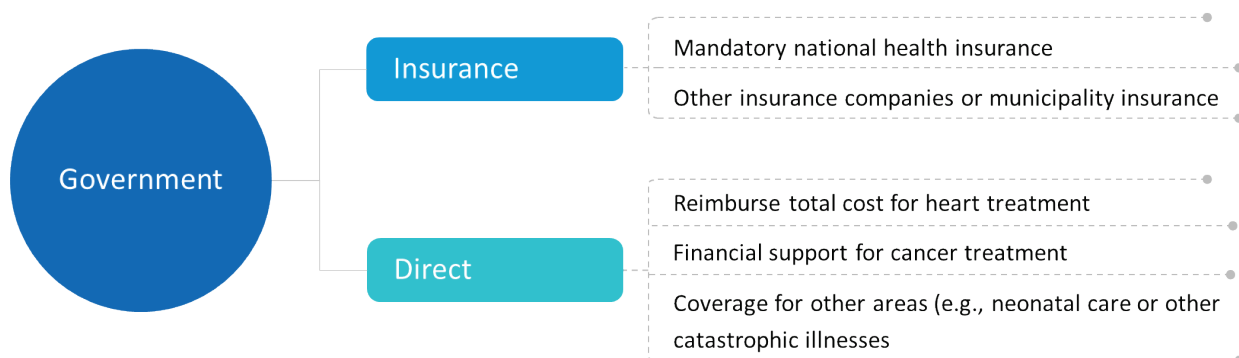
Our purpose is to serve all children in Nepal: to provide a standard of care that will attract well-off patients to seek out specialty care in Nepal instead of going abroad for treatment and keep costs low enough to reach patients with very low incomes. By providing higher rates for premium rooms or amenities, we can utilize a cross-subsidy model that will offset or cover part of the costs for patients paying regular or subsidized rates. This will also subsidize the cost of care for patients who do not have the financial means to pay at all. Patients who have the means will pay a premium rate for certain services. However, the quality and level of care provided is equal for patients paying a premium or regular rate. KIOCH's financial counselors and social workers will be available to assess the patient's financial status and assist with navigating benefits. Premium rates are set at the level of the regular rates of private hospitals, and regular rates are set at the level of the premium rates of public hospitals in Kathmandu. These rates reflect the high degree of specialization of the care provided by KIOCH, its credibility, and the high-quality of care and services.

PUBLIC FINANCING

The Nepal Government spending on health as a share of the Gross Domestic Product (GDP) has slowly increased from 1.4% in 2015 to 1.9% in 2018. KIOCH will be eligible to receive funding for its main specialties in Phase 1 from the Government of Nepal through two public health programs: 1) for public hospitals the government reimburses 100% of the cost of treatment for cardiovascular patients under the age of 15 and 2) the government provides financial support for low-income patients for select disease conditions including cancer. In other areas of child healthcare, like neonatal care or other catastrophic illnesses, the government will also provide direct funding. Although KIOCH is not categorized as a public hospital, we will be providing high-quality services at low rates comparable to public facilities and partnering with the Government of Nepal. We will fill the gap found in pediatric care, and as a leader in pediatric specialty care, KIOCH will advocate for increased government coverage for child healthcare needs.

Patients enrolled in the national public health insurance program are insured for healthcare services up to a certain amount. The public health insurer pays the hospital directly for services provided to enrolled patients. The implementation of the public health insurance program is currently being rolled out. The goal is to enroll more than 95% of the population within the next 5 years, and also increase the amount of coverage provided. The figure below outlines the different channels for public funding that KIOCH will be eligible to receive. In the future, KIOCH will also be eligible to apply for indirect government grants that are reserved for capacity building and institutional development.

Figure 9. Public Sources of Funding



PRIVATE PAYORS

There are several private health insurers that will pay KIOCH directly for services provided to patients enrolled in their program. Other private health insurance programs will reimburse the patient directly after the patient pays for services out-of-pocket. In order to maintain profitability, it is important that correct and timely billing takes place, and that the correct payment is promptly received from insurance companies. Insurance verification or precertification for services will be streamlined in partnership with both insurance companies and government subsidy programs. Taking a proactive approach reduces the risk of having claims denied or problems collecting payment from patients.

CORPORATE SOCIAL RESPONSIBILITY

KIOCH will explore corporate social responsibility (CSR) funding opportunities from for-profit institutions to help with sponsoring a part of the cost of patient care for those in need. CSR is about engaging for profit companies in striving for social change. CSR is mandatory for industries, banks and financial institutions, as governed by Industrial Enterprise Act (IEA) and Nepal Rastra Bank. CSR practices are still in the developing stages in Nepal and many companies have not established their CSR strategies yet.

KIOCH is eligible for CSR and Government Contribution:

- *KIOCH is not-for-profit organization*
- *Supreme court verdict 8785 dated 2068/3/12 has recognized Not-For-Profit company as an NGO and is eligible for Tax Exemption.*
- *Government of Nepal leased the land to KIOCH in the status of a community hospital*
- *KIOCH will sign agreement with Ministry of Health and Population as a service provider of government schemes.*
- *There are existing practices of government providing grant to community hospitals.*

Figure 10. Corporate Social Responsibility Mandate

Industry Type	Fixed Capital Investment	Annual Turnover Req.	CSR Fund to be Allocated
Small Scale	Less than NPR 100,000,000	Greater than NPR 150,000,000	At least 1% of annual profits
Medium Scale	NPR 100,000,000-250,000,000	No minimum turnover req. (i.e. all medium-large scale industries should allocate funds for CSR activities)	
Large Scale	Greater than NPR 250,000,000		

10% NO TARIFF AND OUT-OF-POCKET

As per Nepalese law, KIOCH will offer 10% of its hospital beds including care services for free to patients who do not have the financial means to pay for care. Again, it is important to emphasize that care provided to such patients will be of the same level of quality as those paying premium or regular rates.

Patients without insurance and who do not qualify for government reimbursements will need to pay for KIOCH services out-of-pocket. However, rather than presenting a large bill to an unsuspecting patient’s family after the service is already rendered, as much as possible, financial management operations will be proactive in verifying payments prior to services. Financial counselors will be available to patient families to guide them through their payment responsibilities.

ALTERNATIVE REVENUE STREAMS

Rather than just focusing on cost-cutting, KIOCH places high importance on cost-effectiveness. The goal will always be to maximize the number of patients treated rather than the number of procedures conducted. Still, there are process innovations that can be implemented to help avoid waste and optimize utilization scores. One example is the use of a magnetic resonance imaging (MRI) machine during evening hours. These MRI machines can be run for longer hours of the day to avoid crowding but also maximize utilization. Patients can even be charged lower prices at night when the machines would normally be idle, as an incentive to get scans done during off-peak hours.

Furthermore, KIOCH will insource many of its lab and diagnostic services to outside patients and hospitals. KIOCH can partner with surrounding hospitals so that testing can be done in our facility. KIOCH exists to fill a need, and if we insource certain services it can benefit others. There are a number of tests that are outsourced to neighboring countries because of access in Nepal. Providing diagnostic services to other hospitals or outside patients could increase revenue streams at limited additional costs.

KIOCH will also generate additional revenue from managing an in-hospital pharmacy. We will purchase medication and supplies at wholesale prices and provide to both patients in KIOCH and the community. The pharmacy is a vital business to maintaining financial viability. We intend to capture our entire patient population by streamlining the prescription pick-up process using electronic systems. With competitive prices, the pharmacy will also gain customers from the surrounding community.

OVERVIEW OF FINANCIALS

The case for financial viability has been supported by the KPMG report prepared in 2018. It is important to note that the expected patient volume will be higher than what was originally provided as an input in the Business Case. It was also deemed wise to incorporate future plans for expansion in Phase 1 itself, in order to avoid higher construction costs and disruption of operations when the hospital expands in the future. Even with the increase in anticipated patient volume, we will

continue to strive for a 50-50 distribution of premium and normal rate paying patients in order to maintain its net asset value. More detailed information of the input parameters can be found in the Business Case, available upon request.

Careful consideration was placed in how to best plan and build out services in a way that was financially sound with minimal risks, while still meeting the needs of the child population. KIOCH is a not-for-profit institution, and therefore all net assets will be reinvested into the hospital to help with achieving our mission. The figure below outlines some of the factors that were considered and how they scored in terms of both the need and feasibility. The care profile for Phase 1 has been defined based on the following factors:

- The need for a subspecialty, based on the current demand within Nepal and the existing capacity for this demand;
- The feasibility to organize the subspecialty in phase 1, based on expected revenues, expected costs, infrastructure, available personnel, and available materials (e.g., equipment and drugs).
- Bed Allocation for different services (May change based on the final design)

Phase 1 Focus Area	Bed Allocation
Cardiology and cardiothoracic surgery	30
Oncology	30
Mental Health	10
Orthopedics and Trauma	20
Pediatric General and emergency Surgery	30
Emergency services	16*
Critical care	50*

- * Shared between services

Figure 11. Rationale for Focus Areas

Phase 1 Focus Area	Score	Need Assessment	Score	Feasibility
Cardiology and cardiothoracic surgery	HIGH	<ul style="list-style-type: none"> • Current capacity is insufficient to meet the demand 	HIGH	<ul style="list-style-type: none"> • Government reimburses cardio surgery and Cath-lab intervention; • Dr. Koirala, KIOCH Chairperson, is a renowned cardiac surgeon
Oncology	HIGH	<ul style="list-style-type: none"> • High incidence and prevalence • Underdiagnosis and undertreatment 	HIGH	<ul style="list-style-type: none"> • Government reimburses a portion of oncology treatment; • Paediatric Oncologist leader is active member of KIOCH team
Mental Health	HIGH	<ul style="list-style-type: none"> • High prevalence • Underdiagnosis • Current capacity is insufficient to meet the demand 	MED	<ul style="list-style-type: none"> • Relatively low investment needed to provide care • Linkages with Kanti Hospital's Psychiatry Ward • Stigma or lack of awareness of care options
Orthopedics and Trauma	HIGH	<ul style="list-style-type: none"> • High prevalence • Underdiagnosis 	HIGH	<ul style="list-style-type: none"> • Relatively low investment needed to provide care

Pediatric General and emergency Surgery	High	<ul style="list-style-type: none"> High prevalence 	high	<ul style="list-style-type: none"> Relatively low investment needed to provide care <p>Same operating room complex can be shared by multiple specialties</p>
Emergency services	HIGH	Current capacity is insufficient to meet the demand	HIGH	<p>Hospital located in populated area,</p> <p>Limited capacity in the central Government hospital, leaving many children out of access</p> <p>Our own network of referral from outside valley</p>

** Programs run in partnership with other organizations already involved / specialized in the discipline*

Looking at the revenue generated from the main care pathways or services alone, with a conservative number estimated for annual number of patients, KIOCH will generate approximately **NRS 387,127,180 in revenue each year**. We expect KIOCH will see up to 100 patients per day in the general outpatient clinic which would increase expected revenue. The figure below breaks down the average revenue per patient per main care pathway. **Please note that this figure does not include the revenue generated from other service lines such as general outpatient services and other inpatient services.**

Figure 12. Estimated Number of Patients and Revenue in Nepali Rupees (NPR)

Care Pathway	Annual No. of Patients	Avg. Revenue Per Patient	Annual Revenue (NPR)
Cardiology w/ Surgical Treatment	600	NRS 109,116	NRS 65,469,600
Cardiology w/ Cath-Lab Intervention	360	NRS 170,373	NRS 61,334,280
Cardiology w/ Medical Treatment	350	NRS 40,388	NRS 14,135,800
Oncology w/ Surgical Treatment	500	NRS 153,021	NRS 76,510,500
Oncology w/ Medical Treatment	400	NRS 144,878	NRS 57,951,200
Mental Health w/ Medical Treatment	2400	NRS 12,357	NRS 29,656,800
Other w/ Pediatric Surgery	500	NRS 102,366	NRS 51,183,000
Critical Care (only by referral)	500	NRS 61,772	NRS 30,886,000

The estimated total annual fixed costs (FC) include the fixed operational costs for electricity, water supply, sewage treatment, etc. and for personnel overhead plus the fixed capital costs for equipment. In the original calculation with lower patient volume, the **annual fixed costs amount to NRS 133,316,354**. According to our sensitivity analysis, this total estimate is not likely to change significantly with an increase in anticipated patient volume.

The estimated total annual variable costs (VC) depend on volume as they include all the resources consumed by patients. The **annual variable costs amount to NRS 198,809,250**. The figure below breaks down the average VC per patient per care pathway.

Figure 13. Estimated Number of Patients and Variable Costs in Nepali Rupees (NPR)

Care Pathway	Annual No. of Patients	Avg. VC Per Patient	Annual VC (NPR)
Cardiology w/ Surgical Treatment	600	NRS 61,329	NRS 36,797,400
Cardiology w/ Cath-Lab Intervention	360	NRS 48,855	NRS 17,587,800
Cardiology w/ Medical Treatment	350	NRS 19,775	NRS 6,921,250
Oncology w/ Surgical Treatment	500	NRS 81,910	NRS 40,955,000
Oncology w/ Medical Treatment	400	NRS 71,610	NRS 28,644,000
Mental Health w/ Medical Treatment	2400	NRS 9,862	NRS 23,668,800
Other w/ Pediatric Surgery	500	NRS 57,479	NRS 28,739,500
Critical Care (only by referral)	500	NRS 30,991	NRS 15,495,500

In summary, total annual revenue (NRS 387,127,180) less the sum of the total fixed costs and variable costs (NRS 332,125,604) equals an **annual net asset value of NRS 55,001,576**. It must be noted that the revenues and costs associated with additional services (e.g., pharmacy or insourcing of lab and diagnostic services) are not included in this net asset analysis. The figure below reiterates each figure used to calculate the net asset value.

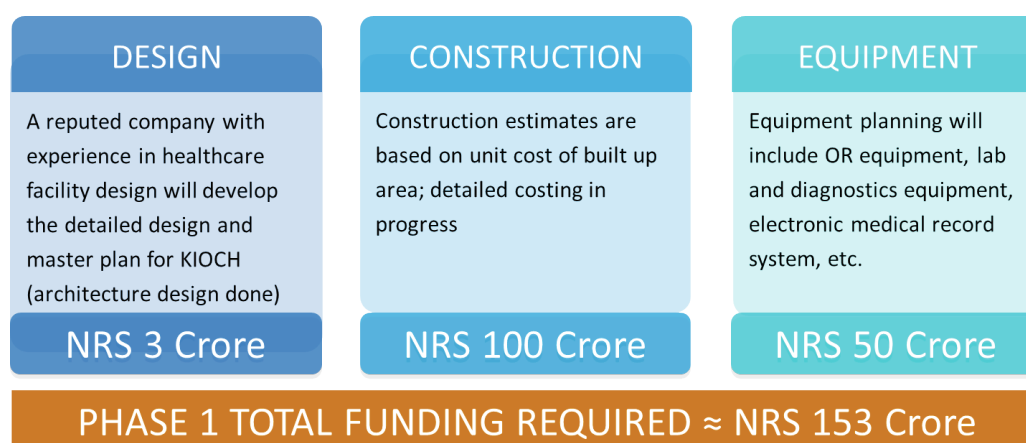
Figure 14. Estimated Annual Net Asset of the KIOCH Phase 1 Operating Care Model

Financial Component	Estimated Amount (NPR)
Annual Revenue	NRS 387,127,180
Annual Costs	NRS 332,125,604
Annual Net Asset	NRS 55,001,576

Please note that this is the Business Case for Phase 1 main service lines only. A separate business model will be developed for the future phases as new information and research is made available.

FUNDING REQUIREMENTS

Figure 15. Phase 1 Estimated Project Costs



Please note that part of the construction cost has already been raised in Nepal and only the gap is requested. Also, KIOCH is already working with organizations like Rotary to gather support in equipment.

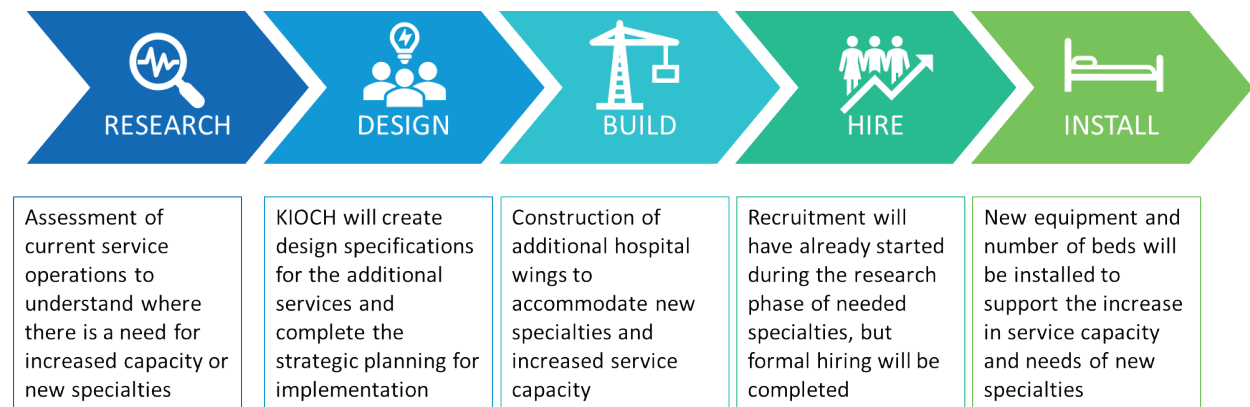
The assumed construction period is a duration of about two to three years. Should the actual construction period be longer than what is anticipated, additional costs and cash outflows may be

incurred. KIOCH will mitigate such risks by negotiating a turnkey contract whereby contractors will be held accountable for any delay in the construction process. **Please note that cost estimates are subject to variations based on building design or negotiated prices for equipment.**

PHASE 2: EXPANSION OF SERVICE CAPABILITY

In Phase 2, KIOCH will expand its existing service capability and capacity and add new specialties to better serve child health needs. Phase 2 requires careful consideration of a number of important variables such as the sophistication of equipment being added, the needs of the population being served, and the operational cost of additional services.

Figure 16. High Level Implementation Process Chart



EXPANSION OF CANCER TREATMENT SERVICES

Using our health information database, we will conduct an analysis of the types of cancer cases seen and create an informed plan of how to proceed with Phase 2 expansion of service capacity and capabilities. We will need to evaluate where to best allocate resources. The following are service expansions that we can foresee, but more research will be required during Phase 2 planning.

BLOOD BANK

KIOCH will expand its blood bank capabilities in Phase 2. New equipment will be acquired to support the improved transfusion medicine services. Different types of transfusions are used for cancer patients when healthy cells are damaged from chemo or radiation therapy. KIOCH will pursue new technology and methods of administering blood transfusions.

RADIATION THERAPY

In Phase 2, KIOCH will build a Radiation Oncology Unit for radiotherapy treatment. This addition will include space for equipment, patient consultation, treatment simulation and planning, and treatment administration. Construction plans will include the radiation bunker with control rooms, changing rooms, and waiting areas.

STEM CELL AND BONE MARROW TRANSPLANTATION

KIOCH will find opportunities to bring stem cell and bone marrow transplantation specialists to the center or train existing specialists. This procedure will help children recover after high doses of radiation therapy or chemotherapy.

NEW SPECIALTIES

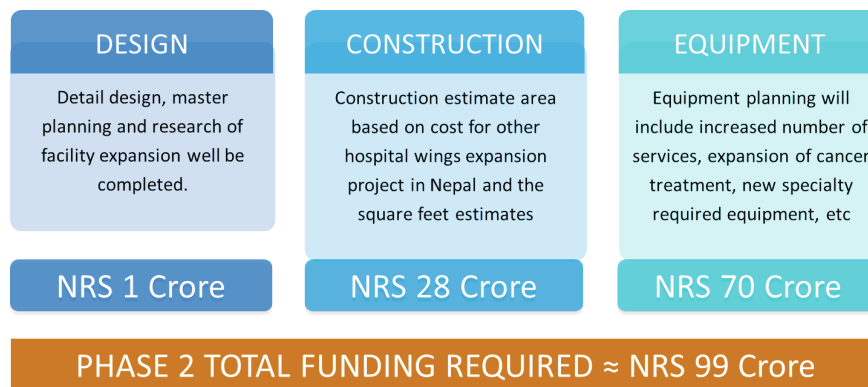
KIOCH will consider the major health needs of children in Nepal when planning new specialty services. Our goal is to fill the gaps in care but also provide most services under a single roof; therefore, we will introduce new specialties in Phase 2. A market needs assessment must be

completed to understand what specialties are most required, but there are some we can anticipate such as pediatric orthopedics, neurology, and nephrology services.

FUNDING REQUIREMENTS

Most of the funding for Phase 2 is attributed to the addition of new equipment to support the expansion of services specifically for the Radiation Oncology Unit. Additional structure will be added for cancer care and new specialty departments. We will ensure continuity in design concepts and building standards. KIOCH will also look to government grants to build out its service capacity in different areas. **Please note that cost estimates are subject to variations based on final building design or negotiated prices for equipment.**

Figure 17. Phase 2 Estimated Project Costs



PHASE 3: KIOCH SATELLITE CLINICS

The most critical stage in the Phase 3 planning is the research on strategic locations for each satellite clinic in each of the remaining six Provinces. Each satellite clinic will offer services that complement the main KIOCH facility located in Bagmati Province. The satellite clinics will ultimately be 50-bed facilities, equipped with some specialty and critical care service capability. In Phases 1 and 2, KIOCH will lay the foundations for the referral network throughout the country. The main purpose of the satellite clinics is to route patients needing more intensive services to the main KIOCH facility for treatment. It will support care that is planned by the main facility, creating convenient access to any follow-up or routine care. Initial diagnostics can be completed in the Provinces and then a plan of action will be made. Furthermore, the satellite clinics will build out their own service capacity to include specialists. Specialists must have equipped facilities available for them to practice in. A separate business model for each of the satellite clinics will be created and available upon request.

Figure 18. KIOCH Satellite Clinic Functions with Main Facility in Center



FUNDING REQUIREMENTS

The following projected costs for Phase 3 are dependent on what resources and support is available from the Federal and Provincial governments. As KIOCH builds its network referral partnerships, there may be opportunities for the building and equipment funding to come from the government or the use of existing facilities. Government in Pokhara, located in Gandaki Province, has signed agreement with KIOCH to provide the 37 Ropanies of Land with the existing two storied building to make satellite hospital and has made strong gestures of funding the equipment and re-construction/ maintenance of the satellite facility in their Province. Similarly, there are number of individuals willing to donate valuable pieces of land to KIOCH in Province I and II for the satellite hospitals. It is important to note that Phase 3 is part of a 5-10-year plan, and this solution is for the ultimate goal of building and strengthening the child healthcare network system of Nepal.

Figure 19. Phase 3 Estimated Project Costs

RESEARCH	DESIGN	EQUIPMENT	CONSTRUCTION
KIOCH will establish local partners in each province understand the terrain and specific population needs and evaluate what is the most strategic location.	Each satellite clinic will have its own customized design to fit the geographical limitations as well as complement the services required to support the hub facility in Kathmandu	Equipment planning will include telemedicine with a strong network for communication, sampling and testing equipment, electronic medical record system, etc.	KIOCH satellite centers will be a modest size, with 50 bed capacity. Construction costs may vary according to the requirements for each satellite center as the design will be customized.
NRS 12 Lakh	NRS 2.3 Crore	NRS 23.4 Crore x6	NRS 35 Crore x6

PHASE 3 TOTAL FUNDING REQUIRED ≈ NRS 353 Crore

** the cost of each provincial hospital will be different and will be shared with the provincial and/or local government.

IN SUMMARY

The Kathmandu Institute of Child Health (KIOCH) aims to be the leading network of child healthcare delivery in Nepal. With an almost 12 million child population, there is an urgent need for concentrated efforts in making child specialty care available, accessible, and affordable in Nepal. KIOCH puts forward a new approach of coordinating care to maximize child health outcomes and quality of life. This project is an investment in the future health of our country, in the children of Nepal.

Our current focus is to quickly complete the phase I project in Kathmandu. Once the services start running, it will be easier for the stakeholders to support the next phases. This proposal is submitted to request for Phase I project in Kathmandu.

APPENDIX A. BIOS FOR KIOCH BOARD MEMBERS

Prof. Dr. Bhagawan Koirala, Chairperson

Dr. Bhagawan Koirala is a Cardiothoracic Surgeon, professor and social worker from Palpa, Nepal. He is best known for pioneering open heart surgery in Nepal and for making operational cardiac care accessible for the public, by developing both the Shahid Gangalal National Heart and Manmohan Cardiothoracic Vascular and Transplant Centres into thriving heart practices under his leadership.

Dr. Koirala graduated from the Kharkov Medical Institute (Ukraine) where he received his MD; he did post-graduate work at the National Institute of Cardiovascular Diseases, Dhaka University in Bangladesh as well, where he received his MS in Cardiothoracic Surgery. In addition, he completed fellowships in Adult Cardiac Surgery at Baystate Medical Center, Tufts University, in Springfield, Massachusetts and in Paediatric Cardiac Surgery at the Hospital for Sick Children, University of Toronto, Canada.

Dr Koirala was the Executive Director and Chief of Cardiac Surgery at Shahid Gangalal National Heart Center from 2001 to 2009, the Executive Director of Manmohan Cardiothoracic Vascular and Transplant Center from 2010 to 2012, and the Executive Director of Tribhuvan University Teaching Hospital from 2012-2014, while concurrently a Professor at the Institute of Medicine (IOM) at Tribhuvan University. At present, he is the Head of Cardiothoracic & Vascular Surgery at Manmohan Cardiothoracic Vascular and Transplant Centre (MCVTC). Dr. Koirala is also the Chair of the Nepal Medical Council, the regulatory body overseeing licensing for all Nepali doctors.

Dr. Koirala is an active advocate for a variety of public health policies and projects that expand access to healthcare for the Nepali public; this includes the implementation of free cardiovascular surgery for children under 15, and seniors over 70; he was also a key driver for National Health Insurance Act.

Mr. Deepak Raj Sapkota, Member

Mr. Deepak Raj Sapkota is a child's rights activist and a development policy professional. With an educational background in child's rights studies, he started his career as the Executive Director of the Nepal Children's Organization. Later he worked as an Executive Director for the Central Child Welfare Board, a government agency overseeing child's rights in Nepal, for more than five years. Mr. Sapkota is a former Chairperson of the Association of INGOs in Nepal (AIN), and he is currently the Executive Director of the Karuna Foundation, an NGO working to prevent avoidable disabilities among children and adults and improving the quality of life of children with disabilities through community-based rehabilitation.

Mr. Govinda Prasad Adhikari, Member

Mr. Govinda Prasad Adhikari is the Executive Editor of the online news portal www.baahrakhari.com and former Chair of the Karuna Foundation Nepal. He has served as the opinions and news editor for the national dailies Himalayan Times, Kantipur, Nagarik Dainik and Annapurna Post; his career in journalism has spanned over two decades.

Mr. Adhikari has also chaired not-for-profit organizations including Creating Possibilities Nepal, Nepal Rugmark Foundation, and Underprivileged Children's Educational Programs. As former Executive Director of the Social Welfare Council that regulates the work of INGOs and NGOs in Nepal, he was also a member of the Steering Committee for "Children as Zone of Peace National Campaign", the National Coordination Committee on Disability Services, and Balsudhar Griha

Vyavasthapan Samiti. He has also served as an advisor to the National Planning Commission of Nepal.

Ms. Bhawani Mishra Rana, Member

Ms. Bhawani Mishra Rana holds a MA in Political Science from Lucknow University, India and is Immediate Past Chairperson of the Federation of National Chamber of Commerce and Industry (FNCCI). She has served as President of the Federation of Woman Entrepreneurs Association of Nepal (FWEAN); she is also a member of the National Reconstruction Authority, the National Tourism Council and the Nepal Investment Board. At present, she is the Director of Hotel Sneha Pvt. Ltd; she has also served as the director of National Life Insurance and Sneha Cultural Entertainment.

Dr. Jyotindra Sharma, Member

Dr. Jyotindra Sharma is Executive Director of HAMS hospital. He was the Executive Director and the Head of Cardiovascular Surgery at Shahid Gangalal National Heart Centre. He has served as a supervisor in Cardiac Surgery at the College of Physicians and Surgeons (CPSP)-Pakistan and is also a visiting associate professor at the Institute of Medicine, Tribhuvan University, Nepal. He is a Nepal Medical Association, and Society of Surgeons of Nepal.

Mr. Bhuvan Kumar Dahal, Member

Mr. Bhuvan Kumar Dahal is the Chief Executive Officer of Sanima Bank Ltd, Nepal. He is currently serving as the President of Nepal Bankers' Association. Prior to working at Sanima, he worked at Nabil Bank Limited for more than two decades and has served at different national level committees including at the Central Bank of Nepal, Convenor Finance Committee, and the Nepal Banker's Association. He also has served as the Director for Swabalamban Micro Credit Development Bank.



APPENDIX C. KIOCH PHASE 1 COMPONENTS

No.	Category	Description
1.	Pediatric Main Specialties	<ul style="list-style-type: none"> • Cardiology and cardiothoracic surgery • Oncology • Mental Health • Emergency services • Orthopedics and trauma services • Critical care
2.	Departments/Services	<ul style="list-style-type: none"> • Outpatient Consultation Rooms • Minor Procedure Rooms • Vaccination Clinic • Diagnostics and Investigations • Post-Anesthesia Care Unit • Surgery/Operation Theatre • Pre-Op and Post-Op Units • Pathology and Lab • General Wards and Single Rooms • Daycare • Critical Care • Emergency • Pharmacy • Physiotherapy • Dental Clinic • Postmortem • Sample Collection • Blood Bank
3.	Support Services	<ul style="list-style-type: none"> • Laundry and Housekeeping • Security and Traffic Control • Canteen and Meal Delivery • Reception and Care Coordination • Billing/Claims Management • Research Lab • Waste Management • Central Sterilization • IT and Electronic Medical Record System
4.	Other Amenities	<ul style="list-style-type: none"> • Family Play and Relaxation Areas • Cyber Café and Library • Activity or Classroom Space • Theatre or Auditorium • Conference Rooms • Employee Lounge Areas • On-call Rooms • Waiting Rooms • Helipad Landing • Housing Complex • Prayer Room • Garden Path • Parking • Power Supply • Waste Disposal • Toilets
5.	Administrative Offices	<ul style="list-style-type: none"> • Executive Leadership/Management • Human Resources • Accounting and Claims Management • Community Outreach • Legal • Grievances and Appeals • Infection Control and Quality Monitoring • Information Technology • Supply Chain Management • Philanthropy/Development • Social Services