BQA NCQF QUALIFICATION TEMPLATE

SECTION A:	QUALIFICATION DETAILS														
QUALIFICATION DEVELOPER (S)	University of Botswana														
TITLE	Master of Philosophy in Paediatric Cardiology and Congenital Heart Disease											**NCQF LEVEL**	9		
STRANDS (where applicable)	1. N/A 2. 3. 4.														
FIELD	Health and Social Services											**CREDIT VALUE**	600		
SUB FIELD	Health Science														
New Qualification	✓	Legacy Qualification								Renewal Qualification			N/A		
										Registration Code			N/A		
SUB-FRAMEWORK	General Education			TVET			Higher Education		✓						
QUALIFICATION TYPE	Certificate	I		II		III		IV		V		Diploma		Bachelor	
	Bachelor Honours			Post Graduate Certificate			Post Graduate Diploma								
	Masters		✓	Doctorate/ PhD											

RATIONALE AND PURPOSE OF THE QUALIFICATION

The Republic of Botswana is a high middle-income country with a population of approximately 2.3 million. Each year, about 51,000 children are born in the country. Out of this figure, about 500 of them are born with congenital heart disease every year. Like in the other countries in Southern African Development Cooperation (SADC) region, Botswana also has a significant burden of acquired heart diseases in children. However, the clinical care that these sick children are supposed to receive is not

well developed in the country. Currently, Batswana children with congenital and acquired heart diseases receive cardiac surgery and interventional cardiology care through a government-sponsored cross border referral to Republic of South Africa. This model of critical care is extremely expensive and inconvenient to families and patients.

Besides, the requirement for immigration formalities to cross the border has resulted in loss of lives of several children while awaiting the completion of the administrative formalities. Even worse, the lockdown period during the COVID-19 pandemic has demonstrated that the only way to provide a comprehensive care for these children is to establish a local facility that can treat them. Currently, there are only 3 Paediatric Cardiologists in the country out of whom one is an expatriate staff. Only Princess Marina Hospital and Bokamoso Private Hospital have Paediatric Cardiologist/s. There is only one Cardiac Anaesthesiologist in a private setting and very few perfusionists that mainly focused on adults. There is no qualified Paediatric Cardiac surgeon in the country.

In line with the government's commitment to tackle the threat posed by Non-Communicable Diseases (NCDs), the Human Resource Development Council of Botswana, 'Priority Skills and Employment Trends Report' (HRDC: 2019) has listed Cardiologists as one of the professions that are in demand in the country. Under the priority areas, training of enough paediatric cardiologists is top on the list.

PURPOSE: (itemise exit level outcomes)

The purpose of this qualification is to produce graduates with advanced knowledge, skills and competence to:

1. Diagnose and treat patients with congenital and acquired heart diseases as per cardiology procedures.
2. Apply a variety of communication and manual skills related to the practice of paediatric cardiology to the assessment of cardiac patients.
3. Manage paediatric cardiac patients safely and effectively in settings at the different levels of the healthcare system.
4. Contribute effectively to the management of paediatric cardiac units in the healthcare system and provide care within a multi-disciplinary team.
5. Conduct capacity building for the cardiac care team members at different levels of the healthcare profession (Paediatricians, medical officers, nurses and technicians).
6. Develop policies and programmes in paediatric cardiology discipline and implement them.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

1. Bachelor's Honours degree, NCQF Level 8 (MBBS or equivalent qualification plus specialization in Paediatrics & Adolescent Health or Paediatrics & Child Health or equivalent post graduate qualification).
2. The candidate must be registered or registerable with BHPC to be able to practice Medicine in Botswana.
3. Access through Recognition of Prior Learning (RPL) and Credit Accumulation and Transfer (CAT) is accessible to all candidates through institutional policies in line with the national RPL and CAT policies.

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SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
1. Apply advanced expert - level knowledge in the evaluation, work-up, diagnosis and treatment of infants, children, and adolescents (including the fetus and the young adult) with congenital and acquired heart diseases.	1.1. Apply evidence-based guidelines in the diagnosis and the treatment needs of infants, children, and adolescents (including the fetus and the young adult). 1.2. Provide patient care that is compassionate, appropriate, and effective. 1.3. Perform and interpret physical examination, laboratory and imaging tests that are appropriate and relevant to the individual patient needs. 1.4. Identify and prepare patients with indications for cardiac surgical interventions or percutaneous catheter-based interventions and conduct appropriate and effective counseling of the patients and parents/caregivers. 1.5. Make informed diagnostic and therapeutic decisions based on patient information, current scientific evidence and clinical judgment and

	recognize limitations of level of training and experience and seek help appropriately. 1.6. Establish expert-level communication with patients and caregivers with an ultimate goal of providing an effective counseling. *1.7.* Work with health care professionals including those from other disciplines including nursing, nurse practitioners, hospitalists, nutritionists, physical and occupational therapy, speech therapy and child life practitioners to provide patient focused care.
2. Perform transthoracic, transesophageal, and fetal echocardiograms to diagnose simple and complex forms of congenital and acquired heart defects and to assess cardiac function and physiology in infants, children, and adolescents (including the fetus and the young adult) with congenital and acquired heart diseases.	2.1. Apply knowledge of physics related to ultrasound, indications, and limitations of transthoracic echocardiography (TTE), transesophageal echocardiography (TEE) and fetal echocardiography. 2.2. Perform and interpret transthoracic echocardiograms in infants, children, adolescents, and young adults. 2.3. Perform and correctly interpret transesophageal echocardiogram in infants, children, adolescents, and young adults. *2.4.* Perform and correctly interpret fetal echocardiograms and work in collaboration with the obstetrician in the continued care to delivery.
3. Apply advanced knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences in a day-to-day patient care.	3.1. Apply the basic and clinically supportive sciences in paediatric cardiology practice. 3.2. Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems. 3.3. Practice an analytical approach to paediatric cardiology problem solving.

	3.4. Apply skills in systematic approach of quality improvement measures as they relate to paediatric cardiology practice.
4. Perform advanced skills in diagnostic cardiac catheterization and common Paediatric interventional cardiology procedures, including balloon atrial septostomy and pericardiocentesis.	4.1. Perform hemodynamic studies and correctly interpret them. 4.2. Perform structural diagnostic cardio angiography procedures and correctly interpret them. 4.3. Perform emergency balloon atrial septostomy in newborns with d-Transposition of the Great Arteries. 4.4. Perform diagnostic and therapeutic pericardiocentesis in infants, children and adolescents including young adults. *4.5.* Recognize limitations of level of training and seek help appropriately.
5. Assess, evaluate, and treat neonates, infants, children, adolescents, and adults with cardiac disease in an intensive care setting.	5.1. Describe the conduct of cardiopulmonary bypass and provide appropriate and patient-oriented intensive care to children post open-heart surgery. 5.2. Apply adequate skill in cardiorespiratory care of postoperative cardiac patients and those with serious cardiorespiratory conditions, including intubating and ventilator care, establishing central venous cannulation, and establishing arterial lines for invasive monitoring. 5.3. Utilize different modes of ventilation and their indications with an ultimate goal of providing patient-oriented respiratory support. 5.4. Perform and correctly interpret arterial blood gas analysis and devise appropriate interventions. 5.5. Perform appropriate imaging studies including but not limited to transthoracic echocardiography,

	transesophageal echocardiography and implement appropriate therapeutic measures. 5.6. Order and interpret laboratory tests and imaging studies including Chest X-rays, cardiovascular CT, and MRI and conventional cardio - angiographic studies as indicated. 5.7. Perform surface electrocardiograms and correctly interpret and implement appropriate intervention. *5.8.* Collaborate with paediatric cardiac surgeon, cardiovascular anesthesiologist, and paediatric intensivist in the care of paediatric ICU cardiac patients.
6. Evaluate and treat infants, children, adolescents, and adults with acquired and congenital cardiac disease in a non-intensive care in-patient setting.	6.1. Perform a thorough cardiology focused history to include patient and family history and thorough cardiovascular and other relevant physical examination in the outpatient and non-ICU inpatients settings with ultimate goal of generating appropriate diagnosis/differential diagnosis. 6.2. Perform and interpret cardiac X-rays, ambulatory electrocardiograms (ECG), and Holter ECG recordings and to support decision making. 6.3. Perform transthoracic echocardiography, transesophageal echocardiography and other relevant investigations and procedures to facilitate correct and timely diagnosis of infants, children, adolescents, and young adults. 6.4. Apply knowledge, skills, and attitudes necessary to evaluate and manage/treat infants, children, and adolescents with heart failure. 6.5. Apply knowledge, skills, and attitudes necessary to evaluate and manage/treat infants, children, and adolescents with pulmonary hypertension.

	6.6. Collaborate with other specialties and units and provide comprehensive cardiac care to infants, children, adolescents, and young adults with congenital or acquired cardiac disorders under the care of other specialties for non-cardiac problems. 6.7. Apply counseling skills in cases were counsel patients and caregivers in the indications, benefits, and possible risks of cardiovascular diagnostic or therapeutic interventions and consider patient/parent preferences in work-up/treatment of paediatric cardiac problems. 6.8. Perform/lead a team of professionals in cardiopulmonary resuscitation using paediatric advanced life support (PALS) protocol. 6.9. Identify the community resources for a patient with congenital and acquired heart disease and participate in multidisciplinary specialty rounds. *6.10.* Treat adults with congenital heart disease in the outpatient and inpatient setting.
7. Interpret an electrocardiogram and interpret a basic electrophysiology study, diagnose, and treat cardiac dysrhythmias, perform basic interrogation and reprogramming of permanent pacemakers and ICDs and evaluate and treat palpitations, presyncope and syncope.	7.1. Perform and interpret various forms of ECG, including ambulatory surface ECG, 24-hour Holter monitoring, and transesophageal ECG as required. 7.2. Perform evaluation and treatment of children, adolescents, and young adults with presyncope and syncope. 7.3. Perform evaluation and appropriate treatment of children, adolescents, and young adults with palpitation and/or chest pain. 7.4. Perform diagnosis and treatment of common cardiac dysrhythmias in infants, children, adolescents, and young adults – including but not

	limited to counseling, medical treatment, and cardioversion. 7.5. Perform basic interrogation and reprogramming of permanent pacemakers and implantable Cardioverter-defibrillators (ICDs).
8. Perform and interpret cardiopulmonary exercise testing.	8.1. Apply advanced knowledge of the basic components of cardiopulmonary exercise testing, indications, risks, and contraindications of the procedure. 8.2. Apply advanced knowledge in the different types of exercise test protocols and their applications. 8.3. Perform pharmacological stress tests. 8.4. Perform patient preparation and monitoring before, during, and after cardiopulmonary testing of children, adolescents, and young adults. 8.5. Collect, compile, and interpret the results of a cardiopulmonary exercise testing. 8.6. Perform informed diagnostic and therapeutic decisions based on patient information, current scientific evidence, and clinical judgment.
9. Apply expert level knowledge and skill in the conduct and supervision of research and critically analyze scientific evidence.	9.1. Apply critical thinking in practice-based/problem-based research questions and conduct comprehensive and relevant literature review to answer the research question. 9.2. Organize scientific reference materials using software including, but not limited to EndNote, Mendeley, Zotero. 9.3. Select an appropriate study design, develop a study proposal, design data collection and storage tools. 9.4. Apply and seek approval of study proposal by all relevant institutional review boards (IRBs) and regulatory authorities.

	9.5. Perform data collection according to national and international guidelines and standards that govern research involving human subjects. 9.6. Select appropriate data management technique and ensure patient privacy and confidentiality. 9.7. Perform analysis of data and compilation of results in accordance with a pre-specified data analysis protocol, using common statistical software including, but not limited to Microsoft Excel, SPSS, R/RStudio, STATA. 9.8. Perform a scientific write-up and discuss study findings and draw an appropriate conclusion.

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SECTION C	***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Credits Per Relevant NCQF Level***			***Total Credits***
		Level [9]	***Level [ ]***	***Level [ ]***	***600***
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	The basic science of Paediatric Cardiology & Congenital Heart Disease	4			4
	Introduction to Clinical Paediatric Cardiology I	80			80
	Introduction to Research Proposal Development & Grant Writing	4			4
CORE MODULES	MPHIL Dissertation	80			80
	Introduction to Clinical Paediatric Cardiology II	80			80
	Intermediate Clinical Paediatric cardiology I	80			80

	Intermediate Clinical Paediatric cardiology II	80			80
	Adult Congenital Heart Disease	16			16
	Advanced Clinical Paediatric Cardiology I	80			80
	CMSA exam Preparation I	8			8
	Advanced Clinical Paediatric Cardiology II	80			80
	. CMSA exam Preparation II	8			8
STRANDS/ SPECIALIZATION ***N/A***	***Total credits***				***600***
		Level [ ]	***Level [ ]***	***Level [ ]***	
1.	***N/A***				
2.					

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
Core - 9	*600*
TOTAL CREDITS	***600***

Rules of Combination:
(Please Indicate combinations for the different constituent components of the qualification)

This qualification comprises of:

A. Fundamental Courses = 88 credits

B. Core Courses = 512 credits

TOTAL CREDITS: 600

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ASSESSMENT ARRANGEMENTS
Assessment includes both formative and summative modes. Assessment will be carried out by BQA-registered and accredited assessors. **1. Formative Assessment** Formative assessment contributes 60% to the overall grading for the qualification. **2. Summative Assessment** Summative assessment contributes 40% of the overall grading for the qualification. Both internal and external assessors shall have a Ph.D. in the field of Paediatric Cardiology or related discipline.
MODERATION ARRANGEMENTS
There is internal and external moderation as a quality assurance measure, in line with the policies of the Educational Training Provider. Internal moderators must be suitably qualified in the field of Paediatric Cardiology and be registered/registerable with the Botswana Health Professions Council and have BQA accreditation. External moderators are appointed for their teaching and disciplinary expertise and are subject to the approval by the institution. Both internal and external moderators shall have a Ph.D. in the field of Paediatric Cardiology or related fields.
RECOGNITION OF PRIOR LEARNING
There shall be provision for award of credits through RPL
CREDIT ACCUMULATION AND TRANSFER

A learner may transfer academic credits towards the award of the qualification as may be determined by the provider in line with institutional policies.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning

Vertical:

- Doctor of Philosophy in clinical Epidemiology/Cardiovascular Epidemiology
- Doctor of Philosophy in Cardiovascular Physiology
- Doctor of Philosophy in Cardiovascular Pathology

Horizontal

- Master of Science in Clinical Epidemiology/Cardiovascular Epidemiology
- Master of Science in Biomedical Sciences

Employment:

- Subspecialist in Paediatric Cardiology
- Medical academic
- Medical researcher
- Medical administrator
- Advisory capacities (e.g., medical boards, medical insurance, drug company or medical device boards)

QUALIFICATION AWARD AND CERTIFICATION

Minimum of 600 credits must be attained to be awarded the qualification. Additionally, candidates must pass examination of the dissertation by internal and external examiners, and pass the examination of the Colleges of Medicine, South Africa. Up on completion of all components, the candidate will be awarded Master of Philosophy (MPHIL) degree in Paediatric Cardiology.

Certification

Candidates meeting the prescribed requirements will be awarded the qualification in accordance with the institutions'' standards and applicable policies for awarding. A Master of Philosophy (MPHIL) degree in Paediatric Cardiology will be awarded upon successful completion of the qualification.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

The qualification has been compared to the following regional and international qualifications in Paediatric Cardiology:

Regional:

1. Master of Philosophy in Paediatric Cardiology in the University of the Free State, South Africa, 300-credit qualifications, and

International:

1. The Children's Hospital of Philadelphia, University of Pennsylvania, USA, a Paediatric cardiology qualification.

Summary of similarities and differences:

Regional:

The qualification at the University of the Free State is a 300-credit qualification at NQF level 9. This qualification is developed taking the University of Free State qualification as a benchmark. The entry requirements, the logbook requirements, and the graduate profiles are similar. In the qualification of the University of Free State, the learning modules are 7 whereas this qualification has 16 modules. This is due to various reasons:

1. Botswana Health Professionals Council (BHPC) requires Health qualifications to be a minimum of 600 credits;
2. The prospective qualification holders need to have strong background in the basic & clinical sciences and the field of research.

This qualification also assigns MPhil degree a requirement unlike our benchmarks in South Africa. This higher credit requirement is also in agreement with the international benchmark, CHOP. In CHOP and other institutions in the United States where fellows are expected to spend 60 – 80 hours per week even though credits are not calculated, or MPhil degree is not associated. Translating this to notional hours over a 3 – year period, it is much higher than the 6,000 notional hours our candidates spend.

This qualification reads MPhil in Paediatric Cardiology & Congenital Heart Disease unlike the qualification taken as a benchmark. This is needed to stress that the qualification holders will also provide care for patients of any age with congenital heart disease, including adults.

International:

This qualification is like the qualification in the Children's Hospital of Philadelphia (CHOP) in terms of content. However, the qualification in CHOP is not associated with MPHIL even though the candidates still do research work as a component of subspecialty certification.

REVIEW PERIOD

The qualification will be reviewed every 5 years starting from the date approval.

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For Official Use Only:

CODE (ID)			
REGISTRATION STATUS	**BQA DECISION NO.**	**REGISTRATION START DATE**	**REGISTRATION END DATE**
LAST DATE FOR ENROLMENT		**LAST DATE FOR ACHIEVEMENT**	