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SECTION A: QUALIFICATION DETAILS														
<b>QUALIFICATION DEVELOPER (S)</b>		University of Botswana												
<b>TITLE</b>	Master of Medicine (Clinical Pathology)										<b>NCQF LEVEL</b>	9		
<b>FIELD</b>	Health and Social Services			<b>SUB-FIELD</b>		Clinical Pathology				<b>CREDIT VALUE</b>	640			
New Qualification						✓		Review of Existing Qualification						
<b>SUB-FRAMEWORK</b>		General Education					TVET					Higher Education		✓
<b>QUALIFICATION TYPE</b>	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

#### Rationale:


The Master of Medicine (Clinical Pathology) is a degree to qualify medical doctors to contribute at an advanced level in the development of knowledge in the Clinical Pathology discipline. This degree aims to create a medical specialist cadre in clinical laboratory-based sciences. Currently, in Botswana, there is no training programme for doctors who wish to specialize in Clinical pathology.

Pathologists have considerable skills which enable them to contribute significantly to the provision of high quality efficient and effective health care. By training first as medical practitioners and then as specialist pathologists, the skills they acquire enable them to understand clinical disease processes in depth and their diagnosis. Pathologists have the ultimate responsibility for the test results, the quality and safety standards of the laboratory and advising clinicians on the interpretation of the test results in the “appropriate clinical context” and recommend further investigation of the patient when necessary. The Clinical Pathologist develops skills

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and work in multidisciplinary laboratories: Microbiology, Chemical Pathology, Hematology and Blood transfusion. They form an integrated laboratory team together with scientists and technicians but also support doctors and other medical professionals in the clinical setting. In other words, through their medical background, Clinical Pathologists perform a dual role of understanding the needs of other clinicians caring directly for patients and also the exact requirements of the laboratory to produce accurate, appropriate and timely results. An important further area of experience that a pathologist has is that, as a senior medical student, intern and resident medical officer, the pathologist has been a referrer to a pathology service and has been trained in responsibly requesting diagnostic pathology investigations. Furthermore, he/she has a clear appreciation of the medical significance of a patient's test results and is able to assess which require urgent notification to the treating clinician. These core professional functions of pathologists are a crucial and necessary part of any evidence based health care delivery service.

Our investigations into Botswana's health care delivery services showed that evidence-based practice is grossly limited because of the lack of or inadequate number of pathologists in practice in the country.. Medical specialists in pathology and laboratory medicine are some of the scarcest skills in health. There is not a single citizen doctor that is a Clinical Pathologist. None of the district hospitals have a single clinical pathologist and yet most offer care at specialist level. This has affected the quality of patient care as laboratory results are either not reliable or feedback is never provided to the requesting clinician. Capacity enhancement in laboratory service through training of specialist laboratory physicians is critical to revolutionize the delivery of health care services and improve health outcomes for Botswana. Currently, there is no Master of Medicine (Clinical Pathology) degree being offered in the country for young Botswana doctors who may wish to specialise in Clinical Pathology. Master of Medicine (Clinical Pathology) degree is only offered in South African and Kenyan Universities in the SADC region and so Clinical Pathologists are in demand both in the public and private sector. This therefore means that, this qualification will be very marketable in the region and beyond. Additionally, with Botswana's ever growing economy, it is envisaged that a number of private providers of health care services will be established which will further place a demand for the services of specialist pathologists. Hence, the need for the Master of Medicine (Clinical Pathology) degree in the University of Botswana.

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**Ref:**


1. MOHW TRAINING STRATEGY AND PATHOLOGY HIGHLIGHT (attached)
2. Sayed, S., Mutasa, R., Kaaya, E., Mudenda, V., Rajiv, E., Vuhahula, E., ... & Fleming, K. (2020). Establishing the College of Pathologists of East, Central and Southern Africa-The Regional East Central and Southern Africa College of Pathology. *African Journal of Laboratory Medicine*, 9(1), 1-8.
3. HRDC Top Occupations in Demand Report 2017, page 6 – 9.
4. Botswana Health Professions Council (BHPC) 2012/13 Annual Report, page 22 – 26

**PURPOSE:**

The graduate of the Master of Medicine (Clinical Pathology) will be able to provide high quality Clinical Pathology diagnostic services in the field of Chemical Pathology, Hematology, Blood transfusion and Microbiology.

The qualification will enable graduates to:

- Apply advanced knowledge of medical laboratory science to conduct high-level laboratory testing, as well as interpretation and formulation of results.
- Interpret laboratory results in the “appropriate clinical context” and thus balancing the needs of the requesting physician and the patient.
- Develop substantial professional and management skills to enhance the optimum use of limited laboratory resources such as advice on unnecessary and/or inappropriate requests for tests.
- Develop specialized research and capacity to conduct research in clinical scenarios that will generate new knowledge and improve their operations.
- Demonstrate competencies in health leadership.


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### ***ENTRY REQUIREMENTS (including access and inclusion)***


Applicants must hold

- NCQF Level 8 Bachelor of Medicine Bachelor of Surgery degree (MBBS/ equivalent) from recognized Universities
- Recognition of prior learning (RPL) and credit accumulation and Transfer (CAT) will be applicable and considered for access to this qualification
- Completed at least two years of clinical practice that must include at least 12 months in a recognized supervised internship programme.
- They must also be registered or registrable with the Botswana Health Professions Council (BHPC).

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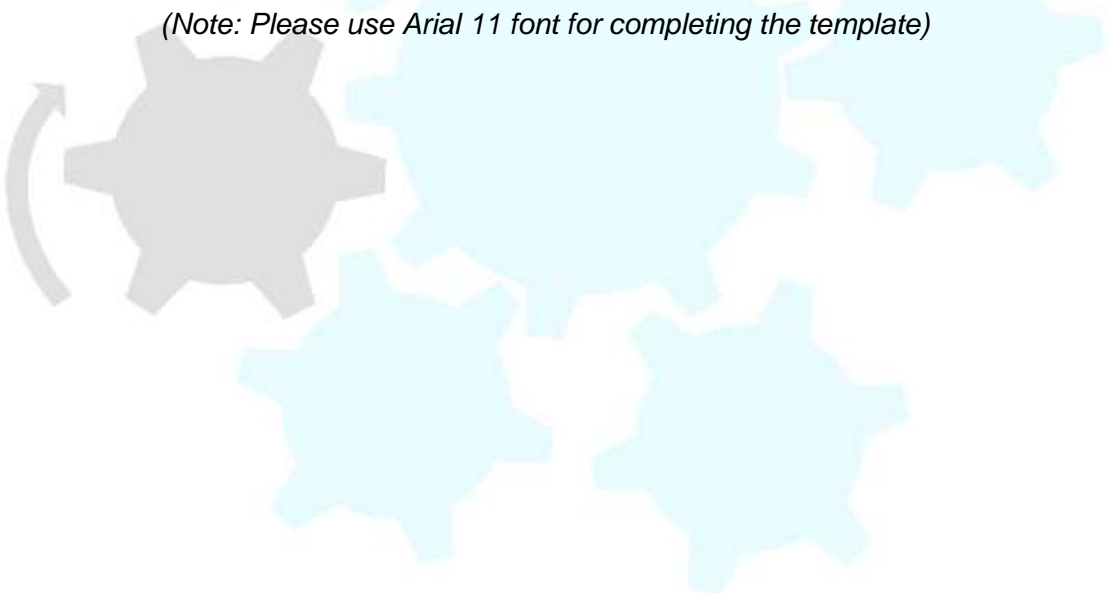
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<b>SECTION B</b>		<b>QUALIFICATION SPECIFICATION</b>	
<b>GRADUATE PROFILE (LEARNING OUTCOMES)</b>		<b>ASSESSMENT CRITERIA</b>	
1. Develop high level of competency in the interpretation of diagnostic tests results and situate them in the appropriate clinical context.		1.1 Perform diagnostic tests related to Clinical Pathology competently. 1.2 Interpret diagnostic tests results accurately and correlate them in the appropriate clinical context. 1.3 Demonstrate understanding of the disease process.	
2 Evaluate the needs of the clinician and the patient from the perspective of delivery of pathology services.		2.1 Deliver correct and timely advice regarding appropriate tests and proper collection of specimens to the clinicians. 2.2 Interpret and record results accurately. 2.3 Devise effective communication regarding laboratory test results with the clinician. 2.4 Deliver verbal and written/printed test results to clinicians in a timely manner. 2.5 Conduct follow up of the patients with critical results	
3 Evaluate laboratory data and conduct clinical audit periodically.		3.1 Plan periodic clinical audit. 3.2 Analyze the audit data accurately. 3.3 Disseminate audit information to the clinicians and relevant authorities regularly and timely to improve patient care.	
4 Develop effective communication with other staff in the laboratory on quality control measures and standard operating procedures (SOPs) for testing and issuance of results.		4.1 Develop effective communication with laboratory staff in verbal and nonverbal format. 4.2 Develop documents on SOPs for all tests and procedures and quality control measures employed for each test. 4.3 Conduct audits on staff practice according to the documents and give recommendations effectively.	
5 Develop effective collaboration with other members of the health care team and thereby foster multi-disciplinary teams in patient care.		5.1 Develop good interpersonal communication skills with all members of the health care team; in both verbal and nonverbal format. 5.2 Organise multidisciplinary team meetings and grand	

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	rounds to suggest or modify patient management appropriately.
<p>6 Develop advanced managerial, organizational, supervisory and safety skills in the delivery of services at primary and secondary health care laboratories.</p>	<p>6.1 Manage the laboratory service effectively.</p> <p>6.2 Perform internal audits and mitigates problems arising.</p> <p>6.3 Demonstrate safety measures employed in the lab.</p> <p>6.4 Provide documentation on standard operating procedures (SOPs) for all tests and quality control (QC) measures employed for each test.</p> <p>6.5 Implement quality improvement projects to improve lab mandate.</p> <p>6.6 Design cost effective interventions to optimize processing and reporting systems at primary and secondary healthcare laboratories to allow timeous delivery of test results to clinicians.</p>
<p>7 Supervise undergraduate students, residents and other cadre of health care staff in development of laboratory skills and research.</p>	<p>7.1 Develop training instructions for teaching and upskilling medical students, residents and other members of the healthcare team.</p> <p>7.2 Mentor junior residents and undergraduate students to develop necessary laboratory skills, communication skills with other stakeholders and research skills.</p>
<p>8 Deliver quality service professionally, ethically and consistent with the obligation of a medical specialist.</p>	<p>8.1 Provide compassionate care and professionalism to the patients other stakeholders.</p> <p>8.2 Recognise the roles of other health care workers, treats them with respect and consult them appropriately.</p> <p>8.3 Provide leadership when called upon to do so.</p> <p>8.4 Demonstrate accountability to the patient, society and the profession.</p>
<p>9 Develop problem solving skills in the delivery of patient care.</p>	<p>9.1 Identify problems in the routine laboratory activities.</p> <p>9.2 Demonstrates effective problem-solving skills in the delivery of care to the patient.</p>
<p>10 Design research ethically on health problems of the country and communicate the findings in a useful manner.</p>	<p>10.1 Identify a suitable research topic.</p> <p>10.2 Conduct a literature search to establish current knowledge concerning the selected topic.</p>

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	10.3 Design a comprehensive protocol for submission for ethical approval for the research.
	10.4 Collect the necessary data and materials ethically from participants.
	10.5 Conduct the tests if required, generate and analyse the data to arrive at conclusions.
	10.6 Prepare an original research thesis and/or article for publication in a recognised academic journal.


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<b>SECTION C</b>	<b>QUALIFICATION STRUCTURE</b>				
<b>COMPONENT</b>	<b>TITLE</b>	<b>Credits Per Relevant NCQF Level</b>			<b>Total (Per Subject/ Course/ Module/ Units)</b>
		<b>Level[ ]</b>	<b>Level [ ]</b>	<b>Level [9]</b>	
<b>FUNDAMENTAL COMPONENT</b>  <i>Subjects/ Courses/ Modules/Units</i>	Communication, Ethics and Professionalism			<b>4</b>	<b>4</b>
	Introduction to Clinical Research			<b>4</b>	<b>4</b>
	Introduction to the medical literature			<b>4</b>	<b>4</b>
	Public Health Principles and International Health			<b>4</b>	<b>4</b>
	Introduction to Healthcare Management			<b>7</b>	<b>7</b>
	Principles and techniques of medical education			<b>4</b>	<b>4</b>
<b>CORE COMPONENT</b>  <i>Subjects/Courses/ Modules/Units</i>	M. Med Exam preparation			<b>16</b>	<b>16</b>
	Introduction to Clinical Pathology			<b>121</b>	<b>121</b>
	Dissertation			<b>72</b>	<b>72</b>
	Intermediate Clinical Pathology			<b>260</b>	<b>260</b>
	Advanced Clinical Pathology			<b>144</b>	<b>144</b>




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<b>ELECTIVE/ OPTIONAL COMPONENT</b>  <i>Subjects/Courses/ Modules/Units</i>					

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<b>SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL</b>		
<b>TOTAL CREDITS PER NCQF LEVEL</b>		
<b>Component</b>	<b>NCQF Level</b>	<b>Credit Value</b>
<b>Fundamental</b>	<b>9</b>	<b>27</b>
<b>Core</b>	<b>9</b>	<b>613</b>
<b>TOTAL CREDITS</b>		<b>640</b>
<b>Rules of Combination:</b> <b>(Please Indicate combinations for the different constituent components of the qualification)</b>		
<b>Fundamental Level 9 contributes 27 credits and Core Level 9 contributes 613 credits for a total of 640 credits. No Elective component for this qualification.</b>		
<b>ASSESSMENT ARRANGEMENTS</b>		
Assessment will comprise of : Formative assessment= 40% Summative= 60%		
<b>MODERATION ARRANGEMENTS</b>		
Both internal and external moderation will be undertaken by moderators who have been quality assured.		
<b>RECOGNITION OF PRIOR LEARNING</b>		
RPL and CAT will be applicable for award of Master of Medicine in Clinical Pathology qualification on a case by case assessment as per the regulation of individual ETP and in alignment with international policies.		
<b>CREDIT ACCUMULATION AND TRANSFER</b>		
Credit accumulation and transfer will be applicable for award of this qualification on a case by case assessment and as per the regulations of individual ETPs and in alignment with international policies.		
<b>PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)</b>		

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Candidates who have completed this qualification will be registrable with the Botswana Health Professions Council or equivalent to practice independently as a specialist Clinical Pathologist. They can go into further horizontal or vertical pathways

#### Horizontal articulation (NCQF Level 9)

- Subspeciality**

Master of Medicine in Hematology  
Master of Medicine in Chemical Pathology  
Master of Medicine in Clinical Microbiology  
Master of Medicine in Clinical Immunology  
Master of Medicine in Molecular pathology  
Master of Medicine in Medical Genetics  
Master of Medicine in Virology

#### Vertical articulation (NCQF=10)

- Doctor of Science in Medicine
- Doctor of Philosophy (PhD)

#### Employment

Clinical Pathologist

Medical Academic

Medical researcher

Lab Managers/Lab administrators

Hospital/ Health system Administrators


Serve in advisory capacities (medical boards, medical insurance, medical device/drug company boards)

#### QUALIFICATION AWARD AND CERTIFICATION

Qualification and Certification of Master of Medicine in Clinical Pathology will be awarded along with the transcript to the candidate who achieve **640** credits and satisfies the rules of combination as shown in page 5.

#### REGIONAL AND INTERNATIONAL COMPARABILITY

The Masters of Medicine (Clinical pathology) of the University of Cape Town and Witwatersrand (NQF level 9) is similar to the proposed qualification in regards to the core disciplines, exit outcomes, and assessment methods and in the development of specialist Clinical Pathologists.

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The difference is in the years of training, fundamental courses, rotations in the labs each year and the credits.

- The training period is 4 years and six months for MMed (Clinical Pathology) at UCT and WITS. Last six months residents practice as independent pathologist in UCT and WITS. The training for the proposed qualification is 4 years.
- There are no fundamental modules/courses in the MMed qualification at UCT and WITS whereas the proposed qualification has the fundamental courses.
- The proposed qualification has three monthly rotations in each of the three disciplines (Chemical Pathology, Microbiology, Hematology and blood transfusion) yearly (In total 12 months). The South African qualifications have yearly rotation in the three disciplines (12 months).
- The proposed qualification has a total credit of 640 for the four years of training, taking into consideration 40 hours of learning weekly, including student directed learning in the form of assignments, preparations for seminars, journal club and clinicopathological discussions etc. The 180 credits by UCT&WITS is calculated differently (Unknown).

The MMed (Clinical Pathology) qualification at Aga Khan University, Kenya, is also similar to the proposed MMed Clinical Pathology qualification in terms of:

- Training of 4 years duration
- Fundamental and core modules.
- Exit outcomes and rotations in all disciplines each year. The different core courses are offered every 3 months yearly
- The summative assessment for the part 1 and 11 are similar. There are two very similar summative examinations at the same stages of training.
- Both the qualifications aim to produce highly competent specialist Clinical Pathologists.
- The difference is in the calculation of the credits. The credit units are calculated taking into account the total teaching and learning hours. (Total teaching/learning hours for 48 Weeks in a year (40 x 48) 1920)

For purposes of allocating time for the courses, the unit system has been used.

The units are derived as follows:

- 1 Unit - 16 hours of lectures or
- 32 hours of tutorials or
- 48 hours of practical/self-directed laboratory work/learning (SDL)

The total Credit unit for the Aga Khan MMed (Clinical Pathology) qualification is 190 whereas the proposed qualification has a credit of 640.

*(Further details given in the attached Qualification comparability matrix)*

## **REVIEW PERIOD**

The qualification will be reviewed every five years in line with the requirements of NCQF policy.

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