

Optometric Education in Trinidad and Tobago: Developing a New Program in the West Indies

Sandra Wang-Harris, OD, MPH, FAAO

Abstract

Trinidad and Tobago (TT) is a twin island nation in the Southern Caribbean, just northeast of Venezuela. TT had recently signed the World Health Organization's Vision 2020: Right to Sight declaration and was working closely with the Pan American Health Organization's Strategic Framework for Vision 2020-Caribbean Region, when the University of the West Indies St. Augustine Campus opened its doors in 2009 to the first BSc degree program in optometry in the English-speaking Caribbean. Since then, the university has forged a foundation seeking to produce world-class optometrists recognizable by international standards. This paper summarizes the history of this degree program, the current situation and the multitude of factors shaping the future TT graduates in optometry. .

Key Words: *international optometry, Trinidad and Tobago optometry, WHO Vision 2020, optometric education*

Economy and Background

The two islands comprising Trinidad and Tobago (TT) are small in land size at 5,000 sq. km., slightly smaller than the U.S. state of Delaware, but TT is the economic, industrialized powerhouse of the English-speaking Caribbean, West Indies. Due to its large oil and natural gas reserves, its energy sector accounts for more than 40% of the Gross Domestic Product. 90% of TT's export commodity and 50% of the government's revenues are derived from oil and natural gas.¹⁻³ TT's growth rate and per capita income are among the highest in Latin America and the Caribbean, and the island nation is poised to continue to grow as the current government looks to diversify the economy amid current inflation surges during the worldwide recession.¹

The 2011 Human Development Index, published by the United Nations Development Program, ranked TT 62nd out of 197 countries, which positions it in the category of "high human development."³ With almost 1.3 million inhabitants, the country has an average life expectancy of 71 years and boasts one of the highest literacy rates in the world at 98.6%.² Primary and secondary education through 12 years is compulsory and free for all TT children. The government places education high in its priorities, providing 100% government tuition funding for TT citizens who matriculate and pursue a tertiary level qualification at a local or regional university.⁴ This environment of strong educational support has fueled the birth of optometry as a tertiary professional degree.

History of Trinidad and Tobago Optometry

The profession of optometry has a long history in the republic of Trinidad and Tobago that is directly linked to the country having been part of the commonwealth of the United Kingdom (UK). Under British rule, ophthalmic opticians set up practice and dispensed ophthalmic prescriptions at the turn of the 20th century. Prior to 1960, TT optometrists followed the British National Health Service Regulations. Ironically, optometrists were freely al-

Dr. Wang-Harris is a lecturer at the University of the West Indies Faculty of Medical Sciences where she conducts distance-based courses via the Internet. Living in the country of Timor Leste, she is a consultant for The Fred Hollows Foundation New Zealand in eyecare development and education.

lowed to use diagnostic drugs such as mydriatics and cycloplegics at that time. In 1960 the Trinidad and Tobago Opticians Registration Council (TTORC) was created to act as a regulatory board. Afterwards, the Opticians Act of 1960 barred optometrists from practicing with mydriatics, cycloplegics or other pharmaceuticals. The title or degree of "Doctor" was also barred from use by optometrists or practitioners registered under the Act of 1960.⁷ This offense is still on the books as punishable by a \$1,500 fine and 6 months imprisonment.⁷ More recently, the Amendment of 1987 allows registered optometrists only limited use of diagnostic anesthetics and diagnostic staining drugs.⁸ However, the original Opticians Act of 1960, drafted more than a half century ago, still stands as the law of TT in today's practice of optometry. Currently, a revised draft policy proposal is under review by the TT Ministry of Health to change the structure of the TTORC and increase the scope of practice available to qualified and licensed optometrists.⁶ As in other developed countries, any legislative proposals to widen optometry's scope of practice have been met with severe criticism by political and economic interests as well as organized ophthalmology.¹⁰

There are 114 optometrists registered with the TTORC under the Ministry of Health.⁵ Of this total, the majority of licensed optometrists received their training and licensure from the UK (approximately 60%). The next largest group of optometrists were trained and qualified in Nigeria (approximately 25%). At 13% and increasing yearly, optometrists trained and qualified in South Africa comprise the third group of optometrists. The remainder of registered optometrists are North American-trained and licensed (2%).⁶ As occurs in Jamaica, the British-trained optometrists receive bachelor's degrees in optometry, qualify and register under the General Optical Council in the UK and, with further training and licensure, can qualify to prescribe therapeutic pharmaceutical agents (TPA). Yet, under current TT law, these optometrists, regardless of qualification, are still restricted in TT from use of diagnostic and therapeutic pharmaceutical agents.^{9,11} The TT law today makes

it illegal for any optometrist to dilate pupils in order to perform a thorough fundus examination, regardless of the country in which he or she was qualified and licensed. Failure to diagnose a blinding condition due to incomplete examination not only endangers the patient, but also diminishes public confidence in the provider and the eyecare profession overall.

Establishment of the Optometry Degree Program at the University of the West Indies

Rationale and history

The decision to begin any academic training program, particularly a professional program, must be carefully weighed by all stakeholders, including the government's Ministry of Health, Ministry of Tertiary Education, the public health sector, the private health sector and the training institution that would undertake the program. In the original syllabus of the BSc optometry degree, the rationale for starting the program states:

"This proposal for the introduction of a Bachelor of Optometry programme at the undergraduate level at the St. Augustine Campus of the University of the West Indies arose out of the need to increase the number of trained optometrists to adequately service the region's ever growing demand to deliver effective health care services within the health sectors of the region [. . .]. The University of the West Indies has as one of its mandates the provision of appropriate human resources both in terms of numbers and appropriate skills and competences necessary to fulfill the developmental needs and in the process positively transform the Caribbean Region. It is in this context that the FSA [Faculty of Science and Agriculture] is pleased to propose this programme and now sets the way ahead to address this human resource need required by the region as it strives to fulfill the delivery of Vision 2020."¹⁷

In TT, the cost of health care provided in public hospitals is borne by the government. Salaries of the optometrists in public health service are also paid for by the Ministry of Health and the TT government. Prior to 2000, the TT gov-

ernment sponsored students to study in the UK and return to public health service after receiving their diploma. A generation of optometrists returned to their native country to practice optometry and after finishing their public health service contractual period in the government clinics, began their private practices. Slowly, as optometrists retired and left the public sector, government clinics and hospitals closed the primary care optometry and optical eye services for lack of adequate staffing or resources. Ophthalmology services, however, always provided for the public in the government-sponsored hospitals and clinics throughout this time until the present. In 2006, TT signed onto the World Health Organization's (WHO)'s Vision 2020: The Right to Sight initiative, and TT's public stakeholders realized that optometry ought to play some role in the provision of primary health care in the public sector.¹⁴⁻¹⁶ In 2008, a UK-trained optometrist joined staff at one of the pilot eye departments at Sangre Grande Hospital and is currently the only optometrist employed by the TT's Ministry of Health.¹² Now realizing the importance of optometry in eyecare services for the public, it is the present goal of the Ministry of Health to open optometry eye clinics and staff them with locally trained optometrists at the country's major hospitals by late 2013.¹⁹

At the same time TT's public health services sought to improve its provision of eyecare services, the private sector also became an integral stakeholder in the optometry degree program. Over the course of the past two decades, along with the upsurge of TT's economic growth, demand for optometric and sight testing services increased. Private sector independent and corporate optical companies could not meet the consumer demand for optical goods and services. In response to this enlarged economic demand, the private sector began looking into ways to increase optometric manpower. One of the ways to do this was to augment the number of sponsored Trinidadian students on scholarship to the UK. After qualifying in the UK, these TT citizens were expected to return and work for the sponsoring company. More recently, private companies using recruitment services

have been able to staff optical offices with optometrists from other foreign countries such as South Africa. Seeking still other sources of optometric manpower, many private companies supported the idea of a local training center, which would produce optometric manpower that would be economically feasible and self-sustainable for TT.

A working and planning committee consisting of private, public and educational stakeholders began working on the feasibility, funding and impact of starting the first BSc degree program in optometry in the English-speaking Caribbean.¹³ The University of the West Indies (UWI) was the prime location to launch this endeavor as UWI is the premier institution in the region with campuses in 15 countries. UWI is known internationally for academic and research excellence, boasting eight prime ministers, two Nobel laureates and many dignitaries as alumni. With the full support and commitment of Professor Clement Sankat, Pro Vice Chancellor and Principal of UWI's St. Augustine Campus, and Professor Dyer Narinesingh, Dean of the former Faculty of Science and Agriculture, the UWI BSc optometry program commenced with its first class of 16 students in September 2009. Faculties from both the former Science and Agriculture as well as the Faculty of Medical Sciences taught students. Now, starting its fifth year, the program has shifted to the Faculty of Medical Sciences under the Office of the Dean, Professor Samuel Ramsewak. There are currently four full-time optometry faculty members and one part-time distance-based faculty member (the author). The faculty members must have graduate degrees in optometry, vision science or the equivalent in experience. Today, there are approximately a total of 90 students in all four years of the BSc program, including students from other Caribbean countries.

Objectives of the optometry program in Trinidad and Tobago

For any type of optometric training program, the mission is to produce graduates who can provide quality eyecare services to the public. From the beginning of the establishment of the planning committee for the optometry program, there was much discussion

Figure 1
Jehan Ali, a student in the BSc degree program in optometry at the University of the West Indies St. Augustine Campus in Trinidad and Tobago, works with a patient. The program is the first BSc degree program in optometry in the English-speaking Caribbean.
(photo by Annelise Randall)



Figure 2
Camelia Powdhar is a student in the BSc degree program in optometry at the University of the West Indies St. Augustine Campus in Trinidad and Tobago. In the past two decades, demand for optometric services in the twin island nation has increased along with an upsurge in its economic growth.
(photo by Annelise Randall)



on how comprehensive the training should and could be in order to receive the UWI BSc in optometry. In other words, at what competency level would UWI optometry graduates qualify after receiving the BSc degree? In the BSc in optometry syllabus, the curriculum states the following objectives:

- To provide a sound scientific and professional base for the production of optometrists capable of working anywhere in the Caribbean and elsewhere in the world where the qualification, skills and competence of the BSc optometry (UWI) are acceptable.
- To produce optometrists who would satisfy internationally recognizable standards and who could undertake further training towards specialization.
- To produce optometrists with sufficient management ability to play a leadership role in healthcare delivery.
- To provide such training as would equip the optometrists to render and/or participate with other health practitioners in providing health care.¹⁷

In the points above, UWI actively seeks students from other Caribbean nations in order to meet the human resource needs for the region. Also, UWI clearly states that it aspires to train graduates in optometry to international standards. Due to the rapid globalization of most health professions and the wide differences in educational standards from country to country, the World Council of Optometry (WCO) has developed a Global Competency-Based Model of Scope of Practice in Optometry. The four categories of services represent cumulative skills in this order:

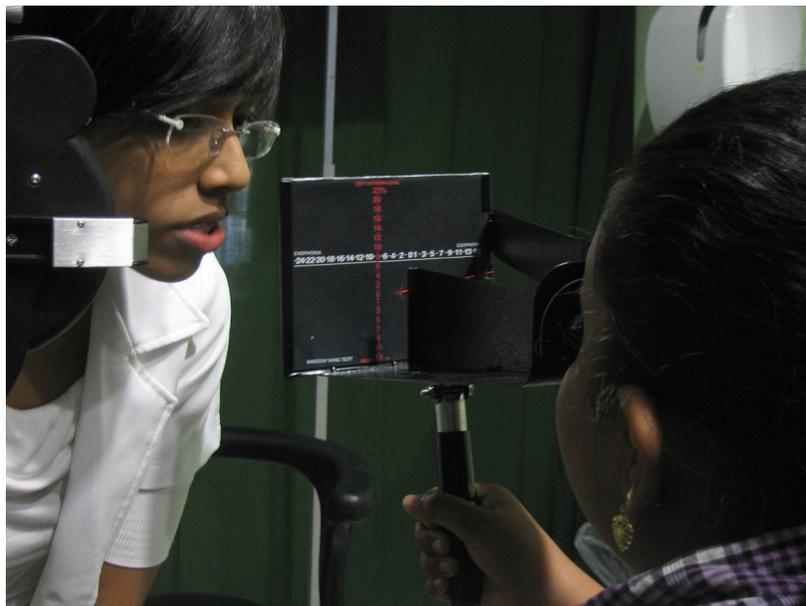
1. Optical Technology Services

Management and dispensing of ophthalmic lenses, ophthalmic frames and other ophthalmic devices that correct defects of the visual system

2. Visual Function Services

Optical Technology Services, plus
Investigation, examination, measurement, diagnosis and correction/management of defects of the

Figure 3
Among the students in the BSc degree program in optometry at the University of the West Indies is Farielle Khan. Built on a strong foundation in curriculum, clinic, teaching and support from the Trinidad and Tobago government and the university administrators, the program graduated its inaugural class this year. At the same time, it is being met with controversy by some in the community regarding the scope of practice and licensure of graduates.
(photo by Annelise Randall)



- visual system
- 3. Ocular Diagnostic Services**
Optical Technology Services, plus
Visual Function Services, plus
Investigation, examination and evaluation of the eye and adnexa, and associated systemic factors, to detect, diagnose and manage disease
- 4. Ocular Therapeutic Services**
Optical Technology Services, plus
Visual Function Services, plus
Ocular Diagnostic Services, plus
Use of pharmaceutical agents and other procedures to manage ocular conditions/disease¹⁸
- In order to progress from category to category, there are stringent indicators to measure each level of criteria. Optometrists must show competency based on performance in order to achieve the next standard. The WCO writes that in order to be an optometrist, an individual must “provide comprehensive eye and vision care, which

includes (1) refraction and dispensing, (2) detection/diagnosis and management of disease in the eye, and (3) the rehabilitation of conditions of the visual system.¹⁸ The document entitled “World Optometry: Enhancing Vision, Protecting Health: A Case Statement” is highly recommended reading for those who would like a detailed description of the global competency-based model for optometry.¹⁸

The current syllabus of the UWI BSc in optometry written in collaboration with stakeholders on the planning committee accounts for the WCO definition and offers UWI graduates a robust and comprehensive optometric education worthy of a UWI diploma recognizable by international regulatory bodies.

Qualifications for admission into the BSc in optometry program

The requirement for admission to UWI’s BSc in optometry is quite rigorous and competitive. Since the program’s inception in September 2009, this popular program has had large

numbers of applicants. The large pool of qualified applicants is partially due to TT's Government Assistance for Tuition Expenses (GATE) funding scheme allowing TT citizens to obtain a tuition-paid tertiary education. However, only candidates with strong academic backgrounds are accepted into the BSc program.⁴ There are more than 100 applicants every year for entrance into the program, while only 24 are accepted based on competitive standardized tests and qualifications.

The Caribbean Advanced Proficiency Examination or CAPE, as it is commonly called, is used to assess students finishing secondary schools. The Caribbean Secondary Education Certificate (CSEC) is given by the Caribbean Examinations Council (CXC) using a six-point grading scheme. Grade I is the highest grade for the CSEC; whereas, Grade VI is the lowest grade possible. The General Certificate of Education qualification (GCE) is also known as "A" level or Advanced level. To the North American reader, this is loosely equivalent to a beginning freshman course in an undergraduate degree program. Entry into the UWI optometry program requires the candidate to meet the following minimum qualifications:¹⁷

- The university requirements for UWI matriculation and have passed English, Mathematics, Biology and Physics at CSEC General Proficiency level at Grades I, II or since 1998, Grade III or equivalent qualifications.
- Obtained passes in three two-unit subjects at CAPE, both units at Grade II or better, or GCE A Level Equivalent. This must include Physics and Chemistry, or
- Have an appropriate Associate Degree or equivalent certification with a minimum GPA of 3.0 (or equivalent) from a recognized Tertiary Level Institution, or
- Have any other appropriate qualification and experience acceptable to the Faculty of Medical Sciences.¹⁶

Despite stringent admission requirements and a large pool of applicants, there is still some attrition (less than 3% of total optometry students) and repetition of courses with students fail-

ing to comprehend the degree of intensity mandated both in time and depth of academic study to complete the optometry program as a bachelor's level professional degree.

Program curriculum development¹⁷

The UWI optometry program is a meticulous, strenuous course of study with clinical practice. The university calendar is based on two semesters of 10 weeks each. The first year of the optometry course consists mainly of theoretical and basic science courses with a strong emphasis on physics, biochemistry, anatomy and physiology (**Appendix A**).¹⁷ The courses are taught by both lecturers in the Faculty of Medical Sciences and the newly formed Faculty of Science and Technology. The optometry faculty members concentrate on the vision science courses, including perception and visual optics. The second year of the optometry course continues with a strong foundation of theoretical vision sciences with the addition of clinically related courses including general clinical procedures, binocular vision, contact lenses and low vision in the latter part of the year. The third year is strongly clinically based with particular emphasis on ocular and visually related systemic disease and manifestations. To further prepare students for professional practice, students also complete a course on visual ergonomics and another in law and optometric management. A third-year capstone experience is a yearlong assignment on a relevant thesis, including literature review, seminal research with clinical element and a summary poster presentation. This research project is to give students an opportunity to conduct a small-scale study on a topic of interest to both the local and worldwide optometric community. It is hoped this experience will give some students a chance to consider optometric research or optometric education as a career possibility.

The UWI's first low vision clinic began seeing patients in May 2011 and works cooperatively with the Trinidad and Tobago Blind Welfare Association with low vision patient recruitment and dispensing of low vision aids to the clients. To date, it has performed well over 100 low vision evaluations and has dispensed as many low vision aids. Working with a pediatric behavioral specialist

from the public health hospital system, the pediatric and binocular vision clinic began seeing patients in November 2011. UWI's specialty clinic currently provides comprehensive pediatric examinations, binocular vision training, perceptual vision testing and training. There is no lack of patients, as referrals from patients, community optometrists and staff keep the waiting lists full for these types of services, which are not readily available anywhere else in the country.

Before students are allowed to continue to the fourth year, their internship year or pre-registration year, all students must successfully pass a competency examination in the final weeks of the third year. This exam on basic clinical skills, including refraction, binocular vision assessment, lensometry, tonometry and fundus examination, is evaluated by all optometry faculty as well as external examiners. Students evolve rapidly into independent clinicians during the fourth year. This is when they attain proficiency in the professional and ethical aspects of the optometry profession. The fourth-year clinical experience includes eye clinics in the public hospitals, an outpatient clinic of the optometry department at UWI, as well as private eye clinics or practices that can ensure adequate supervision by an assessor or preceptor.¹⁹ After the fourth-year internship is successfully completed, students graduate with a BSc in optometry from UWI and are eligible to become candidates for registration with the TTORC.

Credentialing and licensure of graduates from UWI

At the time of this writing, procedural policy has not yet been enacted on an external assessment of UWI graduates in order to demonstrate their competency level. The TTORC, which is the regulatory body for opticians and optometrists, needs a mechanism in order to license the new graduates. Licensure solely by virtue of graduation is not sufficient in other developed countries, and therefore should not be in TT either. There are many people who rightly have the responsibility of safeguarding the public's vision and thus the responsibility to ensure the quality and competency level of optometry graduates from UWI and TT. To this

end, the UWI optometry faculty realizes that this program must be accredited by a recognized international accreditation body in order for the program to be viewed as a proficient and superior educational institution for optometry. Successful registration for UWI optometry graduates to practice in TT or other countries is one of the top priorities for the faculty at UWI in this academic year. Overall, the program is a very vigorous three-year course with a solid clinical practice internship in the fourth year.

Strengths and Weaknesses of Optometric Human Resource Development in TT

From the UWI optometry program's inception until present, key persons have wholeheartedly supported the idea of optometric education in TT. These include the visionary leadership of the Deans of the respective Faculties of Science and Technology and Medical Sciences, as well as the strong support of the Pro Vice Chancellor and Campus Principal of the UWI, St. Augustine Campus, Trinidad. Professional educational programs require great investments of time, money, resources, political persuasion and personal emotional energy.

Another crucial element in the successful building of this educational venture is the support of the government of TT, especially the Ministry of Health and the Ministry of Tertiary Education and Skills Training. Also, the faculty members, lecturers and staff increased their already full-time workload during these first years of the birth of this program. It is clear that this program could not have started and continue to thrive if devoted individuals did not continuously fan back into a flame the goal of producing state-of-the-art optometrists in the region. The commitment of these individuals and institutions is a strength that cannot be lightly stated in the long-term outcome.

With any new academic program, there are many limitations to what can be done in a short period of time. One of these is faculty recruitment and development. Although more than 100 practicing optometrists are registered on the island, virtually none have graduate degrees at the doctoral, professional or post-doctoral level. Per university

regulations, lecturers must possess a degree at the graduate level. Managing 90 full-time optometry students in all four years of study, the four full-time optometric faculty members are teaching multiple courses while simultaneously providing clinical instruction and administrative supervision — a feat unheard of by counterparts in other developed countries. Although specialty clinics are being managed by the current faculty, lecturers and instructors with specialized training, such as in low vision and pediatrics, are difficult to recruit for full-time faculty positions. Both specializations — childhood blindness and low vision — target underserved areas and are WHO goals in Vision 2020: The Right to Sight.²⁰ UWI is managing only due to strengths from committed individuals. Some of the brightest and most aspiring students are already stating ambitions to continue optometry studies abroad, complete graduate degrees, and return to TT to join the faculty at UWI.

TT might be resource-rich in natural gas and oil; however, the public health-care system suffers from system-wide lack of supplies and equipment. Nevertheless, the optometry program at UWI is able to find other ways of providing for the immediate need for specialized ophthalmic equipment for teaching, training and patient examination. Perhaps one of the most generous contributors from whom UWI optometry has benefitted in these first years is the partnership with Volunteer Optometric Services to Humanity (VOSH). The mission of VOSH is “to facilitate the provision and the sustainability of vision care worldwide for people who can neither afford nor obtain such care.”²¹ By supporting optometry schools and clinics, VOSH is fulfilling its mission statement through sustainable human resource development. VOSH, along with other international eyecare service organizations such as the Lions Club, has given invaluable service and support to the students at UWI. Working to combat blindness in developing countries, both organizations are stakeholders for the development of optometry in the region of Latin America and the Caribbean. Realizing that the long-term solution to avoidable blindness is patient/public education as well as pro-

vider training, VOSH has sent thousands of U.S. dollars' worth of equipment, spectacles and optical goods to TT for use in student education and patient service.

Discussion

TT has been fortunate to have large increases in its socioeconomic development in recent years. Though eyecare services have been more privatized over the past decade, there is still a great need for public and hospital-based optometry to help the majority of the population without the means or resources for private care. More importantly, with the increase in socioeconomic development, treatment of communicable eye disease is no longer the first priority in reduction of blindness in TT. Rather, eyecare practitioners in TT are called upon to treat chronic eye diseases and provide long-term care and rehabilitation.¹⁵ Around the world in developed countries, populations will continue to age, and the risk of visual impairment from glaucoma, diabetic retinopathy, and age-related macular degeneration is a top priority for Vision 2020 implementation.¹⁵

Conclusion

As populations begin to age and life spans increase, ministries of health are well aware of the chronic morbidities such as blindness that can exact an economic cost as well as a cost of adherence and patient compliance.¹⁵ Optometrists play an important role in managing these populations, usually being the first point of contact for patients seeking eyecare services in TT.

Now in its fourth year (**see Addendum**), the BSc in optometry program at the University of the West Indies, St. Augustine, is running with a strong foundation in curriculum, clinic, teaching and support from the TT government entities and the UWI university administrators. However, it is being met with controversy by some in the community regarding the scope of practice and licensure of graduates. If all of those who have doubts on the competency level of UWI's optometry graduates would consider the competent level of education given to the students by UWI's Faculty of Medical Sciences, and prioritize the needs of the country and the population, particular-

ly the public with limited access to care, it will be evident that optometry plays a pivotal role in the long-term eye care of the patient — not just short-term provision of optical goods. Perhaps the controversies regarding the role of TT's future optometrists revolve around the educational level and competencies because improved educational development usually works simultaneously with the legislative process?¹¹ It is clear that UWI's optometry students are being trained to WCO's highest level of education for an optometrist. Thus, ensuring a legislative future based on reason and focused on patient needs will reflect the true abilities of UWI's future optometry graduates. Such legislative change will, until proven over time, make some uncomfortable.

Regardless of the discussion or arguments, policy-makers must always remember that the good of the patient is paramount. Patient needs should always be considered first and foremost. Optometry and UWI's BSc program currently stand at a crossroads to improve the accessibility of quality eye care for the people throughout the entire Caribbean region. A high-level training program will attract the best students and faculty from other countries, while impacting the provision of optometric services for the future and fulfilling UWI's mandate in "the provision of appropriate human resources both in terms of numbers and appropriate skills and competencies necessary to fulfill the developmental needs and in the process positively transform the Caribbean Region."¹⁷ The reality is today's UWI optometry graduates are well-positioned to deliver the needed services and health care to protect and preserve citizens' eye health and functional vision. The UWI optometry program is soundly poised to become the primary optometry training facility for not only Trinidad and Tobago, but the entire English-speaking Caribbean

Addendum

As noted in the manuscript, the University of the West Indies, St. Augustine Campus, established the first BSc degree program in optometry in the English-speaking Caribbean in 2009. In September 2013, the program graduated its inaugural class.

References

1. United Nations Development Program, Country Programme Document for Trinidad and Tobago 2012-2015. [cited 2012 June 27]. Available from <http://www.undp.org.tt/>.
2. CIA World Fact Book. Trinidad and Tobago. (Updated September 11, 2012). [cited 2012 Sept 30]. Available from <https://www.cia.gov/library/publications/the-world-factbook/geos/td.html>.
3. United Nations Development Program. Human Development Report 2011. International Human Development Indicators. [cited 2012 Sept 30]. Available from http://hdr.undp.org/en/statistics/?gclid=CJ7z3c_Q3LICF-SPHtAod-V8AiA.
4. Trinidad and Tobago Ministry of Education. Government Assistance for Tuition Expenses (GATE). [cited 2012 Sept 30]. Available from <http://www.moe.gov.tt/gate.html>.
5. Trinidad and Tobago Ministry of Health. List of Registered Optometrists, Dispensing Opticians and Companies - 2012. [cited 2012 Sept 30]. Available from <http://www.health.gov.tt/downloads/DownloadDetails.aspx?id=270>.
6. St. Rose N. Member of the Trinidad and Tobago Optician's Registration Council. Personal correspondence. September 2012.
7. Trinidad and Tobago Ministry of Health. The Opticians Registration Act 1960. [cited 2012 June 27]. Available from <http://www.health.gov.tt/downloads/default.aspx?id=40>.
8. Trinidad and Tobago Ministry of Health. The Opticians Act Amendment 1987. [cited 2012 June 27]. Available from <http://www.health.gov.tt/downloads/default.aspx?id=40>.
9. General Optical Council. Information available on the world wide web at <http://www.optical.org/>.
10. WOLFE: World Ophthalmology Leaders Forum in Education. Global Optometry: Changing and Challenging Non-Physician Providers – Lessons Learned Around the World. Orlando, FL, 2011. [cited 2013 January 8]. Available from http://www.aao.org/international/wolfe/upload/WOLFE_global_optomtery_forum_2011-3.pdf.
11. Leasher J, Pike S. Optometry in the Americas. In *Optometric Care within the Public Health Community*. Old Post Publishing, 2009. Available from <http://webpages.charter.net/oldpostpublishing/old-postpublishing/Section%205,%20World%20Optometry/Sect%205,%20Optometry%20in%20the%20Americas%20by%20Leasher%20and%20Pike.pdf>.
12. Sharma S, Bridgemohan P. Personal correspondence with the author. May 2012.
13. Ming M. Personal correspondence. February 2012. There is currently an eyecare training program being run at the University of Guyana. At the time of this writing, the objective of this program is to train eyecare workers and refractionists. It is not a 4-year degree program.
14. Pan American Health Organization. Strategic Framework for Vision 2020: The Right to Sight. Caribbean Region. Barbados: 2010, pp. 9-13.
15. World Health Organization. Vision 2020 - The Right to Sight: Global Initiative for the Elimination of Avoidable Blindness; Action Plan 2006-2011. Geneva, Switzerland: 2007.
16. World Health Organization. Program for the Prevention of Blindness and Deafness. Global Initiative for the Elimination of Avoidable Blindness. Geneva, Switzerland: 2000.
17. University of the West Indies, St. Augustine. Syllabus for BSc in Optometry. Draft 14 published 12 July 2008.
18. World Council of Optometry. World Optometry: Enhancing Vision, Protecting Health: A Case Statement. 1 April 1005. pp. 20-21.
19. Fourth Year Clinical Studies for BSc Optometry: A Suggested Programme. Official proposal from UWI given to the Ministry of Health Permanent Secretary on 11 April 2011.
20. World Health Organization. Action Plan for the Prevention of

Avoidable Blindness and Visual Impairment, 2009-2013. Geneva, Switzerland: 2010.

21. VOSH International and VOSH - South East. Information available on the world wide web at www.vosh.org and <http://www.vosh-southeast.org/>.

APPENDIX A

UWI BSc in Optometry Program Summary

Every credit hour is equivalent to 1 hour of lecture per week and 1 hour of laboratory biweekly

Year 1

OPTM 1011 (4 credits) Human Anatomy and Physiology
OPTM 1012 (4 credits) General Pathology and Microbiology
OPTM 1062 (3 credits) Introductory Biochemistry
OPTM 1021 (6 credits) Anatomy and Physiology of the Eye
OPTM 1022 (3 credits) Anatomy and Physiology and Physiology of Related Structures
OPTM 1031 (2 credits) Introduction to the Optometry Profession
OPTM 1032 (2 credits) Introduction to the Clinical Optometry
OPTM 1041 (3 credits) Pure Optics
OPTM 1042 (3 credits) Visual Optics
OPTM 1051 (3 credits) Vision 1
OPTM 1052 (3 credits) Perception 1
OPTM 1061 (3 credits) Learning and Key Skills Development.

Year 2

OPTM 2021 (3 credits) General Pharmacology
OPTM 2022 (3 credits) Ocular Pharmacology
OPTM 2042 (3 credits) Ocular Pathology and Immunology
OPTM 2072 (3 credits) Ophthalmic Lenses and Dispensing
OPTM 2031 (3 credits) Visual and Ocular Assessment and Techniques
OPTM 2061 (3 credits) Assessment of Binocular Vision
OPTM 2051 (3 credits) Physiology of Vision and Perception II
OPTM 2082 (3 credits) Contact Lens Practice
OPTM 2011 (6 credits, yearlong) Clinical Optometry and Communication Skills

OPTM 2092 (3 credits) Clinical Methodology and Statistics
OPTM 2102 (3 credits) Low Vision and Ageing

Year 3

OPTM 3011 (3 credits) Ocular and Systemic Diseases I
OPTM 3012 (3 credits) Ocular and Systemic Diseases II
OPTM 3021 (6 credits, yearlong) General Clinical Practice
OPTM 3031 (6 credits, yearlong) Advanced Clinical Practice
OPTM 3041 (3 credits) Visual Ergonomics
OPTM 3051 (3 credits) Binocular Vision and Orthoptics
OPTM 3061 (3 credits) Contact Lens Practice II
OPTM 3072 (3 credits) Law and Optometric Management
OPTM 3082 (6 credits) Research Project

Year 4

OPTM 4021 (8 credits) Primary Eye Care Clinical Externship (summer, semester 1 and 2)
OPTM 4022 (6 credits) Paediatric and Binocular Vision Externship (summer, semester 1 and 2)
OPTM 4022 (6 credits) Paediatric and Binocular Vision externship (summer, semester 1 and 2)
OPTM 4023 (6 credits) Cornea and Contact Lens Externship (summer, semester 1 and 2)
OPTM 4024 (4 credits) Low Vision Externship (semester 1 and 2)
OPTM 4031 (8 credits) Medical/Surgical Clinical Externship (summer, semester 1 and 2)
OPTM 4041 (4 credits) Current Topics in Practice Management, Law and Ethics and Occupational Health (semester 1 and 2)