

# SUMMARY REPORT TO HOST INSTITUTION: Fulbright Senior Specialist Visit – March 2018

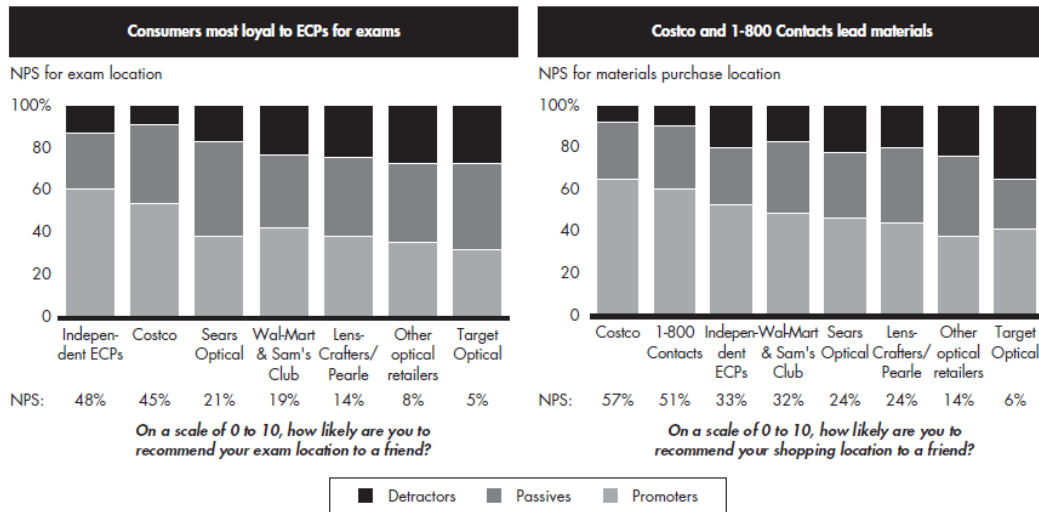
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## INTRODUCTION:

Optometry in South Africa remains largely a retail optical business model and has yet to be incorporated into the overall health scheme of the country as a health care profession. But if the profession is truly moving to a medical model, to resolve the massive unmet need for routine medical eyecare services, this will also require a push for government to shift its funding scheme to make optometry more like medicine and dentistry, where the revenues are linked to services and procedures rather than primarily retail sales. As a practical matter, this is a timely reinvention of optometry and is one that should be embraced heartily at all levels. Retail sales of optical goods (contact lens replacement and eyeglasses) will increasingly occur online, representing a declining revenue base for the current model of optometric practice. (<https://www.prnewswire.com/news-releases/us-online-eyewear-market-size-worth-usd-5054-million-by-2025-hexa-research-678739483.html>) Fighting this trend is a natural response because this revenue stream is currently at the core of what runs optometric practice. But viewing this fight as one that could be won and could result in reversal of this trend is futile, even if this is hard for some to accept. Fighting this trend is sensible, but solely as a way to forestall the inevitable, while fighting even harder for a new funding scheme to replace the revenues from retail sales that will someday disappear almost entirely for optometry – worldwide. Even online refraction looms as a technology that may be perfected. The reality is that even if driven with great determination, optometrists cannot metaphorically link arms along a beach and prevent the high tide from coming in. Denying the inevitable is not a strategy. The sole revenue stream available for optometry to add, into the second half of this century, is to be paid fairly in the health care system for services rendered and procedures performed. It has been shown that patient loyalty is far greater for services than for materials. (Figure 1, below. Source:

(<http://www.bain.com/publications/articles/the-future-of-independent-optometry.aspx>)

Figure 7: Eye care professionals earn the highest loyalty from exams, not materials



Note: NPS is % promoters minus % detractors (0-6=detractor; 7-8=passive; 9-10=promoter); 1-800 Contacts for contacts only; Target has small n (under 50)  
Sources: Bain Consumer survey (October 2010, n=6,055), Bain analysis

Facing this reality, the worst thing optometric educational programs could do in response, is to think of therapeutics education as just a little block of additional coursework to tack onto the existing current curriculum. (See Powerpoint Presentation sent under separate cover)

To really be prepared to meet the massive unmet need for medical eyecare in South Africa, and to be ready to embrace this very different reimbursement model, as online sales swallow up retail revenues, a very new and different product must come out of optometric educational programs. The new five year program must not be thought of as being a little extra time that has been added to offer a couple of TPA courses in an otherwise unchanged curriculum. There needs to be a reinvention of what an optometric graduate will be – a newly designed practitioner who has been prepared to take on these medical responsibilities at a professional level and not just at the level of a technician. If the new optometrist is only trained at a technician level in medical management they will never feel confident to embrace and push for new revenues for medical services because they know they are not ready to

take them on. That will push them back to retail optical as the only place they feel comfortable, leaving them sadly like a herd of hippos fighting desperately for space in the remaining mud holes at the end of dry season. The difference is that there will not be another wet season for retail optical in optometry – ever, and the tremendous opportunity created by emergence of the 5-year program will have been wasted.

A curriculum should, ideally, be produced to make a completely new professional, or the new grads of the 5 year program will not feel confident to undertake the new challenges that are likely to be the only viable major source of revenue in the second half of their careers.

What would such a curriculum look like?

Optics has, since the beginning of the profession, been the core of its knowledge base. Because there was not need for any significant medical education, it did not have to compete for space in the curriculum. In the specific case of the UJ program, this expanded to an extreme, under the direction of an optical engineer who insisted that optics be taught at an engineering level, even including linear algebra. If South African optometry has decided to move to an expanded model in which optometrists will eventually assume responsibility for significant amounts of acute and chronic ocular disease management, room will have to be made for the substantial coursework and additional supervised clinical time required to produce such a practitioner, if they are to work at a professional rather than merely a technical level. And while more knowledge is always a good thing, it will inevitably be optics and traditional vision science that will have to be “right-sized” to make room for the expansion of medical education, even with the addition of another year to the program.

## **CURRICULUM PROPOSAL FOR MEDICALLY QUALIFIED OPTOMETRIST**

ASSUMPTION: I am assuming that an academic year is made up of two 14-15 week terms and that most courses include 3-4 lectures hours a week. And where labs are included, each course has one three-hour lab per week. The programs will also have to decide whether to use any of the time between

academic years to add more clinical experience as is done in OD programs in the US.

### **Pre-Professional Year One:**

This year should provide a foundation in the general sciences and math to prepare students for a health professions education taught at the level of a diagnostician and prescriber, not solely as an allied health professional who is working under the orders of a physician. As much as possible, it would make sense to have this year mirror the first year of dental education, with which the parallels are substantial, since the goal of both programs is to create an independent, prescriber-level practitioner focused primarily upon one organ system.

**\*General physics** – two term (must include the optics part)

**\*Chemistry** – two terms

Uncertain if Chemistry 1C includes both inorganic and organic. Students need both, plus some biochemistry and it should be possible to include what is needed in two terms.

**Math/Calculus** – one term, combining differential and integral calculus

**Introduction to Optometry**

**Molecular and Cell biology**

**The Health Care System of South Africa**

**Medical Ethics**

**Statistics and Critical analysis of published data**

**Psychology (one term should be sufficient)**

In my view, this is too soon to begin Human Anatomy and I believe anatomy should be shifted to the first professional year, substituting molecular and cell biology into the pre-professional year. The first year should be core science and Molecular and Cell Biology makes a more logical and necessary pre-optometry inclusion as the representative core bioscience course to parallel with pre-professional physics and chemistry. This lay-out also

parallels with the structure and content of the pre-professional year of South African dental programs as well.

## A NOTE ON THE CURRENT OPTOMETRY CURRICULUM NOMENCLATURE.

The program should rename current courses called “Optometry-theory” to Vision Science-theory). The program should no longer call only the traditional elements of the curriculum Optometry. That sends the wrong message. It sends the dangerous message that all of the TPA part of the program is a little side-car to the curriculum, the core of which remains solely optics and psychophysics and only those parts are truly optometry. Both biomedical coursework and disease management must now be as much a part of Optometry Theory as optics and psychophysics. I would suggest that the program call what is now called optometry theory “vision science theory” and call biomedical science courses, “biomedical science theory”- or call all of them optometry theory (vision science or biomedical science). But reserving the term optometry only for those bits that are the traditional curriculum is no longer appropriate.

### **Year Two – OPTOMETRY**

#### **First half of the academic year**

Overview of Gross anatomy, Histology and Physiology:

The gross anatomy, histology and physiology facilities available for the training of optometry students at UJ are exceptional, even by comparison with many North American programs. The combination of cadaveric and plasticized specimens represents a rich environment for a solid grounding in anatomy and computer based teaching of histology is excellent. This array of facilities and online learning vehicles are the result of a career long commitment of Professor Shahed Nalla. In such a resource-challenged environment, what has been built is truly remarkable.

My understanding is that optometry students are currently taught only Head and Neck (and neuro) and they are taught the subjects using a systems rather than a regional approach. A regional approach inevitably focuses on function

of a system and secondarily the distribution of that one system, rather than the structural relationships between anatomical structures of all systems. In my view, this is a less useful approach for teaching anatomy to clinicians responsible for making diagnoses. For such professions, anatomical relationships between systems are most often the key to understanding a set of multi-system signs and symptoms. Optometry has until recently not been a diagnosing profession in South Africa, at least regarding disease. Thus a systems approach was likely sufficient. But a systems approach also makes it more difficult for students to integrate the material into the use of current clinical methods used for diagnostic examination, especially CT and MRI, for which this generation of optometrists must now be prepared. I would respectfully recommend shifting to a regional approach of teaching for optometry students. In addition, an expanded exposure beyond head and neck will now be required as optometry transitions from a non-medical to a medical profession. Arms, legs and back or not critical, although types of joints are an essential in order to understand and distinguish arthritides from arthropathies, almost all of which have significant ocular complications. In some cases the eye finding can be the presenting sign of the systemic disease, requiring the optometrist to begin the process of differential diagnosis of a systemic condition. Thorax, abdomen and Pelvis should be covered as a proper foundation for understanding systems physiology, diagnosis of systemic disease and adverse consequences of oral and topical medications that these learners will someday prescribe. Again, my recommendation would be that these parts of the course be taught using a regional rather than a systems approach.

I would suggest a change in the sequence.

Start human anatomy with about 12-15 lecture hours of gross anatomy of the eye. Very early on they must know basics like sclera, cornea, etc so that other courses can use those terms and have students know what is meant. But they have yet to complete histology of tissues and so histology of the eye must be deferred. After these first few hours, I would turn to Thorax, Abdomen and Pelvis, which, with therapeutics, must now be added. Head and Neck alone is not enough. And I would urge a regional approach to anatomy and NOT the current systems approach. And I would separate anatomy and physiology. If you look carefully at most clinical training programs and the way textbooks are created for each, you will generally find

that texts combining anatomy and physiology are created for ancillary professionals while, in the prescribing professions, they are encompassed in separate texts and separate courses.

**Histology:** The histology course should last a full term (half a year) but be divided up into two parts. The first half of the term should be histology of basic tissues types (epithelium muscle, hard and soft connective tissues, etc) and the second half the histology of some but not all organs, prioritized by those that are most central to core physiological and pathological processes of diseases having an ocular component (e.g. blood vessels, kidney, adrenal, liver, pancreas, spleen and less detail on unique properties of the parts of the GI tube, reproductive organs, etc.). By the time histology of tissues is complete, thorax, abdomen and pelvis should be done as well.

At that point, I would suggest that histology, ultrastructure and embryology of the eye be inserted (whether as part of the human anatomy or histology of organs course.) I would urge it be in human anatomy rather than histology because otherwise there is not enough room in histology of organs to get it all done in a term. And if you add a block of histology of the eye to the human anatomy course, there should still be time in one 14-15 week term, to follow histology of the eye with Head and Neck, done in sufficient depth if there is a separate Neuro course. But anatomy should ideally be taught to prescribing clinicians using a regional approach, not a systems approach, since the latter does not lend itself to integration of multisystem signs and symptoms in a body region as occurs in most conditions. Further it does not lend itself to an understanding of regional anatomy as seen in clinic using current imaging methods (CT and MRI – which grads will have to know going forward.)

Designed in this way, after 14-15 weeks, you have completed anatomy of the eye, human anatomy, and histology of both tissues and organs.

**Geometrical optics** – one term.

Most mature, TPA programs retain a one-semester course in geometric optics, one term combined for physical and visual optics and one in ophthalmic optics (including dispensing but not including contact lens

optics). The latter is traditionally taught within the contact lens course. None are taught at a level requiring math beyond trigonometry.

**Vision Science I** – formerly Optometry Theory I

(I presume this is monocular sensory aspects of vision)

**Optometry 1 Practical** –likely no change required

**Second Half of the Year 2** – In this term, students should begin doing community vision screenings, maybe in schools, to get some early practice in basics such as EOMs, pupils, testing VA, even if they have yet to complete all the theoretical underlying bits in class. Throw them in the pool and get them swimming !!! They need practice. This will also get them used to relating to people they have never met and get them comfortable with touching and testing people they have never met.

**Systems Physiology** – taught with a systems approach

**Normal Ocular Vegetative Physiology (not a full term long) Either separate or part of systems physiology**

**Physical and Visual Optics**– combined into one term total

**Neuro (Gross, microscopic anatomy and embryology of the CNS including autonomic nervous system – also including neurophysiology).**

Traditionally, when it comes to neuro, the paths of nerves after leaving the CNS (e.g. cranial, cervical, thoracic, lumbar, sacral) get taught in Gross Anatomy and it is only the pathways in the brain and spinal cord that are taught is neuro. Limited overlap is often provided for emphasis of especially important things.

**Vision Science 2 – Binocular aspects of vision**

**Optometry 2 Practical**

**General and Ocular Pharmacology**



By the end of this year they are competent to do entrance exam skills (pupils, EOMs, confrontation fields) and complete the refraction part of an exam on someone with no BV problem, including single vision and presbyopes.

## **Year Three – OPTOMETRY**

### **First half of the Academic year**

#### **Ophthalmic Optics - including dispensing (except optics of and dispensing of contact lenses)**

**Immunology** (excluding immune rejection and graft vs host immunology)

**Microbiology** – combination of Micro 2A and 2B. 2A is no longer enough.

**Binocular vision** – one term only.

**Ocular disease** – Ant segment

**Optometry Theory** – The eye health part of the exam (indirect, 90D, slit lamp, gonio)

**Contact Lenses** – one term only

**Peds half a term/Low vision half a term - theory**

Possibly have half a day of clinic in which they do preliminary part of exam working up patients for 5th year students, with the latter carrying responsibility for the parts done by the more senior students. Also, let them begin dispensing. Quickly teach them the rudiments of adjusting and put them in the dispensary under good supervision to learn in a practical manner.

### **Second half of the Academic year**

**Clinic one day a week**

**Pathophysiology of systemic disease**

**Ocular disease – posterior segment and glaucoma**

**Practice Management**

**More Peds, CL, BV and or Low vision if needed.**

*By the end of this year they are competent to do a complete, comprehensive exam and be competent in their core eye health techniques. And they can do a soft lens fit (single vision, toric and bifocal, plus use common LV devices (e.g. stand magnifiers, clip on telescopes, etc) and a few core VT methods*

**Year 4 (Final Year of the 4+1):**

**Mostly clinic, emphasis on disease management especially red eyes, diabetes and glaucoma management.**

**Rotation in peds** (meaning not just BV cases but kids with sick eyes as well)

**Rotation in CL clinic.**

**Completion of the Required Masters thesis as the sole didactic component.**