

Ophthalmology 4.0

Oftalmologia 4.0

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Industry 4.0 or Fourth Industrial Revolution is a concept of “Intelligent Factories” involving the “Internet of things” (digital interconnection of everyday objects with the Internet so that they communicate and cooperate with each other and with humans) and Cloud Computing (possibility of accessing files over the Internet). Health 4.0 follows the revolution 4.0 by investing in mobile devices (smartphones and wearable devices) that use the Internet of Things and artificial intelligence to improve access to disease diagnosis. Once the industry becomes 4.0 with connected machines, Health follows this path and makes use of the same resources for disease prevention.

The current telemedicine system provides equipment to diagnose health problems at a remote location, but the physician is the one to interpret the exam results. I believe that in the very near future medical devices will be intrinsically present in people’s daily lives collecting information in real time and monitoring the human being in their daily activities with suggestions coming from artificial intelligence (telehealth). The physician’s work will probably be reduced to explaining the diagnosis, the association with other diseases, and the treatment procedure.

Automation and universalization of health problems diagnosis will probably not depend much on human talent, so that tests previously dependent on the physical presence of the physician such as refractometry and glaucoma, cataract and retinopathy screening, will then be carried out by apparatus. The benefit of this technological development for ophthalmology will be the ease of access to ocular checkup, which will contribute to the massification of ophthalmological examinations with the subsequent early identification of diseases. This will probably increase the demand for specialized treatments. Thus, good general practitioners will be needed for the adequate interpretation of the clinical significance of the exams, and good subspecialists to treat complex cases.

The problem is that during the last 20 years the number of medical schools in Brazil has practically tripled, and specialization courses did not keep up with the increasing demand, especially for the better structured university services. As in Brazil the newly graduated physician is allowed to practice medicine, many young people excluded from ophthalmology specialization programs end up deciding to work without being well prepared. Thus, a significant amount of technically unprepared physicians are likely to enter the ocular health market each year, and will often work in big clinics carrying out the initial examination to screen disease cases for subspecialists to treat. That is, they do exactly what the mobile devices will.

We may then believe that in the short term technology will take the place of professionals with less technical preparation. Also with the advantages of universal ocular examination with lower cost and greater accuracy. That is, the future of ophthalmology is becoming more valuable with large financial groups buying and consolidating clinics, but the future of the ophthalmologist is biased, with physicians progressively ceasing to be autonomous professionals to be employees of large health care companies.

It is possible that technological change is unavoidable, but innovations may be proposed to improve teaching in ophthalmology and thereby reduce the devaluation of the medical work. The focus would be to “think outside the box” to increase the number of positions in well-structured residency services without compromising the quality of teaching.

One way of improving efficiency in the use of resources in medical residency services in Ophthalmology considering the current context is to prioritize the clinical teaching of all subspecialties to all students, and focus on surgical teaching. Thus, ocular surgery techniques would not be taught to all resident students anymore. I think offering a training program including several surgical techniques is a waste of the limited resources of the educational institutions, and the student will hardly apply most of them in their professional life. In this scenario, the student would choose a single surgical technique to learn during their medical residency. The time for teaching other techniques would now be used to eventually carry out more of the chosen procedure, and in special to intensify the general clinical training. Even the student’s time during medical residency would be improved. Thus, it would be possible to offer more specialization positions, and the students would be better prepared during the period of medical residency as general ophthalmologists with certain surgical subspecialty, and would be better trained for an eventual internship of complementary specialization, or even to start a professional career right away. ⁽¹⁻⁵⁾

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I believe that the world is currently facing rapid social, economic and behavioral changes, so the Brazilian Ophthalmology also needs to transform to follow these changes. The Brazilian ophthalmologist needs their medical boards to innovate. Defending refractometry is important, but it is not the only priority. The leader entities of Brazilian Ophthalmology need to innovate the professional training in order to prepare the professional of the future. And also discuss and try to influence issues such as:

- The progressive “entrepreneurship” of Ophthalmology and the consolidation of clinics, with the subsequent precariousness of medical work.
- Stimulate and assist the ophthalmologist to be a autonomous professional
- Use new technologies to value the work of ophthalmologists without replacing them.
- The need to increase the number of positions in well-structured medical residency services.

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