

# The important role played by Biostatistics in Health professionals' training

## *A importância da Bioestatística na formação de um profissional de Saúde*

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The year 2020 has turned Biostatistics, whose image is significantly controversial among Health professionals, into an unexpected protagonist. Even the non-specialized media has given unusual emphasis to “graphs”, “tables” and “incidences”. We evolved into discussions around “Rt”, “mortality and lethality rates”, “moving averages” and “increase and decrease rates”. Now we have become quite familiar with “phase-3 tests” and “effectiveness rates”. Managers started discussing about using “models”, “projections” and “estimates” as subsidy for planning and actions associated with public policies. <sup>(1)</sup>

However, the discipline ‘Biostatistics’ is always associated with the following question, mainly among undergraduate students: “why is it necessary to study this subject?” This question is overall accompanied by the following statement: “we, in the healthcare field, have little affinity for numbers!” the Discipline matrix structure of undergraduate courses in the Health field comprises one or two Biostatistics disciplines, which are often taught in the initial terms. This thinking tends to change as the course advances, since students need to deal with academic papers, as well as with activities carried out in leagues, tutoring and scientific initiation programs. Once graduated, these professionals start to feel the weight of deficient statistics training, either as researchers or at the time to read scientific articles. <sup>(2-4)</sup>

Biostatistics refers to statistics applied to the Biology and Health fields. It provides the theoretical basis to extract knowledge from data in the presence of variability and uncertainty. It is essential knowing the fundamentals of biostatistics to better understand the specialized literature, as well as to carry out experiments in the biology field and clinical studies in the medical, pharmacology, physiotherapy and dentistry fields, among others. It is so, because Biostatistics plays key role at the time to make decisions about diagnostic tests, treatments and patient care, since one can never have absolute certainty about a given outcome.

The development of new technologies and definitions of public policies are firmly based on the correct use of biostatistics concepts, just as the use of principles of Evidence-Based Medicine is adopted as basis to define treatment protocols. <sup>(5)</sup>

Every year, billions of dollars of public and private funds are invested in research, which mainly depend on the correct definition of methodology, data analysis and result interpretation.

Nowadays, we are living the era of “big data”, according to which, large amounts of data available in databases held by the government and by large complementary healthcare operators are evaluated by new algorithms and powerful computers. Therefore, this process requires knowledge about modeling, computing and statistics. <sup>(6-7)</sup>

Studies have suggested using Artificial Intelligence (AI) as palliative technique to raise the number of accesses to health services. This technique has been tested for a series of activities that were previously attributed to professionals such as the one accounting for issuing diagnostic exam reports. Recent experiments have been carried out to detect Covid-19 based on computational algorithm. Supplementary healthcare operators currently use AI to authorize surgeries (or not), to audit medical bills (or not), as well as to define beneficiaries who should participate in chronic-patient programs or who need closer monitoring, in order to improve the service and to reduce costs. <sup>(8)</sup>

All these factors make it necessary changing one's perception about biostatistics since the beginning of graduation. Lack of using more attractive teaching methodologies by biostatistics professors is one of the factors accounting for its bad reputation. Although much effort has been made in studies about statistical training for primary and secondary education, little has been done with respect to higher education. There has only been increase in the number of these studies in the last decade. <sup>(9)</sup>

Recent studies have focused on developing attractive techniques and tools for students in the health field. Only recently, the important Journal of Statistics Education started to dedicate an entire section to teaching methods in the aforementioned field. <sup>(10)</sup>

Some scientific journals aim at filling the knowledge gaps in biostatistics concepts by publishing a series of didactic articles, with emphasis on the series of editorials about topics in biostatistics presented in the American Journal of Ophthalmology. <sup>(11)</sup>

The structure of generalist statistical departments often allocates teaching professionals with poor knowledge about the specificities of each field to applied disciplines. It is not common to have disciplines addressing didactics in teaching in the discipline matrix of bachelor's or postgraduate studies in statistics, which are the spring of future teaching professionals.

It is essential encouraging the outspread of Biostatistics Departments in Brazilian universities, where the joint performance of

health, statistics and computing professionals tends to help exchanging experiences and improving research quality.<sup>(12)</sup>

It is of paramount importance to provide solid background in basic concepts of biostatistics to health professionals; such a background will be even more important in the near future. Increased development of statistical skills is associated with good mathematical basis, changes in the way concepts are presented and with the valuation of these skills by senior professionals.<sup>(13)</sup> The rupture of this paradigm must be driven by close partnership between actors in order to change individuals' perception about Biostatistics and to enable effective improvement in the quality and number of research and health professionals.

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