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## University Autopsy Service: a high-powered tool for medical teaching and scientific research. A testimony

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Created in 1931, the São Paulo Autopsy Service (SPAS) had the original mission of enlightening the *causa mortis* of the natural deaths that occurred in the São Paulo city of Brazil. In 1939, this service was incorporated into the University of São Paulo (USP), and was linked to the Pathology Department of the School of Medicine, operating in the current School of Medicine's building.

Over time, the SPAS turn out to be a successful example of an autopsy service not only as a remarkable teaching tool, but also as a scientific research device in the medical area.

From 1980, the SPAS began to work 24 hours a day (including weekends and holidays), which brought undeniable benefit and comfort to the families of the deceased autopsied in the SPAS.

Over the years, the SPAS' work has been far-reaching and of great importance in obtaining essential epidemiological data for the adoption of a public health policy pertaining to São Paulo and, consequently, Brazil. The SPAS also became a reference center for diagnosis and personnel training in the area of autopsy of cases of death by natural causes, serving as a model for the creation of other autopsy services in several cities in Brazil.

In the 1980s, the SPAS became an autonomous unit of the University of São Paulo. However, the historical connection with the Pathology Department

of the Medical School has been maintained and several activities of both go hand in hand, including many teaching and research projects, which are jointly decided and implemented.

The renovation of the physical area, completed in 2007, fostered a revival and upgrading of the facilities, providing adequate infrastructure for both teaching and research activities.

In 2009, the SPAS reached an impressive mark of 500,000 autopsies, and in 2018 this number exceeded 620,000. In 2017 alone, 14,771 autopsies of death by natural causes that occurred in hospitals, homes, or public locations of São Paulo were performed. The autopsies of natural death cases that occur in the Hospital das Clínicas of São Paulo (which is currently up to 630/year) are performed in the SPAS facilities by the medical residents of the Pathology Residency Program, under supervision.

Over time, as well as assistanting the community, the teaching and research activities supported by the SAPS have reached great prominence. Both the undergraduate and medical residency disciplines of the Department of Pathology benefit from the teaching conditions made available by the SPAS. Residents of other specialties, particularly surgery, also improve their knowledge with the anatomosurgical studies performed in the SPAS facilities. The SPAS receives many groups of medical students (of the Medical School of the University of São Paulo) that witness

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autopsies to enhance their knowledge and education, under the supervision of a professor. At the start of the year 2000, the project of “Telepathology”, supported by the SPAS and with the initiative of the Pathology Department, was created for teaching purposes. This initiative enables the transmission of images of the gross findings of an autopsy to a high number of students. Thus, under the coordination of a professor of Pathology and another of Internal Medicine, it is possible, in real time, to develop an anatomoclinic correlation session with the aid of clinical data—a well-known way to teach medicine. This activity has been transmitted to other medical schools in Brazil, supplementing the medical education of many faculties that do not have an autopsy service.

In scientific research, over time, the SPAS has provided support to many research projects that use autopsy data that end up generating published papers and doctoral theses. More recently, in the mid-2000s, with the active participation and collaboration of the SPAS, continuing interdisciplinary projects have been developed with the biological material sampled from autopsies, always with the families’ consent. In this regard, the Brain Aging Project was the pioneer, highlighting neurodegenerative entities, especially Alzheimer disease, which counts on the participation of the departments of Pathology, Internal Medicine through to the discipline of Geriatrics, Neurology, and the Psychiatry of School of Medicine of the USP—and in cooperation with other national and international centers. As a result of this project, the Bank of Human Brain of the School of Medicine was created, which

is already one of the largest in the world and has been transformed into the Biobank for Studies on Aging. In 2012, the Project of Virtual Autopsy was implemented with the continuing participation of the Pathology and Radiology departments of the School of Medicine together with the SPAS. This project is based on obtaining images of the corpse prior to the autopsy performance. For this purpose, the project has a computed tomograph and a 7-Tesla magnetic resonance imaging scanner to study the postmortem images. Among the many objectives that can be achieved, this project renders the correlation between the anatomopathological diagnosis obtained by the conventional autopsy and those captured by the imaging studies. This widens the knowledge of both the pathologist and the radiologist, besides permitting the comparison of the conventional and virtual autopsies, enabling the use of the ancillary imaging methods in the conventional autopsy. Indeed, this interdisciplinary and interdepartmental project has achieved considerable prominence in the activities of scientific research and teaching developed at the School of Medicine of USP.

Therefore, throughout its existence, the SPAS has played a role of great relevance concerning the three primary purposes of the University of São Paulo, namely (i) providing a community service; (ii) teaching; and (iii) scientific research.

This reinforces the importance of an Autopsy Service being linked to a university that has units specifically focused on the area of human health.

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