



## Therapeutic and toxicological consultation service (Secott): Experience of eight years in a hospital of the third level of attention in Guatemala, Roosevelt Hospital 2008-2016.

### Servicio de consulta terapéutica y toxicológica (Secott): Experiencia de ocho años en un hospital del tercer nivel de atención en Guatemala, Hospital Roosevelt 2008-2016.

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### Resumen

Los centros de información de medicamentos, constituyen un apoyo fundamental al equipo asistencial, especialmente cuando se encuentran dentro de los hospitales, al realizar actividades de información activa y pasiva. En este estudio descriptivo retrospectivo, se realizó la caracterización y análisis de las actividades y consultas elaboradas por el Servicio de Consulta Terapéutica y Toxicológica (Secott), en un hospital de tercer nivel de atención, como lo es el Hospital Roosevelt. El estudio se elaboró con los datos de las consultas recibidas desde la fundación del servicio en el 2008, hasta los datos obtenidos en junio de 2016. En el periodo de estudio, se obtuvieron 1,740 consultas, de las cuales 1,330 fueron de químicos farmacéuticos, siendo las más frecuentes, las relacionadas con estabilidad de medicamentos (19.6%), indicaciones terapéuticas y posologías. También se recibieron 187 consultas toxicológicas y 441 notificaciones de farmacovigilancia. El tiempo promedio de respuesta de las consultas fue de 15 min, sin embargo esto puede variar en relación con la complejidad de las mismas. La forma de recepción de consultas más utilizadas fue por comunicación oral. Estas fueron resueltas en su mayoría en forma electrónica y escrita. Los resultados demuestran la productividad del servicio, así como las necesidades actuales que cubre, y las similitudes con el funcionamiento y actividades de otros servicios de consulta terapéutica hospitalarios.

Palabras clave: notificación, farmacovigilancia, estabilidad de medicamentos, indicaciones terapéuticas y posologías.

## Abstract

Drug information centers are a key support for health care professionals, especially when they are in hospitals, to engage in active and passive information. In this retrospective study, characterization and analysis of activities and consultations undertaken by the Consultation Service Therapeutics and Toxicology Consultation Service y Secott (tertiary care hospital), as is the Roosevelt Hospital was performed. The study was conducted with data from the consultations held since the founding of the service in 2008, to June 2016. A total of 1,740 therapeutic consultations were obtained, of which the majority (76.1%) were done by pharmacists, the most frequent queries, related to stability of drugs (19.6%), therapeutic indications and dosages. During this period, 187 poison consultations and 441 pharmacovigilance reporting were conducted. The average response time of queries was 15 min; however this may vary in relation to the complexity thereof. The most commonly used form of query reception is by oral communication. Consultations were mostly resolved by electronic path in written form. The results show the productivity of the Service, which current needs are covered and the existence of similarities with the operation and activities of other hospital therapeutic consultation services.

Keywords: notification, pharmacovigilance, stability of medications, therapeutic indications and posology.

## Introduction

One of the services developed by the hospital pharmacists is the information about drugs that includes all the techniques and procedures focused on the transmission of knowledge in the field of drugs, with the aim of optimizing therapeutics in patients and promoting rational use thereof (Delgado, 1995). The Medical Information Center (*CIM for its acronym in Spanish*) can be defined as a functional, structured unit, under the direction of a qualified professional, whose aim is to respond to the demand for information on drugs objectively and in a timely manner, contribute to an correct selection and rational use of drugs, as well as promoting appropriate therapy (Rosell-Monzón, 2005; Melnyk, Shevchuk, & Remillard, 2000). CIMs can perform various types of activities that are divided into: Active information (activities in

which the CIM takes the initiative at the time of developing medication information, with an educational and training orientation) and passive information (activity that meets the information requests of health professionals) (Gutiérrez & Córdoba, 2013). In Guatemala exists 3 Medical Information Centers: *Centro de Información y Asesoría Toxicológica (Ciat)*, *Centro Guatemalteco de Información de Medicamentos (Cegimed)* and *Secott*. The latter is the service unit that provides technical and scientific information in an effective and timely manner to solve therapeutic and toxicological consultations, in addition to carrying out pharmacovigilance activities. This service is located within the facilities of Roosevelt Hospital in Guatemala City, where it provides services and assistance to health personnel of said hospital.

Secott, is a service provided by the Hospital Pharmacy Subprogram of the Teaching Experiences Program with the Community (*EDC for its acronym in Spanish*) of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala, covering the areas of research, teaching and service at Roosevelt Hospital and whose main objective is to provide the service for the resolution of medication, therapeutic, toxicological and pharmacovigilance consultations, which is directly in charge of a pharmaceutical chemist with the support of students in their supervised professional practice (Cabrera, 2007). In this sense, the information services of drugs located in hospitals have proven to be very useful to the healthcare team in studies carried out in other countries (Tumwikirize et al., 2011). The operation of the Secott began on July 15, 2008, being established in a letter of understanding signed by the top representatives of both institutions, on January 26, 2010 (Gaitán & Cerna, 2009). Among the activities carried out by Secott since its inception are: Attention of therapeutic and toxicological consultations, pharmaceutical care, in a personalized way to patients who attend the hospital's external consultation, support to the hospital's pharmaceutical services, research, dissemination of information of drugs, through newsletters, informative notes and the publication of scientific articles, teaching health personnel on different topics of hospital importance. Secott is part of the Network of Medication Information Centers of Latin America and the Caribbean (Cimlac), and is also the Sentinel Center of the Pharmacovigilance Sub-Committee, which is in charge of its Secretariat at Roosevelt Hospital, being in direct contact with the National Pharmacovigilance Program of the

Ministry of Public Health and Social Assistance of Guatemala (Gaitán & Cerna, 2009). The aim of this study is to characterize and analyze the activities and consultations carried out by Secott from its foundation in 2008 to June 2016, to know the current needs covered by the service and to determine improvements to it. The results were obtained from the retrospective review of the Secott database of the study period, through three phases, in which therapeutic consultations, toxicological consultations and pharmacovigilance notifications were analyzed and characterized.

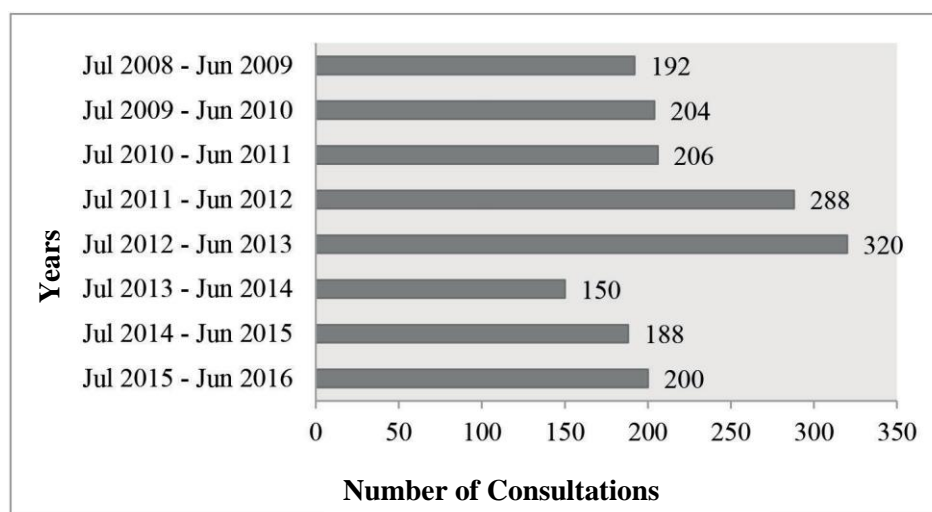
### Materials and Methods

Secott is physically located in the basement of Roosevelt Hospital, all inquiries are received by phone, email or in person from 7:00 a.m. to 3:00 p.m. by a pharmacist assigned for this purpose. Both the queries and the resolutions thereto are recorded in specific forms and stored electronically in a database designed in Microsoft Excel® spreadsheet. The design of the study was retrospective descriptive. The analysis was based on records from the Secott database of therapeutic and toxicological consultations conducted over a period of eight years, from July 2008 to June 2016. In a first phase, the data related to therapeutic consultations were obtained and evaluated: Type of consultation, consultant, consulted service, nature of the consultation, time and manner of reception and response thereof. In the second phase, the number of toxicological consultations per year were evaluated, and in a final phase, the database of pharmacovigilance notifications was reviewed, grouped by years and number of notifications. All data were collected by pharmacists and analyzed with descriptive statistics by frequency, percentages and graphs, according to the aforementioned variables.

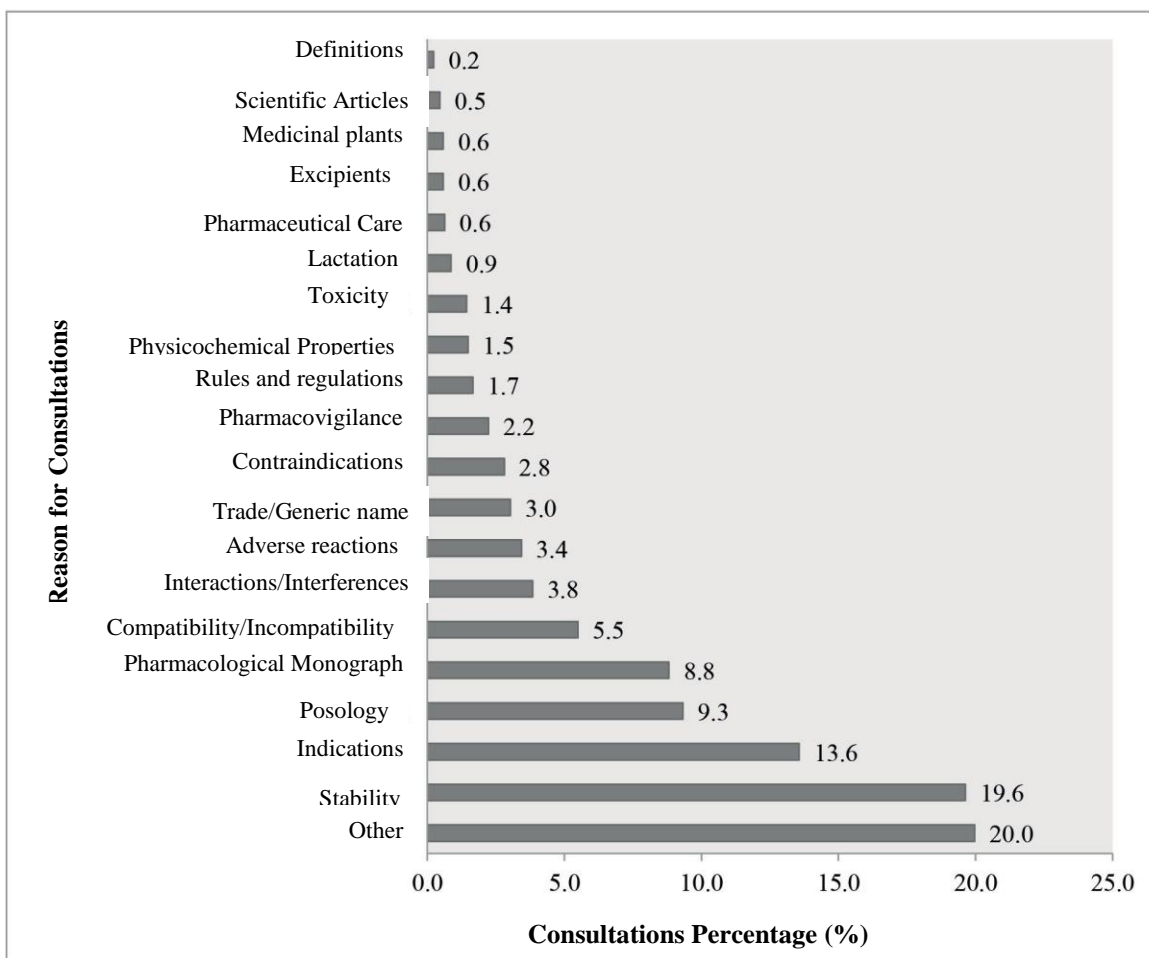
## Results

During the eight-year study period, from July 2008 to June 2016, 1,748 therapeutic consultations were conducted. On figure 1 results Figure 1 shows the results of the consultations elaborated during the study period, the data are expressed in total consultations per year, indicating that the period from July 2012 to June 2013 was the one with the highest number of consultations made, with a total of 320. Regarding the results of the consultations prepared according to their classification, in figure 2 it is observed that the majority were those related to stability, consultations with 343 (19.6%), indications of the medications consultations with 237 (13.6%) and dosage consultations with 163 (9.3%).

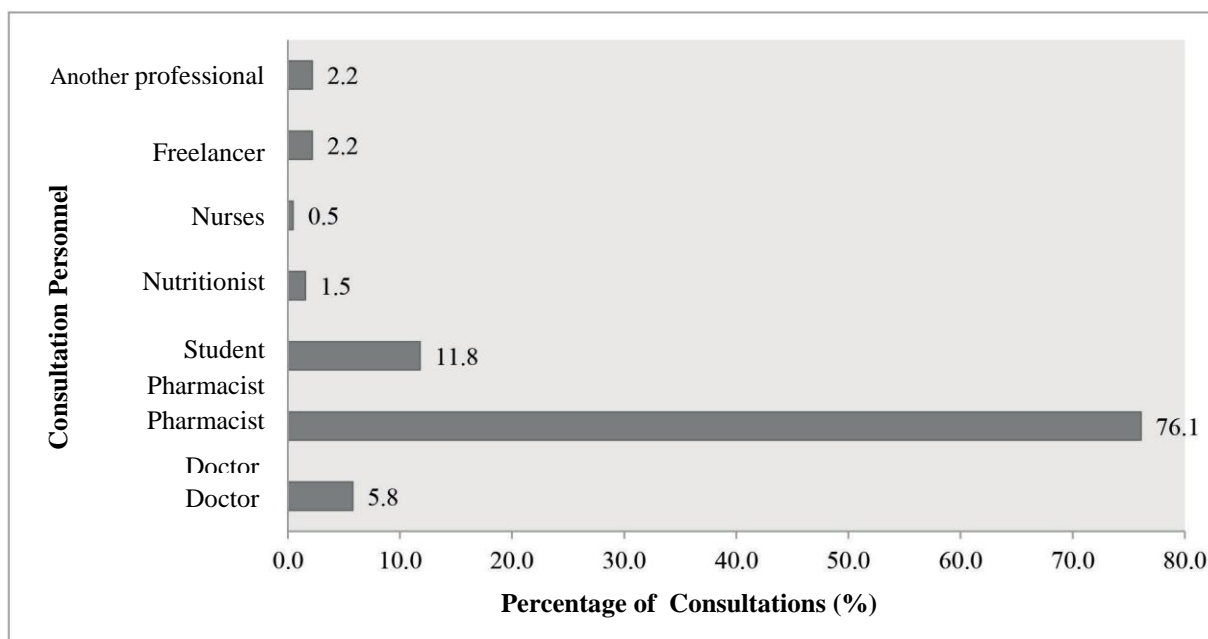
Figure 3 describes the type of personnel who conducted the therapeutic consultations during the study period, results show that according to the consultant classification, 1,330 (76.1%) of consultations were conducted by pharmacists, 206 (11.8%) by students in the health area of different specialties and 101 (5.8%) were conducted by hospital doctors. The most frequent forms, both of reception and response of therapeutic consultations, were determined. Results show on figure 4 The results show in figure 4, that the most frequent form of reception of the consultations elaborated is the oral communication in the service, consultations with 749 (51.6%). Moreover, in figure 5 5 it is observed that the most frequent form of answer to the queries corresponds to those that are sent by email, being 510 queries (35.2%).



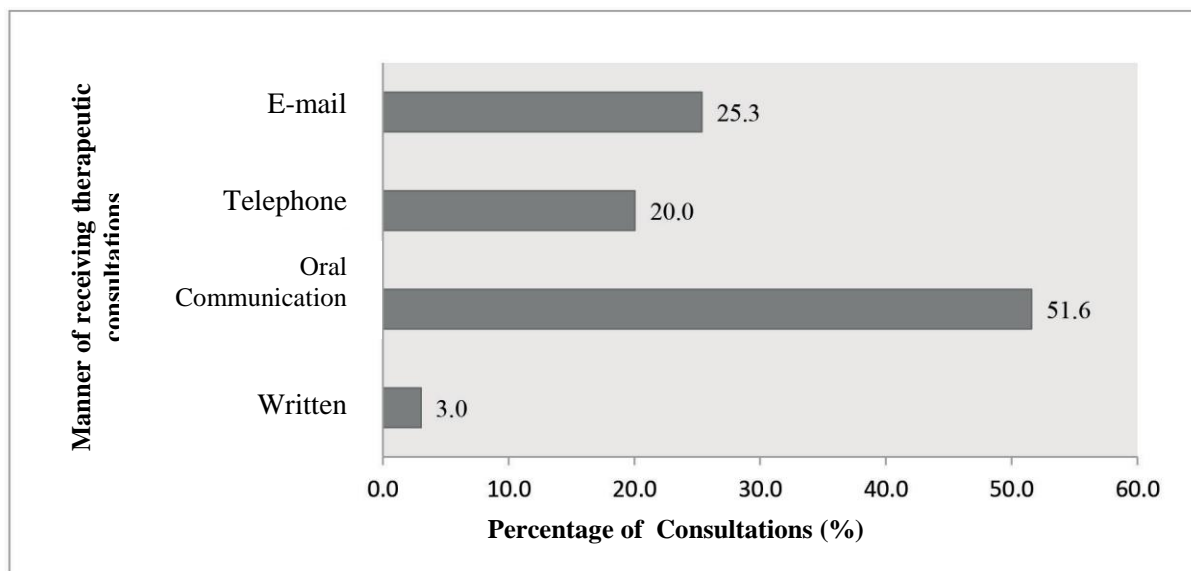
**Figure 1.** Number of consultations conducted at *Secott* from July 2008 to June 2016.



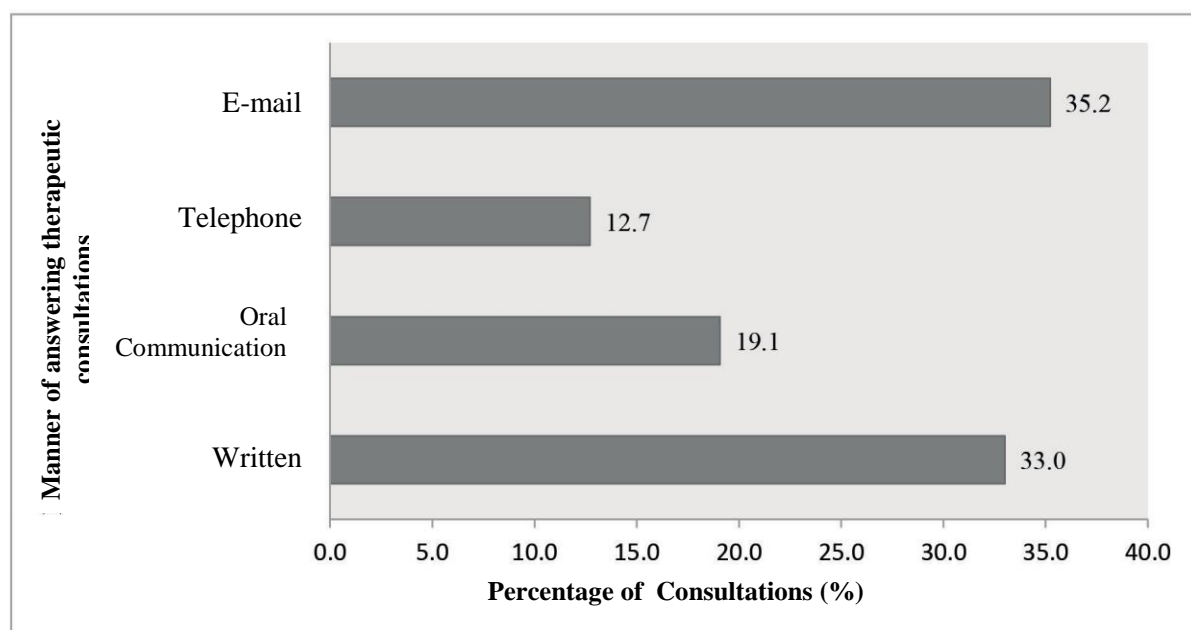
**Figure 2.** Causes of therapeutic consultations conducted at *Secott* from July 2008 to June 2016.



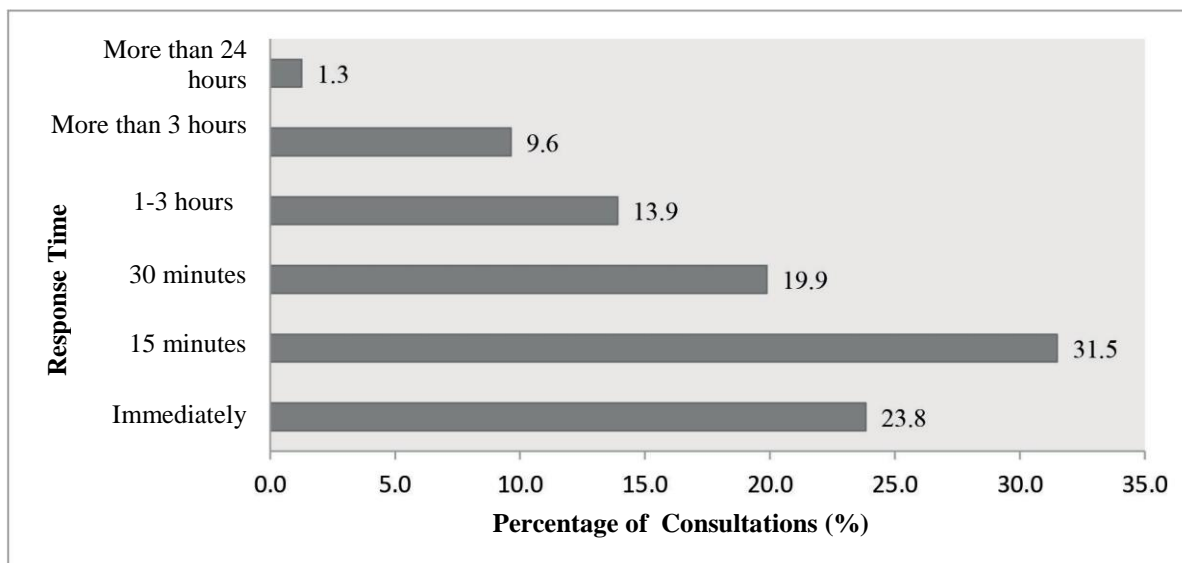
**Figure 3.** Type of personnel that conducted therapeutic consultations at *Secott* from July 2008 to June 2016.



**Figure 4.** Manner of receiving therapeutic consultations conducted at *Secott* from July 2008 to June 2016.



**Figure 5.** Manner of answering therapeutic consultations conducted at *Secott* from July 2008 to June 2016.



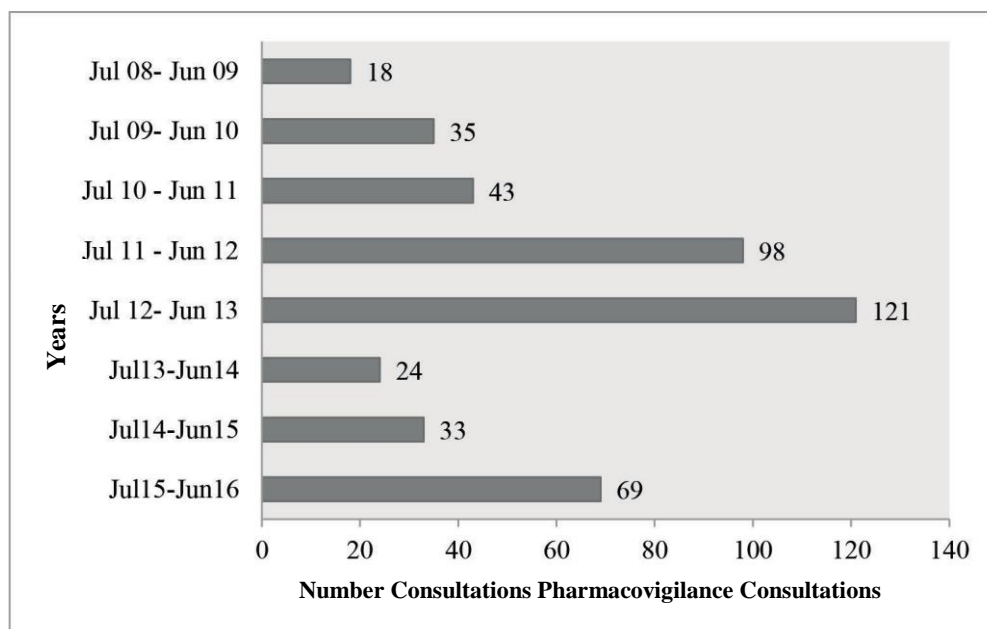
**Figure 6.** Response time of consultations conducted at *Secott* from July 2008 to June 2016.

In Figure 6, it can be observed the response time reported for conducted consultations of which 526 (31.5%) were resolved in 15 min, 398(23.8%) immediately, and 332(19.9%) in 30 min. The rest of consultations were resolved over a more extended period of time.

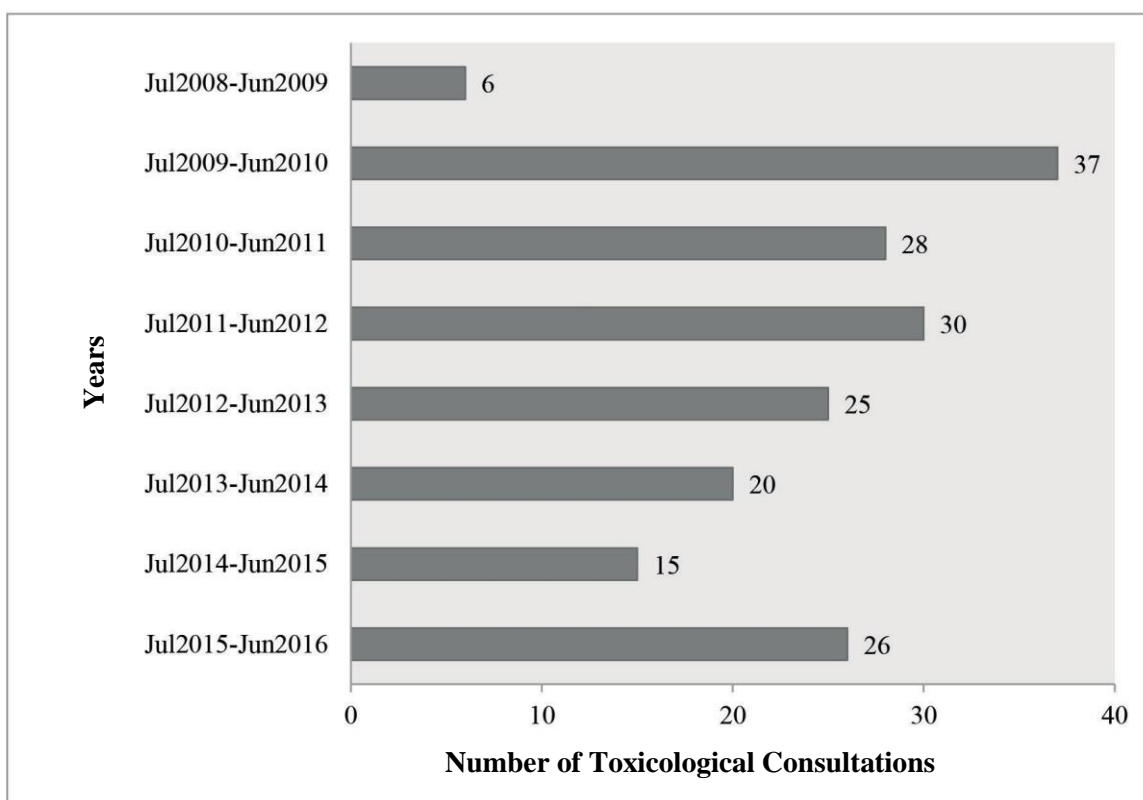
In the case of notifications from pharmacovigilance, Figure 7 shows the total results of the notifications received by *Secott* during the research period. The data are represented in total of notifications per year, being July 2012 to June 2013 the period with highest number of notifications received, with a total of 121.

Likewise, Figure 8 shows results about the toxicological consultations conducted by the *Secott* during the research period, presenting the data in total of consultations per year, in which is observed that the highest number of consultations was conducted in the period from July 2009 to June 2010, with 37 consultations. As for the personnel who conducted the toxicological consultations, it was determined that most of them were conducted by doctors with 129(70.1%) consultations, which can be seen in Figure 9, according to the consultants' classification.



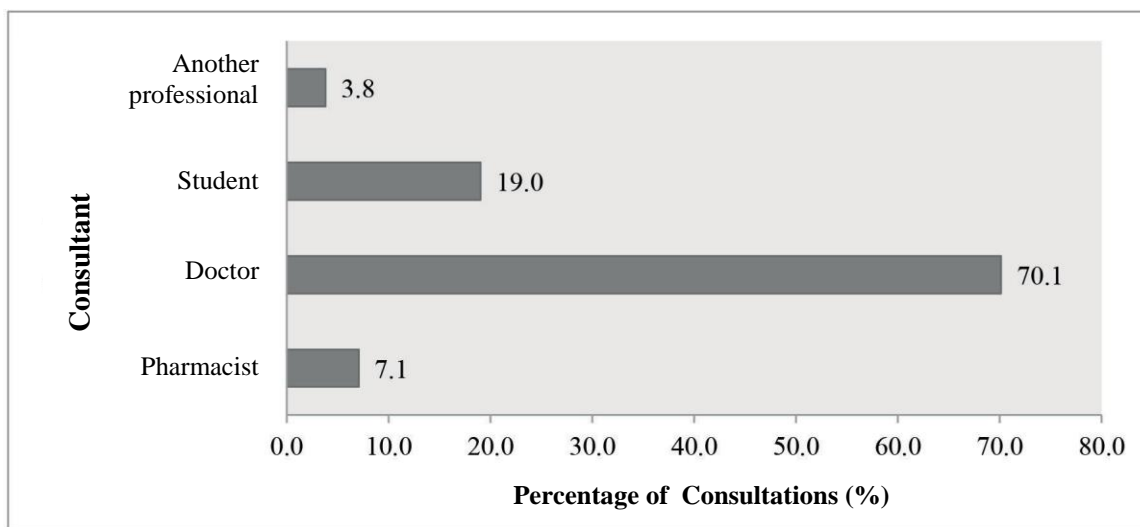


**Figure 7.** Notifications of pharmacovigilance received by the *Secott* from July 2008 to June 2016.



**Figure 8.** Toxicological consultations conducted by the *Secott* from July 2008 to June 2016.





**Figure 9.** Type of personnel that conducted toxicological consultations at *Secott* from July 2008 to June 2016.

## Discussion

The number of consultations made to Secott, depended on the needs of the hospital during the study period, so there was no specific trend, showing variations in the amount depending on the time and demand for the service.

Of the 1,740 consultations made, the most common reason for consultation was in relation to drug stability, mainly information was requested on the stability of intravenous medications in different diluents, as well as stability of oral solid medications that are prepared in the production laboratory of the hospital, in liquid oral readjustments to be administered in patients who by medical order required it in this way. Consultations on therapeutic indications and dosage of the medications were the following most common. The most frequent consultations reported are related to the type of consultant most frequently reported, since they are mostly pharmacists, which demonstrates the highest percentage of

consultations regarding stability, indications and dosage, due to the fact that pharmacists are usually who guide the nursing personnel inside the hospital, especially in the area of medication administration. This behavior has also been observed in studies of the characterization of consultants in other information centers similar to Secott, among which are the main ones, pharmacists, doctors and the nursing team, who mostly consult on aspects of stability and administration of drugs (Odnicki, Grou, & Miasso, 2007). In this sense, in this study it was found that many of the main consultants correspond to nursing, pharmacy and medical students. Currently, in other studies, it has been reported that access to medication information by nursing personnel, allows to reduce potential medication errors at the time of preparation and administration of medications, so Secott is a great support in this sense, when providing information in a precise and quality way, to nurses, both professional and in training (Silva, Grou, Miasso, & De Bortoli, 2007). It is also important to notice that this service is a very

useful tool for the medical team in a hospital, which is reflected in the same way in studies conducted in other countries, where the doctor is one of the main consultants (Tumwikirize et al., 2008).

The consultations were conducted orally, by telephone, email or in writing, however, most of them were carried out by oral communication, this is due to the fact that the consultations are mostly carried out directly at the *Secott* office, where they are also located the internal pharmacy offices of the different services of the hospital, which facilitated access to the service, when making personal consultations directly at *Secott*. Most of the queries resolutions were sent through email, since most of the consultants have access to the internet in their work areas. Nevertheless, the written form was also one of the most common forms of response; this is common in the consultations that are carried out by pharmacists or doctors who need the printed form since they are usually not located in an office in which they can access the internet.

The response time is important in those cases in which the consultation represents an emergency or need to have the information available instantly. It was found that most of the consultations were resolved within the range of 15 min or immediately (less than 15 min). The rest of consultations were resolved during a time considered prudential according to the need of the consultant, varying between 1 to 3 hours, more than 3 hours or even more than 24 hours. This depended of the urgency and complexity of the consultation. There were cases in which the consultant indicated

waiting at *Secott* for resolution, mostly by pharmacists, who must have the information at the time by any consultation in the medical round, in support of therapeutic decision-making, or for some masterly preparation that needs your prompt intervention. It was observed that these results present values within the usual range for other reference information centers (Figure 6).

It should be mentioned that the data obtained cannot be used as quality indicators, since the response time and volume of consultations, depends directly on the degree of complexity of the same and the needs of the hospital, consequently these data are taken only as indicators of service productivity.

Regarding pharmacovigilance notifications, there was a variation between the years of operation of this service at *Secott*. During the first five years of operation there was a significant increase in the number of notifications received per year, this is attributed to support for the pharmacist by two pharmacists in supervised professional practice, who among its attributions have the follow-up of work in the Pharmacovigilance Subcommittee, carrying out promotion and training of professionals in the field of pharmacovigilance, as well as monitoring the notification mailboxes within the different services of the hospital, as part of their professional training. In subsequent years, a drop in the notifications received was observed; probably due to the fact that in this period only was the support of one pharmacist in training.

This activity was of great importance, in the issue of surveillance of the safety of drugs in the country, which meant an impact at the national level, since all notifications were analyzed and sent to the National Pharmacovigilance Program of Guatemala, who is directly responsible for its monitoring. Hospital pharmacovigilance is relevant due to the fact that currently adverse drug reactions represent a significant percentage of morbidity and hospitalizations in healthcare centers, and therefore the monitoring and contribution of health professionals in this regard is essential. Through the mentoring of Secott, pharmacists have designed and implemented pharmacovigilance programs for different clinical services of the hospital, which have been supportive of the development of this work (Juárez, Orellana, & Bendfeldt, 2016).

A total of 187 toxicological consultations were resolved by Secott, of which most of them were conducted by doctors, with a total of 129 (70.1%) consultations. The doctors represent the main consultants because they are the ones who assist the intoxicated patients, especially those patients with acute poisoning in the emergency services. In this way, the doctors were the ones who consulted the poisoning treatment form, as well as the correct way to collect, store and transport the various samples that were analyzed in the Toxicological Information and Advisory Center of Guatemala, which subsequently provided the doctor an analysis opinion with the possible toxic agent found. This allowed doctors to support the correct approach to the intoxicated patient and better resolution of cases. An immediate response was provided for all toxicological consultations, due to their urgent nature.

Among the findings, it can be mentioned that Secott presents a level very similar to other hospital information centers, both in its physical structure, as in its operation and production. In the same way, it is important to note that some critical points that are opportunities for improvement in the data storage process, so that more information can be captured that can be useful later for the analysis with quality indicators, which allows comparison with international standards, and improve the level of service provided. In addition, it is important to continue with the promotion of the service provided by Secott, recognizing that Roosevelt Hospital is a school hospital, in which a large part of the assistance personnel in training, is in continuous rotation, so the training continues. It is of vital importance so that health personnel can rely on this service.

At the moment there is no information on the source used to resolve the queries (magazine, textbook, newsletter, database, and others), which would be important when comparing the quality of the sources used in these consultations with those used internationally. Likewise, toxicological consultations were not characterized, so this also represents a point of improvement in data storage, for later analyzes in which the toxic agent involved could be included, age of intoxicated patients, place of intoxication and other epidemiological parameters of the patients treated.

It is important to note that the work of resolving consultations has always been carried out by hospital pharmacists; however the registration of this service has not been formalized.

These results demonstrate the existing need for consultation services such as Secott within hospitals, and the work they contribute to the performance and quality of health care provided in these institutions. It is necessary to continue with the dissemination and promotion of the activities of the therapeutic, toxicological and pharmacovigilance consultation service at Roosevelt Hospital, in such a way that it is constituted as support for the healthcare team, as it has been up to now..

In Guatemala, Secott is the only medication information center that is located inside a hospital. In Costa Rica, a recent study reported that 85% of medication information centers are located within hospitals, and the remaining 15% are in the pharmacy faculty of that country. When comparing the information activities, both active and passive, that are carried out in the drug information centers in Costa Rica, there are similarities regarding the participation in hospital committees, the attention in the consultations, method of registration of the consultations, the forms of consultation and response, production of support material in health education, development of courses and conferences, and the training of students in the area of hospital pharmacy (Hall, Gomez, & Fernández-Ilimós, 2006). With this analysis, it was determined that Secott works very similarly to hospital MICs in other countries, and in relation to the conditions that a center like these must consider, in terms of hours of care, the fact of having a pharmacist of plant and a student in his professional exercise, as well as the physical and virtual library that he has (Delgado, 1995).

In this way, Secott fulfills the task of being an entity that answers multiple questions from patients and professionals, to whom the information is provided independently, updated, timely and of scientific quality. At the same time, providing the service through updated, novel, accurate and scientific-quality information represents a challenge for Secott, bearing in mind that in recent years, the increase in new drugs, as well as information on themselves, has had an important advance. Además, representa un desafío, el uso de la tecnología y los medios más actualizados, que facilitan el acceso a la información.

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