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SOME OBSERVATIONS ON THE DEVELOPMENT OF PHARMACY AND RECOMMENDATIONS FOR IMPROVING THE ALLOCATION OF RESOURCES AT ST. JOSEPH'S HOSPITAL

Ivy Ann D. Lee-Sharpe

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INTRODUCTION

It is the intent of this paper to trace the developmental history of pharmacy alluding to the profession as an integral part of medicine when treatment was simple, magically connected and filled with superstitutions. It separated when medical knowledge expanded, technology advanced and regulations formalized pharmacy. Social and environmental factors established the needs for specialists to handle, compound, prepare and dispense drugs and medicines. The institutionilization of care and the entrance of the pharmacists in these institutions were influential in this separation and will be discussed. Although formally separated, pharmacy stayed intimately linked with medicine in literature and formal education and this unity of the professions will be presented. Along with the rise of specialization and increased governmental legislature into health care came the modern growth of the speciality of hospital pharmacy. It was to become organized, defined and incorporated into the institution as a key and vital service to be effectively managed. Within the hospital system, the pharmacy manager evolved to assume duties and responsibilities among which is the supply, procurement and the control of drugs. This has led to him being aware of various purchase plans, and factors to be considered in the management and control of his inventory.

In this light and aware of the amount of drugs purchased annually, a study of a specific hospital's purchase and management procedures were examined. Some recommendations made based on observations perceived. The presentation will be concluded with projections of future institutional practices and the scope it will encompass in the near future.

CHAPTER I

DEVELOPMENTAL HISTORY OF PHARMACY AND MEDICINE

PHARMACY AS AN INTEGRAL PART OF MEDICINE

The history of medicine and pharmacy as described by Trease, is not a record of constant human progress. As civilizations rose and fell so did medicine, science and the arts.[1] Periods of stagnation, progress and decline found their way into Pharmacy's history. The evolving form of knowledge designed to provide safe and effective drugs and health supplies comprises a significant and basic component of people's needs. Whenever civilizations rose Pharmacy became international in response to those needs. In order to make observations on Pharmacy's developments as a profession the international scope it comprises must be included.

Pharmacy as a profession performing all the tasks of procurement, preservation, preparation, compounding, and dispensing of drugs was an integral part of the professions are reflected throughout the history of any civilization. Pharmacy remained a part of medicine as long as preparative pharmaceutical techniques were simple, the basic sciences undeveloped and treatments in medicine remained mythical, supernaturally linked and magically connected.

Among the most primitive of people there has been some crude knowledge of healing. Before the days of priest craft, the wise men or women of a tribe gathered knowledge and experience healing by word of mouth or experiment.

Medicine in most countries had a common origin in the fetishistic philosophies which recognized a soul in inanimate objects.[2] Disease was the soul of one object attacking the other. To drive away malign influences various noises, incantations and contortions were employed. On this basis, developed many religions, medicine and pharmacy.[3] For a long period of time religions incantations formed the chief part in the treatment of diseases. The chanter of litanies were seen to occupy a higher place than the physician who applied the remedies in some cultures.[4] Many of the simplistic treatments that survived through writings through the centuries can be traced to have been present in Babylonian-Assyrians culture, in ancient Egyptian history and in the Greco-Roman Empires.

Early man associated the action of drugs with supernatural forces, demons and spirits. Priest,pharmacist and physican were all in one. The priest became the healer of the body as well as the soul. Applications and administration of certain herbs or plants were common parts of treatment. A Babylonian priest would be at the bedside of a patient chanting to the Gods and giving instructions for the compounding of a remedy. A lamb would also be present and act as a transfer of the demon out of the body of the sick and into that of the animal.

In a Babylonian household the sick member was commonly left wrapped in litter and placed in a heap in a hope that a passerby would see the person, recognize the symptoms of the disease and come up with a cure.[5] A treatment for diseased gall bladder was found to call for cypress extracts, goat's milk, palm wine, barley,ox and bear flesh and wine.[6]

The ancient Egyptians were recorded to have had many invocations and forms for driving away disease and specific recipes for drug making. They exhibited an abundant faith in drugs and in the art of compounding them. History passes on a list of over 700 drugs used by the Egyptians. Precious stones were frequently crushed and inhaled as acceptable treatments. The Egyptians were known for their recipes for treatment and from their records were recipes for baldness, headaches and worms. Many of the medicines were herbal in nature but animals were included in their treatments. Many of their concoctions were intended for driving away disease.[7]

The interlinkage of medicine, pharmacy,religion magic, and myth continued into the Greco-Roman period. During this time, the treatment of the sick was as primitive in thought and practice as the earlier cultures. Earth was an acceptable and widely used therapy for an antidote in poisons, as a cure for dysentery, fever and eye infections. It was in demand and pharmaceutically prepared for sale and cure. Clay and bricks were as popularly accepted and also in demand.[8]

The Greco-Roman mythical history of disease and treatments survives in such legends as that of Prometheus and Pandora's box. The myth enhances the thoughts of the time that suffering man is a punishment from the Gods and the art of healing and being healed a favor and reward from them. In the medical writings of the Greeks and the Romans the Gods of healing are frequently discussed. For centuries after the fall of the Roman Empire and the introduction of the concepts of Christianity physicans and patients journeyed to shrines of saints and patrons of medicine to be cured and many were reported to have been cured.[9] Evidences of active homage to these saints are recorded well into the eighteenth century.[10]

In general, it can be said that the period between 1640 B.C. to the middle ages and the entrance of the Arabians, the treatments of diseases were very simple and views on disease very much linked with superstitions, magic and religion. Knowledge of anatomy was limited. Medicines were herbal in nature, but animals were frequently used in treatment. The use of lizard's blood, swines teeth, putrid meat, stinking fats, moisture from pig's ears, milk, goose's grease, asses hoof, excreta from animals, including human dung and urine were acceptable forms of treatment.[11] Toad's eye lids, earthworms, rolled in honey, centepedes were not uncommon treatments.[12] Along with the simple treatments, magic,superstition,religion

and myth dominated human endeavors in these early periods. Astronomy the science, was hidden in astrology, and in augurs, soothsayers and interpreters of dreams. Religious superstitions gave birth to sorcery, apparitions and phantoms. The use of amulets to ward off diseases and their demons were frequent. Healing powers were attributed to the spoken word as well as the written word. "ABRACADABRA" was frequently written on a piece of paper and swallowed by a patient to allow fever to leave the body.[13] Roots and herbs were said to have supernatural powers. Certain cures were given only in conjunction with one's horoscope. Love, affection, amulents, incantations, drugs, the supernatural and the mythical flourished brilliantly in antiquity.[14]

Although the early cultures were integrated and deeply rooted in myth magic and religion, each of the periods contributed to the development of the professions of medicine and Pharmacy. The Babylonians-Assyrians because of their mathmatical abilities manifested a highly perfected system of counting, weighing and measuring, a developed alphabet, simple arthimetic and instrumentation for measuring time. The ancient Egyptians as a whole contributed to improving trade and manufacturing and to the art of compounding of drugs by their use of polypharmacy. The Greco-Roman contributions were to set the stages for the development of the sciences. Scientific interests and activities in this period resulted in men of

this era looking at drugs, collecting them, examining them and underlying rules for their storage. They also organized the drugs they examined into classes. The sciences of Botany and Toxicology were rudimentally introduced. The sciences of anatomy and pharmacology were beginning to be developed and medicine began to be divided into sects. The dispensing physician was a part of this era. The contributions of this period to pharmacy were made by physicians who practice pharmacy in line with their duties of healing the sick.[15]

Among the many persons noteworthy during this period was Galen who practiced and taught early medicine and Pharmacy in Rome. Although much of his conceptions of anatomy and science were erroneous, he maintained his medical supremacy for nearly 1400 years. His greatest contributions were the correct compounding and use of drugs. He was sophisticated in his techniques and developed many methods for mixing, extracting, refining and combining drugs. He created a system of pathology that was logical and acceptable well into the sixteenth century.[16] He was able to advance technology and science through his scientific skills. He tested drugs qualitatively and quantitatively. He not only prepared and compounded his medicines but had a storeroom for them.[17] Galen's works were published in nineteenth century. His complete volumes covered anatomy, physiology, surgery, hygeine, dietetics,

the pulse, pathology, therapeutics and pharmacy. His skills in formulations led to the term galenicals and later became a general term for some class of chemicals.[18] (See definition)

Science slowly advanced due in part to its mixture with magic and religion. Pharmacy remained integrated with medicine, remained undeveloped but responded to its surrounding influences. this would eventually lead to its professional separation. Other than the unity of Pharmacy and medicine in practice there was also the unity in formal education and literature. This intergration would continue from early periods throughout the eighteenth and nineteeth centuries.

Sonnedecker has stated "One of the most important means of building up professional reputation is in the education of the rising generation".[19] Didactic instruction in medicine and pharmacy were always incorporated in the education of the physician and perserved through the institutions of higher learning. The Arabs were greatly responsible for libraries, schools and universities that later prompted European nations to adopt their practices and subsequently preserved and continued pharmacy education through the physician. Pharmacy as a profession did not find a special academic place of its own until late in its development. For the better part of its history, pharmacy stayed largely in the hands of medicine and within the boundaries of a rigid medical and therapeutic doctrine. Throughout the early periods and throughout Europe the education of the physician

included Pharmacy in the curriculum. Pharmacy was taught for and by the physician. Prior to the sixteenth century very few attempts were made to provide any instructions in pharmacy to pharmacists. Changes in educational structure in British Europe and eventually America staggered throughout the centuries. Pharmacy and medicine were to reamin integrated in education until the nineteenth century.[20]

Urdamp and Kremer, pharmaceutical historians, are quoted as saying "the written word has been called the memory of mankind".[21] There were few independent pharmaceutical writers in the early history of pharmacy. The early Dispensatories later called the Pharmacopoeia and other pharmaceutical writings and formularies about drugs were the compositions of scientists, diplomats and physicians who promoted their personal interests in Pharmacy. In the Pharmacopoeias, the Bible of Pharmacy the writing authorities who added new drugs to older ones were all medical men. (See definition).

The Arabs contributed much to the literature of pharmacy and laid the ground work for the recognition of a separate entity in literature. Pharmaceutical writings stayed embedded in the medical profession expressing only a medical point of view or knowledge. Long after the formal separation of pharmacy from medicine which took place in the thirteenth century did the pharmacist appear official as part of a writing team to prepare the Pharmacopoeia. This occurred in the eighteenth

century. Pharmacist input into medical literature developed eventually through journals, periodicals and other publications. Many of these writings were still produced with the needs of the physician primarily in view but the impact of pharmacy's entrance into the literature world would later be seen.[22]

SEPARATION OF PHARMACY FROM MEDICINE

Pharmacy became an independent branch of medicine when an increasing variety and number of drugs and the growing complexities of compounding them demanded specialists thoroughly familiar with techniques to prepare them. The practice of pharmacy was extended by the Arabs whose technological advances in the pharmaceutical arts and preservation of medical knowledge aided the advancement of pharmacy. The birth of the public system led to an institutional aspect of care and legitimize the need of pharmaceutical specialists to protect public interest. These early manisfestations of pharmacy's independence from medicine gave impetus to the development of institutional care, and the gradual rise of specialization in technology and the professions.

The Arabs became heir and administrator of the remnants of Greco-Roman culture and from the nine to thirteenth centuries preserved the knowledge and technology of past civilizations. The arranged existing facts into a systematic order.[23]

The Arab rulers of the middle ages translated early writings of the Greeks and Romans and collected that knowledge, from other sources and passed it on through the centuries by education and trade. The Arabian formularies and compendiums offered a collection of recipes and medications arranged in a system with instructions for formulating a variety of drug products. These recipes were practical, precise and free from superstitions. They gave attention to adjustments of doses in the treatments of diseases, and the side and additive effects of drugs if taken together. Their contributions to the field of toxicology listed various antidotes, toxic symptoms of drugs and described complex drug reactions.[24] The Arabs added to the existing use of medicinal plants by a comprehensive summation of existing Botany. They contributed to the practical need to organize and to elaborate medical knowledge into great encyclopedic works. This influence would extend across seas to develop pharmacy and medicine in Europe. By their compilations of drugs into order and the listings of available drugs, the basis for recognizing pharmacy as a separate branch of the healing arts were strengthened. Arabian Drug Armamentarium listed 1800 botanical drugs, 145 mineral drugs and 130 drugs from animal sources.[25] Armed with this list they developed effective methods of administering them. New ingredients were introduced into the preparation of drugs. Sophisticated recipes against complicated and specific diseases were used. This

developed the pharmaceutical art of the preparation of drugs. Sugar as a vehicle in the compounding of medications was an Arabic contribution.[26] Scientific processes were also developed and used by the Arabs. They distilled aromatic preparation and alcoholic ones.[27]

They were also interested in Alchemy (defined in glossary). The influence of Alchemy on pharmacy was to create a demand for many materials that easily adapted to pharmaceutical use. Alchemy inspired modern sciences development and affected the science in nine to seventeenth centuries. The alchemist had well equipped laboratories, was familiar with chemicals and acids and had a wide range of apparatus. They used a variety of chemical processes in their experiments which were to produce many substances. Alchemy which transcended from the Arabian world to the European continent would aid in advancing techniques. It also advanced the spirit of discovery. Knowledge was acquired and pursued through experimental fun and chemical studies.

The arabian universities attributed to the advance of medical knowledge by opening the way for the translation of existing medical works and to the creation of centers of higher learning. The University of Salerno established under the Arabs adopted the practice of separating pharmacy from medicine. Their example set the stage for similar universities throughout Europe adopting the practice of the Arabs. Salerno's school

provided an openness to learn and accept knowledge from other traditions. This contributed to progress in an otherwise Dark Period of history which followed the fall of Rome and lasted through the middle ages. Through its openness to science the Arabs renewed an interest in learning that helped pharmacy and medicine spread into the European continents.

In medieval times, Pharmacy emerges as a separate profession and a distinct calling from medicine. This was very much because of the Arabian influence which stressed education, progress and a division of labor. The Arabs also controlled the professions and accumulated a wealth of information to be preserved they paved the way for broadened and expanded knowledge by trade, education, and a belief in progress. Their thoughts and technology established beneficial procedures that laid the groundwork for medicine and pharmacy in the Renaissance.[2

The Renaissance meant the revival of learning and the return to the original writings of the Greeks and the Romans, to the spirit of individualism and liberty of thought. This was to open new worlds, discover new horizons, and create the possibilities for expanding technology and medical knowledge through expanding foreign trade and explorations. This spirit of adventure was encouraged and remained from 1400-1800 A.D. The introduction of printing in the sixteenth century made the knowledge of discoveries, inventions and ideas of these periods within easy reach. They spread rapidly and spanned continents.

In science, medicine therapy and technology changes flourished and gained international acceptance. Medical knowledge was affected and so was pharmacy who found itself still subservient to medicine. Through notable voyages the foundations were laid for interchange of materials between East and West.[29] In this era, Chemistry and Physics entered their modern phases. The revival of learning that started in Italy would spread and develop pharmaceutical chemistry and therapeutics. With the increasing geographical and botanical areas of knowledge expanding a more scientific approach to learning resulted. The study of herbal medicine turned to more scientific approaches to understand them. The "science" of alchemy turned to Chemistry. The desire and need for chemicals increased. Science became analytical. Old theories of medicine were attached and doors opened to the introduction of new concepts. Paraclesus theories on the body's receptiveness to chemicals gathered belief. Chemical remedies and substances prepared by chemical processes were frequently prepared and used.

Disease was viewed as localized and the need for treatment to be specified began to be stressed. These theories led to advances in pharmacy and medicine that influenced the transformation of pharmacy from a purely botanical based science to one based on chemicals.[30] By the seventeenth century, significant chemical remedies appeared in the Pharmacopeia. Instrumentation began to be more sophisticated. The predecessor to the thermometer was developed. Attempts to systematically explain metabolism

and other bodily functions and processes were not uncommonly proposed. Theories that were postulated at this time are presently upheld.[31]

Specialization and industrialization expanded technology and medical knowledge significantly. Specialization occurred in the sciences and in the professions themselves. These contributed to newer remedies being discovered. The spearation between medicine and pharmacy became more lucid. As the physician came under the influence of Arabic medicine and grew familiar with the names and uses of Eastern drugs the demand for them increased. This stimulated foreign commerce in order to make these drugs available for physician use. Certain merchants realizing the need were led to handle the drugs and the distribution and importation of them. This was the start of Pharmacy having a place of its own. Through the drug shops of the Arabs, pharmacy provided a legitimate and valuable service to the physician. This division led to a separation of pharmacy from the physician.[32] Many of these merchants were predecessors of the merchants who later would organize into Guild Systems, rise to power, bring posterity to upcoming towns and communities, stimulate trade and eventually develop industrialization in the nineteenth century. Memberships in the Guilds not only provided stimulus to trade but also gave the opportunity to manufacture on a small scale.[33]

As the Guild system developed and increased in membership,

competition between Guilds became rampant. This would provoke legislation in attempts to regulate the practice of pharmacist members. Bitter rivalries between each other also resulted in the formation of other groups whose interest and aspirations were recognizably different from the existing groups. The rise of the apothecaries into a society of their own is one such case. Among the apothecaries themselves varied interests and differences would lead to the creation of specialties.

Many apothecaries would become the chemist, others the pharmacist and some others strictly the medico-practioner.[34] By the seventeenth century some degree of specialization in manufacturing had commenced. The widespread use of chemicals as well as the influx of drugs from East to West were responsible for adding to the complexity of trade. This resulted in the emergence of the wholesaler who realized the lucrative profits that could be yielded by specializing in the trade of commodities that were in demand. The specialists were known as druggists.[35]

By the eighteenth century medicine had taken a gigantic step forward in terms of diagnosis. The sciences were continually advancing. Firms began to establish themselves to chemically produce and manufacture drugs that were now needed. Some of the smaller firms merged with other firms and enlarged. Some established laboratories and these labs were to develop into large manufacturing plants later forming the bases for large

scale chemical and pharmaceutical industries presently manufacturing and responsible for a wide area of research. The eighteenth century had all the specialties of Pharmacy as is known today. They grew to assume the places they occupy. The retailer exists to serve the community. The wholesaler distributes and supplys drugs to the physician and other retailers. He manufactures what he needs on a small scale. Other druggists became large scale manufacturers.[36]

The large increases in population in the eighteenth century accentuated the demand to treat the masses. The manufacturer of drugs was afforded more outlets for his goods. The Industrial Revolution showed the manufacturer the benefits of new machinery in this specialty. There was increased use of mechanical means increasing the production and scale of manufacturing. The manufacturing pharmacist seized the advantages offered by industrialization and changing technology to turn small businesses into big operations. By the nineteenth century the manufacturer of drugs not only applied present technology but helped to develop mechanical techniques for making drug products.[37] The processes of extracting drugs changed. Machinery increased the number of drugs produced. Laboratories grew as the economics of drug producing became enticing.[38] By the middle of the nineteenth century it was recognized as a fruitful period of inventions of processes and apparatus. From industries would come the transformation of drug therapy and many new substances.

Manufacturers themselves would become highly specialized, concentrating on one area of speciality and improving techniques and knowledge in their own field. The changes in drug manufacture were not only changes in methods of manufacture but changes in response to the changes in the sciences.

The various sciences themselves would become specialized in the late nineteenth century. The microscope having been developed and in use stimulated the improvements in techniques and in the creation of new sciences. Pharmacy in drug therapy took on a new meaning and purpose. Rapid developments took place in old sciences of Chemistry and Surgery and in the newer ones of Pharmacology, (see definition), Biochemistry, synthetic organic chemistry and Bacteriology. Physiology became specialized. The nature of the heartbeat was recorded. Useful chemistry tests were introduced to detect disease. Laboratory sophistication in diagnosis and analysis and organic chemistry developed rapidly. Drugs were studied microscopically and living organisms isolated as known disease causes. New preparations as vaccines, serums and injections were the interests of bacteriologists and pharmacists. Improvements in surgery and the use of antiseptics and anesthetics were by this time commonly employed in practice. The use of x-ray processes and sophisticated apparatus was accelerated. The benefits of the technological and scientific occurrences were to widen medical knowledge and improve patient care. Pharmacy as a separate profession responded to these changes.[39]

All the changes in medical concept that influenced therapy made an impact on pharmaceutical practice. According to estimates there are over 5,000 drugs used today.[40] The twentieth century has witnessed the development of a variety of liquid and solid preparations, blood plasma and synthetic drugs, sulfonamides, penicillins, antimalarials and necessary food factors as vitamins. Harmones, tranquilizers, antihypertensives, psychotherapeutics, drugs and chemotherapeutic agents have been added to the materia medica in this century. Immuniological vaccines to diagnose, cure and prevent disease have contributed to medical knowledge advancement and the use of new methods in treatments. The pharmacist has evolved inspired by a social motivation to develop in the practice of his profession as indeed separate from medicine.[41 & 42]

The advances in knowledge and technique aided pharmacy's separation as a profession. It is the recognition of governmental responsibility for the health of people that fostered the creation of a public system and established its early separatism. The Arabs stressed a growing emphasis on the health field. Medicine, Pharmacy and Chemistry found a peculiar fascination with them and that helped to shape western pharmacy. Under the influences of Arabic wisdom pharmacy took firm roots in European soil as a profession to be respected, regulated and progressively developed. The Arabians were noted for their hospitals which carried out the concepts of public health they promoted. The

treatment of their patients in these hospitals were also remarkable. A state hospital was founded in Damascus as early as the seventh century.[43] The Arabian idea of hospitals laid down elaborate rules and regulations for its conduct. The hospitals were supported by taxation.

La Wall describes an Arab hospital as such. "It possessed four courts, each having a fountain in the center, lecture halls; wards for isolating certain diseases. Dispensaries for outpatients were also found. Among the most novel attractions was a hall where muscians played day and night. Another was a story teller employed for the benefit of those suffering with insomnia. Those religiously inclined could listen to the reading of the Koran, which went on day and night, uninterrupted in certain rooms. Each patient, upon being discharged from the hospital as cured, received some gold pieces that he might not be obliged to attempt hard labor at once."[44] The Arab's concern for people's health was not only in the hospitals. They established very hygienic standards in their towns. One of the first indoor toilets was found in the Alahambra.[45] Cordova boasted more than 300 mosques, 50 hospitals, and a library of over 250,000 volumes. This city had more than 250,000 homes.[46]

Most of Europe was at this time in the midst of barbarism and the most primitive of conditions. London was without a single paved street. The inhabitants there were living in windowless, shelters. Moorish Spain boasted many miles of

paved roads and lighted streets. The concern for public health was extended to include the drug merchants. Pharmacists and their stocks were regularly inspected and punishment meted out to those who were found guilty of selling deteriorated drugs.[47] The creation of this public health system which actively included pharmacy that helped to develop pharmacy's social role. Pharmacists were seen as the individual merchant as well as the guardian of public health. The pharmacist offered to those who needed their services,the art of compounding pure drugs and protection from impure medicines.

The "Magna Charta" of Pharmacy was created by Frederick of Sicily who issued an Edict that formally recognized pharmacy as a separate profession. This promulgation forms pharmacy's most notable landmark. By a series of degrees, pharmacy was officially regulated and rules of conduct of the profession established.[48] Three regulations of the Edict created the independence of the profession from medicine. It was under a government supervised health service on European soil. They were:

1. Separation of the pharmaceutical profession from medicine. This official separation acknowledged the fact that the practice of pharmacy required special knowledge, skill initiative and responsibility if the protection of people was to be guaranteed. The law tried to establish the ethical prinicples for the profession by forbidding any business relationship between the pharmacist and the

physician. The functions of the profession should be a service and the sick should not be exploited was acknowledged. This rule transgressed by both parties constituted the charter of Pharmacy's separation.

2. The official supervision of pharmaceutical practice. Pharmacy was acknowledged as a public service for the protection of people.

3. The obligation by oath to prepare drugs reliably, according to art and skill and in a uniform, suitable quality. This requirement pointed out the necessity of having pharmaceutical standards.[49]

The provisions and context of this regulation made pharmacies subject to inspections, with serious penalties imposed for malpractice. Pharmacists had to stock drugs needed by the physicians and keep them within certain guidelines. The regulations of pharmacies spread throughout the countries of Europe. France and Italy adopted formal regulations that separated the professions early in their history. The separation in England did not occur until in the nineteenth century. This was due in part to the absence of regulations and the function of medicine and pharmacy in medical care remaining poorly separated.

With the rise of different sects of practioners in England professional rivalries began to develop. In the reign of Henry VIII the rivalry between the apothecaries and the physicians

over the division of functions began. The king issued the first regulation for the English practice of medicine and pharmacy ordering that "no persons could lawfully practice medicine or surgery unless they had taken an examination, had been approved and admitted to practice by a regulatory board.[50] By 1540 legislation had been further extended to include the apothecary who became legally subjected to medical supervision. The apothecaries in their practice had transgressed the legal boundaries and had trespassed in the physician's territory. The apothecaries had become readily acceptable by the public prior to this. The public appreciated the response of the apothecaries to their needs. The popularity of the apothecary practicing medicine was generally resented by the physician. By the end of the sixteenth century the apothecary began not only to give advice and prescribe medicines, but also continued to be the successful businessman in drug shops. Seeing the obvious encroachment upon physician territory by the apothecary, the physicians were successful in establishing the passage of legislation that attempted to supress the competitor. By this time many of the apothecaries enjoyed their positions and the prestige of being the practioner. They began to abandon the drug shops and turned toward the practice of medicine. They resented the restraints placed upon them by the physician. The conflict came to legal confrontation.

As a result of the Rose Case, apothecaries were given the right to practice medicine, a job performed by them long before it was legitimized.[51] The physician in trying to prosecute the apothecary had instead led to their own legal defeat.

The rivalries between the apothecary and the druggists and the chemists were also brewing. The apothecaries resented the threat to their society the "wholesalers" were now presenting. The chemists and druggists began to flourish and had begun to multiply as wholesalers and middlemen in the passage of drugs from the importer to the apothecary. Some had also become preparers and sellers of chemical substances who possessed skill in the use of chemical processes. The Society of the apothecaries who early in its history had started to manufacture drugs and chemicals and by the seventeenth century had acquired the status of a regular commercial company, had become monopolist over the supply of drugs. They soon began to resent the successes of their competitors and attempted to supress them by legislation. This was not a successful endeavor. Instead it led to the druggists and the chemists uniting in organized efforts to preserve their rights in compounding and dispensing of drugs.[52]

The Pharmaceutical society was founded in an attempt to benefit the pbulic from its services and to elevate the profession of pharmacy. The group recognized that pharmacy

had become complicated and enhanced many sciences. Slowly the society moved toward the establishment of professional status. By the middle of the nineteenth century, (1852) the first Pharmacy Act empowered the professional society to conduct examinations and grant certifications to pharmaceutical chemists.[53] Subsequent acts made qualifications and registrations compulsory for all the members of the profession. Future legislation brought pharmacy under the complete control of the Society. Pharmacy became recognized as self-governing, free to conduct its own affairs and only subjugated to government control in activities effecting the public.[54] The Pharmaceutical society in England developed into the administrative and educational body of the profession. Regulations throughout the twentieth century has enforced pharmacy's position as separate and distinct from physician rule.

Comprehensive medical acts have further recognized the independence of both professions. The acts would have economic and social impact upon pharmacy. The universal health insurance principle has effected the development of pharmacy and has left its impressions on American thought. It has also left its impact on professional services. The Acts have given the pharmacist the opportunity to develop the dispensing side of the profession by separating prescribing functions from dispensing ones. The pharmacist has been brought into a more integral part

of a complex health system.[55] Before the national Health Acts, England was the only European country in which the physician had full liberty to dispense and deliver medicines. After the adoption of a national plan, the physician was forbidden to do so. The dispensing of medicine has become restricted to pharmacists. The long term relationships between British and American pharmacy has long existed. In America, the apothecary, the druggist in tradition and thought are seen. The devotion to occupational independence and self-determination are also there.

In Europe the development of group goals have been a result of government regulations leading to a homogenius practice. The uniqueness of American pharmacy is that legislation has been a result of and greatly influenced by the initiative of private individuals and not by governmental acts. These individuals enacted laws and voluntary regulations in response to evolving needs.

With the beginnings of the seventeenth century North America became a land for colonization. The search for drugs from the new world attracted additions to the expanding materia medica. In British North America, pharmaceutical activity began in the tradition of the British and this British influence remained the dominant factor throughout the colonies. Colonial pharmacy ran parallel with the apothecary becoming the medical practioner in England. In the colonies

only about one-ninth of the established practioners had any medical training.[56] Physicians played dual roles as doctors and dispensers. Professional transition and transgressions were frequent. There was no clear cut distinction between physician, apothecary, merchant, or wholesaler-druggist. The interchangeability of medical and pharmaceutical functions existed: Doctors Shops (fashioned after the British) were run by physicians who also performed pharmaceutical tasks; the apothecaries were genuine pharmaceutical practioners who secondarily engaged in the practice of medicine; the merchant found drugs profitable, dealt with drugs and non-medical commodities, perhaps prescribed, and very often compounded drugs. Some apothecaries acted as wholesalers especially to the physicians and some physicians frequently established wholesale businesses to supply their colleagues and had their practices.[57] It was not uncommon to see changes in and out of the professions and individuals adopting titles and performing services without being duly qualified or legitimatized.[58]

The first attempted separation of pharmacy and medicine in the colonies come in 1736 by an act of legislation which attempted to separate professions through the use of the prescription. At the time of its origin this idea was recognized as a means of getting the dispensing function away from the physicians and into the apothecary shops. It was not accepted

and the dispensing function primarily stayed in the hands of the aopthecary-physician. Before pharmacy could get its independence and establish the importance of its function, it had to free itself from the reigns of the medical profession. The first hospital in the colonies attempted to do that. Through the hospital the separation of the two professions were seen.[58]

The true interest in pharmaceutical activity began in America with the wholesaler, the chemists and the druggists who provided the physicians with drugs. They upheld the responsibilities for the drugs effectiveness. In order to detect adulteration they became very interested in obtaining knowledge about drugs and chemicals. As their counterparts in England, professional pharmacy standards were initiated and commenced by professionals whose aims would separate medicine from pharmacy by self-imposed regulations and self-discipline. Prodded on by the unprofessional practices evolving in the drug stores by the ill qualified and unprofessional practioners in the colonies, the physicians and medical groups began to make attempts to regulate pharmacists. The druggists began to unite and organize in efforts to avoid subjugation to medical rules. The organization of the pharmacist through voluntary efforts began to lay down fundamental ethics for the practice. This led to the separation in America. The organization would establish standards and regulate education. The American

appetite for independence from physician rules and restrictions was the external force that caused this unity.[59]

The first pharmaceutical association met in Philadelphia in the middle of the eighteenth century. It was the result of local associations branching into state and national organizations. The American Pharmaceutical Association (APHA) represented, defended and promoted all fields of Pharmacy interest on a national level and has been the guardian of professional progressive movements in this country. It was through the APHA that laws were passed which regulated the standards of imported drugs.[60] Many other organizations were to grow out of the APHA in an attempt to maintain the speciality interests of its members whether it be scientific, educational, commercial,ethical or legal. Efforts to coordinate pharmaceutical personnel has been a constant goal of the organization. Legally enforced standards and controls that have effected pharmacy has been initiated in the interest of public welfare. Since the nineteenth century the complex network of regulations has been in response to safeguarding public interest.[61]

Various types of laws are initiated and established to set pharmacies standards. State statutes are intended to be within the constitutional delegation of power given to the state and has been efforts of APHA to provide the public with safe and effective drugs. State laws establish licensing practices and work in conjunction with the organizations

to promulgate guideline for profession[illegible] policing of the regulations are also g[illegible]very Uniform national regualtion also cove[illegible] drugs and foods that are pure. The F[illegible] the federal response to unadulterate[illegible] The control of licit and ilicit drugs are also the respons[illegible] of government and pharmacy in establishing guidelines for controls. The separation of pharmacy and medicine are promoted by Pharmacy's voluntary response to accept its responsibilities.

Social and environmental factors have aided the establishment of the need for specialist in the area of drugs. This is particularly true in times of need.

The early history of pharmacy reveals many references to quackery medicine. The majority of people in early history were self-medicators. The masses relied for their medication on their own knowledge. Living close to nature they recognized the treatment and prepared it. The growing demand for made-up medicines gradually evolved. Medicines were gathered up and sold, usually by country men and women. Quacks became increasingly numerous. In the fifth and sixth centuries, quacks and charlatans were prevalent. They were bone-setters, occulists and dentists. In the eras when medicine and healing were primative, the market areas for quackery medicine flourished. The term quack was first used in the middle ages and in these times they appeared in markets, at pilgrimages, and a

shrines. They sold their potions, poisons and offering panaceas for body and mind, magic,pills and powder of every kind.[62]

The German quacks known as the "whispering physicians" claimed possession of enchanted herbs and whispered cures and magic formulas into patients ears.[63] Healing knowledge was attributed to wise women especially if they were old and wrinkled. The drug peddlers were well known and widely used as sources of great cures. Quacks were common in royal courts and many monarchs healed by magic touch.[44] By the sixteenth and seventeenth centuries, quacks were as many as the unqualified practioners both in England and in colonies. Their approach was direct and effective. The colonists would frequently self-medicate and self-diagnose. The absence of the professional made the lady of the house have herb gardens and frequently recommended her own care. Occasionally trips to the apothecary to purchase crude drugs or patent medicines were undertaken. The vendor of the home medicines frequently took the form of a quack. Home shows existed wherever a market could be obtained. Many of the quacks traveled and sold their wares. They frequently erected stages, took their own staff and props and made a "brave display".[65] They gained an audience and made a fortune. The traveling quack appealed to the populace and was a figure in many markets until the twentieth century.[66]

It was in the protection of people from quackery medicine that prompted legislature to curtail the amount of "unqualifieds" and aided pharmacy's separation.

The Revolutionary War gave an impetus to the separation of pharmacy from medicine by establishing the worth of the pharmacists. The overburdened physicians and surgeons in the hospitals and the armies had little time for pharmaceutical tasks during the war. The making up of drugs and the dispensing of them were handed over to the apothecaries. Shortages of drug supplies was a problem that constantly plagued the army. At first the army drew on the stocks of the private pharmaceutical firms. Later the apothecaries established a major laboratory and storehouse for the compounding of medicines. Medicine chests were stored, issued, and replaced by apothecaries and their assistants. When the private drug stocks became inadequate to supply all the medical needs of the war, the apothecaries in the army assumed the responsibility of preparing their own medications. This became significant for the independence of the profession. The Revolutionary War showed the physician and the public the knowledge and competence of the pharmacist. The action of the apothecary in the war gave status to the profession. The war also represented the first practical attempt to manufacture uniformly through the military. The efforts of local manufacturers to mass produce were also recognized.[67]

The disappearance of the dispensing physician was not due to the physicians willing concession to give in to the pharmacist. It was due to the expanding medical knowledge that demanded a greater deal of the physician's time and caused him to cede some of his personal domain. The physician did this reluctantly realizing that by relinquishing his pharmaceutical activities his income would be affected.[68] The scientific and professional development of the physician along with the growth of medicines made him drop the practice of pharmacy. The symbol of the separation of pharmacy from medicine and prescription writing. The prescription acknowledged thr turning over of dispensing tasks to the pharmacist. The early attempts to use it were described as unsuccessful. Increased prescription use occurring at this time echoed the separation. It was still pharmacy that in itself insisted upon its separate identity. This development occurred in the nineteenth century.[69]

Notable separation of the professions in education came in the later part of the eighteenth century with the opening of the college at Philadelphia in 1759. Pharmacy in this school was recognized as a subject to be taught. It would take until the nineteenth century though before pharmacy emerged separate and apart from medicine in instruction. Then it was taught with attempts to present a professional pharmacy's point of view.[70] Prior to this in America pharmacy was considered by the physician as an art that did not require

theoretic knowledge. It could be learned by practice. In spite of these attitudes, the college at Philadelphia began teaching courses in pharmacy. Subsequently, schools imitating the Philadelphia school, began to appear throughout the country. Enrollment in them were small and graduation from most of them even smaller. By the efforts of the professional associations education as a base of pharmacy began to be "sold" and thus the educational independence of pharmacy was on its way. As a separate art pharmacy declared its own standards and curriculum and began to be taught by qualified teachers who had mastered the scientific foundations they had demonstrated a complete knwoledge of the profession. Courses of instructions in these schools were nutured by the professional organizations dedicated to promoting pharmacy. Many of the established medical schools by the end of the nineteenth century were offering formal courses in Pharmacy but depended on the educational and the financial support of practicing pharmacists.[71]

Pharmacy educationally made its connections with the upcoming state universities. This was opposed at first by the professional associations. Future developments were to balance out their differences. By the twentieth century a well organized, consolidated system of pharmaceutical education had resulted. Standards for education in pharmacy began to be drawn. Graduation from a secondary school was a preliminary requirement into a Pharmacy curriculum in order to obtain a Bacculaureate Degree. American Pharmacy had found its academic base. Standards became up-

graded to obtain state licensure and uniform education nationally came into existence. As the academic requirements advanced and standarized the long apprenticeship periods that were formerly the requirements for practice became gradually reduced. A period of internship is still required as a part of educational competence, but is no longer the only standard as in the past. The pharmacist today has a choice of the professional degree he desires. To obtain a Bachelors of Science Degree a completion of five years of approved curriculum is required. This has increased from a two year program offered in 1907, a three year one in 1925 and a four year one in 1932.[72] Many schools also have a six year program developed in 1970. A nationwide shift in pharmacy education occured. Clinical pharmacy was introduced and offers to a pharmacist a move in the direction of a certified specialist. The education of pharmacy is presently divided among the profession but indeed separate from medicine.[73]

Before America had a pharmaceutical literature of its own, practioners of pharmacy and medicine relied heavily on European works. The first step to attempt the separation in literature was taken in the eighteenth century by John Morgan, a physician who recognized the importance of separating pharmaceutical works from medical works. This was not successfully done until the middle of the nineteenth century.[74] Pharmacy in this century would be officially

represented in the revisions of the Pharmacopeia. By this inclusion of pharmacy in this piece of literature the writing of the pharmocopeia as exclusively a work of medical people ended. The official recognition of Pharmacy's place in pharmaceutical literature was publicly acknowledged. Pharmaceutical interests in subsequent revisions of this book increased as that of medical interests decreased. A Pharmacist has participated in every revision since the official recognition and has assumed the responsibilities of accumulating formulas and setting the standards of subsequent pharmaceutical reference and textbooks.

The books present in pharmaceutical literature represent a variety of writings ranging from encyclopedic volumes to systematic informative literature. The content of them is to present and explain pharmacy form a pharmaceutical standpoint. Books can cover the art of compounding drugs and dispensing medicines as well as deal with the selection, control and monitor of drug usage. After 60 years of being separated from medicine, American pharmacy has matured to provide its own specialized literature in the pharmaceutical sciences. The texts of the twentieth century reflects the trend toward specializations in the sciences and the profession.[75] Books represent the static aspects of the profession and shows cumalative scientific progress. The dynamic aspects are represented by the many journals and periodicals that are a part of professional growth.[76]

The journals stress information about pharmacy on the scientific and commercial aspects of the profession. One set of publications are based on scientific knowledge, the other set is geared toward the trade principles of pharmacy operation. The journals put out by the associations have gained national and international recognition. The periodicals have been useful and influential as media for promoting pharmacy as a separate profession.[77]

The development of drug manufacture on large scale levels was accompanied and promoted by legislation that created rights to protect product processes.[78] In an industry as pharmacy that is based on science and elaborate technology the use of international patents and trademarks are well supported by government. This practice is internationally accepted. The government grants a patent to protect the rights and rewards of discovery. The laws exist to protect legal and scientific methods, curb extravagant claims and to protect people. England was the first country to patent medications in the pharmaceutical field. America's development in this area was in response to the international trend of the nineteenth century, the extensive development of international firms. Their subsequent research projects which led to advances in medicine and eventually medical benefit internationally catapulted the modern separation of this specialty. From the commercial and economical aspects of international standards for the

protection of individual rights would come the professional separation.

Social international concerns have also led to standards governing trade of opiates and narcotics and pharmacy's involvement in the area of international cooperation and decision making has established the separate qualities of the profession. In the second half of the nineteenth century European trading nations and America became aware of the threat and problems of addiction and habituation that drugs could cause. From this developed international standards for treatment of addiction problems. Pharmacists along with other professionals emerged as specialists in attempts to set standards and controls to deal effectively with these problems. It is internationally understood by many that the regulation of dependency producing drugs places a special responsibility on international Pharmacy. Pharmacy importance in this area is emphasized from the point of public health.[79]

As a profession pharmacy establishes its international force. International Congresses of Pharmacy are held in various countries. The Federation of the Congresses represent a concept of international cooperation fostering efforts toward unifying international drug standards. The International Pharmacopeia is a collection of recommended specifications which are not intended for legal status but is used as an international reference source.[80] Through the World Health

Organization (WHO) an international commitment by its participants tries to agree on standards and uniform pharmaceutical nomenclature. The international heads of organized development within the profession reflects the separation of pharmacy as a profession.

Government intervention in the health field has significantly emphasized pharmacy as a separate and distinct profession. Extra professionals have been responsible catalysts in bringing about pharmacy's separation from medicine. Rising costs of health can be viewed as an external force that has aided this separation, establishing the needs for specialists to study their areas of speciality and device ways within governmental regulations and provisions to curtail costs. Since World War II ended, medicine has become one of America's largest industries. Within the next decade it is projected to be the leader.[81] The health care system has become large, complex and costly. By 1990, 15 percent of the GNP will be spent on health.[82]

Many factors have contributed to the rising expenditures for health and include: 1) the improvements in technology.
2) the improvements in machinery and equipment.
3) the increases in utilization of services
4) the rising costs of personnel and supplies.[83]

In 1929 the national health spending was $3.6 billion. In 1978 the spending accounted for $192.4 billion. Every five years since 1950 the increased changes in the ratio of health expenditures to GNP has been tremendous. The changes have increased by 2 percent each year since then.[84] (See Chart 1.3 g. Appendix.)

Government's health expenditures in that total health bill has also been steadily increasing. In 1972 the government's spending amounted to $27 billion.[85] The federal government underwrites almost one-third of the national expenditure on health.[86] They have become intimately involved in the delivery of care and by this has provoked changes in the professions associated with health care delivery. Pharmacy has been affected by government's involvement.

Government intervention in health care delivery started in 1798 with the construction of a seaman's hospital. Since then the twentieth century has issued forth a series of governmental acts prompted into passage by public needs and demands for more equitable distribution of services. There has been significant changes in the commitment of government to assume responsibility for the financing of programs for the improvement of health in its people. Every decade since 1920 has resulted in legislation aimed at providing this improvement. (See Chart 1.3 g.1 Appendix for a listing of a few of the regulations.) The regulations extended into the community and affected community oriented service.[87]

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With the institutionalization of care the separation of pharmacy and medicine was seen. In the institution the care of the patient demanded the need for specialists and created the environment for pharmacy to separate.

In 529 an Italian monk named Benedict founded what was to become a famed monastery. This served as a model for over 40,000 similar institutions that flowered throughout Europe.[88] Benedict established the principle that each monastery should be a self-sufficient community and be able to provide all the necessities of life.[89] Many of them had libraries, pharmacies and infirmaries. The infirmaries were used for their ailing monks. Some infirmaries became hospitals for any sick people, rich or poor. In many of the monasteries the tasks of preparing medicine was given to the monks. The physicians gave away their dispensing tasks and with that the separation of pharmaceutical from medical functions. The hospitals in the monastery were primarily a place for care rather than cure. They were also homes for the poor and travelers, pilgrims and strangers. The supply of drugs and medicines to the sick was a customary part of care. This was especially true in the cases of the indigent and the aged who needed it. Many monasteric hospitals became leper houses or lazar houses and provided care to the socially unfit. The institutions run by the monks would grow and use their own herbs and mixtures.

Monks and nuns practiced medicine.[90]

Institutional care developed outside the monasteries as well. The Arabs as previously described provided excellent care to the institutionalized patient. From the tenth to the fifteent century an expansive network of hospitals began to be built in Europe. This was spurred on by the results of plagues and war. A certain amount of the hospitals were reserved for women and children and a few were reserved for those who "had lost wit and memory." In the early sixteenth century England began the building of hospitals to treat its people. This stimulus to build was due to the supression of the monks and the closing of many of the monastery hospitals. The care in these institutions left much to be desired. Much of the care was described as unsavory and the hospitals were considered as an activity set apart from the mainstream of the community.[91]

The pre-twentieth century American hospital was described as a stopover for the burial ground. Not only was there the lack of aseptic techniques and curative methods but it was not considered the center of care.[92] The first American hospital was founded in 1751 in Philadelphia. It was a transplant of the British voluntary hospital. The colonist would follow the British example in many of the subsequent hospitals built. The first to offer medical care to the sick were the almhouses which offered shelter to those unwilling or unable to pay or support themselves. The small almhouse

infirmaries were often characterized as undesirable.[93] The colonist also followed the British practice of quarantining debarking immigrants and sailors suffering from contagious diseases. This was done in "pest houses" and were so called because of the poor conditions under which they were maintained.[94] Like the almhouses, these hospitals were mainly custodial institutions.

As the eighteenth century wore on, increasing complaints were heard against the forms of charity existing in the institutions of England and America. The idea of recognizing the necessity of providing care for aged and indigent was readily accepted. It was objectionable to the early Americans to give charity to the lazy who refused to work. In an attempt to aid the industrious poor and return the sick to a useful role in society, the voluntary hospital movement was founded. Many physicians were strong supporters of the idea for they saw an opportunity in this to expand medical education. Many of the physicians served in the institutions au gratis. They in turn would be able to bring in their students to the hospitals for informal observations and clinical instructions. In addition to offering advantages to the pupils a physician connected with the hospital was considered honorable. This enhanced public recognition of him and expanded his private practice. The voluntary hospitals attracted many medical men to its staff.

Each voluntary hospital established the rule that a certain minimum donation entitled the donor to be classified as

a contributor. These contributors met annually to elect a Board of Governors or Managers of their respective hospitals. The responsibilities of the Board were broad. The board members made decisions, hired staff and served on committees. The voluntary hospitals did not admit patients suffering from contagious diseases or those who were somatically ill. While the "deserving sick" were not charged for services, sevants slaves and other patients were overcharged for hospital care. From the profits, more revenues were generated to provide more free beds.[96]

Approximately one-third of the patients in the Philadelphia hospitals were termed insane. Unlike the curable and uncurably ill patients who were not admitted, the insane were admitted as free paying patients. This was done mainly to get them off the streets. The other insane patients were admitted as paying patients to get them out of the homes of the emotionally hard-pressed middle and upper class families. The families of these insane would contribute large sums of money to these institutions. Many of the insane were housed in cold damp basements. Chains and other restraining devices were used on the violent. Drunken and sadistic cell keepers used physical punishment to intimidate many of the patients. By the nineteenth century a great deal of criticism was directed at the conditions inside the hospitals. In some areas, states began to take control of them. Even under the control of the

state, mortality rates among the patients continued to be high.[97] As the years progressed activities with surrounding medical schools became increasingly frequent. A course study in clinical medicine became a requirement for the medical degree. The mentally disturbed and other patients began to be the beneficiaries of more humane treatments. Social conditions in the hospitals began to improve. Hospitals continued to bleed, purge, shock, and drug patients but living conditions improved. A new approach to treatment pioneered in Europe, was beginning to be used in America. Kindness, understanding, removal of physical restraints gradually began to emerge in the treatment of the ill.[98]

The almhouses infirmaries were evolving into hospitals. The marine hospital established by a compulsory government program was active. Hospitals to handle infectious diseases and epidemics as smallpox and yellow fever began to replace the pest houses. Opthalmic dispensaries, ear and chest hospitals and other speciality hospitals began to emerge. Toward the end of the nineteenth century hospitals and hygeine were closely related. Emphasis was placed on public health and sanitation. Local authorities assumed responsibilities for disease control through public health regulations.

During the twentieth century the systems of hospitals changed. Hospitals were thrust beyond the new concept that they should be organized for best service to the patient, in

their training of personnel and for the progress of medicine. The new hospitals became inspired by the social role based on cure and prevention of disease in every citizen. The structure of the modern hospital included specialities, efficient management as well as therapeutic effectiveness.With the social motivation and scientific advances in technology,the care of the patient shifted from simplistic treatments to complex treatment centers. The modern hospital would become the focal point of care.

The hospital has become a "nerve center" of activities vital to the community.[99] There has been a variety of definitions given to it. Levey calls a modern hospital a part of today's living standards.[100] According to Hassan the hospital is a complex organization utilizing a combination of intricate, specialized, scientific equipment. It functions through the capabilities of trained people educated to the problems of medical science. These are welded together in the common purpose of restoring and maintaining health.[101]

The hospital has become as complex structurally as organizationally Hospitals are classified into medical surgery or maternity based on speciality; long term or short term facilities based on length of stay; governmental or non-governmental based on ownership and control; and accredited non-accredited or provisionally accredited based on accreditation by JCAH.[102] (To be defined) There were over 7600 hospitals in America in 1972;[103] 76 percent are non-governmental and 24 percent are governmental. The

voluntary hospitals are the most prevalent of the groups.[104] The organizational patterns of the hospital assumes that of any business or industry. Hospitals have administrative services and responsibilities and in general are organized according to the corporate laws of the state in which they operate. The corporation organizes through adoption of by-laws and the election of officers. Because the organization may consist of a large number of people a representative group is elected to a board of trustees which becomes the governing board of the hospital.[105] The hospitals are also guided by a more voluntary mechanism for regulation-accreditation by Joint Commission on Accreditation of Hospitals (JCAH). This group, an off-growth of the medical profession, sets minimum standards of practice for its member hospitals. The standards relate to the hospitals medical staff, clinics, medical records, laboratories and the other departments throughout the facilities.[106]

Hospitilization has evolved into a big industry. In 1978, 40 percent of the health care expenditures were spent on hospital care.[107] The voluntary general hospital represents a major capital investment in the provision of personal health services that are very essential to the community. The use of the facilities has been a contributing factor to this. The use of them have steadily increased. In 1965 of the 7,123 hospitals registered by the American Hospital Association handled 28,811,925 admissions, and cared for 3,308,381

births.[108] The use of the hospitals can be attributed to their accessability and availability. The building of facilities across the countries were the direct result of Hill Burton legislation that inaugurated organized planning for health, helped to set the standards for the quality of care and helped to distribute and integrate health services throughout the country.[109] The use of the hospitals is also influenced by the third party reimbursement. This has not only led to the services of the hospital being utilized. It has also made government responsible to the public for the use of their funds in public programs to pay for the increasing share of government into the nations health bills. The hospitals too are pressured by government to be more accountable to the community. The pluralistic payment mechanism and increased government interventions have made the hospital sector organize and gear toward properly administering and effectively managing their institutions.

The active management of the hospital is delegated to the Board of Trustees to the Administrator of the hospital and to his staff,associates, assistants and department heads. The main function of the administrator is to enforce policy and maintain an active role in the community. The administrator studies the way to improve the internal efficiency of the hospital. He keeps abreast of organizational changes that stimulate a more effective system. He considers the

community and its public relations and demands. The administrator watches the complexity of the regulations fostered by government and integrates the solutions of problems that are realistic in the system. The hospital is a system within a system that includes a variety of areas. The pharmacy is only one area of many divisions but it exerts a great deal of influence on the hospital. The administration and management of this department as other departments in the hospital are left to be managed by efficient specialist.

CHAPTER II

DEVELOPMENT OF PHARMACEUTICAL MANAGEMENT IN THE HOSPITAL

A. Early Influences

In the very beginning, the hospital pharmacist has played a unique role within the institution. His early beginnings is within the monasteries where the pharmacist was called upon to cultivate medicinal herbs and prepare his own medicines. Many of the monks prepared their gardens and their herbs in elaborate group fashions. One such scene survives in history: a monk mixed herbs in a jar (jars become the symbol of certain religious orders with special and ornate artistry. They adorned the pharmacies of the larger monasteries); another monk boiled a poultice and a third prepared a potion while giving thanks to the Divine Providence who guarded their hands.[110] In the richer monasteries pharmaceutical tasks were combined with the distillation of cordials.[111] Most monasteries maintained "physic" gardens laid out in accordance with specific plans. A particularly noted garden was the one at St. Gall, Switzerland founded in 614 A.D. It was arranged in 16 plant beds, divided into four plots marked off by intersecting paths that formed crosses. Frequent sketches of gardens as these were copied and circulated to other monasteries.[112] It is in the cultivation and maintenance of gardens like these that the

primary duties of pharmacists were reflected. The pharmacist was also depicted as the "storekeeper" as he was in charge of all the spices and supplies for his order.

In the early hospital practice in the colonial periods the scope or salary of the pharmacist could not have been very attractive. According to Urdang "much is left to be clarified historically about the place the pharmacist occupied in the institutions."[113] It is known that the apothecary in colonial times did separate the dispensing and the preparing of medications away from the physician. Before the early nineteenth century the American and English pharmacist as the colonial pharmacist combined pharmaceutical functions with medical and nursing ones. Apothecaries cared for instruments, administered medications, visited the sick, and if there were no physicians or surgeons available, administered emergency care. Apothecaries appointed to the hospitals in these early periods were expected to "cup and bleed on the medical wards."[114] They were also assigned clinical duties as making rounds with surgeons, and had to report about the conditions of their charges. These duties were later charged to the physician. The apothecary was expected to compound and dispense all medicines prescribed, label them for patient use and distribute them to the patient areas. From then to the early twentieth century hospital pharmacy was described as a "quiet tributary" of the profession with many hospitals getting along without pharmaceutical services altogether.[115]

B. Modern Professional Growth

The twentieth century began to show changes in hospital pharmacy when the systems of hospitals changed. The speciality came alive. With the structural changes in the hospital, increased utilization of its services, and with the progress of clinical medicine opportunities for hospital pharmacy to emerge as a specialty were created. By organizing through associations, the developmen and growth of the profession in this area was seen. As with the hospital as it became the focal point of care, hospital pharmacy was cast into the areas of patient care, teaching and research. The art and the science of the speciality would likewise develop. One of the biggest boosts to this was having the speciality of hospital pharmacy defined. By its definition the broad and extensive areas of responsibilities placed on the pharmacy and the hospital pharmacist were recognizably widened. The definition covers the functions and services concerned with medications supplied to nursing units and other services, prescriptions filled for inpatient and outpatient use, the manufacturing of bulk medications, the control of narcotics, the storage of drugs the preparation of injectables and sterilized products and the dispensing of other supplies.[116] The official definition of hospital pharmacy assured the pharmacist that he occupied a significant and important place in the institution.

In 1942 the greatest strides were made in hospital pharmacy by the formation of a professional society. In affiliation with the APHA, the American Society of Hospital Pharmacists (ASHP) established goals and outlined standards for the professional practice of pharmacy in hospitals.[117]

The society continues to contribute to its growth by subscribing to a policy of advancing basic knowledge and assuming the responsibility of representing the speciality. The ASHP promulgated six goals with intent to coordinate and implement them into the system. The society set the goals and outlined its objectives as:

1) Teach hospital pharmacist the philosophy and ethics of the speciality and for them to assume personal responsibility and accountability for professional pharmacy.

2) Strengthen and expand professional services.

3) Strengthen and perfect managerial and administrative skills of its members as department heads.

4) Attract well trained pharmacy specialist to hospital practice.

5) Promote realistic monetary rewards for pharmaceutical staff and managers.

6) Utilize the resources of the speciality to assist in the development and improvement of the profession.[118]

To meet these goals and objectives, the society has developed training programs, and certification of centers for residency programs, has established education programs, has promoted education immensely, and has through its publications recognized and

demonstrated a commitment to the elevation of pharmacy. Two decades after its formation tremendous progress has been realized in the area of practice.[119]

The standards set by ASHP present guidelines for their application and encompass the organization of pharmacy, the policies that should be initiated and developed within pharmacies, the personnel needs for pharmacies operation, and the facilities itself. Outlined also was the responsibilities of the pharmacist to the profession and to the institution.[120] The ASHP officially recognizes the abilities required of the specialists in the hospital. The society has recommended changes and reforms in present curriculum that would give the pharmacist specialized education and enforce the pharmacist's abilities: 1) to have a thorough knowledge of drugs and their actions; 2) to develop and conduct manufacturing if needed; 3) to initiate control procedures; 4) to conduct research programs; 5) to conduct in-service education programs; and 6) to administer and manage a hospital pharmacy.[121] The ASHP has been the motivating force in transforming hospital pharmacy from a "drug room" concept to an integral part of patient care. The pharmacy has evolved from a storage room for medical material into a focal point for all activities related to drugs.

The pharmacy has come to exert a great deal of influence on the economy of the total operational costs as well as upon the professional stature of the hospital. It interrelates with other services and interacts with other health care professionals.

The pharmacy is an interdisciplinary link between departments within the institution. It renders important services to the entire hospital. Radiology and laboratory, housekeeping, central service, accounting are all interdependent on pharmacy. The pharmacy also serves a particular service to the medical staff. Pharmacist compounds special preparations that cannot be purchased. Pharmacies also provide an updated medical library that is readily available to the hospital staff. Pharmacists assist nursing in various ways of education.

The pharmacist frequently acts as liason between the medical staff and the provision of drugs in a hospital through the hospital formulary system. This system has been described as a balancing wheel in the mechanism for pharmaceutical service.[122] As an important and permanent member of the Pharmacy and Therapeutic Committee (P&T), the Pharmacist establishes guidelines for drugs, evaluates them and selects them along with the medical staff. The formulary has benefited the standards of drugs in the hospital and has resulted in better patient care. Through other committees the pharmacist has increased his "advisory" role concerning drugs and has become an active member in initiating of policies throughout the hospital.

Many of the policies in pharmaceutical practice has been established by voluntary recommendations of JCAH. In 1953 their recommendations to member hospitals contained a very brief section on pharmacy or the "drug room".[123] In 1957 the pharmacy

had been listed among the essential services of the hospital by JCAH. Since then the pharmacy has been described as the most extensively used of the therapeutic facilities.[124] By 1970 JCAH recommendations contained the first comprehensive standards for pharmacy. The main emphasis of them was that the pharmacist is responsible for medications throughout the hospital. Between 1970 and 1976, the standards were expanded and indicated concern for drug control. In 1977, the concept that pharmacy is involved in patient activity was highlighted by them.[125] The standards of JCAH and ASHP have a purpose. They hope to set rules that are implemented. JCAH trains its surveyors on measuring concepts. They meet and discuss existing standards and new ones. Hospitals are complying to their recommendations. Pharmacists have used JCAH standards to initiate change within their institutions.

A stated expansion of scope that hospital pharmacist have entered is in the area of research. This area has been recognized as an objective to be reached and as a means of advancing pharmacist contributions to professional growth. The ASHP has made its recommendations to its members based on its commitment to improved patient care. The involvement by pharmacist in research will hopefully lead to the development of new dosage forms, improve existing ones, or to the development of new and accurate methods of analyzing drug products.[126] Specially trained hospital pharmacists in research represents a new scope of the practice.

C. Management Dynamics

Hospital administration is the coordination of men, money and materials to provide facilities to assist a physician to treat his patient.[127]

The dollar volume of hospital drug purchases from commercial laboratories had more than tripled between 1961 and 1973.[128] In 1965 there were approximately 7,123 hospitals registered by the American Hospital Association (AHA). In caring for their patients, these hospitals purchased an excess of over $500,000,000 worth of pharmaceuticals.[129] Many modern hospital administrators surveying the amounts of drugs purchased and the increased use of drugs realized that only trained pharmaceutical personnel should handle purchasing, storing, pricing and dispensing of drugs. It is in this recognition that the hospital pharmacist has moved into a position of "considerable autonomy" of professional planning and action reflected in the respect and authority awarded the pharmacist by his administrator.[130]

Most pharmacies in hospitals retain the services of a pharmacist for the procurement, supply and dispensing of their drugs. Broad areas of pharmacy administration and management includes pharmacy integrating pharmacy policy into the mainstream of the hospital. Pharmacists must communicate to others in the hospital. Budgeting, stock control, maintaining records, preparing reports are part of the pharmacist responsibilities. The hospital

pharmacist must be completely familiar with the organization of the hospital, and staff and line responsibilities. The pharmacist-manager coordinates pharmacy's activities with the other departments such as nursing and medicine. He interviews, hires and evaluates pharmacy personnel. He is responsible for personnel training and development. He must be able to supervise and manage the people in the department.

The pharmacist in charge of the hospital pharmacy is responsible for justification, accountability and expenditure of funds in the department. He must analyze and interpret data, and forecast for future expenditures. The manager must keep an accurate system of stock and control. He must develop if applicable a charge policy for pharmaceutical services. He must administer the department in an efficient, business-like way for the pharmacy is a part of a very large piece of a complex organization.

The pharmacist operates within a structure of legal and voluntary constraints partly in response to governments response to curtail the rise of costs and partly because of voluntary efforts by the hospital to slow the increase of costs.[131] As the hospitals become more pressured by government and rising costs, the departments within the system will be effected. The environment in which the hospital pharmacist works will respond to the need for change. In pharmacy how drugs are purchased, drug usage

reviews, strict adherence to formularies, generic substitutions and clinical pharmacy services are a part of cost containment efforts.[132] They call for the pharmacist manager to operate within the established guidelines for the supply, procurement of drugs. Besides the function of dispensing medications, the pharmacist has become an administrator and an economical business-man in the hospital.

CHAPTER 3

THE SUPPLY, PROCUREMENT AND CONTROL OF DRUGS IN THE HOSPITAL

Early History

From the bills of monasteries preserved through the centuries, items such as spices and syrup were listed. Most of the items were used in medevial cooking and historically almost impossible to decide to what extent they were used in the preparations of medicines. It is assumed that the early inventories of the monks reflect the pharmacist more as the storekeeper than the pharmaceutical practioner. (153) The earliest stock outside of the monastery belonging to the pharmacist (spicer as he was then called) appeared in 1358 AD. In this listing, the ingredients supported the nature of the general practice of pharmacy during the Fourteenth Century. The pharmacist catered to public needs and provided commodities that were not necessarily pharmaceutical in nature. The inventory included bales of almonds, wax, peppers and various spices. (134) The lack of drugs was noteworthy and it was not until the Fifteenth Century that history of stocks began to take on a pharmaceutical nature. (135) The earliest inventory of the English Apothecary to survive the centuries included ninety-two items of which all were pharmaceuticals. There were also syrups, oils, pills, ointments and various remedies. The total inventory was valued at approximately $15. (136)

Between 1603 and 1638 AD the inventories became more detailed. In history the inventory of an English apothecary

listed over 500 pharmaceutical items valued at approximately $270 out of a total inventory of $1,000.[137] These inventories began to show equipment such as a mortar and pestles, bottles, enema syringes and various non-pharmaceutical items. What inventories were in hospitals are not recorded extensively in these periods. It was mentioned that the hospital apothecary, in his appointment to an institution in the Sixteenth Century, was alloted a very modest expenditure for drugs. In 1566, the apothecary Thomas Califfe was required to purchase all his drugs out of his annual salary of $84.[138]

In the colonies in America, the record of Robert Talbot, who died in 1725, gives a detailed account of the activity of a pharmacist in the Colonial period. There is listed a few chemicals, many minerals and much equipment which suggests the extent of large scale manufacturing appearing in the practice of pharmacy in that time.[139] Hospital inventories were not mentioned in great depth in the colonies. It was common practice to obtain drugs from outside sources, through wholesalers and drug shops. This carried throughout the Eighteenth and Nineteenth Centuries and to the early part of the Twentieth Century.

Hospital inventory became a specialized area of concern in the middle of the Twentieth Century when the importance of the speciality earned its right. Although it was common practice in smaller hospitals to depend on relationships with larger hospitals or community pharmacies or satellites to provide their drugs, hospitals began to employ full time pharmacists to obtain and dispense their medications and drug supplies. Today, the purchase and inventory of pharmaceuticals are a special and

important phase in the operation of a successful pharmacy. Surveys since 1949 have indicated a continued rise in the consumption of pharmaceuticals. Population growth and increase in the number of hospitals and associated health plans have contributed to it.(140)

Statistics compiled by IMS (a consulting corporation that studies marketing and purchasing trends in the health care field) illustrates the increasing costs of drugs in hospitals.(141) During 1972-1976, the dollar mount of pharmaceuticals purchased by hospitals increased by 57.4 percent.(142) In 1976 alone, drug expenditures increased by 17.8 percent. In 1977 hospital expenditures for pharmaceuticals were expected to exceed $1.4 billion.(143) A questionnaire is sent out to directors of hospital pharmacies across the nation periodically. The survey reveals general trends around the country with regard to pharmacy practice in hospitals. In 1979 the survey results provided some interesting data regarding inventory and purchases. Purchases in a hospital, for those who participated in the survey averaged $520,600 and the average inventory was $92,252.(144) Over a four year period of the survey, inventory investment has increased 34.2 percent at an annual growth rate of 8.4 percent.(145)

Monies spent on purchases have risen 61.5 percent at an annual rate of 15.4 percent.(146) In 1978 the purchases of pharmaceutical and related supplies were expected to be $2,215,000 to $2,772,000 in pharmacies of short term hopsitals alone.(147) Realizing the great amount of money involved in drugs and pharmaceuticals, the purchase and control of inventory is left to the administrative staff of hospitals who, as shown, has delegated

the responsibility to the pharmacist to include purchasing and inventory for the pharmacy department.

Procurement

Some institutional purchasing is centralized under a purchasing agent who purchases supplies and drugs for the entire institution. The pharmacist, like other department heads, requests items to be purchased on a special form. The selection of the brand products and the vendor is left to the discretion of the purchasing agent. Another system uses a specialist, the hospital pharmacist, who has the technical skills to properly select and purchase drugs. Other systems use a combination of both systems in which a centralized purchase system exists but the pharmcist in charge is responsible for setting the specifications for procurement of drugs through a centralized department. The hospital pharmacist uses the actual function of purchasing through the purchasing department but he develops the specifications and program for pharmaceutical products within the general program of the hosptial.(148) The purchasing system can be formal or informal, simple or complex. The purpose of it is to improve the overall efficiency of the hospital.(149)

The functions of the hospital pharmacist in the procurement of drugs in a hospital are many. According to minimum standards for pharmacies set and elaborated by ASHP, pharmacists are responsible for setting the specifications as to quality and source for drugs.(150) He must set the criteria for purchasing pharmaceuticals and consider certain factors in their purchase. Hospital pharmacists have been given the responsibility and obliga-

tion to purchase products under a generic name system. The pharmacist is a vital person in the selection of competitive products. One of the first considerations in purchasing drugs is the question of quality. It is a moral responsibility of pharmacists to provide quality medications for the patient. By working along with the P and T Committee, pharmacy can set the criteria for the purchase of pharmaceuticals of quality products. The pharmacist must also select drugs on the acceptability of the patient to the product. Cost of the drugs is also an important factor for its purchase.(151) Pharmacists also have the responsibility to be aware of the different purchase plans and the services given to them by vendors. Pharmaceuticals in a hospital may be purchased:

1) by direct order from the manufacturer;
2) direct purchase from the wholesaler;
3) by bid from either the manufacturer or the wholesaler;
4) by purchase from an outside pharmacy;
5) by contract agreement with the manufacturer; or
6) by contract purchase through a group plan.

The benefits of purchasing medications in quantity is cost effective. Savings can be passed on to the patient. Volume buying is done in hospitals either through a group purchase or by contract agreement, usually obtained by bids. There are advantages to each method of purchase and pharmacists should be aware of them. Volume buying guarantees a certain price for drugs and protects the buyer from price increases during that contract period. It also benefits the supplier who knows

what he must offer.[152] Monetary savings can be realized because of discounts that can be given with volume buying. Volume contracts are frequently offered by a majority of manufacturers. Discounts can also be obtained if prompt payment is received on the institution's bills. Discounts are available through other policies from manufacturers and pharmacy managers should be aware of them.[153] The type of available service from the vendor would also be significant in determining the criteria for obtaining drugs.

A big area of responsibility for pharmacists in drug procurement is establishing a good purchase program procedure which protects the life line to the hospital. The pharmacy income is a good portion of the hospital's revenue. A simple, efficient drug purchasing system can save time and money.[154] A program for purchasing begins with deciding when and how to order medications and products. The method to purchase depends on when the medication is needed and the quantity needed. In general, the decision to buy is made when stock level reaches a certain level. After the pharmacist decides when to purchase, he initiates an order to buy on a purchase order. The purchase order is usually a multiple form consisting of a copy for the vendor, accounts payable, the department purchase files. One copy is kept for the return of the invoice from the vendor to which it is attached. It is then forwarded to the accounting department to be processed for payment. Purchasing the medications by one method may be more costly than another. The department should give itself the appropriate amount of time between the time the drug is ordered and the time it arrives in the pharmacy.

The way the medications are ordered varies from the type of institution and with the way it is obtained.

The purchase program should also provide a method for receiving the order. Usually when it arrives in the pharmacy the order is checked through the purchasing slip and matched against the purchase order. If it is in order, the invoice is sent to the accounting office along with the copy of the purchase order. Once the merchandise is received, the pharmacist should have a purchase record card that will be available as a source of reference. This can be used to determine rate of use, cost of drug and other information as to date of purchases. Storage of medication is also important in total procurement procedure and pharmacists must supervise proper storage of stock in suitable areas. The pharmacist manager must also have a good procedure for the return of goods and communications with the vendors regarding policies on returned goods. Reserved for emergency situations, a good procurement procedure allows for borrowing from outside sources such as a local pharmacy or another hospital as a backup for getting medication immediately to patients.(155)

Control - Management and Control of Inventory

Whatever the inventory is will have an effect on what is purchased. The ideal inventory allows efficient and economic purchases. It is efficient if it supplies adequate amounts of what is needed and economical if it allows purchases that give the best savings. Inventory has been defined as the control on purchases.(156)

Inventories are maintained for two purposes: protection and economy. It is more economical to maintain adequate stocks than to utilize a supplier for each order. Inventories are also necessary to provide protection against unpredictable demands. Adequate stocks are maintained so that fluctuations in demand for various goods can be met.(157) Two basic methods are used to determine the inventory; periodic and perpetual. The periodic inventory involves the physical counting of goods on hand at the end of a general accounting period. This method does not provide any means of control, does not indicate where the inventory is or who is responsible for it at any one time. The perpetual inventory is a continuous record of what is on hand and updated each time items are removed or added to stock. This system provides for control over inventory because inventory levels are seen and are easily available. Shortages can be easily seen and readily determined. The disadvantage to it is the time and effort involved in keeping it up to date.

Valuation of inventory is important to making administrative decisions. Proper valuation of inventory has an impact on the hospital. Ending inventories overstated or understated affect the financial picture of the institution. Inventory on balance sheets and income statements reflect the cost of goods sold. A true representation is needed for reimbursement purposes.(158) The valuation of inventory exerts a power of control over purchases. Turnover of inventory is measured by computing the ratio of annual purchases over average inventory. A low turnover indicates a high average inventory and too much money tied up in inventory. It represents duplicate stocks,

large purchases of slow moving items, and dead inventory. A high turnover indicates a low average inventory and may mean too many little, small volume purchases.(159) When inventory levels are kept too low and a majority of drugs are bought in too little quantity, it results in excessive order costs. Low inventory levels mean a greater chance of running out of items and necessitating the purchase of the item from a wholesaler and at a premium price until a direct order can arrive. Purchasing drugs from a wholesaler that are normally bought directly from a company at bid prices, is an expensive procedure.(160) In 1978 the inventory ratio for an average size hospital was 4.7 - 5.8.(161) In 1971, Lillys' survey, the turnover ratio for a 300-399 bed hospital was 5.9.(162)

The basic difficulty of inventory management is having the right amount of stock on hand and maintaining the proper amount of inventory investment. Inefficient use of capital invested in inventory causes financial problems.(163) Proper inventory management effects the overall operation of the institution. By alloting too much money in inventory, the result is a shortage of cash if needed in daily operational costs. This can have its effect on financial solvency and daily cost of operating. Excessive inventory affects marginal and overhead costs - both are increased.(164) The effect of proper inventory management on operating costs should not be understated. Both the quality and quantity of inventory can be maintained through adequate control procedures. Inventory control is deciding how much to buy and purchasing the right quantities at the right time. This constitutes a good purchasing program.

In view of the large investment and range of available products, the need exists for pharmacists to become responsible managers in inventory control. As a manager, the pharmacist must select an appropriate inventory control system or combination of systems. Proper management of inventory has become increasingly sophisticated. Many of the methods that are employed consider other factors. Many are dependent on demand, quantity, time of procurement and the usefulness of the items. These factors affect the pharmacies purchasing and control methods and include costs, both marginal and acquisitional, additional labor time, and storage area for drugs.[165, 166] The methods of inventory control range from elementary and ineffective to the very sophisticated and most effective.

There are six basic methods of inventory control:

1) Want Book Method - This is the first intuitive method and a common method in practice today. It is also the least effective. It is a useful auxiliary tool. It is no longer advisable to use the "want book" method as the only control on inventory levels.

2) Systems of Want Book - There is a want book for every direct account and each wholesaler. Based on a predetermined maximum and minimum level the item is ordered to bring the inventory up to the level. The selling price, the cost of goods purchased are also recorded on the accounts. Information about the order - when it was placed, when it's received is also recorded. This method can

serve as a record of what activity goes on for products. The data in these books can be used, reviewed and refined periodically. The method is succesfully used for inventory control if the operation is small and if it is used in combination with other systems.

3) The "Open-To-Buy" Budget System - One of the simpliest and easiest inventory control systems to implement is the O-T-B-B. The system consists of adjusting each month's purchases based on an increase or decrease of sales of the previous month in corresponding to the budget allocation for that month.

4) The Stock Record Card System - This system is used to determine the optimum number of individual units for each product. The use of the stock record system has been very effective. It shows the manufacturer's name, address and discount policies and sales terms. The name, size, cost per unit of the drug and the maximum/minimum quantity is listed. The inventory and purchases are recorded by date. The minimum/maximum quality can be changed.

5) The Minimum/Maximum System - A minimum level is established below which stock should not fall. A maximum level is also set above which stock is not allowed to rise. This method provides protection against unusual demand.(168)

6) Computerized Perpetual Inventory Systems - This method is the most scientific and effective method of inventory control. It requires computerization and feasible computer terminals. The feature for wide scale control is accurate and efficient input of data. The terminal permits perpetual inventory control and a recorder print and quantity determined by the Economic Order Quantity concept (EOQ).

The means of inventory control that were formerly used and developed only in businesses and large organizational complexes of materials management are finding their way into the hospital pharmacy. The development of price and value indexes have been used in hospital pharmacies to provide the pharmacy with a means of measuring its purchasing and inventory control performance, forecast drug acquisition costs and budgeting. The use of indexes provide the pharmacist with accurate information with which he measures, objectively, procurement and inventory performance and resulting in improved financial performance.(169)

Other means of inventory control used in pharmacies in hospitals that were formerly used in materials management are the ABC Classification System and EOQ Concepts. The ABC Classification System has been a vital step for organizing for financial control within a pharmacy department. The inventory is classified in order to make use of the resources to its maximum. It is the more sophisticated method to arrive at economic ordering points. ABC Classification offers a means of classifying items in inventory into groups in order to establish appropriate

degrees of control over them.[170] A small number of items account for a large volume of expenditures and a large number of items account for a small dollar amount.[171] Ammer used this generalization as a basis for describing ABC Classification:

> "A Items" account for 80 percent of inventory expenditures but consisted of only 10 to 15 percent of the inventory.
>
> "B Items" account for 20 to 25 percent of inventory items but only 15 to 20 percent of inventory expenditures.
>
> "C Items" would be classified as 60 percent to 70 percent of inventory but only 10 to 15 percent of inventory dollars.

The A items deserve close attention because proper controls have significant affects on the inventory expenditure. In practice, A items require a high turnover and maintenance of perpetual inventory. An ABC analysis provides a way of modifying purchases and control procedures by a systematic method. The analysis could be used for potential bid items. Bidding procedures are usually based on a projected annual useage. By using the analysis, items that should be a part of the bid procedures can be pointed out.

ABC analysis has also been used in conjunction with the EOQ Concept to see where items that are bought too frequently can be pinpointed. Significant savings has been realized through this method. This analysis was done in 1977 by a hospital in Michigan. A projected savings of $53,170 was realized by the hospital when it led the pharmacy department to solicit contract

agreements for that year on all items that were available on bid.[173]

The EOQ is the reorder quantity for an item which will result in the lowest annual cost for that item. EOQ is the point where carrying costs equal acquisition costs. If the total cost is high in acquiring drugs, it is probably due to the too many, small orders being placed.[174] As the correct order point is achieved, the cost for acquiring the item will diminish. If the order size is too large for normal useage, the inventory turnover will be low. EOQ allows total costs to be at the minimum.[175] EOQ allows the optimum turnover rate automatically and ends in significant dollar amounts saved. The benefit of good control of inventory is realized with the initiation of a sound program for procurring drugs. Hundreds of hospital managers indicate that many deficiencies that exist in hospitals are directly related to inefficiences in purchasing and inventory control practices.[176, 177]

CHAPTER 4

St. Joseph's Hospital Kirkwood
A Case Study - History of the Hospital

In 1939 the U.S. government constructed a hospital in Kirkwood. During the 1940's this marine hospital was operated by the U.S. Public Health Service for government employees. The building was declared surplus property in 1952. The 150 bed hospital was deeded to the Sisters of St. Joseph of Carondelet in 1953 and subsequently opened under their sponsorship the following year. Eight years later a 77 bed wing was added onto the hospital and by 1970 expansion was underway for a 60% renovation. Ground was broken for a new four story addition providing new nursing units and expanded ancillary services. In 1974 the addition was completed. From 1976-1980, there has been added constructions yearly and the complex presently includes a modern I CU facility, an extended Radiology department, a medical office building and newly constructed addition to its present floors.

St. Joseph's today serves the community in Kirkwood as well as neighboring areas in St. Louis, Franklin and Jefferson Counties. The hospital currently has 332 beds, 350 physicians, and over 1000 employees with an annual operating budget of over $25 million. More than 12,000 patients are admitted each year and nearly 30,000 receive emergency medical services. The

hospital provides a variety of comprehensive services for treatment of inpatient and outpatients such as a modern fully equipped surgical suite, a hematology-oncology unit, and a wide variety of technological screening, monitoring and diagnostic services. In addition to providing for the acute care needs of its patients, St. Joseph's is committed to serving the community, to identify health care needs and has projected into the community with various educational and informational programs. These are aimed at the diabetics, the chemical dependent, as well as, the professionals and would be professionals in the community.

Purchasing System in the Hospital

Most of the purchasing at St. Joseph's is done through materials management departments centralized purchase program. It consists of a well organized purchasing procedure including purchase order, purchase record and purchase controls. On July 1, 1980 the Materials Management Department implemented a mini-computer system used to control inventories and purchase orders and to provide cost data. The system culminated six years of successfully performing the functions on a manual basis. The project was a jointed effort with the Accounting Department. It was projected when justifying the program that a preliminary study indicated a reduction of as much of $30,000 in inventory over a three year period. The Quantel System is equipped with inventory, purchase order and accounting programs. All the departments within the hospital will be eventually geared toward this system motivated by its cost reduction and by improved

inventory efficiency. One-third of the computer's memory has been reserved for pharmacy's use. The organization of pharmaceutical products into the system is the objective of the hospital. The hospital realizes the improvement of inventory productivity and efficiency that can result from this incorporation, The supply, procurement and control of medicines and drugs are under the direction of the Pharmacy Department at St. Joseph's.

Pharmacy Department

The pharmacy has reflected both physical and organizational changes since the opening of the hospital. It started out with only a staff of two. By 1966 supportive personnel were added. The pharmacy expanded its layout when the services of the hospital increased. An IV room complete with a laminar flow hood expanded not only square footage of the department, but also added services in pharmaceutical admixture programs. In 1971 3 students and two Pharmacists joined the staff. Three years later patient profiles (part of the clinical approach) and unit dose distribution system was initiated. The present personnel includes 6 full time pharmacists, 2 part timers, 4 technicians, 2½ clerk typists. The Director of Pharmacy has an assistant who supervises the department. Dedicated to teaching as well as improving care, the pharmacy employs 4 pharmacy students and is involved in a training program for externs in adjunct with the St. Louis College of Pharmacy. The Pharmacy is opened from 7 am to 11 pm and the hours of coverage has also been a record of expansion. There is a pharmacist on call for the time it is physically closed and medicines available to nursing through a night "cupboard".

The Department up until July 1980, has had the same director for the last 17 years. The same procedure of procurement existed prior to this direction and is still used. Through the years' modifications to the procedures have taken place, but the overall procurement program has remained intact. Drugs are procured by any of the following: direct orders from the manufacturer; direct purchases through the wholesalers; bids from the manufacturers or wholesalers; contracts from the manufacturers supplied directly through the wholesalers; group purchase through a hospital association (HAMSL) supplied through the companies or the wholesalers and by borrowing from other hospitals or a local pharmacy. There are routine visits from vendors and established procedures for them.

The procruement procedure is initiated by the purchase order (p.o.) which is a multiple form and is distributed very much in detail as the form described in Chapter 3.2C. A separate p.o. is generated for items that are ordered from the direct companies regularly or if ordered from the companies through HAMSL. The orders are called in or mailed in or given to the visiting vendor. The medications ordered by pharmacy are received in pharmacy. The exception to this are the IV fluids orders which are delivered through the Receiving Departments but are controlled and checked in by pharmacy. Once received, the items listed on the packing slip are matched against the items listed on the p.o. by a clerk. A copy of the invoice and the p.o. is sent to the Accounting Department. The Accounting Department checks the quantities and price, notes discount terms

of the vendors and may proceed to begin the payment process if indicated. The clerk in pharmacy who has checked the order will note any reasons for possible return of goods, shortages in shipment and if there are none will date the items and put away the merchandise. If any drugs are needed to be returned, the established vendors have the procedures for doing so.

Another clerk in Pharmacy maintains a record of purchases. Information is entered from the invoice and listed are the drugs, vendors, dates obtained, prices paid and quantities received. Also checked are any increases or decreases in costs. If they are significant, the change is passed on to the Accounting Department for adjustment of charges to be made.

In September 1980, a record of purchases from all direct accounts were started and noted manufacturers terms, drugs ordered, quantity purchased, previous quantities purchased, price paid and any other information that aid in inventory management. The department depends on items needed for inventory on what's listed on the want book. The items are placed on it as a rule, toward the end stages of their supply. There is no ongoing inventory checks on a routine basis. Three years ago an ABC classification was done by the head of Materials Management. Suitable reorder points were established based on EOQ concepts. They were never utilized. The analysis revealed a tremendous amount of C items in Pharmacy's inventory.

The decisions of what to buy and how much to buy should depend on the inventory. The inventory is determined periodically by a physical count of stock on hand. This is done June 30.

In Pharmacy a perpetual inventory is maintained on narcotic drugs. To determine what to buy the department relies on usage, previous and current, and the wantbook method. The Accounting Department furnishes Pharmacy with a list of activities of all drugs and I.V. fluids used in the department. This list is determined by the charges Pharmacy sends them and is returned to Pharmacy through an activity analysis. The analysis is useful in helping to determine how much of the drug has been used to-date and is a part of the control on purchases. Patterns of use can also be determined for review.

Observations and Comments

The hospital has a formal purchase program procedure which Pharmacy utilizes. In spite of this, the inventory amount from June 1980 has shown a steady increase. Between July and October 1980 inventory dollar amount has increased by $34,000 which represents 28% of the total inventory. Observations were made of the tremendous amount of drugs that were obtained from the wholesalers on a daily basis, and that the lack of precise on-going inventory controls in the department perhaps resulted in haphazard ordering patterns. The department was running out of drugs and having to obtain them from outside sources and not necessarily in emergency situations. Some suggestions are made in hopes of improving this aspect of the program. A restrospective look at the department's purchase orders and procedures were undertaken and conclusions drawn.

It was also felt that the purchase orders could be more fully utilized, by increasing the amount of drugs ordered once the purchase order had been generated. Further observations indicated that the purchase orders themselves were inconsistently prepared. Since many of the orders were in this period, called in on the telephone, the order was left to be transferred from a piece of paper to the purchase order forms by an available typist or technician. This resulted in differences in the manner in which they were typed and lack of uniformity in their typing procedures. The differences involved the quantity per unit and total quantities and the cost per units and cost per quantities. Some of the details that the Accounting Departments had used as a counter check were not carried through because of these inconsistencies.

The Pharmacy Department was taken over by a new director in July 1980. He assumed the position at the same time this period of study began. It was also the beginning of a new fiscal year. Inventory on hand, had been physically counted the preceding month. Stocks were understandably low. The hospital census was high. The average occupancy rate was 88.5%, in July 86%, August 83%, September 90% and October 87%. The average yearly purchases for drugs between October 1979 and October 1980 exceeded $19,000 during the period of the 4 month study. The largest amount of drugs for the year October 1979 - October 1980 was during the month the study concluded. Using the voucher distribution records released by Accounting, it was revealed that forty-seven % of payment of drugs purchased were distributed to the wholesalers. Fifty-three % were distributed to direct accounts

and outside sources.

Step 1 - Table 1

All purchase orders generated by the Department between July and October 1980, were duplicated and studied. (Step 2 - Table 2) The Company's name, date, drug ordered and quantity of drugs ordered were listed. Every drug that was obtained from the wholesalers, Meyer Bros. and Narco, were also duplicated. (Step 3 - Table 3) Any drug that came from the wholesaler were reviewed and the manufacturers names entered beside it. (Step 4) (This information is confidential. No tables for illustration purposes are presented) Any drugs that were available through the group purchaser HAMSL were also checked and arranged by the company for comparison purposes. (Step 5 - Table 5) Any of the drugs that were supplied through the wholesalers but were available from a direct company were identified and an X placed beside the drug. (Step 6 - Table 6) The study of individual purchase order generated for direct accounts were also made. The amount of purchase orders (a), dates of order, type of order (regular or HAMSL) were checked (b). The individual drugs ordered in those purchases were noted. Any direct company's drugs that were ordered from the wholesaler were listed beside the purchase orders' drugs that were placed during that period. Correlations between dates of orders and drugs were observed (c). A comparison was also made of the drugs that were on order from direct companys but still were obtained through the sholesaler subsequently because the direct order had not yet arrived (D1).

A comparison was also done to see if any of the drugs that were obtained from the wholesalers could have been placed on any of the direct companys' purchase orders. (D2) (Step 7 - Table 7) All drugs that were available as direct drugs but ordered through the wholesaler were checked to see if any of those drugs were also available from the group purchaser. If they were they were marked by H. (Step 8) The total number of purchase orders were tallied (a). The total number of line items in each purchase order were obtained (b). The average line items per purchase order was computed (c). (Step 9 - Table 9) The quantity of drugs that were obtained from external sources were reviewed. A comparison was made of how many were available from direct accounts, how many obtained through HAMSL, versus how many needed to be ordered from the wholesalers.

One of the tremendous problems to this study was the the abundant amount of data that had to be transcribed and analyzed. The chance of human errors in the transfer of information collected by manual methods only was constantly present. To gather and reproduce the purchase orders with a high degree of accuracy was tedious and time-consuming.

The following tables are provided for illustration of the various steps.

Table I.

Company	Date of Order	Drugs Ordered	Type of Order
Lederle	8/12	Nilstat Tetanus	HA
	8/13	Folvite Artane 2 mg. Etc.	Reg
	8/26	Tetanus Nilstat	HA

Table 2.

Wholesaler	Date of Order	Drug Order
Meyer Bros.	8/1	Pred Forte Prostaphllin Etc.
Narco	8/4	Nescaine Pred Forte Vistaril etc.

Table 3.

Wholesaler	Date	Drug	Manufacturer
Narco	8/22	Dariose Bentyl Etc.	SMP Merrell
Meyer	8/19 8/21	Bounty Symmetrel Enduron Catapres	 Endo Abbott B.I.

Table 5

Wholesaler	Date	Drug	Manufacturer	Direct Avail. Acct.
Narco	8/28	Theragram	Squibb	X
		Benadryl	PD/various	Yes
		Depo-Medrol	Upjohn	Yes
		Ancef	SKF	No
		Carbocaine	Penwalt	X

Table 6

Company	Date	Type of Order	Drug		Date	Drug	Wholesaler
Lederle	8/12	HA	Nilstat		8/1	Methotrexate	Lederle
			Tetanus		8/4	Stresstabs	
	8/13		Folvite			Gevrabon	
			Artane		8/6	Stresstabs with Zinc	
	8/26		Tetanus		8/7	Stresstabs with Zinc	
				Versus	8/11	Folvite	
			Nilstat		8/22	Dipth. Tet.	
					8/25	Ferro Sequels	
					8/26	Dip Tet (out)	
					8/29	Dip Tet (out)	
Bristol*	8/1	HA	Prostaphillin		8/1*	Prostaphillin	Bristol
			Polycillin				
			Kentrex				
			Etc.				

*This drug was available on contract, obtained through the wholesaler and ordered from a direct company.

Table 7

Wholesaler	Date	Drug	Available HAMSL
Narco	8/20	Ilopan	HA
		Kaon Elixir	HA
		Betalin	
		Etc.	
	8/22	Septra D.S.	HA

Table 9

(Drugs obtained from external sources)

Month	Source	Drug	Available Direct	Available HAMSL
July	Pharmacy	Lotrimin	Yes	No
Sept.	Hospital	Adriamycin	Yes	Yes

DATA ANALYSIS

Table 10 Distribution of line items

	a.	b.	c.	d.
July	444	222	222	57
Aug.	420	229	191	85
Sept.	510	278	232	86
Oct.	557	309	248	107
Totals	1931	1038	893	335

a. Amt of orders received through wholesalers

b. Amt. available from direct companies

c. Amt. only obtainable from wholesalers

d. Amt. of direct drugs going through wholesalers available through group purchasing.

Table 11 Purchase order data

A	B	C	D
58	221	742	3.4

E	F	G	H
27	210	952	4.3

A. No. of direct companies orders placed

B. Total no. of purchase orders

C. Total line items in purchase orders

D. Avg. line item per P.O.

E. Company purchase orders that could have been used more fully

F. No. of increased lines that could have been added to P.O.

G. Increased total line items per purchase order

H. Avg. increased line item per P.O.

a. Drugs order from direct

b. Drugs obtained from wholesalers before direct order received

a	b
742	138

Drugs on order

Table 12

Table 14 Drugs obtained from external sources

Wholesalers Only	Direct Available	Available from HAMSL	On order from Direct Co.
6	7	2	2

Total drugs 13

Many of the drugs ordered from wholesalers were available from direct accounts. (Table 10) Of those available directly, a large quantity were also obtainable through Group Purchasing. (Table 10D) In many cases, a purchase order had been generated for the direct accounts already. (Table 11) These purchase orders were not as fully utilized as they should have been . (Table 11) Routinely stocked drugs were obtained from other sources normally reserved for emergency situations. (Table 13) The conclusions were drawn that the wholesalers were used for a great many line items that were directly available from direct companies. It was also noted that a significant amount of drugs were directly ordered but still ran out before the order came in Table 12. The procurement procedure in the department is sound. Inventory control may require improvement particularly when dealing with direct accounts. Introduction of a system that provides on going checks on inventory may provide some significant benefits.

RECOMMENDATIONS

A relatively simple, on-going inventory check on direct accounts is suggested which theoretically will improve this part of the program. Also recommended is the need for a clerk typist presently employed to be assigned the duties of an inventory clerk. This full-time person would be given the responsibilities of on going checks on all direct company products stocked in pharmacy. The typing of all purchase orders will also be the assigned responsibility of this person. Uniformity in the purchase orders can be easily maintained, as the same persons will be initiating correct procedures.

Each direct account should have a record card, that will be color-coded to match a group of companies in that assigned color. Each card will list the items that are made by the company, and stocked. The items will be arranged on the cards alphabetically. Every week will also be color-coded on a calendar and will correspond to the color that has been assigned to groups of direct companies. Along with each drug on the record card, there will be a basic stock number which represents a quantity to be on-hand at all times. This "basic stock" can be periodically adjusted as to the items use, disuse, replacement or prescribing patterns. On the week corresponding to the color codes on the almanac all the direct accounts falling into the category of colors will be checked. The balance on hand and the balance to be ordered to bring stock to its basic levels will be noted. See Appendix

The checks will be continuous and rotating as the colors appear on the calendar. At least once a month every direct account inventory will be checked. The frequency of some sompany's orders may be increased if in practice once a month checks are not feasible. This system of checking on inventory levels is easily implemented and functional. It requires a minimum amount of reorganization on the department. The benefits of the system is a decreased ordering through the wholesalers on a daily basis. A more fully utilized purchase order for direct accounts can be seen. The line items per order will be increased. The time spent by present personnel in checking in orders and processing daily orders can be rechanneled into a systematic method of checking inventory on-hand. In applying the system areas in which supplies are kept will expedite efficiency if all items in the area that's going to be checked is alphabetically arranged. The clerk can correlate the record card listing to the area that is being checked. It would also be advisable to arrange the groups in a fairly even manner. Therefore a group of red squares company's would havea selection of three of the larger direct companies and 2 smaller ones rather than having 5 large volume companies in the same group.

Using some of the data from the study a theoretical application can be set up and some possible results translated. Potentially all wholesalers orders could be reduced by fifty-three percent. The purchase order utilization would be increased by approximately ten percent each order. Twenty-eight percent more

line items would be added to the purchase order. The chance of running out of the drug before the order that has been placed is received will be virtually eliminated. With the system of checking inventory a good lead time can be projected for having the items in the pharmacy. At least 7% of the orders that ran out would definitely have been avoided. Theoretically, fifty-three percent of the orders obtained from other sources could be avoided.

It is not the intent of the author to totally eliminate the use of the wholesalers. The benefits of drugs coming from wholesalers have been enumerated. It is the intent to make a good system more efficient. A cost effective analysis was not done here as it goes beyond the intent of this study. What can be said is that potential savings can be realized in the deployment of personnel elsewhere in the hope of improving daily operations. The inventory clerk is needed in the complex organization of hospital pharmacy.

Some immediate benefits of the systems are the on going inventory checks. Knowing what the inventory is, leads to effective management of it. Although geared toward direct accounts, it will also effect other orders. If in checking direct accounts there is not enough merchandise to warrant a direct purchase order, those drugs can be added to the wholesalers' order. The use of the clerk as a constant source of information to the manager of what supplies are needed helps the Pharmacy Departments. The Accounting Department is also helped by the clerks. They can uniform typing of p.o. Accounting can run their system of checks before they process the invoice for payment. They are more assured when they see consistently prepared purchase

orders. The future at St. Joseph's is projected toward incorporation into the sophisticated methods of inventory control. The system recommended for Pharmacy is by no means as sophisticated or complex, but it does introduce a means of on going inventory check.

In attempts to rearrange drug supply areas of duplication in stock can be seen. The proper adjustments to the formulary committee can be suggested. In theory then much of the inventory invested in the large numbers of C items present in its stock can be ultimately reduced.

Chapter V

The Future of Hospital (Institutional) Pharmacy

Throughout the history of the profession, pharmacy has shown its adaptability to changes. It has been versatile and flexable in all phases of its services. Although it is established as a separate profession it works closely with medicine and other professionals. For the most part pharmacy cooperates with them in the performance of its functions. The changing and increasing responsibilities that the pharmacist have assumed recognizes the fact that the profession does change, is reformed and will be disciplined as it is needed. As the distribution of essential services reaches more and more into the community, the social, political, and economic influences that effect the community will effect the professionals who provide the services.

According to Anderson, the perils of deprofessionalism has confronted pharmacy.[178] This has been brought about by decreasing low public esteem of pharmacy through the years; the indifference of other professionals to the pharmacists; pharmacie's money-making ethics; the professions failing sense of social mission and the pharmacists wanning dependence on his knowledge.[179] The hospital creates the environment to restore the

respect the public once had toward the profession, to develop its social values as an essential service on which the community depends, and to counter the downward-trend in the status of pharmacy. Through the hospital pharmacy practice, prestige and dignity can be achieved by building up trust and reliance of the worth of this service dedicated to improved patient care.

In the hospital, institutional practice has escaped most of the slander that has brought about public distrust, prompted regulations to curtail dishonesty, fraud and protect the public from inferior drugs. The commercial aspects of pharmacy that has allowed "kick-backs", inferior substitutions, competitive price wars and their repercussions has not hit this speciality. The institution recognizes the need to have a close relationship with the patient, to know their medication habits, what drugs they are allergic to, and correlate this information and make suitable comments. This is all a part of clinical pharmacy that emerged in the hospital and is projected to be a vital part of care in future clinics, group practices, and the communities. One hope to reverse the downward threats of deprofessionalism is through the roles of pharmacist as counselor, advisor, monitor of patient therapy and care. In the

institutional setting there is a dedication to excel in drug information and knowledge and a chance for uplifting pharmacy. Working along with the associations, who constitutionally are dedicated to serving the public and its members, who have developed formal standards of practice and reform in education training and residency programs, the pharmacist is expected to be the drug expert and to disseminate the knowledge to those who might need it. The future will eventually require each pharmacist in institutional practice to be a specialist in drug information, regulate his education around the principles of developing his expertise and achieve this through specific patient contact, clinical education and individual commitment to personal proficiency and competence.[180]

In 1976, Anderson presented this projection of practice in institutions of the future. "Visualize the impact of this upon the effect of the status of pharmacy and the quality of service if every director of pharmacy in every large hospital sat down their staff and told them that as pharmacist they did not know enough about drugs and that they needed to become drug experts in a speciality drug class if they needed to be a hospital pharmacist. As pharmacist they will be expected to develop their own personal libraries, and maintain

proficiency in drug information. If a drug information service center received a question about a drug in their area the expert pharmacist would be able to answer it. If there was a lecture to be given or a class to be taught the speciality pharmacist would be the principle resource person. If a poison treatment center is faced with a problem of over dosage the pharmacist would receive the call for assistance and respond. If the ambulatory patient needed advice in proper management of his theropeutic regimen, the pharmacist would see he got it."[187] Pharmacist must achieve control over their practioners and establish the bonds of commitment and respect with the patients, use knowledge effectively and accept the responsibilities of the tasks involved in proper patient care."[182]

Other than the future being predicted that hospital pharmacists will become drug experts in a specialized area of concentration, as Anderson envisions, it is also felt that Schools of Hospital Pharmacy will be an intergal part of a major university as are schools of Dentistry, Medicine and Nursing.[183] In the future as now, associations will continue to be powerful and through them resources will be provided for individual pharmacist to develop their desire to perfect their areas of expertise. Continuing education courses will be mandatory and established as a means of upgrading

and updating professional knowledge.

All health professions will in the future be directed toward the maintenance and prophalaxis of ill health. These professionals will be carefully integrated into teams, assigned where needed for the good and equal distribution of service. These changes will be motivated by government and its concern for the ultimate provision of better health for all and doing so by cost effective means.[184] Dr. Tice has presented an interesting perspective of the scope and implications of practice in the next century. This serves to conclude the presentation. His views are aimed toward a complete reorganization of the total delivery of health care, the use of automation and computerized systems in its delivery, and the increased use of supportive personnel. His views reflect the same areas of changes that has come about in the past years. These changes are in the institution of health care, the effectiveness and accessability of health care developed by individual institutions and in the third area the changes of government in health delivery.

Dr. Tice projects that in the future health care will be under the aegis of government and all health professionals will be salaried as civil servants. There will be a world-wide data bank for storing information and providing easy retrieval of it. Data will be used

for consultation services as well as for advancing international science. All educational programs will be financed by the government. A single standard for advanced education will exist, competance and performance. Within the different health professions, the lines between pharmacy, medicine and nursing will be non-existant. The administration and control of facilities will not be by physcians but by specialists trained to handle the complex organizational and administrative details. Outpatient care will grow in magnitude, as more and more preventive medicine is practiced and cost control measures make in-patient care feasible only for those who really need it.

Terminal cases will be handled in institutions where people's emotional, religions and physchiatric needs are given the same attention as physical pain. The individual patient care will begin prior to birth with strict prenatal care and supervision to assure that individuals are physically and mentally stable at birth. From birth to death every person will be given proper prophalactic means to avoid ill health. A patient profile will be maintained and stored in a data bank and will be retrieved anywhere in the world, when needed. Information will be analyzed and integrated in seconds, possible implications will be assessed and

flashed back. If tenative diagnosis is to be made, it will be as will the tests needed and the therapeutic regimen. Possible drug interactions arising from existing therapy will also be listed along with any relative hazards. Any treatment on a patient will be by a medical team.

The physician will be concerned with eliciting information from the patient concerning his problems, symptoms of the disease and deciding what tests to perform. A computer analysis will check to make sure if the possible answers are compatable with the available history. The nature of the drugs to be ordered will be discussed with the pharmacist and his input into the direction of the therapy will be obtained. All labeling and dispensing of medication will be by machines as will all supplies dispensed for that patients' use by reorder. The machine will keep an ongoing inventory and reorder automatically as a low predetermined amount is reached.

Pharmacist will interact with patients and will also feed data into the data banks. As new therapy regimens are developed after clinical studies they will be studied and understood by all those involved with the patient in his care. The pharmacist will act to monitor therapy, adjust doses, check blood pressures, and blood sugars.

If the patient is not progressing satisfactorily, he (the pharmacist) will explore with the physician what steps are to be further pursued. As the computers and data bank relieve the professionals from the tedius tasks, they will have more time for patient counseling and the inefficiency of the system that now plagues it in present health care delivery should hopefully be eliminated. Technicians will be used and will allow the professional added time for clinical functions. Patients should not have to wait in clinics endless hours in order to receive attention, nor will economic psychological or emotional attachments to physician or institution be a motivation to receive care. There will be a more equitable sharing of earth's resources, and a complete world wide cooperation in eliminating social and political threats that so characterize present society.

185

In the year 2000 + the health care delivery will be using pharmacist in roles that are now only the vision of a relatively new era. As ideal as these projections may seem to some involved with the professionalism of pharmacy and who are eagerly awaiting the complete acceptance of the clinical approach, the ideas are by no means remote. Pharmacy has recognized much of its problems through eyes of those who were farsighted enough to insist on change and who stepped to the forefront with ideals and standards to protect themselves as professionals

and the public as users of their services.

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GLOSSARY FOR HISTORY OF PHARMACY

PHARMACOPEIA

"Bible of Pharmacy" listing drugs and medicaments used in the profession. First one used in 1498. It is a compilation intended to secure uniformity in medicine agents in kind, quality, composition and therupeutic strength; a book of standards to inform in preparing and dispensing medicines.

Alchemy - transmutation of metals into gold.

Pharmocognosy - Science of studying the macro-scopial aspects of drugs.

Galenicals - A broad category of medicinal preparations whose simple ingredients remains unchanged chemically. It excludes modern drugs as biologicals and antibiotics.

Pharmacology - Science that studies the uses, actions and effects of drugs.

Biologicals - serums, vaccines.

APPENDIX

TABLE 1.36

HEALTH EXPENDITURES

YEAR	$ AMT. SPENT	% G.N.P.
1929	316B	4.5
1950	12.7	4.5
1960	26.9	5.3
1965	43	6.2
1970	74	7.6
1975	133	8.1
1977	170.3B	
1978	192.4B	9.1

CHART 1.3 g.1

INCREASED GOVERNMENT INTERVENTION IN HEALTH CARE

1918 Maternal and Infancy Acts

1935 Social Security Acts < Medicare, Medicaid

1940 Public Health Acts < HMO, EMS

1950 Comprehensive Medical Acts

1970 Occupational Safety and Health Acts

1974 National Labor Relations Act

ITEM NAME (2)	STRENGTH SIZE	BASIC STOCK (4)	(5) MONTHLY CHECKS DATE 10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
ALL ITEMS BY DIRECT CO		20	Min stock to be	(6) ordered																						
PARKE DAVIS																										
(3) Benadryl	(CAPS) 50mg	20X100	15/5																							
Chloromycetin	(CAPS) 250mg	5X100	4/1																							
Dilantin	CAPS 100 mg	6X100	3/3																							
LEDERLE																										
FOLVITE																										
↓																										
UPJOHN																										
CORTISONE																										
↓																										
SQUIBB																										
THERAGRAN																										
↓																										
ROCHE																										
ENDEP																										
↓																										
Enclosure 4/3																										

APPENDIX 4.EA

(26)

september

SUN	MON	TUES	WED	THURS	FRI	SAT
	1 LEDERLE WEEKS	2	3	4	5	6
7	8 PARK DAVIS	9	10	11	12	13
14 UPJOHN	15	16	17	18	19	20
21 SQUIBB	22	23	24	25	26	27
28 ROCHE	29	30				

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