While the Dark Ages were a time of intellectual and societal stagnation throughout much of Europe, the torch of academia continued to burn brightly in the Islamic world. The intellectual progress made during this time includes numerous medical breakthroughs which physicians, historians, and students should strive to understand not only for academic interest but also to learn and improve medicine today. The use of secular hospitals originated in this era and there were significant developments in a variety of medical fields including anesthesia, ophthalmology, pharmacology, neurology and psychiatry. A strong emphasis on patient-centered and interdisciplinary care was evident in many of the areas of Islamic medicine during the Dark Ages. The achievements of Islamic physicians during the Dark Ages also demonstrates the importance of strong communication within the global medical field, as the presence of avenues for global academic communication could have eliminated much of the disparity in medical care in different parts of the world over subsequent centuries. The need for improved international communication applies to medicine even today.

Introduction
The Dark Ages are known to be a time of intellectual and societal stagnation throughout much of Europe and as learners in the Western world we rarely hear about the academic achievements during this time. This is clearly seen in the medical field where historians often move from the work of the Greco-Romans before the Dark Ages to the discoveries of the Europeans afterwards. However from the seventh to thirteenth centuries the Islamic empire spread from Spain to China and was the centre for trading of goods, knowledge, and ideas. The Islamic civilization was thriving intellectually at this time yet many historians regard the role of the Muslims during the Dark Ages as merely translators and transmitters of the Greco-Roman medical knowledge.

There are three important stages in the development of medicine in Islam. The first is the compilation and translation of the medical works of previous eras which occurred in the seventh and eighth centuries. The second stage was that of significant and genuine contribution by Islamic physicians to the current medical and scientific knowledge base. The third stage, occurring after the thirteenth century, was that of intellectual stagnation and decline within the Islamic world.

This article will briefly review the above described second stage, discussing the unique contributions of Islam to medicine during the Dark Ages and their relevance to modern-day medicine.

Hospitals
One significant contribution of Islam to medicine was the introduction of hospitals as we are familiar with them today. Although hospitals had existed prior to the seventh century, it was the Islamic era that transformed hospitals into secular institutions for the first time in history. All ill individuals were treated irrespective of financial status, gender, age, and faith. Since Muslims required clean water to prepare for their daily prayers, all hospitals were also supplied with ample clean water and for the sake of modesty between genders separate wards were created for male and female patients in which the nurses and patients were of the same gender. The nature of this hospital care is a clear example of making the patient’s needs and preferences a priority – a concept towards which medicine is returning today.

The contributions of Islamic medicine to the development of hospitals also included allowing only qualified physicians to practice medicine, originating an extensive teaching system within hospitals in which medical students became active learners, the advent of patient records for the first time in history, and the use of hospitals to care for lepers, the mentally ill,
and other groups that were ostracized for centuries to come in other areas of the world.
Ophthalmology
These centuries were also a time of tremendous growth in the field of ophthalmology. Not only did most medical manuals published during this time in the Islamic world include a chapter devoted to the eye, but a variety of compendiums were also written solely for diseases and conditions of the eye. Hunain ibn Ishaq’s influential “Ten Treatises of the Eye” was a work that demonstrated significant advancement from the previous knowledge of the Greco-Romans, while al-Haytham’s “Optical Thesaurus” inspired the theories of future notables including Roger Bacon, Leonardo da Vinci, and Johannes Kepler.

Furthermore, it was Al-Razi (Rhazes) who discovered the light-reaction of the pupil, Ibn Sina (Avicenna) who first described the six intrinsic muscles of the eye, and Ammar bin Ali who was the first to describe cataract extraction using suction. This again reinforces the idea that the Islamic era was not merely one of translation but rather one of medical breakthroughs.

Anesthesia
Ali ibn Isa was the first in history to propose the use of anesthesia. The soporific sponge, which was a sponge soaked with aromatics and narcotics and then held to the patient’s nostrils, was also invented by Islamic physicians. This implementation of anesthesia was one of the causes of the “rise of Arab surgery to the level of an honorable specialty” while it remained a less cultivated profession in Europe until the formula for the soporific sponge was received from Muslim sources in the thirteenth century. In 1886, Burton reiterated the precedence of Islamic physicians in the field of anesthesia by stating that “anesthetics have been used in surgery throughout the East for centuries before ether and chloroform became the fashion in the civilized West” thereby reminding that communication of medical research and discovery is integral to global health and well-being.

In addition, it was Avicenna who introduced the concept of oral anesthetics. He described numerous recipes for anesthetics and analgesics in his Canon of Medicine and was the first to propose the pharmacological effects of opium as well as various other drugs. Avicenna was also the first to describe the effect of pain on one’s ability to ventilate.

Pharmacology
The field of pharmacology saw tremendous growth during the Dark Ages within the Islamic world. Indeed it was during this era that pharmacology was first established as a separate discipline from alchemy and medicine. For the first time, licensing for pharmacists was introduced. These changes were also accompanied by refinement of the methods of drug production as drug preparation and extraction became a high art. Furthermore, pharmacies were introduced adjacent to numerous hospitals for the first time in history – this is yet another example of the precociously progressive approach of early Islamic medicine towards multi-disciplinary care.

Islamic physicians of the time also introduced a variety of new drugs, including camphor, musk, and senna. The use of alcohol as a pharmaceutical, anesthetic, and anti-septic also originated during this era. The various medical texts published during this time consistently included chapters devoted solely to pharmacology and it was Ibn al-Baytar whose compendium described more than five hundred drugs discovered by Islamic scientists in addition to over one thousand classical drugs derived from previous knowledge.

Neurology and Psychiatry
Several significant developments occurred in the field of neurology and psychiatry in the Islamic world as well. Contrary to the common practices in Europe, Islamic medicine attributed psychological problems to neurological deficits and not to demonic possession or supernatural forces. The importance of sharing knowledge globally is evident as this could have prevented much of the social stigmatization that accompanied psychiatric disorders throughout the world in subsequent centuries.
Some modern-day history-taking techniques were also evident during this time. For example, in his 11th century practice, Ibn Ridwan would ask questions to determine a patient’s state of mind and note both their responses and behaviour. He also noted whether the affliction was of recent or long-term origin and treated accordingly. Ibn Ridwan’s exam tested the acuity of vision and hearing and articulation of speech. Furthermore, he evaluated muscle strength by asking patients to lift weights and grasp objects. He also recommended that physicians observe a patient’s gait both forwards and backwards during their clinical assessments. Physicians such as Ibn Ridwan exemplify the truly advanced state of medical sciences in the Islamic world over one millennium ago.

Physicians in the Islamic world at this time were also responsible for discovering hydrocephalus and various brain tumours, as well as differentiating between delirium, meningitis, and meningismus. They were also the first to describe post-traumatic epilepsy and the notion of epilepsy as a manifestation of brain disease.

Numerous other developments in neurology were made, including Rhazes’ description of the pupillary light reaction and his original description of the laryngeal branch of the recurrent laryngeal nerve. Avicenna elucidated the differences between vertigo and epilepsy and also gave the first account of a trigeminal neuralgia. This era also brought the first description of a brain abscess following otitis as well as the association between headaches and temporal arteritis.

Other Contributions
Islamic physicians made numerous other notable contributions to medicine during this era. One of the most significant was the first description of the pulmonary circulation by Ibn el Nifas in the thirteenth century. Furthermore, it was Rhazes who distinguished measles from smallpox, Avicenna who introduced the use of catgut for surgery, Halle Abbas who first proposed that childbirth was caused by uterine contractions, and Ibn al-Quff who presented novel works on embryology.

Conclusion
The era between the seventh and thirteenth centuries was one of tremendous development and growth in the Islamic world, playing host to many physicians who made profound contributions to the world of medicine. Their compendiums and texts were commonly used throughout Europe during the subsequent centuries, illustrating that throughout time, the torch of knowledge was passed from one civilization to the next. It is important for physicians, students, researchers and historians today to realize that this torch continued to burn brightly even during the Dark Ages.

It is also important that we apply the lessons learnt from early Islamic physicians, such as the value of interdisciplinary and patient-centered care, as well as recognize that global sharing of information in medical care today is essential to ensure the success of medical care tomorrow.

References