

Chapter

1

A History of Geriatric Medicine and Geriatric Pathology

Harold Sanchez

Glossary

Elder: An individual 60 years of age or older.
Vulnerable populations: Individuals most vulnerable to natural disease, trauma, and violence.

Introduction

The emergence of geriatrics as a separate division of medicine is a very recent development driven not only by advances in clinical medicine, but also by a variety of demographic and sociological trends. The field of geriatric pathology has been even slower to emerge. The reasons for this are explored in part by comparing the field to pediatric forensics.

Demographics

A major historical impediment to the study of the diseases of the elderly has been the relative lack of elderly patients. For much of our history, human populations have been characterized by high fertility and high infant and child mortality. Those who did survive to adulthood died at high rates (compared to modern standards) of either natural disease or violence. Reaching old age was considered an achievement. Displayed graphically, this population dynamic resulted in a characteristic bottom-heavy population pyramid with lots of infants born, lots of infants and children dying, and a sharp taper to a narrow peak of the very elderly (Figure 1.1).

Stable food supplies, clean water, and improvements in public health and clinical medicine have changed the population dynamic in the developed world. Life expectancy has risen steadily, and birth rates have fallen. The average age of the inhabitants of most industrialized countries has been steadily increasing. In the 2014 Canadian census, the number of senior citizens surpassed the number of Canadians under 14 for the first time [1]. In Japan the number of people over 60 is more than double the number of people under 14. Of course, other factors such as political upheaval, war, immigration, and emigration also affect the age distribution of the population. But in general, fewer births and longer lives have resulted in population distributions in the developed world that more closely resemble crock pots or fire hydrants than pyramids (Figure 1.2).

The burgeoning population of elderly citizens has produced a demand for specialized care and created a market for geriatricians. (The same forces have also helped to drive the creation of medical insurance, elder law, and retirement communities.) The concept of specially trained physicians to deal with natural disease in the elderly has become reasonably well established. The idea of a specialized study of injuries and violent death in the elderly has been slower to take hold. The same sort of delay is also evident in the history of pediatric forensics. A comparison of the field of pediatrics with that of geriatrics provides some interesting insights and possible explanations for this delay.

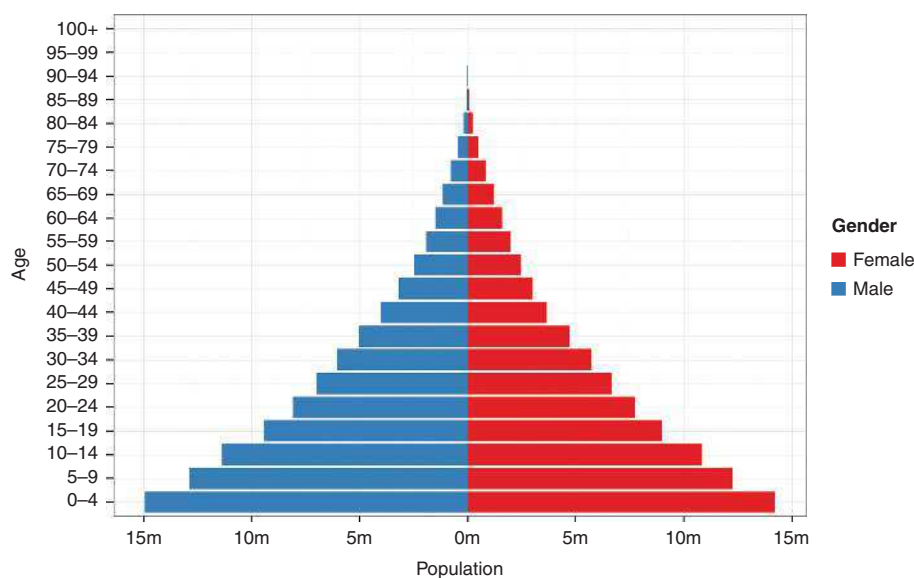


Figure 1.1 A typical population diagram for a society before the availability of modern sanitation and medicine had a pyramid shape with a large number of births and a steep decline to a tiny number of elderly people.

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology

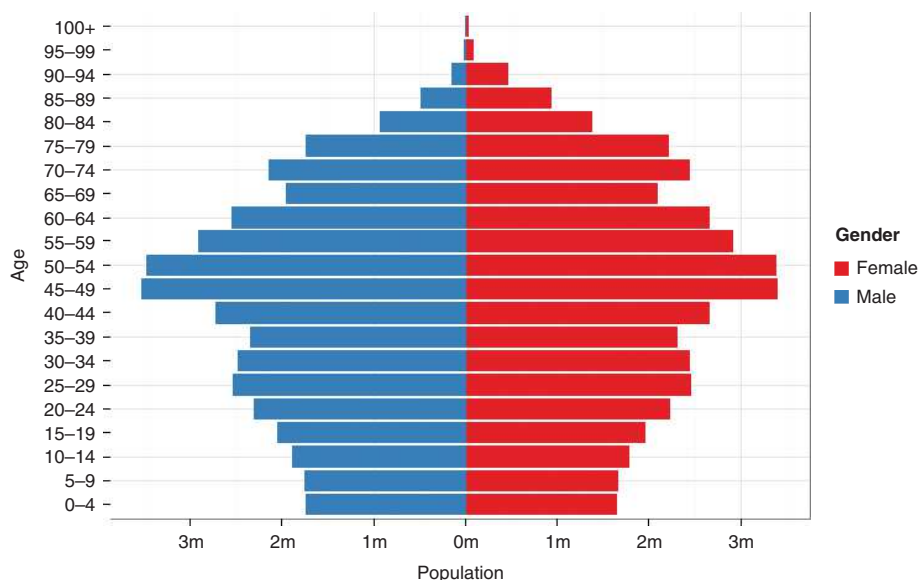


Figure 1.2 A typical population diagram of a contemporary developed population. Note the reduced birth rate and the marked increase in the number of elderly people. Note also the female preponderance among the oldest adults.

Examining Vulnerable Populations: Children and the Elderly

Prior to the late nineteenth century, natural deaths in the very young and very old were all too commonplace. People at the extremes of the age spectrum have always been the most vulnerable to the ravages of natural disease and the least likely to survive it. They are also less likely to survive the trauma of neglect and abuse. For centuries the high natural death rate provided a sort of smoke screen which helped to hide violent deaths. A destitute mother who made the painful decision to quietly kill her newborn had little to fear from the medical community or the law. The elderly, infirm patriarch of a starving family might be allowed to die of starvation and neglect without arousing the suspicion of neighbors. And while historians agree that such things occurred, it is hard to gauge just how often.

Advancements in clinical medicine and public health improved the longevity and health of the general population. And by reducing the deafening background noise of the high natural death rate, they also made the signal of violent deaths more clearly audible. Equally important for the purposes of this chapter, the evolution of professional death investigation and the centralization of accurate vital statistics helped to ensure that the signal would be detected and reported. For the first time, policymakers could gain some sense of the scope of the problem of violence against vulnerable populations.

As prospects for survival improved, the medical profession gradually turned its attention to the distinctive medical problems of subsegments of the population, such as women, children, and the elderly. In certain ways, the development of pediatrics and its subspecialties resembles that of geriatrics. Some authors have compared the current state of geriatric forensic pathology to that of pediatric forensic pathology 30 years ago [2]. Geriatrics and pediatrics are similar in that they both deal with potentially vulnerable segments of society. For the purposes of this discussion there are, however, some striking differences.

One difference is the threshold for reporting of instances of violence. For the most part the death of an infant or child, particularly a violent death, has become an unexpected departure from the usual course of events, a jarring anomaly. Prenatal care, newborn screening, vaccinations, and antibiotics have made the sudden death of a child so uncommon that it is met with horror by surviving family and community. (This difficulty in processing the idea of violence against children may, in part, explain the remarkable rationalizations and delays that slowed the progress of pediatric forensics [3].) In the developed world, the death of a child outside of a hospital setting is almost certain to provoke an investigation. On the other hand, death in those who are perceived as elderly and frail is not shocking, surprising, or likely to arouse suspicion. For those interested in detecting the signal of unnatural deaths in an elderly population, their debility and chronic illness continue to provide a very noisy background. To complicate matters further, many of the telltale signs of abuse and neglect in the elderly can be very difficult to distinguish from changes related to advanced age or chronic illness [4]. The result is that, even today, the threshold for death investigation in the geriatric setting is much higher than it is for the pediatric setting. This is poignantly illustrated by the case of serial killer Dr. Harold Shipman who murdered an estimated 215 people over the course of several decades. It is no coincidence that the vast majority of his victims were elderly women (Figure 1.3).

A second difference has to do with the likelihood of victims reporting episodes of violence. Children are typically not assumed to be reliable historians in cases of abuse. Their youth, inexperience, and at times their emotional dependence on their abusers may prevent them from perceiving and/or reporting mistreatment. Protective societies and mandatory reporting legislation have been created to help address this problem. It would be easy to assume that the elderly, with the exception of those with cognitive impairments, do not have the same impediments to accurate reporting. This assumption is not, however, borne out by the literature. In one study, a full third of abused older adults denied a history of abuse [5]. This

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology



Figure 1.3 Dr. Harold Shipman's shocking murders of over 200 people over decades was aided in large part by his choice of elderly women as victims. (Copyright PA Images. Used with permission.)

was true despite the fact that these participants had suffered documented episodes of abuse and were specifically questioned about it. When elderly victims of abuse did come forward, they were especially unlikely to speak to a physician. Only 2% of cases of abuse in the study were reported by doctors. Cases of sexual abuse are particularly likely to go unreported [6].

A third difference relates to the nature of vulnerability in children as compared to the elderly. While children are a diverse and heterogeneous group in many ways, they are all alike in one notable way: they do not enjoy the full rights of adult citizens and cannot effectively advocate for themselves. They do not pay taxes, vote, run for elected office, or have the means to directly influence those who do. They are the passive recipients of the political, legal, and medical decisions made by adults. The situation for older adults is very different. Older adults are well represented in elected offices, corporate boardrooms, and the medical establishment. In most of the developed world, the number and percentage of older citizens has been increasing for decades. Older citizens in the developed world have influential organizations that lobby on their behalf, and they turn out in large numbers to vote. An analysis of voter turnout by age in the United States consistently shows that a larger percentage of the over 60s vote than any other age group [7]. That is to say, unlike children, the elderly are not uniformly vulnerable. Far from being the helpless recipients of public policy, the most influential older adults in a society are the creators of public policy. This is an important point for the reader to bear in mind while reading this chapter. Many of the descriptions of poor treatment of the elderly which follow pertain only to those who were displaced from supportive families and became dependent physically or financially. Elder abuse appears to be the product not so much of age or frailty, but rather the result of poverty, dependence, and marginalization.

This chapter looks at Western society's approach to its oldest citizens. The focus will be on the interaction between age demographics, societal attitudes, governmental policies,

and medical responses. The value of reviewing medical and legal approaches to old age in a book about geriatric forensics is obvious. But societal attitudes toward the elderly are also an important part of the discussion. The opinions of younger adults regarding the elderly help drive policymakers' decisions. The discussion will largely concentrate on developments in what is now the industrialized world with emphasis on English-speaking countries. The discussion is organized into four loosely defined time periods: antiquity, the Middle Ages and Renaissance, the French Revolution to the Industrial Revolution, and the twentieth century. This historical review is intended to provide the context in which to consider the current state of geriatrics and geriatric forensic pathology.

Antiquity

- *Societal perceptions of old age in antiquity ranged from reverence to hostility and did so in surprising and unpredictable ways.*
- *Ancient medicine recognized old age and its ailments as an inevitable development to be managed rather than repaired.*
- *With the exceptions of the Byzantine Empire and Sparta, most ancient governments accorded no special legal status to the elderly and largely treated the displaced elderly as part of the larger group of the dependent and disabled.*
- *The early Catholic Church included facilities for the disadvantaged elderly in the hospitals that were built alongside cathedrals.*

The study of old age in antiquity is plagued by a variety of problems. One is the lack of reliable demographic data on different age groups. Life before the age of indoor plumbing and antibiotics is often characterized as brutish and short. And while there is no question that the average life expectancy has increased in recent history, there is no consensus on exactly what it was before. Studies of hunter-gatherer societies

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology

without access to modern amenities and medicine typically show an average life expectancy of 35 to 40 years, largely the result of high rates of infant and child mortality from infectious illnesses and accidents. But those who survived this early wave of mortality had a reasonable chance of surviving to 50 or 60 years. It is tempting to assume that conditions in established agrarian societies were better, but for many ancient civilizations there is little reliable data to support that position.

A second problem is a lack of consensus on the definition of old age in ancient societies. The classic Greek physicians and their followers did not agree completely on what constituted old age. Solon of Athens, who divided the ages of man into 7-year intervals, distinguished between old age and senescence. In his scheme, a man was a *senior* at age 42 and a *senex* after age 63. Rather than choosing a particular age, Galen defined old age functionally as the beginning of declining health, which started some time after a man's prime (which he placed at 35 to 40 years of age).

With those caveats in mind, this section will focus on the state of the elderly in ancient society, particularly in Ancient Greece and early Christian Europe.

Societal Attitudes toward Old Age

Nomadic hunter-gatherer societies depended on mobility and strength for their subsistence, and environmental conditions could quickly change their situation from stable to starvation. During hard times, those who consumed resources without contributing substantially to group survival became a threat to the welfare of the community. The widespread practice of infanticide in such situations is well documented. Descriptions of geronticide (murder of the elderly) are more unusual, perhaps in part because of the much smaller number of elderly adults compared to children (Figure 1.1). Anthropological studies of some hunter-gatherer societies with insecure food supplies describe examples of socially accepted killing of the elderly. In societies such as the Inuit of North America and the Koryak of Northern Siberia, geronticide was not a shameful or covert undertaking. It was done after public ceremony and feasting with the consent of the elderly victim who recognized cooperation as a sort of civic duty [8]. The development of agriculture and animal husbandry allowed for permanent settlements, provided a reliable supply of food, and decreased the societal premium placed on mobility. In stable agrarian societies, older members of the community could perform important sedentary tasks and accumulate wisdom and wealth. The development of social institutions and written laws in these stable communities provided for the protection of vulnerable groups including the elderly.

Organized religion, for example, is thought to have exerted a positive influence on society's treatment of its most vulnerable members. The scriptures of all three Abrahamic religious traditions include exhortations to respect the elderly. For example, in the Torah and the Book of Proverbs it states:

You shall rise up before the gray headed and honor the aged, and you shall revere your God; I am the Lord. (Leviticus 19:32)

A gray head is a crown of glory; It is found in the way of righteousness. (Proverbs 16:31)

Likewise, in the Epistles Paul writes to the Ephesians:

Children, obey your parents in the Lord, for this is right. "Honor your father and mother" – which is the first commandment with a promise – "so that it may go well with you and that you may enjoy long life on the earth." (Ephesians 6: 2–3)

And in the Quran it says:

Your Lord has commanded that you worship none but Him, and that you be good to your parents. If either of them or both of them reach old age with you, do not say to them a word of disrespect, nor scold them, but say to them kind words. And lower to them the wing of humility, out of mercy, and say, My Lord, have mercy on them, as they raised me when I was a child. (Quran, Surat Al-Isra 17:23–24)

There was even one ancient Greek state in which certain politically powerful positions were reserved for elderly men. Sparta in 7 BCE was governed by a council called the *Gerousia* composed of 2 kings and 58 elected men over the age of 60 known as the *gerontes*. It is interesting to note that one of the functions of the council of elders was to rule on the fitness of newborns and to condemn to death those who were seen as unfit.

Ancient China provides perhaps the most striking example of a society which revered its oldest citizens. The principle of deference to one's parents was a core tenet of Confucianism and the subject of the *Classic of Filial Piety (Xiaojing)* written in 4 BCE (Figure 1.4). A child's respect for his or her parents was seen as the foundation of a stable society. To quote the *Xiaojing*:

Now filial piety is the root of all virtue, and the stem out of which grows all moral teaching . . . Our bodies – to every hair and bit of skin – are received by us from our parents, and we must not presume to wound or injure them. This is the beginning of filial piety.

This idea of deference to one's parents was extended further to encompass respect for elders in general and ultimately for one's rightful rulers. To quote the *Xiaojing* again:

As they serve their fathers, so they serve their mothers, and they love them equally. As they serve their fathers, so they serve their rulers, and they reverence them equally.

It would be a mistake, however, to assume that all nomadic societies were hostile to their elders or that all established agrarian communities were hospitable to them. A thorough review of hunter-gatherer societies shows that there are many that held their elders in high esteem despite their inability to perform strenuous physical labor. For example, traditional Australian Aboriginal society was organized into extended families in which elders played pivotal roles [9] as advisers, educators, and caretakers.

It is also relatively easy to find examples in comparatively prosperous agrarian societies of revulsion and antagonism

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology



Figure 1.4 The Frontispiece from the *Classic of Filial Piety*, written in 4 BCE. In ancient Chinese society respect for the elderly was the theoretical key to maintaining a harmonious society.



Figure 1.5 Heracles and Geras, Attic red-figure pot, ca. 480–470 BCE. This image of Hercules, the embodiment of youth and vigor, clubbing Geras, the representation of old age and infirmity, graphically illustrates the attitude toward old age in some ancient Greek societies.

toward the aged. In Greek mythology Geras, the embodiment of old age, was the sibling of Thanatos (death), Hypnos (sleep), Moros (doom), and Oizys (suffering) (Figure 1.5). While Sparta revered its elders [10], Athenians in 5 BCE were noted to show contempt for their older citizens. And despite Biblical directives to revere the elderly, some of the scholars of the early Catholic Church interpreted aging and senescence as divine punishment for the original sin of Adam and Eve [11]. A head of white hair was not a crown, but rather a reminder of the inevitable corruption of our physical bodies occasioned by our disobedience. As St. Augustine of Hippo wrote:

And therefore it is agreed among all Christians who truthfully hold the catholic faith, that we are subject to the death of the body, not by the law of nature . . . but by His righteous infliction on account of sin; for God, taking vengeance on sin, said to the man . . . “Dust thou art, and unto dust shalt thou return.” [12]

Elderly citizens without a family to care for them depended on the government or charitable organizations for support. In early Christian Europe this often meant religious organizations. The early Catholic Church provided for the aid of the indigent sick and other disadvantaged groups by establishing and maintaining hospitals. The first Nicene Council of the Catholic Church, convened by the Roman Emperor Constantine in 325 CE, urged the establishment of a hospital in association with every new cathedral. An example is the Hotel Dieu in Paris which has been in operation since 650 CE. The mission of hospitals in antiquity was not restricted to the care of the sick: they also received the disabled, religious pilgrims, and the elderly poor. Hospitals of that era were sustained by the charitable work of the clergy, the proceeds from goods produced on their land, and the patronage of wealthy donors who saw their good works as an investment in their eventual salvation.

Just as in the case of religious literature, ancient secular literature was divided in its treatment of the elderly. There are some examples of works that extol the virtues of old age. Perhaps the best known is Cicero’s *On Old Age* (44 BCE) in which he lists the various losses that come with old age and argues that they are offset by gains that come with wisdom and experience:

It appears, therefore, that nothing can be more void of foundation than to assert that old age necessarily disqualifies a man for the great affairs of the world. As well might it be affirmed that the pilot is totally useless and unengaged in the business of the ship, because while the rest of the crew are more actively employed in their respective departments, he sits quietly at the helm and directs its motions. [13]

Many other works, however, focused on the losses associated with old age. In *Metamorphosis*, Ovid (born 43 BCE) introduces Polyphemus, the archetypal *senex amans*, a self-deluded, unattractive old man who believes himself attractive to younger women (a motif repeated countless times since). Another notable example is provided by the work of sixth-century poet Maximianus. In his *Elegies of Old Age*, the author mourns his loss of physical and sexual vigor and compares life in the body of an old man to imprisonment:

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology

*Why wilt thou not inlarge my Soul to Ease,
 And the vex't Pris'ner from his Jayl release?
 To me 'tis worst of Punishments to live,
 And Death alone a peacefull Rest can give.
 But all these Pleasures, all these Joys are past,
 And a dead Numbness all my vitals wast
 Ah! what an uncouth part of Life remains
 To Aged Men, fill'd with Disease, and Pains.* [14]

Medical Approach to the Elderly

Although physicians have recognized the physical signs of old age for thousands of years, ancient physicians apparently did not see enough elderly patients to accumulate the experience or interest necessary to generate a specific treatise on geriatric ailments. Ancient medical authorities disagreed on the nature of old age. Some saw it as an inevitable natural process that predisposed to serious illness and eventually ended in death. These physicians saw their task as slowing the rate of the process. Others approached old age as a disease like any other. They saw their role as a search for a cure. For example, the Edwin Smith papyrus (Egypt ca. 3000 BCE) suggested that a remedy containing fenugreek oil could rejuvenate an old man. This section will concentrate on the former approach, particularly as espoused by ancient Greek physicians.

Ancient Greek science and medicine were built on the foundation of the four elements (earth, air, fire, and water) which had their corresponding four humors in the human body (blood, phlegm, yellow bile, and black bile). Each of the four humors was associated with a particular characteristic (hot, cold, wet, and dry). Disease was the result of imbalances in the four humors, and it was the task of the physician to bring them back into equilibrium. As Aristotle noted in the *Parts of Animals*, the four humors were:

... practically the causes controlling life and death, not to mention sleep and waking, prime and age, disease and health.

Throughout Europe, the humoral theory of medicine provided the foundation for medical practice for over a thousand years. Mainstream medieval medicine essentially involved the translation and application of the works of the Greek physician Hippocrates as interpreted by Galen and his later commentators. Hippocrates was a keen clinical observer and was well aware of the differences in diseases that afflicted various age groups. As he wrote in his *Aphorisms*:

To old people dyspnoea, catarrhs accompanied with coughs, dysuria, pains of the joints, nephritis, vertigo, apoplexy, cachexia, pruritus of the whole body, insomnolency, defluxions of the bowels, of the eyes, and of the nose, dimness of sight, cataract (glaucoma), and dullness of hearing.

(*Aphorisms*, Section III) [15]

Hippocratic physicians felt that the aging process was the result of the gradual loss of vital heat and moisture from the body. Regimens to improve the health of the elderly consisted of warming and moistening maneuvers. Since vital heat was sustained by the intake of food, the physician had to adjust the diet to the body's demands for heat. Whereas children and

young adults needed to consume great quantities of food to meet their requirements, similar quantities would be harmful for the elderly. Hippocrates suggested modest portions of relatively bland food with care to exclude salty and spicy dishes. The meal should be accompanied with old red wines rather than young sweet ones. Warm baths and gentle massages were also thought to help. Galen placed a greater emphasis on the loss of moisture than the loss of heat.

Galenic physicians acknowledged that while they could manage the aging process and minimize its attendant morbidity, they were powerless to arrest it. They likened the aging process and the loss of bodily moisture to the burning of lamp oil. No matter how judiciously you use it, it will eventually burn out.

There is little to say about anatomy or pathology in ancient Europe. With the exception of a brief period in Alexandria under Ptolemaic rule [16], human dissection was banned throughout the ancient Western world. Knowledge of human anatomy was largely based on the Galenic texts which in turn were based in large part on extrapolation from animal dissections. Humoral medicine did not depend on a detailed knowledge of anatomy. The glaring errors in Galenic concepts of normal anatomy and any pathological changes in normal organs caused by disease were invisible to physicians. There was no reason to study the internal organs in either natural or unexpected death.

Legal Approach to the Elderly

Athenian law from the era of Solon prescribed loss of citizenship as a penalty for those who failed to care for their aging parents. Roman law as originally written in the Twelve Tables in 449 BCE granted wide powers (*patria potestas*) to the male head of the household (*pater familias*) over the members of his family. The *pater familias* was entitled to kill his deformed newborn children, sell his healthy children, and (with certain exceptions) to take possession of his children's properties and money. There were no age limits on these rights. For daughters these rights continued until she was married. For sons they technically continued until the father's death. If the *pater familias* became senile, a son could apply to become his curator, but the principles of *patria potestas* still applied. There were no special provisions in the law for the care of the elderly, although select indigent elderly Roman citizens (along with the Roman disabled and unemployed) were eligible to receive free food from the grain dole. Dealing with the elderly as part of the larger group of disadvantaged, non-working citizens rather than as a separate group with peculiar problems was the norm for most Western civilizations.

The Byzantine Empire was a notable exception. Legal scholars under the reign of Byzantine Emperor Justinian composed the *Corpus Juris Civilis* in 529 CE, a code of law that would eventually influence legal systems throughout the Western world. The code provided for the creation of publicly funded institutions designed to assist specific subgroups of the disadvantaged: *xenodochia* and *nosocomia* for the ill, *brephotropia* for foundlings, *orphanotopia* for orphans, and *gerontocomia* for the elderly. State recognition of the elderly as a special

subgroup of needy citizens appears to have been a short-lived Byzantine innovation that was not adopted elsewhere in the ancient world. It was not seen again for centuries.

After the fall of the Roman Empire, much of Europe was governed by a patchwork of laws that combined local interpretations of Roman Law, Church Canon Law, and tribal custom. Sometimes referred to collectively as Barbarian Law, the laws showed wide local variations. The seventh century Visigothic version of Barbarian Law is especially interesting for the purposes of this discussion, particularly the code that governed compensation for bodily injuries. The principle of *wergild* (literally, man-price) awarded damages on the basis of the intrinsic worth of the injured party. The penalty for injuring a young fertile woman was more than for an injury to a postmenopausal woman, and injuries for a man over the age of 60 were valued at two-thirds the price of similar injuries to a man aged 25 to 40.

There is little to say about forensic medicine in the ancient world. The medical profession had very little to do with the law in antiquity. Physicians were sometimes consulted to explain medical principles in selected legal cases, but they did not typically play a role in the investigation of suspicious deaths.

Middle Ages and the Renaissance

- *In many parts of Europe, the Reformation dramatically diminished the role played by the Catholic Church in the care of the elderly and shifted the responsibility to government.*
- *This period saw the advent of anatomy, the beginnings of clinical pathological correlation, and some of the earliest medicolegal investigations of death.*
- *The spread of centralized governmental tabulations of vital statistics provided early data on causes of death; old age was often recorded as a cause of death.*
- *The Poor Laws led to the establishment of workhouses and almshouses as catchalls for the insane, indigent, and elderly.*

Societal Attitudes toward Old Age

Authors disagree on the longevity of Europeans in the Middle Ages and early Renaissance, and records are spotty and unreliable. A study of several centuries of vital statistics for British nobles suggests that in the mid-1400s to 1500 few lived beyond their mid-40s [17]. Interestingly, noblewomen of that age lived considerably longer than their husbands. An anthropological analysis of the skeletal remains of medieval Englishmen suggested that the average life expectancy at birth was about 35 years, but those who reached 35 could expect to live another 20 years [18]. Although all such estimates are prone to error, a reasonable assumption is that in medieval Europe elderly people represented a much smaller fraction of the population than they do now.

The tradition of including hospitals as part of the construction of new cathedrals was continued and supported in the eighth and ninth centuries and beyond by Catholic monarchs such as Charlemagne. In Germany it is estimated that between

1207 and 1577 some 155 new hospitals were built. Religious orders continued to staff large city hospitals as well as smaller facilities in the countryside. But the close association between the Catholic Church and hospitals would begin to fray with the Protestant Reformation. Perhaps the most striking example of this trend occurred in England in 1540 when Henry VIII and the Church of England cut ties with Rome. As part of the process, the majority of Catholic monasteries in England were dissolved along with their properties, including most hospitals and infirmaries. An unforeseen consequence of this was the sudden displacement of the sick, disabled, and elderly poor. Although some of the Catholic institutions survived the transition (notably St. Bartholomew, St. Thomas, and the Bethlehem Asylum), there was suddenly a large gap in the care available for the needy. One result was the creation of public hospitals and almshouses.

There were other less obvious but still important changes in medical care that came with the Reformation. First, it signaled the start of a gradual shift in the composition of the medical workforce. Before Martin Luther, most hospital workers were clergy who were as concerned with the souls of their charges as they were with their bodies. With the dissolution of the monasteries, the nursing and physician workforce increasingly became lay staff without a religious mandate. Second, the Catholic principle of charitable works as an effective means of gaining salvation was replaced by a Protestant emphasis on belief and faith. In Protestant communities the idea of wealthy patrons buying their way into paradise was repugnant. The result was a decline in private donations to religious charities and an increased reliance on government money to support the care of needy groups including the indigent elderly.

Medical Approach to the Elderly

Medicine changed very little from antiquity to the Middle Ages. The work of Galen was accepted as the final authority on virtually all medical matters for hundreds of years. Much of the medical scholarship of the Middle Ages occurred in a religious context. Under the patronage of Muslim monarchs in Syria and Persia, Arabic physicians studied Galenic texts and wrote influential commentaries on his work. For example, Ibn Sina (or Avicenna) in his encyclopedic *Cannon of Medicine*, written in 1025, discussed the diseases of the elderly and favored 60 as the start of old age. Ibn Sina saw old age as an intermediate state between good health and disease. Like people with healing wounds, the elderly were not sick but were more susceptible to disease. He also noted that older patients were slower to heal and less likely to develop high fevers than younger patients. His suggestions for slowing down the aging process were very similar to those recommended by Galen.

Roger Bacon (1214–92), an English scholar and Franciscan monk, believed that much of the aging process was caused by anxiety and excess. He felt that by modifying diet and lifestyle, human lifespan could be significantly lengthened. He became interested in alchemy (which caused no end of problems with his religious superiors) and was convinced that the proper applications of its principles would produce an elixir of immortality, the fabled philosopher's stone. On a more

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology

practical note, Bacon addressed the failing vision associated with old age and the principles of corrective eyeglasses in his 1266 *Opus Majus*.

In 1489, Veronese physician Gabriele Zerbi wrote a work dedicated exclusively to the diseases of old age, his *Gerontocomia: On the Care of the Aged* [19]. Although it added very little to the work of Galen or Ibn Sina, it has the distinction of being the first textbook of geriatric medicine. Francois Ranchin of Montpellier in his 1627 work *Opuscula Medica* included a chapter on diseases of old age [20]. Perhaps the most notable aspect of this chapter is its condemnation of physicians for ignoring the elderly and its exhortation to greater effort in the field:

“What has been written about the conservation of old people and the healing of the diseases of old age, is so bad and so unproductive that we get the impression not only that this noblest part of Medicine was not cultivated but even that, yes, it has been flatly suppressed and buried.”

This period saw a remarkable re-emergence of interest in anatomy that can be traced back to the founding of the medical school and animal dissections at Salerno around 1200. In 1241, Holy Roman Emperor Frederick II authorized students in Salerno to see one human dissection per year. Other Italian schools began to allow the dissection of executed criminals for the purposes of anatomical demonstration. Most of the available bodies, therefore, were those of young men. Elderly bodies, particularly those of elderly women, were very hard to come by through legal channels.

Anatomical dissections were uncommon occurrences at first and became something of a public spectacle with members of the general public vying for limited seats at the anatomy theater. Indeed, the proceedings seem, in retrospect, as much theater as they were instruction. University professors in their regalia sat above the cadaver in impressive chairs and read from Galenic texts, while a dissector exposed structures and an ostensor pointed them out to the audience. So powerful were the Galenic goggles, that they obscured the fact that many of the findings described by the professor did not correlate in any way to the anatomy revealed by dissection, and no objections were raised.

The religious prohibitions against the dissection of bodies eased. Although the Church forbade certain funerary practices that involved dismemberment and boiling of human remains, routine embalming practices and academic anatomical dissections became widely accepted. Remarkably, the bodies of exemplary Italian Christians were occasionally dissected as part of the investigatory process that led to sainthood [21]. Suspension of the natural process of putrefaction or miraculous findings in the internal organs were gathered as evidence of divine favor.

The practice of performing medical autopsies in order to ascertain the cause of death also appears to have started in Italy at about the same time as academic anatomical dissections. It is not clear which came first [21]. Florentine physician Antonio Benivieni compiled a series of 160 case reports including some 20 in which autopsies were performed. Published posthumously

in 1507, *De Abditis Nonnullis ac Mirandis Morborum et Sanationum Causis* is considered by some as the first text of pathology. But while Benivieni correlated his clinical findings with autopsy observations, his ideas of pathophysiology were still heavily influenced by his background as a classically trained physician and a devout Catholic. He relates cases of natural disease with anatomical explanations in the same matter of fact way that he describes cases of illness due to demonic possession or the use of magical incantations to remove foreign bodies.

The unquestioning acceptance of Galenic anatomy ended when Andreas Vesalius, a young professor of anatomy at the medical school in Padua, took the unprecedented step of descending from the academic chair and doing the anatomical dissections himself. The inconsistencies between the existing texts and his observations drove him to produce his own textbook of anatomy, *De Humani Corporis Fabrica*, in 1543. It was a milestone in the history of medicine and the first (largely) accurate text of human anatomy. Although Vesalius remained a staunch believer in humoral therapeutics in his practice of clinical medicine, his anatomical work constituted the first successful challenge to the authority of Galen in over a thousand years.

With reliable standards for normal anatomy and increasing experience in observing morbid anatomy, physicians began writing textbooks that increasingly resembled modern medical works. In 1679, Swiss physician Theophile Bonet wrote his *Sepulchretum: sive anatomia practica ex cadveribus morbo denatis* (The Cemetery, or, anatomy practiced from corpses dead of disease), an ambitious if somewhat disorganized compilation of clinical pathological correlations. Diseases were gradually acknowledged to reliably produce changes in affected organs. And while pathology did not exist as a separate specialty yet, academic clinicians took an increasing interest in dissection and morbid anatomy.

A perfect example of the Renaissance physician–pathologist is William Harvey (1578–1657). Trained in anatomy at the University of Padua, he returned to England to become head physician at St Bartholomew’s Hospital in London. An avid dissector, he was appointed as Lumleian lecturer in anatomy for the Royal College of Physicians and performed autopsies on indigent hospital patients, private patients, and even his own father and sister [22]. Harvey’s contribution to geriatric medicine came on November 16, 1635 when he was asked by King Charles I to perform an autopsy on the remains of Thomas Parr. Old Parr, as he was known, had led a long life as a farmer in the English countryside. Although there was no record of his birth, he was acknowledged to be at least 100 years old and claimed to be 157. An English nobleman was so struck by Parr’s longevity that he transported Old Parr to London to be presented to Charles I. Parr died shortly afterwards. After the autopsy, Harvey concluded that “all the internal organs seemed so sound that had he changed nothing of the routine of his former way of living, in all probability he would have delayed his death a little longer,” and that the polluted air of London and the rich diet and stronger drink, “ruined the functions of almost all his natural parts” [23]. In short, Harvey appears to

have supported the Hippocratic notion of the beneficial effects of a moderate diet and simple lifestyle for the elderly.

Legal Approach to Old Age

In the early Middle Ages when Barbarian Law applied, legal disputes were often settled by trial by ordeal. Until 1215, male serfs underwent trial by water and freemen and women were subject to trial by hot iron. There was also trial by combat in which the parties to the legal action would engage in armed battle with the idea that God would protect the righteous combatant. Women and the elderly were excused from trial by combat and could choose a champion to fight in their stead.

English common law, based on legal precedents established by earlier judge's rulings, developed over many years. But it is generally agreed to have become firmly established and systematized during the reign of Henry II (1154–89). Criminal trials became the exclusive province of royal courts and could not be tried by local lords. Trial by jury came to replace trial by ordeal. A system of itinerant judges, or justices in Eyre, was established to handle the legal matters of the crown, including death investigation. The Articles of Eyre, written in 1194, established the office of the coroner who had the right to convene a hearing in cases of suspicious deaths. The proceedings were conducted in the jurisdiction where the body was found, and witnesses could be called to give testimony. The coroner was not required to have any medical background, and autopsies were not typically a part of death investigation.

The first description of an actual autopsy performed to determine the cause of death (rather than a didactic anatomical dissection) was written in 1286 by Salimbene of Parma. He described how a physician from Cremona in the midst of an epidemic that killed birds as well as people decided to dissect both types of victims. He described similar changes in the hearts of both. Physicians were increasingly called on to render their opinions in situations where the public health was threatened or foul play was suspected. After 1300, courts of law in Bologna regularly consulted physicians and surgeons in cases of suspicious deaths and could ask for autopsies to provide evidence for criminal proceedings [21]. Although there were no medical coroners, medieval physicians could be named to the office of protomedicus. In Germany in 1532, the *Constitutio Criminalis Carolina* of Holy Roman Emperor Charles V enumerated rules for establishing guilt or innocence and specifically called for the testimony of physicians on medical questions.

The longstanding difficulty of accurately assessing people's ages and longevity was relieved in part by a series of laws in the sixteenth and seventeenth centuries. In England, for example, Catholic parishes had long kept informal records of births, weddings, and funerals. Henry VIII established the mandatory maintenance of vital statistics in 1538 (Figure 1.6). Data were collected at a local level and transferred periodically to central repositories. Birth registries allowed for more accurate reckoning of age, and death registries often included information about the cause of death. Interestingly, old age by itself was felt to be an appropriate cause of death for the purposes of record keeping, and at one point old age comprised roughly 10% of



Figure 1.6 The Reformation (1517–1648) in Europe and the reign of Henry VIII in England (1509–47) saw dramatic changes in the way governments cared for the elderly and monitored vital statistics.

the listed causes of death in the London Bills of Mortality [24]. Similar laws mandating the maintenance of accurate population statistics were enacted in France (1539), Italy (1563), and elsewhere throughout the Western world.

Interestingly, as the investigation of death and the collection of vital statistics in England were becoming more centralized, the care of marginalized groups was becoming less so. A series of laws known as the Poor Laws (the first of which was passed in 1601) charged local governments with collecting taxes and using the proceeds to establish facilities to manage the elderly poor, the disabled, the insane, and the “undeserving poor.” There were obvious compelling financial incentives to economize on such facilities. In addition, there was the notion (driven in part by the Protestant work ethic) that making such institutions too comfortable would promote sloth. In some larger, wealthier jurisdictions, separate almshouses, workhouses, asylums, and houses of correction could be built. When jurisdictions had more limited funds, a single facility would have to do for everyone. Elderly citizens who lacked a family to care for them or the funds to care for themselves could find themselves housed with the mentally ill, disabled, and vagrants. Attempts by marginalized citizens to move from poorer jurisdictions to wealthier jurisdictions were countered

Chapter 1: A History of Geriatric Medicine and Geriatric Pathology

by the institution of the laws of settlement which required proof of residency in order to qualify for admission. The English model of almshouses and workhouses would later be adopted in the United States and Canada as well, with some minor modifications.

French Revolution to the Industrial Revolution

- Industrialization with net migration from the countryside to the cities decreased the number of multigenerational households and increased the number of vulnerable urban elderly.
- Conditions for the urban poor and workhouse residents were appalling.
- As children and the mentally ill moved into dedicated public institutions, the elderly became the largest fraction of workhouse residents.
- The correlation of autopsy findings and clinical findings became a foundation of academic medicine. Autopsies refuted the idea of old age as a cause of death.
- Weisman proposes that old age and death are inherent to animal biology and not pathological processes.
- Forensic pathology emerges as a specialty.
- Germany establishes a social safety net for the elderly.

Social Attitudes toward Old Age

In medieval Europe, finished goods such as textiles and weapons had been produced by highly skilled artisans organized into guilds. During the eighteenth century, the manual methods of the guilds were largely supplanted by the mechanization and standardization of factories. The Industrial Revolution provided many more goods at lower prices and created a large number of

jobs and vast amounts of wealth. There was an overall movement of people from farms in the countryside to cities. Families in cities like London and Dublin did not have the option of living in large multigenerational homes. Extended families became less cohesive, and elderly adults without supportive families could find themselves in almshouses and public hospitals.

Civil engineering and infrastructure lagged behind the demands of the exploding urban populations. The resulting squalor and ease of disease transmission are difficult for modern city dwellers to comprehend. Prior to the establishment of sewer and city water systems, the streets in cities were choked with trash and sewage. Before the introduction of motorized vehicles, the volume of horse manure in Victorian London was so great that microbiologists were able to culture *Enterococcus* from the air.

Industrialization made the lives of the most vulnerable segments of society even more precarious. The ranks of the workhouses swelled, and conditions deteriorated. By the 1840s, the English press began to report on the deplorable state of government run workhouses where the starving elderly poor fended off illness and ectoparasites alongside the disabled and insane. Government inquiries followed. A report by the Sanitation Commission in 1866 noted that workhouse residents, “lead a life which would be like that of a vegetable, were it not that it preserves the doubtful privilege of sensibility to pain and misery” [25]. Specialized institutions for children, the mentally ill, and the physically disabled siphoned off many of the other residents of the almshouses, and the elderly became an ever larger fraction of the workhouse population (Figure 1.7).

Medical Approach to Old Age

The experimental work of William Harvey and other physicians of the iatromechanical school had a profound influence



Figure 1.7 Residents in the St. Pancras Workhouse, 1897. As specialized homes for displaced children and the mentally ill became more widespread, the elderly constituted an increasing fraction of the workhouse population.