Chapter Two

Biomedicine: the dominant model of health

> *For several centuries the Western world has pretended to find a unifying concept of health in the Greek ideal of a proper balance between body and mind. But in reality this ideal is more and more difficult to convert into practice. Poets, philosophers, and creative scientists are rarely found among Olympic laureates. It is not easy to discover a formula of health broad enough to fit Voltaire and Jack Dempsey, to encompass the requirements of a stevedore, a New York City bus driver, and a contemplative monk* (Dubos, 1984, p.9).

Introduction

This chapter provides an overview and background of the biomedical model of health—the dominant paradigm by which western capitalist societies conceptualise health issues. The intention is not to provide an exhaustive discussion of the biomedical model of health, but more to demonstrate its key elements and themes.

The chapter begins with a discussion of the nature of health, which is followed by a brief examination of the key assumptions that shape the model and characterise it, including the definition of disease; specific etiology; the generic nature of disease and the scientific "neutrality" of medicine. The chapter then explores the biomedical model's historical and philosophical origins, especially through the rise of science and subsequent scientific medicine. This discussion highlights the contributions of Francis Bacon, René Descartes and Isaac Newton to biomedical thought and practice, and how its developments—coupled with the enthusiasm surrounding the Enlightenment—redefined management of health and illness.

This is not to suggest though that the evolution of the biomedical model has been straightforward or uncontroversial. Sociologists note the importance of political and ultimately social processes in the creation and defence by professional medical interests of their pre-eminent position in health and health care (Willis, 1994, p.5). This theme assumes great significance in the latter part of the chapter, especially with regard to the period of the nineteenth and twentieth centuries, which also allows us to explore some alternative health options that may have found much greater expression in different (and indeed more amenable) historical circumstances.

What is health?

The definition of health begs complexity. Health is described as the most individual of all private possessions, something unique to a single person and never the property of a collective or group (Reisman, 1993, p.5). It is a concept that draws on the experiences and concerns of daily life, whereby thoughts about health reflect the quality of our physical, emotional and social dimensions, and reveal assumptions about individual and social reality (Crawford, 1984, p.62). What this suggests is that people think about health in ways that reflect their particular individual circumstances, which brings some perspective to the saying, "if you have your health you have everything" (Bury, 1997, p.1). Studies thus illuminate a range of different conceptualisations about health, where it is seen variously as the absence of illness, a resource, a controllable product of the individual, or as a collective heritage for which broader society is responsible (Loustaunau and Sobo, 1997, p.18).

While health is viewed in varying ways, all conceptualisations reflect a particular definitional basis and standpoint (Mooney, 1992, p.23). From a biological perspective, for example, perfect health may be viewed as a state in which each cell of the body is functioning at optimum capacity and in perfect harmony with every other cell. By way of contrast, a social standpoint may view health as a state in which an individual's capacities are optimised (Mooney, 1992, p.23).

One of the most widely used definitions of health is given by the World Health Organisation (WHO), which defines health as "a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity" (WHO 2002a). This definition, however, is the subject of intense criticism. For example, it is dismissed as "patently absurd and unattainable" and "highly dangerous" given that it is deemed impossible to tell whether individuals or groups have achieved this state, or for such a state to be measured or evaluated (Sax, 1990, p.1). Additionally, the reference to a state of "complete social well-being" is claimed as "so freighted with individual interpretations that it alone renders the definition useless" (Hudson, 1993, p.45). Yet, others have viewed the WHO definition more positively, claiming that it has generated a focus on a broader, more positive concept of health, in contrast to a narrow and intrinsically disease-based focus (Bowling, 1997, p.4).

These contrasting views highlight the inherent difficulty of defining and measuring health. Yet, Jones (1994, p.2) argues that,

> a preoccupation with definitions can obscure much of its complexity and shifting nature . . . By searching for the ultimate definition of 'health' we might fail to explore the intricate relationships between meanings of health and changing social circumstances, experiences and values.

The biomedical model correlates with a definition of health relating to "the absence of negative biologic circumstances", whether that be related to mutated deoxyribonucleic acid (DNA), abnormal physiologic states, abnormal anatomy, disease, disability or death (Durch et al. 1997, p.40). It is a western construct and the most widely accepted definition of health (Larson, 1991, p.3). The remainder of the chapter will now focus on exploring the biomedical model. Initially, this will involve briefly examining the four underlying assumptions about the body, disease, and ways of knowing that significantly shape the biomedical model (Mishler, 1981a, p.1).

Behind the biomedical model — key assumptions

The definition of disease

The biomedical model's core assumption about disease is that it represents a deviation from normal biological functioning. From this definitional basis, disease is seen as "fully accounted for by deviations from the norm of measurable biological (somatic) variables" (Mishler, 1981a, p.3). Consequently, feelings of pain and discomfort or perceptions of change in normal functioning and feeling are believed to indicate a person's ill health (Bowling, 1997, p.1). For example, an elevation of liver enzymes will eventually cause bodily pain because the liver is functioning improperly.

This conceptualisation of sickness or disease can also be understood as physical reductionism, which excludes social, psychological and behavioural aspects of illness (Freund and McGuire, 1991, p.226). It is closely tied to a mechanistic or physical view of the human body, whereby sickness is not seen as something that happens to a "whole" person, but to their "parts". As explained by White (1996, p.38):

> [T]he human being is conceptualised as being made up of interdependent parts or organs in which the mind is separated from the body. Being sick is a biochemical

> or anatomical occurrence which is largely independent of our consciousness or social location.

Specific etiology

The theory of specific etiology has been described as the signature assumption of the biomedical model (Mishler, 1981a, p.7). It encompasses the belief that each disease is caused by a specific, potentially identifiable agent (Freund and McGuire, 1991, p.227), and is considered the most constructive force in modern medical research:

> From the field of infection the doctrine of specific etiology spread rapidly to other areas of medicine; a large variety of well-defined disease states could be produced experimentally by creating in the body specific biochemical or physiological lesions. Microbial agents, disturbances in essential metabolic processes, deficiencies in growth factors or in hormones, and physiological stresses are now regarded as specific causes of disease (Dubos, 1984, pp.5-6).

Human genetic research (explored in chapters five and six) draws from this theory. The traditional assumption underlying genetics is that there are fundamental molecular units that serve as the basic and governing units of life (Herbert, 2002, p.222). However, the notion of "one gene, one disease" is increasingly being undermined and replaced by the notion of genetic complexity, where multiple genes act in concert with non-genetic (including environmental) factors to produce a level of risk of developing a given condition or disease (Herbert, 2002, pp.223-224). Consequently, people are called upon to be "risk conscious" and "genetically literate" by being "attuned to the dangers lurking within them and knowledgeable about how they, as individuals, might help prevent disease" (Bunton and Petersen, 2002, p.202).

Generic diseases

The notion of generic diseases provides another key assumption. It assumes that each disease has specific and distinguishing features and that symptoms and processes are the same across different historical and cultural contexts. Diseases are thus believed to provide a standard taxonomy in a manner consistent with the way natural elements are presented in the periodic table (Mishler, 1981a, pp.9-10). The core implication is that criteria for determining between normal and pathological states are understood to be static.

The scientific "neutrality" of medicine

Yet another assumption is that of the scientific neutrality of medicine, which refers to the ways in which medical practitioners conceptualise and accordingly justify their work. In short, doctors see medicine as science and themselves as scientists. Through this process, medicine is imparted with the rationality of the scientific method while scientists assume the "objectivity" and "neutrality" of the scientist (Mishler, 1981a, p.15), which is based on Cartesian philosophy (discussed below in more detail). This results in biomedical theory, ideology and discourse asserting that medicine—and by association its dominance—is based on neutrality and universality and, as such, is largely unaffected by wider social, cultural, and political factors (Mishler, 1981a, p.16; Gordon, 1988, p.19).

Inevitably, these assumptions have oriented the medical model towards treating illness and disease by scientific means. As highlighted by Navarro, the model assumes that the methods of the natural sciences—especially biology, chemistry and mathematics—are the appropriate methods for the treatment of the sick (cited in White, 1996, p.38). Yet, a well-documented critique exists of this view, and refers to the broader historical and structural context of the biomedical model of health. Larson (1991, p.1) for example, argues that any definition of health is at once a political, economic and social product. Gordon (1988, p.19) confers that the knowledge and practices of biomedicine draw from contexts extending well beyond medical boundaries.

An examination of key reference points in the philosophical origins and development of this dominant health tradition will now enable us to explore these political, economic, and social roots of biomedicine. The exploration is significant in illuminating the status of biomedicine as one of various models of health, and the means by which it achieved dominance over other models.

In context: the origins and development of the biomedical model

Many writers have commented upon what constitutes medical discourse and why popular medical ideas have occurred at particular stages in history (Petersen, 1994, p.15). Overall, a general consensus exists about significant historical moments that

signify clashes between competing philosophical traditions. The first of these moments relates to the embrace of reason in antiquity.

The embrace of scientific reason in Classical Greece and Rome

Before the fifth century B.C., the healing arts in ancient Greece were dominated by many different shamanistic and empirical approaches. Common to these traditions was a view of nature closely related to human existence (Pratt, et al. 2000, p.11). In a holistic conception of Man and disease, illness was overwhelmingly understood as a punishment by the gods to teach moral and religious truths (Risse, 1993a, p.11; Hudson, 1983, p.231; Lyons and Petrucelli, 1987, p.195). With their origins in Aristotelian natural philosophy, these attitudes began to evolve with the social relations brought about by the formation of the *polis* or Greek city-state during the 7th and 6th centuries B.C.

At that time, pressure from northern migrations resulted in ancient Greece being over-populated with regard to cultivable land. The situation created pressure on resources and inspired a new secular approach to problem solving (Magner, 1992, p.65). Most significantly, this involved the intellectual embrace of reason (*logos*), which was identified by the classical Greeks as the superior human characteristic as rational action was seen to lead to the greatest good or progress (Saul, 1993, p.14). Natural philosophy or scientific thinking thus began to challenge the traditional or organic world-view that honoured the dynamics of the natural world, and the superior position of nature over humans within the value system (Spretnak, 1991, p.245; Merchant, 1992, pp.42-43).

Hippocrates (*c*.450-370 BC) fused the evolving concepts about nature with the distinctive medical and healing tradition of the time (Risse, 1993b, p.51). Because of the requirements of sustained warfare and the interest in athletic competition, this tradition sought to "define its own intellectual approach to sickness while formulating a new methodology and rationale for medical care" (Risse, 1993b, p.51). Hippocrates is thus credited with having done for medicine what Socrates did for thought; by liberating it from its "adolescence" and encouraging it to become rational (Inglis, 1965, pp.24-25). The writings attributed to Hippocrates[1] are significant in that they:

[1] The phrase "attributed to Hippocrates" is used to point out that while much is attributed to him, little is known about the man himself. While historians are certain that he was a well-known medical teacher,

> [S]ystematized a medical outlook that had largely broken free of its magical and religious sources and had turned its attention to the study of the natural world through disciplined observation and experiment. Symptoms were delineated, disease pictures were described, clinical histories were recorded, and a theory of health and illness was formulated (Rothman, et al. 1995, p.43).

Hippocrates' work rested on the theory that four humors or fluids constituted the human body, including blood, phlegm, yellow bile, and black bile. When these elements were in equilibrium, or in a state of harmony, it was believed that an individual experienced "health". Conversely, with elements out of equilibrium, disease resulted (Rothman et al. 1995, p.43).

Galen (*c.*129-*c.*200 AD), another Greek physician, significantly influenced the biomedical model through his work in anatomy, physiology, therapeutics and philosophy (Lyons and Petrucelli, 1987, p.251; Magner, 1992, pp.86, 88). Lyons and Petrucelli (1987, p.251) have noted the individual significance of his contribution,

> for nearly fifteen hundred years his works were the unimpeachable authority on medicine in many different lands. A bitter polemicist yet broad in view, Galen was both a careful, accurate observer and an uncritical believer, a dogmatic authoritarian and an original thinker.

Building on the medical tradition pioneered by Hippocrates, Galen earned much respect as a skilful physician and for his interest in developing medications to treat the effects of disease (Lyons and Petrucelli, 1987, p.251; Breckon, 1972, p.14). Performing much of his work in Imperial Rome, Galen is well remembered for his efforts to create a group of learned and experienced physician-philosophers who administered widely (Risse, 1993b, p.53). However, it was not till the Scientific Revolution of the seventeenth century that the science that would transform medical practice along these lines would really emerge. In the meantime, most people continued to subscribe to traditional approaches to health care, many of which incorporated the therapeutic use of herbs.

The Scientific Revolution

The Scientific Revolution of the seventeenth century built on the origins of mechanical philosophy, which is a reductionistic framework based on quantitative science that seeks

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his name does not appear significantly in historical records until centuries later. It has been established that many of the works which were said to have been written by him were in fact a collection of treatises by many doctors holding a range of opinions (Inglis, 1965, p.25).

to understand things in terms of their constituent parts, and led to significant developments in medical knowledge and practice (Lyons and Petrucelli, 1987, p.369). It followed on from the Renaissance of the fourteenth century, through which Europe, aided by factors such as the practical work ethic of Protestantism, slowly began to reject the medieval past dominated by concepts of divine revelation and by the power of the Church and the State (Saul, 1993, p.15; Wear, 1995, p.340). At the heart of this transformation were the founders of modern scientific thought, especially Francis Bacon, René Descartes and Isaac Newton.

Francis Bacon

Although not a scientist, Francis Bacon (1571-1626) was seen as the first "entrepreneur" of science for his efforts promoting science, and its application through technology, as the means of human progress (Haynes, 1995, p.29). In the final decades of the sixteenth century, some English philosophers were becoming increasingly disillusioned with the power of reason to solve societies' problems. There was a sense that the hopes and promises of the Renaissance had not been delivered and individuals like Bacon feared a collapse of learning and a second Dark Ages (Haynes, 1995, pp.23-24). This led Bacon to take on the role of revolutionising (or indeed replacing Aristotelian) learning and, in particular, the place of science and scientists in society (Haynes, 1995, p.25).

Bacon argued that natural science was not an instrument of evil associated with the legend of Faust.[2] Instead, science was associated with God's laws as embodied in nature. By breaking this link between science and the idea of evil, Bacon ushered in a worldview whereby society's problems could be explored and potentially solved through secular and future-oriented thinking as opposed to the contemplation espoused by classical scholars and the church. At the centre of this vision was a new methodology of science based on observation and experimentation and a new standard of scientific behaviour based on an ideal of active, publicly oriented service (Haynes, 1995, pp.24-26).

[2] The legend is the story of a German necromancer and astrologer living around the 16th century who sold his soul to the Devil in exchange for knowledge and power. The legend's enduring notoriety is due to the 16th century publication of the first "*Faustbuch*", which was a collection of old tales about wise men in science and the occult re-shaped with Faust as the central character (Hawkins 2002).

Contemporary historians, such as Hill (1988), argue that while Bacon's ideas constituted a significant philosophical shift, they were not imposed in opposition to the religious order that preceded them. Notions of morality, for example, are seen to have remained the same, with the laws of religion and science both requiring disciplined obeisance (Hill, 1988, pp.157-158).

What was fundamentally transformed though was Man's view of nature. In elevating the cause of science, Bacon advocated degrading nature "to the status of a relatively impotent opponent" through a process of being "bound", "enslaved", "constrained" and "molded" by the mechanical arts (Merchant, 1992, p.46; Haynes, 1995, p.33). In this manner, Bacon proposed "a veridical reading of the Book of Nature" to learn its secrets, which would facilitate "the translation of knowledge to power, and thus restore man's proper dominion over nature" (Fox Keller, 1995, p.52). This was a very significant philosophical shift that conceptualised nature squarely in terms of its functionality to human beings. Accordingly, the experimental method, which allowed for increased knowledge and the testing of new possibilities for controlling and manipulating objects, was imbued with considerable importance (Kollek, 1995, pp.96-97).

In the second half of the seventeenth century, Bacon's ideas gained popular attention. The Royal Society, for example, was established in 1662 on the strength of Bacon's vision of joint scientific endeavour based on experimentalism, open communication and usefulness (Haynes, 1995, p.31; Wear, 1995, p.343). Advances in medical knowledge proceeded more quickly. In 1628 an English physician, William Harvey, revolutionised physiology with theories based on the experimental method. By applying mathematical calculations to the volume and flow of blood, he concluded that the heart acted as a pump to keep blood circulating (Haynes, 1995, pp.35-36).

René Descartes

The work of René Descartes (1596-1640) merged into this growing scientific synthesis. Reacting to Harvey's physiology, Descartes disagreed that the heart's pulsing faculty drew on the vitalistic qualities of the soul. Instead, he argued that all bodily actions had a mechanical (and ultimately mathematical) explanation, where the heart was like an engine or clock-like device powering the body (Wear, 1995, pp.339-340, 356).

This distinction was the beginning of Cartesian philosophy, with the core of this mechanistic framework embedded in the theory of objectivity (as we mentioned above). In more detail, objectivity is the belief in an underlying reality that exists independently of human (or any other) perception, and independently of any other meaning and significance that might be attached to it (Pratt, et al. 2000, p.6). Cartesian philosophy cast the human being, and particularly the human mind, as separate from the physical world (Pratt, et al. 2000, p.9). This perception rejected teleological viewpoints that conceptualised human beings as part of, and not independent of, their broader physical environment.

The separation or alienation of humans from their natural environment in Cartesian philosophy thus strengthened the ideology of science objectifying and dominating nature. While Descartes was more of a thinker or a model builder than an experimentalist (Wear, 1995, p.343), he argued that it was possible to understand the complexity of the natural world by reducing it to a structured order. His method assumed that "a problem can be analyzed into parts, and that the parts can be simplified by abstracting them from the complicating environmental context and then manipulated under the guidance of a set of rules" (Merchant, 1992, p.52). Within this context, Descartes posited that *all* natural objects embodied mechanistic principles (Lyons and Petrucelli, 1987, p.429).

The mechanistic framework of understanding the whole as the sum of many small parts paved the way for advances in medical knowledge. Up until the seventeenth century, the development of biological knowledge was restrained by religious prohibitions on the study of human anatomy. The predominant Christian view was that, "body and soul were one and the same thing and, if the human body was not preserved intact, the soul could not ascend to heaven" (Hart, 1985, p.14). Descartes' dualistic logic (known as Cartesian dualism) made this thinking redundant. It secularised the body through,

> [the] division of man into a soulless mortal machine capable of mechanistic explanation and manipulation, and a bodyless soul, immortal, immaterial, and properly subject to religious authority, but largely unnecessary to account for physical disease and healing (Kirmayer, 1988, p.59).

Yet, despite Descartes' contribution to mechanical philosophy, Newton is seen as its most significant exponent.[3]

Isaac Newton

Isaac Newton (1642-1727) was the dominant figure in seventeenth century science, developing theories of motion, gravity and celestial mechanics that changed the popular image of the scientist (Wear, 1995, p.343; Haynes, 1995, pp.50, 52). Through his influence, the scientist became a highly respected member of society and embodied the highest attainment of reason (Haynes, 1995, p.50).

Newton's publication of *Philosophiae Naturalis Principia Mathematica* (known as the *Principia*), in 1687, is seen as his greatest intellectual achievement. The work on celestial mechanics vindicated a new method of analysis that was seen as fundamental to scientific progress (Haynes, 1995, p.52). At the centre of this method was a view of nature as secondary and subservient to human beings within value hierarchies. As pointed out by Haynes (1995, p.53), the significance of the *Principia* was,

> the unified worldview that it offered, an image of nature that typified order, simplicity, and harmony and that was represented as eminently reasonable and predictable. Taken together, these qualities engendered in Newton's contemporaries a sense of power and a belief that man, far from being of no account in the expanding universe being revealed by the telescope, was elevated to a position of superiority, since he alone was capable of understanding the working of the whole celestial system.

Mechanical philosophy, with its reliance on quantitative science, profoundly influenced the development of biomedicine. The significance of Cartesian dualism stands out in this regard. It led to a reductionistic focus on issues that were observable, amenable to measurement and open to accurate technical description (Moon, 1995, p.55). Over time, Cartesian thinking also gave rise to an "epistemological dualism" that emphasised two different ways of knowing, namely subjective awareness and direct observation (Kirmayer, 1988, p.59). This dualism defined "the physician as active knower" and "the patient as passive known" in keeping with the "subjective", "unreliable" and

[3] Although seen as the most significant mechanical philosopher, historians note that Newton does not fit neatly into a particular category of scientist. He mixed old and new types of learning, some of which was not congenial to the political and intellectual climate of his day. Newton's extensive work on chemical alchemy, for example, which sought to demonstrate links between scientific truths and God, was suppressed after his death (Wear, 1995, p.344; Haynes, 1995, pp.50-51).

"essentially irrelevant" nature of a patient's account of illness in the process of diagnosis by direct observation and examination (Kirmayer, 1988, p.59).

The rise of scientific medicine

Although Newtonian medicine emerged late in the seventeenth century, historians record that much of the heritage of Galen and Hippocrates, which was preventive in focus, continued to be influential (Wear, 1995, p.359). Even so, the entirety of the eighteenth century marked an important point in the history of medicine. It saw mechanical philosophy, along with the invention of printing and the discovery of the New World, fuel expectations of medical improvement (Porter, 1995, p.371). This period, which sought to apply the "new science" of Bacon, Descartes and Newton to the complete domain of human knowledge, is known as "The Enlightenment" (Pratt, et al. 2000, p.22).

The Enlightenment

Enlightenment philosophy was defined by a belief in human progress and the perfectibility of society (Wear, 1992, p.5). This gave rise to a belief that improved health was possible and indeed fundamental to bettering the quality of human life (Porter, 1995, p.374). Subsequently, many physicians enthusiastically adopted this worldview, and while few attempted to reduce all living beings to the "machine" concept, they followed Newton's model and searched for simple and general laws related to human biological functioning (Risse, 1992, p.155; Porter, 1995, pp.376-377). One of the earliest of these studies was by Sanctorius (1561-1636), who developed a balancing chair that weighed food and drink taken by an individual as well as loss of weight due to "insensible" perspiration (Wear, 1995, p.353). Such research led to the development of many new medical theories and systems of classifying disease, which replaced each other frequently (Wear, 1992, p.5).

More significantly though, such activity promoted a secular understanding of health, viewed as the balance of possibilities instead of as God's will (Porter, 1995, p.377). This fuelled an interest in population health, and led to the formal application of medical approaches to society in the belief that it was appropriate that professionals would deal with health-related issues (Risse, 1992, p.154).[4]

[4] The notion that society could be medicalised dates to ancient Greece (Wear, 1992, p.5).

A new medical elite thus emerged in affluent nations to re-define the management of issues including madness and childbirth, and to play increasingly prominent roles in society. The drive to institutionalise and re-educate the insane is indicative of the optimism or faith associated with the medicalised approach. Prior to the medical approach, insane people in Britain were subject to the neglect and brutality of private madhouses (Porter, 1995, p.428). Enlightenment "mad-doctors" sought to supplant this by transferring the insane to specialist, well-resourced and staffed institutions, where the insane could be re-educated. This goal, however, was not generally realised and it was not long before the lunatic asylum became a problematic feature of biomedicine (Porter, 1995, pp.428-429).

Childbirth aspects also changed significantly throughout the Enlightenment, especially for the more affluent social classes in Britain and the United States. Prior to this, birthing was an event, which in keeping with folk and religious rituals was exclusively managed by women. Midwives taught women how to give birth and only called upon male "barber-surgeons" when giving birth was impossible.[5] The development of obstetrical forceps by the barber-surgeon Peter Chamberlen enabled the user to deliver a child without destroying it first. This enabled the male physician or midwife (accoucheur), who had exclusive rights to use forceps, to become involved in all life births. The focus of birthing thus shifted away from the traditions of midwives to the professional sciences of anatomy and physiology. The doctors—who women began to turn to late in the eighteenth century to allay fears of painful or even fatal births—were seen to embody medical progress. Many were European-trained and gave public lectures in obstetrics (Goler, 1988, p.62).

Yet, although perceived as a progressive development, male physicians used more than scientific knowledge to gain territorial rights over birthing. They implemented various strategies to professionalise their practice and to undermine the competition provided by the traditional midwife. A common strategy was to set higher fees than did midwives as a symbol of higher social status and to also add a surcharge when attending births that were initially supervised by midwives (Goler, 1988, p.62). The ability of the male-

[5] Barber-surgeons, who had their origins in the guild system that emerged in thirteenth century Britain, would perform either an embryotomy (crushing of the fetal skull, dismembering it in utero and removing it piecemeal) or remove the baby by caesarean after the death of the mother (Katz Rothman, 1991, pp.13-14).

dominated emerging profession to convince women of both the dangers of childbirth and the incompetence of midwives was also fundamental to gain popularity for the male midwife. This strategy was so successful that despite allegations during the eighteenth century that more mothers and babies died or suffered significant birth injuries through forceps (which were of a primitive design and not sterilized), the average mother was nonetheless convinced of the superiority of the service provided by male midwives (Katz Rothman 1991, pp.14-15).

With specialist male midwives flourishing, birthing was thus no longer primarily a female cultural and social event. Other changes accompanying the shift was a growing fashion of having husbands present during labour, and mothers breast-feeding their babies as opposed to having them wet-nursed (Porter, 1995, p.431). Cultural differences, however, ensured that medical developments were unevenly adopted. For example, the French still favoured wet-nursing; and in Catholic nations like Italy, the use of male midwives or physicians at births was considered inappropriate (Porter, 1995, p.431).

More broadly, while biomedical (or "regular" medical) care certainly grew more popular during this period, so too did the demand for more traditional (or "irregular") health care practices, with the latter incorporating many different practitioners including midwives, bone setters, herbalists and barbers (who performed minor surgery). Amongst the more well known traditional practitioners were mountebanks, who made profits from selling various tonics in the market as opposed to charging fees for advice (Porter, 1995, pp.459-460). The eighteenth century health care market can thus be understood as quite diverse. "Modern" medicine offered but one of many alternatives, and except for the development of smallpox inoculation by Edward Jenner in 1796, it did little overall to improve the health or life chances of populations (Porter 1995). Indeed, as discussed in more detail later, most health improvements derived from public policies that improved the physical environment, such as the provision of effective sewerage and access to clean water.

Also challenging new developments in health care was a resurgence of the traditional at the end of the eighteenth century represented by a new social movement called the Romantic movement. Challenging the Enlightenment, it embodied discontent with

rational and mechanistic science and called for its reform (Pratt, et. al, 2000, p.22). The Romantics thus insisted that human beings had individual power to initiate change and were not merely subject to outside forces. This led them to repudiate the notion that the human mind or nature is passive; to create a new conception of the individual based on the development of human potential; and to infuse a new authority to feeling as opposed to reasoning and to promote nature-mysticism (Pratt, et al. 2000, pp.27-32).

Struggles for recognition

On the strength of the Romantic movement, the nineteenth century brought efforts to fundamentally break with the Enlightenment and reorganise medical knowledge. This was linked to a broader debate about social order, and in particular the interest of some within biomedicine to challenge the patronage-based, hierarchical society endorsed by prominent Enlightenment physicians (Lawrence, 1994, p.29). Within this context, early-mid nineteenth century biomedicine had now become a broad field of practice with different social groups struggling for recognition (Lawrence, 1994, pp.34-35). All sides claimed to be custodians of scientific knowledge, even though they were unable to agree amongst themselves on the constitution of that knowledge. The science of Bacon, Descartes and Newton, despite the challenge of the Romantic movement, assumed greater and greater prominence (Lawrence, 1994, p.34), as it aligned itself with the broad progressive changes and mechanistic concepts of the industrial revolution.

Other powerful challenges also existed. One of the most significant attempts to re-constitute knowledge at this time was cranioscopy or phrenology, based on a new anatomical model of the nervous system. Phrenologists, largely drawn from the middle and lower social classes, claimed that the different parts of the brain were fundamental to mental functioning and that mental function could be investigated by feeling the bumps on the skull as their size revealed the extent of a person's development. Not surprisingly, the medical elite regarded this anatomical model as "utterly fallacious" (Lawrence, 1994, pp.29-30). Moreover, it threatened to displace the establishment worldview based on the immortality of the soul and, by association, organised religion and hierarchical social order. Phrenology, although it enjoyed popularity among the masses spanning two centuries, was eventually rejected as a false and dangerous theory (Lawrence, 1994, pp.29-30).

Nonetheless, phrenology led to the establishment of new priorities in medical knowledge. The priority given to natural history or knowledge based on observable features was expanded upon by an interest in knowledge associated with "internal" factors that were hidden from view. In the process, the practice of reasoning about causes of disease was replaced by an attempt to give causes a physical location through processes of looking, touching and listening (Lawrence, 1994, pp.30-31). France, in the early nineteenth century, embraced the new knowledge when a strategy of including professionals in a national medical care policy became established (Risse, 1993b, p.63). Facilitating the shift was the Paris Medical School, which unified medicine and surgery in a "progressive" curriculum based on anatomical dissection, laboratory work and clinical studies (Risse, 1993b, p.63; Gelfand, 1993, p.1131).

Central to the new strategy was the hospital. Parisian hospitals elevated the surgical approach to medicine and became workshops of clinically oriented medicine (Risse, 1993b, p.63; Wear, 1992, p.7). Biological knowledge proceeded at a great pace, and constituted the first step towards medical knowledge serving as a basis of influence over the healing profession (Risse, 1993b, p.63). The development of biological specialism soon followed, where it was no longer possible for an individual to specialise broadly on the whole body. As pointed out by Moon (1995, p.56), the organ superseded the patient as the focus of attention, which effectively marginalised the patient.

However, medical practitioners were still a long way from securing a dominant market position. Few people in the 1820s, for example, thought that medical knowledge could contribute to the management of diseases and fevers that were increasingly occurring in industrial towns. Within biomedicine, there was no consensus as to the causes, cure, or possible means of prevention of these epidemic diseases (Lawrence, 1994, p.42). The biomedical model was limited to the supervision and discipline of closed institutions, and to the European bureaucratic police model established to manage disease among the urban poor (Lawrence, 1994, p.40). Consequently, when unregulated and large population growth in cities and towns translated into "appalling" health threats, such as cholera and typhoid, people saw the problems and prospective solutions as legislative as opposed to medical (Lawrence, 1994, p.47; Porter, 1995, p.473).

Edwin Chadwick became the most significant figure in the sanitary reform movement, a network of middle-class professionals—including some medical practitioners—that advanced public health issues in Britain in the 1830s and 1840s (Lawrence, 1994, pp.45-47). Following public outcry about the cholera epidemic of 1831-1832, a Royal Commission of Enquiry on the Poor Laws was initiated in 1832 to investigate what were seen as "antiquated and inefficient" poverty-relief laws (University College London 2002). Significantly, the poverty-relief laws prevented the establishment of a competitive labour market, which was fundamental to the development of the laissez-faire capitalist system (Ringen, 1979, pp.110-113). Chadwick's central role in the investigation, which led to the introduction of New Poor Laws that established the competitive labour market in England, elevated him to a position on the Poor Law Commission.

In 1842, and on the Commission's behalf, Chadwick published a three-volume report, *Survey into the Sanitary Condition of the Labouring Classes in Great Britain* (University College London 2002). Although Chadwick had been convinced of the need for environmental improvements since 1828 and had hoped to include sanitary measures in the New Poor Law, the publication of the report was a key event in a ten-year struggle to win parliamentary support for an environmental approach to health (Ringen, 1979, p.113; Tesh, 1988, p.29; BBC 2002). The report pointed to much lower life expectancy in towns than in the countryside and suggested that epidemic diseases did not result from the victims of disease but from environmental "filth" (such as foul odours). It recommended the establishment of new administrative structures, including the appointment of district medical officers to report on local sanitary conditions, and the provision of sewerage and clean water (Tesh, 1988, p.32; Fee and Porter, 1992, pp.252-253). While the changes can be seen as progressive, they were fundamentally consistent with the interest of the new capitalist class in abandoning the traditional quarantine approach to managing the spread of infectious diseases coming from abroad — an approach that stalled the expansion of commercial trade (Ringen, 1979, pp.115-116). Additionally, although these were significant policy innovations that extended the sphere of government, there was an explicit assumption that the cleaning up of the physical environment would, in the long term, lessen the need for government spending in other areas and thus assure a more productive industrial workforce (Tesh, 1988, pp.30, 32). In this sense, the report did not challenge the dominant political

preoccupation with individualism and the related ideals of self-reliance, freedom from authority, or limited government (Tesh, 1988, p.32; Hamlin and Sheard, 1998, p.588).

In 1844, a Sanitary Commission followed on from Chadwick's report to consider the health of the nation and the means by which it could be improved. Its key findings were eventually incorporated into the Public Health Act of 1848, which included the establishment of a central government department to manage public health issues. While the Public Health Act promoted a scientific (but not medical) approach to poverty, local authorities were not bound to implement recommended changes. In keeping with the uneven adoption of the reforms, the sanitary movement was kept to a low profile (Lawrence, 1994, pp.47-48). Others blame Chadwick's personality for the lack of profile, and its eventual failure:

> [H]e was tenacious in pushing a reform by all available means until action was taken, but he was overbearing and unresponsive to the views of others. He did not negotiate or converse but lectured at people, again and again, until they acted. With no faculty for accommodating differences of opinion, he failed as a practical politician, notwithstanding his ability as a political analyst (Hamlin and Sheard 1998, p.588).

Contrary to the sanitary movement's low profile, a naturalist ideology inspired by the Enlightenment emerged between 1820 and 1870 to assume centre stage in health politics. Based on the detailed study of natural phenomena, naturalist theory integrated the once controversial aspects of phrenology into a seamless, evolutionary notion. Naturalist theorists posited that the brain was no longer the seat of the soul and thereby open to experiment and analysis. What especially distinguished naturalism from phrenology was its social context. Unlike phrenology, naturalism was not premised on radical reform. In keeping with its creation by respected members of the social elite such as Charles Darwin, T.H. Huxley and Herbert Spencer, it advocated progressive change and social stability (Lawrence, 1994, pp.58-59). However, in seeking to reform some of the cultural bases upon which medical and non-medical elites maintained influence, the naturalist movement also encountered significant resistance. Many conservative physicians, for example, saw it as an incursion by basic scientists into a curriculum that should remain based on classical learning (Lawrence, 1994, p.59). Others fiercely opposed the experimental characteristics of naturalism, especially animal experimentation. Throughout the 1860s and 1870s, a powerful antivivisectionist

movement emerged that brought together people from all social classes, with women prominently represented (Elston 1987). The passing of the Cruelty to Animals Act in 1876 though, which licensed animal experimentation, eventually defeated antivivisectionism.

Naturalist ideology, which was fortified by physiological and epidemiological knowledge, spread quickly. By the end of the 1860s, it began to marginalise competing environmental notions of health popularised only 20 years earlier by the sanitary reformers. The bitter political struggle over alternate responses to the epidemics of fever, gangrene and sepsis in hospitals stands out as an important juncture in the social process of validating biomedical thought and practice.

The abolition of epidemics within hospitals, known as hospitalism, was a valuable prize to whoever presented the winning solution. The sanitarians, including Chadwick and Florence Nightingale, advocated the abandonment and destruction of the large hospitals in favour of smaller ones in rural areas. This was in keeping with a view that the optimal solutions were legislative and architectural in tone. In contrast, many surgeons believed that the answer lay not in compromising the role of the large hospitals nor in the influence of the medical elites, but in modifying surgical techniques (Lawrence, 1994, pp.64-65).

The surgeons, led by Joseph Lister, proved successful in the 1890s. Lister, who embodied the prized values of high Victorian society (including naturalism, professionalism, gentility and heroism), claimed that hospitalism could be eradicated through better wound management. This became known as the “antiseptic revolution” (Lawrence, 1994, p.65-66), however, historians believe that Lister’s medical achievements were only of limited significance. Lawrence (1994), for example, noted that many changes occurred to both hospitals and surgical techniques throughout Europe and the United States in the latter half of the nineteenth century. These together transformed the scope of surgery. Lister’s political achievement, however, still stands out:

> The sanitarians were vanquished and medical science, university medical education, large hospitals and above all naturalism were made into highly valued cultural products. Equally important, radical interventive treatment was

> transformed from an approach of last resort, carried out by a second class healer, into a treatment of choice practised by new cultural heroes (Lawrence 1994, p.66).

The position of surgeons within this political struggle was fortified by the development of laboratory medicine, which focused on tests and technical procedures to discover the underlying pathology of illness. This increasingly reductionist style of medicine gained prominence with the acceptance of germ theory. Postulated in independent laboratory research by Louis Pasteur and Robert Koch late in the nineteenth century, it explained that infection occurred at the individual level through the action of identifiable micro-organisms (Hart, 1985, p.14). Consistent with Bacon's scientific method, this advance allowed diseases to be classified according to perceived causes, rather than only signs and symptoms. Following this development, the general health of populations was no longer understood in terms of environmental conditions nor of punishment (Loustaunau and Sobo, 1997, p.115; Wear, 1995, p.360). Policy makers were thereby free to ignore what the sanitarians viewed as people's complicated interaction with their social and physical environments (Tesh, 1988, p.39).

Nevertheless, historians argue that with the explicit exception of antiseptic surgery, the breakthroughs in experimental physiology, pathology, and bacteriology in the second half of the nineteenth century had little impact on reducing mortality from disease (Gelfand, 1993, p.1138). While this situation was in many ways reflective of the radical and often harmful nature of much medical care, it allowed for continuing competition at the local level between various health care practitioners (Freund and McGuire, 1991, p.219).

Nonetheless, the antiseptic revolution and the cultural prestige that it afforded the medical profession over other medical traditions created the base upon which medical interests would eventually assume greater control over the health care market by the early twentieth century. By then, physicians had achieved almost total professional dominance over the health care sector, most notably in the United States. The role of science in facilitating this grand transformation stands out (Brown 1980; Willis 1990; Gelfand 1993). As recounted by Gelfand, "the [medical] profession availed itself of the cultural prestige of science", and indeed "incorporated and used science to transform itself" (1993, p.1139).

Reforming medical education and practices: the role of the United States

This transformation took place within the space of a few decades. Beginning in the 1870s, thousands of American medical physicians undertook postgraduate studies in the German-speaking world, which was the leading centre for science and medicine. They returned to the United States with a form of medicine grounded in experimental science that appealed to a public prepared to agree with scientific medicine (Gelfand, 1993, pp.1140-1141). Professional medicine soon became associated with knowledge of the putative causes of disease as opposed to therapeutic behaviour. Subsequently, medical physicians were able to distinguish themselves from the alternate traditions, many of which relied on lay and unqualified healers (Gelfand, 1993, p.1141).

In a similar strategy, medical or "regular" physicians, led by the American Medical Association (AMA), cooperated with "irregular" and especially homeopathic physicians in political efforts to have states enact licensing laws. They shared a common interest in eliminating unqualified healers from the realm of legitimate care. In this manner, courts and legislatures began to grant prerogatives to thus-approved physicians, which led "regular" medicine to coopt and absorb most "irregular" physicians (Freund and McGuire, 1991, pp.220-221).

However, the most significant factors in establishing the dominance of biomedicine in the health sector surrounded the publication in 1910 of the Flexner Report,[6] in the United States (Sobo and Loustaunau, 1997, p.117). In 1908, the AMA had contracted one of the largest American philanthropic foundations, the Carnegie Foundation, to a review of medical education with the intention of standardising and raising its status. At that time, scientific medical education was a significant expense and the capital and operating costs for medical schools could not be provided from within the profession alone (Sobo and Loustaunau, 1997, p.116). Medical reformers thus actively sought to attract large investments into medical education from the growing industrial sector. For many reformers, this meant attempting to rectify the lack of control over the health care market and a lack of internal cohesion within the medical profession (Freund and McGuire, 1991, p.222). Of particular concern was the presence of women, blacks, immigrants and those from the working class in the ranks of the medical profession,

which was seen as preventing medicine from becoming a respected institution (Freund and McGuire, 1991, p.221).

To facilitate investment, the Flexner Report reflected the ideological values of wealthy industrialists, who were the primary sources of capital, in a manner that was not accidental (Sobo and Loustaunau, 1997, p.118). It recommended that the majority of medical schools close down and that the top schools strengthen their teaching through the adoption of a science-oriented program (Freund and McGuire, 1991, p.222). This spawned a major reform process, which led to significant reductions in the number of medical physicians and in access to medical education for minority groups. For example, the reforms led to all but three of the 17 women's medical colleges in the US being shut down (Freund and McGuire, 1991, pp.222-223).

In this manner, conservative (and more importantly wealthy) industrialists were converted to the investment opportunities offered by scientific medicine. In the 20 years following the publication of the report, the nine largest philanthropic institutions within the United States together contributed US$150 million to medical education (Berliner 1985).

As offshoots of the Rockefeller family's petrochemical empire, the Rockefeller philanthropies were the largest single sources of US capital for medical science, education and research. Administratively dominated by Frederick T. Gates from the early 1890s to the late 1910s, Gates was almost singularly responsible for the establishment of the Rockefeller Institute for Medical Research in 1901, which received US$65 million of Rockefeller money by 1928 (Brown, 1980, pp.36, 55, 104-105). Within this context, Gates was historically significant in advancing the mechanistic and reductionist conception of the human body. He believed that the body's component parts were analogous to factory parts in industry, and that medicine was essentially "an engineering task" (Brown, 1980, pp.119-121). Gates was also instrumental in increasing public acceptance of science and the scientific method (Brown, 1980, p.41). He proclaimed that "*[d]isease* is the supreme ill of human life… *the main source of almost all other human ills*, poverty, crime, ignorance, vice, inefficiency, hereditary

[6] The report, *Medical Education in the United States and Canada*, was written by Abraham Flexner, brother of Simon, who was the first director of The Rockefeller Institute for Medical Research (1901-

taint, and many other evils" (Brown, 1980, pp.128-129). As such, Gates saw disease as the cause of misery associated with poverty, where misery was seen as a technical and not social problem (Brown, 1980, p.129).

These pervasive views significantly influenced priority setting in medical education and research (Brown 1980). For example, while this legacy will be detailed more in chapter five in the context of "the Science of Man" project, Rockefeller finance did not tend to support medical research investigating the social or environmental factors in health and disease. Nor did it support the homeopathic tradition favoured by the head of the Rockefeller dynasty, John Davison Rockefeller, Snr. Instead, it focused its extensive resources on chemistry, biology, pathology, bacteriology, physiology, pharmacology and experimental surgery (Brown, 1980, pp.109, 129). While subtle tensions and contradictions within Rockefeller philanthropy would later emerge, including the Foundation's funding of health projects without a biomedical focus, this pattern of investment saw the political and social standing of the medical profession increase dramatically, and by the 1930s, it had achieved a notable degree of professional autonomy (Freund and McGuire, 1991, p.223). Best known in terms of professional dominance, this situation meant the medical profession had virtual freedom from outside scrutiny, authority over other health occupations, and the power to shape society's beliefs about health and how it should be managed (Palmer and Short, 2000, p.48).

From strength to strength

The dominance of the biomedical model—characterised by expenditure on capital inputs including pharmaceuticals, medical technology and hospitals—was firmly established by the 1940s, along with the foundation of molecular biology which the Rockefeller Foundation had also invested in handsomely (Kay 1993). World War II played an important part in this evolution:

> [T]he war made scientific medicine a national asset and an institution, and served as a catalyst for a boom in scientific research that would further define the culture of scientific medicine. Research produced medical discoveries that lowered the military death rate and could be translated to the populace. The United States

1935). The institute's significance will be referred to throughout the thesis.

> emerged from the war as a formidable economic and military power. Scientific medicine became associated with victory, the conquest of infectious diseases, prosperity, and the leadership of the free world — biomedicine was American (Sobo and Loustaunau, 1997, p.120).

From this point on, biomedicine quickly developed a multinational, industrial and complex character (Moon, 1995, p.57). Aided by the rapidly expanding knowledge in areas such as human genetics, immunology, virology, cancer and pathology, and increasingly powerful therapeutic interventions, the biomedical model amassed increased power and prestige over successive decades. Increasingly, pharmaceutical corporations, hospital equipment companies, health insurance entities and the medical professions that characterise the medical-industrial complex, became central to this endeavour (Navarro, 1993, p.10). Over the decades, it has become an extremely powerful nexus of economic power in all developed societies, representing one of the largest areas of business activity worldwide (Evans and Stoddart, 1994, p.27). Within the United States alone, 14 per cent of gross domestic product (or US$1 in every US$7 spent) was expended on health by the mid-1990s, making it the nation's single biggest industry (Navarro, 1993, p.10; WHO, 1999, p.93).

Although the contemporary status of both biomedicine and "other" (or complementary or alternative) models of health care are examined in chapter three and in the Australian context in chapter seven, biomedicine is now the pre-eminent form of health care, particularly in Western societies. No other healing tradition holds such a position (Risse, 1993b, p.69), even though, as we discuss later, biomedicine is a subject of increasing criticism, and where there has been since the 1960s and 1970s a surge of popular consumer demand for other models of health care.

While biomedical interests were successfully embedded within the dominant structures of political and economic power by the 1930s and 1940s, the historical struggle between the different health care traditions has continued. State-sanctions and powerful private support have elevated medicine to possess a capability to reinforce or defend its interests through processes of subordination, incorporation, limitation, and exclusion (Willis 1983).

This broad domain of domination, which is explored in chapter four within a globalisation context, contrasts starkly with claims about the efficacy, and therefore

inevitability, of biomedicine. In short, biomedicine is not necessarily dominant because of its superior efficacy compared with other health approaches, which helps explain the increasing political and economic standing of many other health care traditions, with as many as one in three American and one in two Australian consumers using some form of "other" (otherwise known as "alternative") health care by the 1990s (Easthope, 1998, p.271; Moynihan, 1998, p.248). Although the social, historical and institutional background for each health care tradition differs across countries, the framework of biomedical domination mentioned above broadly applies. In Australia, some traditions, such as phrenology, have largely ceased to be practised. Others such as homeopathy are practised both as a speciality and incorporated into the practices of natural therapists, whom will often incorporate several different health traditions, including naturopathy, herbalism, acupuncture, massage therapy, and iridology amongst others (Willis, 1994, pp.57-61). Optometry, dentistry, pharmacy and osteopathy have been limited by regulation in terms of the occupational territory in which they are allowed to operate, while others like chiropractic have been excluded from government recognition within many health systems (Willis, 1983, pp.125, 162).

To illustrate these domination processes in more detail, our discussion returns to the example of midwifery. This will provide some additional and contemporary insights into the political and social factors structuring the dominance of the biomedical model.

Medical dominance: the case of midwifery

During the twentieth century, and over a short space of time, the notion of birth as a "problematic" medical procedure became dominant and marginalised midwifery. North Americans, for example, born at the beginning of the twentieth century were the first to be born in hospitals. By the 1960s, it had become recognised that midwifery in the US had failed to survive as an independent profession (Brack 1976). Although it is posited that the medicalisation of pregnancy may have occurred because medical care began to offer effective ways of reducing infant and maternal mortality, there is evidence to contradict that view. Barker (1998, p.1068), for example, noted that, "[n]ot only did the significant fall in maternal mortality in the twentieth century pre-date the widespread use of prenatal care, but even the modest fall in mortality since the 1950s has not been convincingly linked to prenatal care". Instead, the transformation in status has been linked to the way in which the medical profession strategically defined and redefined its

territory over birthing. First, doctors designated pathological and abnormal births as "theirs". Second, they proceeded to define all births as inherently pathological and abnormal, which thereby left little room for midwives (Katz Rothman, 1991, p.13). This, in turn, allowed for the redefinition or subordination of the role of the midwife from the position of competitor of the male medical practitioner to assistant.

The US Children's Bureau was the first to adopt a widespread "educational" campaign to popularise biomedical notions of pregnancy. It began in 1913 with the publication of *Prenatal Care*, a guidebook for pregnant women and stressed the importance of medical supervision throughout pregnancy. By the 1930s, the 62-page document had been distributed to over 22 million pregnant women (Barker, 1998, p.1068).

Despite their own non-medical views about their pregnancies, pregnant women were encouraged in *Prenatal Care* to see their condition as medical and themselves as patients (Barker, 1998, p.1070). They were advised to substitute their own knowledge and experience about how they should care for themselves for that of a doctor and to trust medical therapeutics and the increasing emphasis on technological monitoring over preventive remedies (Barker, 1998, p.1073). The lack of any reference to midwifery (except on the enclosed copy of a birth registration form) was consistent with advancing biomedical notions of pregnancy and childbirth. Barker (1998, p.1071) noted its use as "a deliberate attempt to remove the midwife entirely from the public discourse around and understanding of pregnancy and childbirth".

By the 1930s, a successful birth had thus become redefined in medical terms. The standards for a routine or normal birth under these terms, still used today, can be traced to a 1920 article entitled: "The Prophylactic Forceps Operation" by Joseph DeLee in the *American Journal of Obstetrics and Gynecology*. DeLee's procedure required,

> sedating the mother through labor, and giving ether for the descent of the fetus. The baby was to be removed from the unconscious mother by forceps. An incision through the skin and muscle of the perineum, called an episiotomy, was to be done before the forceps were applied. Removal of the placenta was also to be obstetrically managed rather than spontaneous. Ergot of a derivative was to be injected to cause the uterus to clamp down and prevent postpartum hemorrhage (Katz Rothman, 1991, p.17).

The widespread acceptance of this invasive and costly procedure, which replaced the mother being encouraged to push the baby out spontaneously with the assistance of a midwife, can thus be understood in terms of the professional needs of obstetricians early in the twentieth century. Obstetrics was a new and fledgling field that needed access to teaching and medical "material", to justify its costs and prestige, and to routinise patients in a centralised facility. The development of hospital services was central to that need (Katz Rothman, 1991, p.17).

However, the ability of the medical profession to convince the middle classes and in turn the poor and immigrant population that birth was "an entirely medical event, not unlike any other surgical procedure" also owed much to political process (Katz Rothman, 1991, p.18). Medical practitioners had access to the power of the state through their professional associations, which contrasted with the peripheralised position of midwives. This facilitated the spread of licensing legislation across the US that restricted midwives' sphere of activity and indeed also imposed legal sanctions against them (Brack 1976).

Obstetrics thus became a thriving medical specialty in the US, which became repeated internationally. In Australia, medical control or domination of childbirth had also been firmly established by the 1930s. This coincided with rising state interest in maternal and infant welfare from the 1910s, which originated with the passing of the Maternity Allowance Act in 1912. The Act was designed to encourage parents to have more children, make assistance at childbirth more affordable, and thus to increase the birth rate (Willis, 1983, p.111). Despite opposition by the medical profession to the £A5 bonus on the grounds that it would lead to an increase in the patronage of midwives, the proportion of births solely attended by midwives further declined by at least half again over the following decade. The bonus facilitated this by removing for many, "the financial barrier to medical attendance and a greater proportion of women preferred to have a doctor confine them than a midwife" (Willis, 1983, p.113). Although the maternal and infant mortality rates were barely affected, the ability of the medical profession to consolidate its dominance over the health system followed the US example by limiting midwifery through registration acts passed from 1915 to 1920 and through the incorporation of midwifery into nursing in 1928 (Willis, 1983, p.111, 113).

Conclusion

A key picture to emerge through this chapter is that the process of defining health is complex and inherently difficult. The implication is that any model of health represents only one of a number of ways to implement the delivery of health care. This situation is borne out by the historical evolution of biomedical dominance in the 1930s and 1940s, when biomedicine became aligned with the capitalist infrastructure. Up until that juncture, the biomedical model had no special status and was often an unpopular option amongst a range of competing health care choices.

Based on a very particular and tightly defined view of health, however, the biomedical model evolved from ancient times to emerge early in the twentieth century as the dominant model of health. Embodying considerable social authority and cultural prestige, and based on mechanistic and reductionist principles, it provides a style of care that is individually and technologically focused, cure-oriented, hospital-centred, and professionally dominated. The implications of this style of health care, especially over the last eighty or so years have been profound. With regard to the social and cultural foundations of biomedicine that were successfully established by the 1920s, Lawrence (1994, p.3) noted that:

> [M]edicine was predicated on a view of disease as a biological process, best comprehended in the laboratory and best dealt with by technical intervention. It regarded sickness, by contrast, largely as a consequence of self-neglect. This was not a medicine well equipped with resources for giving meaning to suffering it could not alleviate, providing care and technical assistance for the disadvantaged and chronically sick, seeking the wider determinants of disease or understanding health in terms other than the physiological.

The process by which biomedicine assumed the dominant mantle in health care highlights the significance of its foundation relating to the embrace of reason, as expounded by Bacon's experimental method and Cartesian dualism. This foundation paved the way for significant advances in human biological knowledge from the seventeenth century. These led to the development of powerful health care practices like vaccinations against diseases like smallpox in the eighteenth century, which coincided with growing interest in population health issues inspired by Enlightenment

philosophy. In more contemporary terms, observation, measurement and experimentation continue to fuel medical research and practice.

Yet, it is also abundantly clear that biomedicine's dominant position in the health care field reflects the long political process by which it was imbued with social and cultural significance. Indeed, the history of medicine through the eighteenth, nineteenth and twentieth centuries makes it clear that if it were not for the extensive political manoeuvring by the profession in accordance with its own visions and goals, it is extremely doubtful whether biomedicine would occupy the position it does today. This history highlights the fact that there was nothing pre-ordained or inevitable about the dominance of the biomedical model. In different historical circumstances, biomedicine may have looked very different than it does today. Furthermore, biomedicine might not have secured the backing of governments, which has built its status and influence over the past century.

Beyond arguably its demonstrable success, biomedicine thus ultimately became dominant because it created and systematically defended its position in the health care market by aligning itself with political and social elites and destabilising other traditions. The process of achieving domination involved medical practitioners advancing medical control of issues including madness and childbirth; rejecting reforms of medical knowledge associated with radical social change (for example, phrenology); supporting the social stability associated with naturalist ideology at the expense of the environmental health movement; and adhering to conservative social visions to improve the image of biomedicine to secure capital investment. Even though biomedicine had asserted its dominance over health care by the 1930s, it continued to use its political and social influence to marginalise other models of health.

Despite attaining dominance, most alternate traditions have however survived in one form or another into the twenty-first century, which indicates that the biomedical model is neither without its problems nor critics. The discussion of the thesis will now turn in the next chapter to the contemporary status of biomedicine and other health traditions.