In the United Kingdom approximately 7000 heart valve replacement operations are performed each year (1). We are fortunate in the United Kingdom to have established methods of data collection, both for numbers and early outcomes for patients undergoing valve surgery (1), and for late follow-up of patients who have undergone heart valve replacement (2). The first of these is the UK Cardiac Surgical Register, which has now evolved into the National Adult Cardiac Surgical Database (1). Since 1977, this has collected basic data with respect to heart valve replacement and early outcome. This data shows that there was a steady but small increase in the number of valve replacement operations in the United Kingdom from around 5000 procedures in 1977 to around 7000 procedures in 2000. There was a steady increase in the mean age of patients undergoing valve replacements and, in the latter half of the 1990s, this was in the range of 64–65 years. The immediate hospital mortality for commonly performed first-time valve replacements in 1999–2000 in the United Kingdom was 3.5% for aortic valve replacement, 6.7% for mitral valve replacement, and 10% for aortic and mitral valve replacement (1).

The second source of information is the UK Heart Valve Registry, which collects data on early and late outcome. It has now been in operation for 15 years (2). During this period, there have been marked increases in the numbers of patients of 70 years and older undergoing aortic and mitral valve replacement and a marked decrease in the number of younger patients undergoing mitral valve replacement (2). This reflects the decline in the incidence of rheumatic etiology in the United Kingdom as an indication for mitral valve replacement, as well as the increasing predominance of mitral valve repair as a preferred option for degenerative mitral valve disease. The overall 30-day mortality rate for heart valve replacement fell to 5.6% in 2000; this was the fourth consecutive year in which a fall was observed (2). This data must be seen as encouraging in the context of an increasingly elderly surgical population.

CURRENT PRACTICE

In the United Kingdom, in 1990, 75% of all prosthetic heart valves implanted were mechanical. In 2000, only 56% were mechanical valves (2). This steady decline is predominantly a reflection of the increasing age of the surgical population, perhaps
coupled with enhanced durability of the current range of biological prostheses. Of the mechanical valves, bileaflet pyrolytic carbon valves now dominate the market. About 92% of mechanical valves implanted are now of this design, with only small numbers of single disk and ball and cage valves (2). This has been a consistent trend in recent years, which is likely to persist unless the design of mechanical heart valves advances significantly. Forty-four percent of the valves implanted in the United Kingdom in 2000 were bioprostheses. Within this group, 55% of the valves were porcine bioprostheses and 45% were bovine pericardial prostheses (2). Overall, 84% of bioprosthetic valves were stented and 16% were stentless. Around 80 to 100 homograft valves (1%) are implanted in the United Kingdom each year. Eighty-eight percent of bioprosthetic valves and 64% of mechanical valves were implanted in the aortic position. This presumably reflects the reduced durability and the perceived limited benefits of bioprostheses in the mitral position. In comparison to the population in the United States undergoing heart valve replacement, it remains likely that European patients will remain somewhat younger but, contrary to the 70/30 split between mechanical and bioprostheses outside the United States described in Chapter 19, the contemporary data from the United Kingdom suggests that the 56/44 split is now very close to that observed across the Atlantic.

The overall steady but modest increase in the incidence of heart valve replacement over 15 years does conceal quite major changes in the patient population. The principal change has been the decline in the rheumatic valvular heart disease population leading to fewer young patients needing double and triple valve surgery. At the same time, more older people have needed single valve replacements for degenerative or ischemic etiologies. In the aortic position, the patients are increasingly aged and, as a consequence, bioprostheses predominate (2). In the mitral position there remain concerns about the durability of biological valves, and avoidance of warfarin anticoagulation is often not possible in the presence of atrial fibrillation. The implantation of mechanical valves, therefore, tends to predominate.

With respect to selection of particular valve prostheses, obviously the mechanical valve manufacturers each claim superiority with respect to hemodynamic performance and thromboembolic risk. On occasion there are anecdotal reports of poor performance or clusters of valve thromboses (3). The single randomized prospective trial of two bileaflet prostheses has found no difference in outcome at 5 years, and overall intuitively it seems unlikely that there will be much difference in clinical outcome (4). In the National Health Service, cost is a major issue and, to this end, the United Kingdom is currently in the process of agreeing on a national pricing structure for heart valves in an attempt to purchase heart valve replacements at a lower cost.

The use of bioprostheses has been stimulated both by the increasing age of the patients and the recognition that modern stented bovine pericardial valves are demonstrating excellent durability, good hemodynamics, and ease of implantation (5). The use of stentless bioprostheses, homografts, and pulmonary autograft operations is likely to remain limited by the increased technical complexity of the operative procedure and doubts about whether the more complete left ventricular regression and improved hemodynamics observed with stentless valves does actually translate into clinical benefit.