Prior to the 1970s, a diagnosis of a hematologic malignancy was a death sentence. However, advances in modern medicine have seen hematopoietic stem cell transplantation (HSCT) develop to be the only potentially curative therapy available for many patients facing an otherwise fatal disease (Kasberg, Brister, & Barnard, 2011). Allogeneic hematopoietic stem cell transplantation (alloHSCT) is the use of a human donor’s hematopoietic progenitor cells to repopulate bone marrow following a conditioning regime of high-dose chemotherapy and often radiation (Wingard, 2007). The therapy is used to treat a range of malignant and nonmalignant hematologic disorders, including leukemia, lymphoma, myeloma, aplastic anemia, and myelodysplasia (Center for International Blood and Marrow Transplant Research [CIBMTR], 2011). About 25,000 alloHSCTs are performed globally each year, with about 500 of them in Australia and New Zealand (Australasian Bone Marrow Transplant Recipient Registry [ABMTRR], 2010; National Marrow Donor Program, 2011). Those figures continue to rise as developments are made in tissue typing, supportive care, condition regimes, and complication control (Wingard, 2007). Data from Australia report survival rates of 11%–71% 10 years post-alloHSCT (ABMTRR, 2010).

Despite significant advances, relapse remains the most common cause of modern medicine and death following alloHSCT (Barrett & Battiwalla, 2010; CIBMTR, 2011; Maziarz & Slater, 2011; Pavletic et al., 2010). International rates of relapse-associated mortality range from 33%–47% following alloHSCT (CIBMTR, 2011). Post-relapse treatment is complicated by the patient’s decreased ability to withstand additional cytotoxic or immune therapy because of previous damage from chemotherapy, the transplantation conditioning regime, complications, or graft-versus-host disease (Barrett & Battiwalla, 2010). Treatment post-relapse is individualized, depending on various patient characteristics, time...