Introduction
The optimistic prognosis for many children with cancer living in developed countries has been well documented and the extraordinary progress made in the cure of children with cancer over the past 30 – 40 years must be one of the most remarkable achievements for cancer care in the 20th century. Can this be sustained, and if so, how?

In a letter published in 2001, Parker and Craft commented on speculation that the improvement seen in childhood cancer mortality since the 1970s could, if it continued to show the same downward trend, be extrapolated to zero within 20 years [1]. In fact, the authors argued that this was unlikely although they also suggested that further improvements in survival would still be achieved.

Paediatric oncology can be justifiably proud of its heritage of collaboration and its commitment to clinical trials and to care in multidisciplinary teams. However, an unacceptable number of children still die of their disease and we are beginning to see that certainty about cure may take longer to be achieved than it once did. Perhaps some improvements in treatment merely prolong survival without the guarantee that all those who survive 5 years will ultimately be cured [2]. Furthermore, the attention now shown to the needs of long term survivors also illustrates what price some young people pay for their survival.

Where then are the challenges for the future of paediatric oncology, and how will they be met?

Improving cure rates
It is generally estimated that, in developed countries, at least 75% of all children newly diagnosed with cancer will be cured [3]. This average figure incorporates a wide range of outcomes and there are certain diagnoses which now achieve much higher cure rates, including, for example, standard risk acute lymphoblastic leukaemia, Wilms’ tumour and Hodgkin’s disease. In this context, the focus for the future should be on reducing the risks (short and long term) associated with therapy. Achieving this objective requires that attempts to reduce treatment intensity are evaluated in randomised clinical trials. This itself creates a problem as the design and implementation of a clinical trial where the end point is ‘equivalence’ in terms of survival but achieved by less therapy, poses significant statistical challenges about study design. Furthermore, in Europe, recent changes in the regulatory framework have disproportionately damaged the initiation and management of clinical trials in children [4].

For other diagnoses however, for example some brain tumours, metastatic neuroblastoma and sarcoma, current survival rates remain unacceptably low and more effective treatments are required [5]. The suggestion that ‘more should be better’ may not necessarily apply and the expectation that better results can be achieved by intensifying current approaches to treatment has not always achieved the hoped for benefit. It is here that the development of novel forms of therapy is required and paediatric oncologists may now look enviously at the scale of development of new small molecule, biologically designed drugs which are entering adult cancer practice. A lack of priority in developing novel therapies for childhood cancer is apparent from the pharmaceutical sector because of the low potential for commercial return from the investment required.

Equality in prospects for cure
Despite the high cure rates achieved for patients in developed countries, it is clear that not all children worldwide have equal access to the benefits of modern therapy. This disadvantage is most obvious in the developing world [6] but there are important variations in survival rate even within Europe [7]. Reasons for this vary and although there may be differences in diagnostic accuracy and in the adequacy of cancer registration in certain geographical regions, much of the difference is likely to be real and reflect differences in the presentation of disease and in its pattern of care. Whilst referral to a specialist centre and treatment within a clinical trial are considered best practice in developed countries, the challenge is to ensure that children in countries with less well developed health care systems can benefit in similar ways. Remarkable results have been reported from international programmes which link specialist centres in developed countries with those established in low income countries [8] and it is clear that much can be achieved by addressing basic issues such as staff training and clinical service organisation, and by ensuring a secure supply of standard chemotherapeutic agents. Similar approaches may also benefit care in some of the newer countries of the expanding European Union.

Internationally there are also important differences in patterns of patient flow towards specialist centres and considerable variations in the extent to which children can be treated close to their home. In the United Kingdom, the National Institute for Health and Clinical Excellence (NICE) has published guidelines for improving outcomes in children and young people with cancer [9]. Whilst promoting the central role of specialist units (designated as Principal Treatment Centres), the guidance also incorporates an important philosophy about treatment close to home by stating that “the aim is for safe and effective services as locally as possible, not local services as safely as possible”. This approach endorses the concept of ‘shared care’, a model of care by which all patients are referred to specialist centres for diagnosis and treatment planning but at some point after that may be returned to their local health care community for some / all of their subsequent treatment. Achieving this depends on the complexity of the treatment required and on the availability of appropriately skilled and resourced local units. It is hoped that this approach will provide children, young people and their families with optimal treatment without unnecessarily damaging family integrity, educational opportunity and peer social contact. This needs to be further evaluated and it is a model which may merit wider consideration elsewhere [10].

Teenagers and young adults
It has been recognised for sometime that the outlook for older teenagers and young adults (TYA) with cancer is less favourable than that seen for younger children. This has precipitated a debate about optimal patterns of care for this age group [11] and, particularly in the United Kingdom, the development of specialist units for TYA patients. These units appear to best meet the needs of the patients [12] but the wider introduction of similar facilities will require careful evaluation and appropriate staff training. It is not yet known whether
the development of specialist TYA cancer units will deliver improved cure rates but this will be unlikely without a parallel commitment to clinical trial development for this age group. This has been identified as a priority issue [13] but few, if any, countries or collaborative clinical trial groups have yet established a comprehensive portfolio of studies for TYA patients with cancer.

Survivorship
It is estimated that there are already almost 300,000 survivors of childhood cancer alive in the United States and, with current survival rates, this population will grow. Similar statistics apply across European countries with established paediatric cancer services. Many of these individuals are at risk of long term consequences of their disease and its treatment and, compared with their siblings, are 10 times more likely to develop a serious disease in adult life, while their risk of premature morbidity and mortality does not appear to plateau [14]. This creates a significant challenge for the design and implementation of appropriate surveillance programmes and places an important additional demand on health care resources. It is likely that most survivors are not receiving appropriate, risk-based care and that most health care systems have yet to establish optimal programmes of care for all survivors [15].

How can nurses help to meet these challenges?
Paediatric oncology nursing is an area of specialised practise. It has been argued that the protocol driven approach to treatment, and the long term commitment made to an individual patient and his / her family, make paediatric oncology an ideal setting for the development of specialist nursing skills [16]. Advanced nursing roles have been explored in both acute care and, in particular, in the long term follow up of survivors [17]. In many centres, nurses already provide much of the care delivered to children in a community setting and are therefore often best placed to act as a coordinator for the wider aspects of care. The formal concept of a ‘key worker’ is defined in the UK’s improving outcomes guidance [9] and this role is most likely to be fulfilled by a senior and specialised nurse within the oncology team. These roles however largely remain in the existing province of the nurse and it is important to look further to see how nursing research can further progress care and outcome for children and young people with cancer.

Nurses are central to the achievement of higher standards of care and to the delivery of best outcomes and high quality patient / family experience. This can only be achieved if nurses actively engage in, and disseminate the results of, research. One important way to achieve this goal will be by focusing efforts on the application of best evidence to clinical practice. Despite some progress in recent years [18], there is still much that needs to be done to maximise the nursing contribution to research and development. Perhaps most obviously, nursing research should play a leading role in understanding and optimising how symptoms are best managed and in ensuring that the experience of children and young people and their families is enhanced by better care. Such efforts also need to be integrated into the work of the existing international collaborative clinical trial groups [19].

Conclusion
There is much to be gained if the achievements of the past 30 years can be used as a basis for further improvement. Nurses are central to these efforts. They can and should play important and better defined roles in leading aspects of clinical care and in undertaking clinical research.

Contact details
Institute of Child Life and Health, 6th Floor, Education Centre, Upper Maudlin Street, Bristol BS2 8AE, United Kingdom. Email: m.stevens@bristol.ac.uk

References