

An integrated child health service

The new NHS offers the opportunity

The reorganisation of the NHS together with the new contract for general practice present an opportunity to introduce improvements that at other times might be seen as too radical. One such improvement is the integration of acute and community paediatric services. Integration has been discussed for many years and at the 1989 annual conference of the National Association for the Welfare of Children in Hospital was supported by Baroness Hooper, parliamentary secretary at the Department of Health: "One of the key features of high quality children's care is the integration of hospital and community services, to secure continuity through child health surveillance and necessary hospital admission and discharge back to the community."

Some districts have already achieved this goal or are moving towards it, but in many there is a lack of commitment or even frank hostility. Paediatricians who recognise the potential benefits of integration must be prepared to take a more active part in management and to negotiate the necessary changes with colleagues, medical and non-medical, who do not necessarily understand the complexity of health care delivery for children. In particular they should try to prevent or remove management structures that perpetuate the distinction between hospital and community.

Integration does not bring about miraculous changes overnight. It does, however, create an improved team identity and a sense of direction for all professionals dealing with children. Staff feel more motivated to seek innovative approaches to health care, which can improve the quality and continuity of the service while ensuring the optimum use of resources. For example, there are obvious advantages in providing health care for children in their own homes.¹ Community paediatric nurses can offer home based care for a wide variety of conditions, from intravenous antibiotic treatment for children with cystic fibrosis² to terminal care for a child with progressive neurological disease. The nursing service is also an essential adjunct to day surgery, and an increasing emphasis on community based paediatric care is central to Project 2000.

Clinical audit will prompt paediatricians and general practitioners to consider whether some children who are admitted to hospital could have been managed at home or discharged sooner. Admission criteria and the length of stay vary greatly among districts, even for common conditions like asthma.³ The development of service agreements between purchaser and provider should highlight the need for cooperation and

flexibility in the use of beds and community resources.

Standards of care for children depend not only on clinical excellence but also on the extent to which information is shared with parents and the other professionals concerned in the child's daily life. Advances in information technology will soon enable hospital and community staff to maintain and share up to date records, not only of episodes of illness, but also of preventive matters such as immunisation, accidents, and child protection. At present, community doctors perform the function of liaising between hospital and community based professionals, but this is seldom the most efficient or effective means of transferring information. Much better for all staff to recognise their personal responsibility for communicating directly with people such as schoolteachers, social workers, and voluntary workers and for using their shared database of information for pursuing preventive paediatrics. Individual special interests would, of course, be maintained but not on the basis that they were "hospital" or "community" interests.

The new contract for general practitioners encourages them to take over child health surveillance, which, along with health promotion, is a natural part of primary care.⁴ A health visiting network is an essential component of primary care services for children. The integrated department of child health would accept a responsibility to guide and support local primary care teams. In some districts, for example, consultants hold clinics in health centres, an arrangement that is popular with staff and patients. Community child health doctors who are members of an integrated department will be able to contribute their skills in child development, behavioural problems, and child abuse.

Maintaining separate management hierarchies and budgets for hospital and community child health services is not the most rational way of achieving integration, though integration is not impossible with such structures. Some managers, however, want to stimulate competition between hospital and community. This certainly would be incompatible with optimal child care and would lead to inflated costs rather than rationalisation.

Senior paediatricians have long had a vision of an integrated service for children. In 1976 the Court report recommended the integration of child health services, the development of community paediatric nursing, and the greater participation of general practitioners in children's primary care.⁵ Now, almost 15 years later, the opportunity to implement these far

sighted proposals must not be squandered through professional inertia, short term financial expediency, or lack of managerial imagination.

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Cultured composite skin grafts for burns

Banked allografts offer a prospect of immediate wound coverage

Each year more than 10 000 people need admission to hospital in England and Wales for burns.¹ Immediate excision and grafting in patients with extensive burns is thought to improve survival—a hypothesis supported by retrospective studies of both children² and adults,³ although not confirmed by a prospective study.⁴ Early grafting would be expected also to reduce pain and the morbidity associated with sepsis, fluid loss, and scarring.

What methods of grafting are available? The commonest technique for resurfacing full thickness skin defects is with split thickness autografts, which may be expanded fourfold by meshing⁵ or 20-fold by dicing.⁶ Unfortunately, patients with extensive burns may have few donor sites, but meshed skin expanded sixfold may be used by overlaying it with allograft⁷ (which if used alone does not survive in the long term, even if the recipient has been immunosuppressed⁸ or the antigenicity of the donor skin reduced⁹).

Fifteen years ago the problem of lack of graftable skin seemed close to solution with the description of a reliable technique for culturing large numbers of keratinocytes in vitro.¹⁰ The first reports of the use of these cultured autologous keratinocytes were encouraging,¹¹ with expansions of up to 10 000-fold.¹² The most obvious disadvantage was the three week interval between taking the donor skin sample and getting large sheets of cultured keratinocytes for grafting. There is some evidence that cultured keratinocytes have attenuated antigenicity,¹³ suggesting that cultured allogeneic keratinocytes might be used. These cells survive for less than a week, however, and may be acting as no more than elaborate dressings—albeit also secreting growth factors.¹⁴ Keratinocyte grafts have been found to have several persistent problems: blistering and contracture due to lack of dermis¹⁵ and an abnormal ultrastructure of the dermo-epidermal junction within seven months of grafting.¹⁶ These have limited their clinical application and provided further stimulus to the production of skin substitutes with a dermal component.

Cadaver skin allografts have given excellent results.^{17 18} When these are used the dermis survives and the epidermis may later be replaced with cultured autologous keratinocytes.

Unfortunately the demand for allograft skin outstrips supply in the United States by a factor of five to seven,¹⁹ and there is a real risk of transmission of infection. In an effort to overcome these problems a composite artificial skin substitute has been developed, consisting of a dermal component of bovine collagen and shark chondroitin-6-sulphate overlaid with a sheet of Silastic,²⁰ which acts as a temporary epidermal layer but must later be replaced by a thin split skin autograft or cultured keratinocyte sheets.²¹ Use of this composite reduces fluid loss and contracture, and follow up at one year has shown results equivalent to those from split thickness autografts with respect to hypertrophic scarring and patient satisfaction, although graft take was less satisfactory.²² A variation of the technique uses cultured fibroblasts incorporated into the collagen-glycosaminoglycan membrane to emulate a normal dermis more closely.²³ The Silastic dermal composite has the disadvantage of requiring two procedures to achieve epithelial cover.

The latest stage in this evolutionary process is the use of composite cultured skin grafts consisting of cultured keratinocytes on a collagen-fibroblast dermal equivalent. These have been evaluated in animals²⁴ and, more recently, in patients with burns—but poor results were obtained owing to graft lysis.²⁵ Further studies were more promising,²⁶ although the use of autologous keratinocytes still resulted in a delay of a week and an expansion of only 20-fold. Allogeneic fibroblasts and keratinocytes should overcome these problems and were evaluated in patients undergoing full thickness excision of tattoos.²⁷ The grafts were not acutely rejected, and although the allograft cells may gradually be replaced by those of the host,²⁸ this should not pose a problem clinically unless there is ulceration and loss of the graft. After eight months the appearance of the composite grafts applied to burns was superior to that obtained with meshed autologous split thickness skin, and neither contractures nor hypertrophic scarring occurred.²⁶

Several problems still need to be solved if cultured composite skin grafts are to be used widely. Many groups have reported poor handling characteristics and dermo-epidermal separation. A basement membrane develops in vitro only after prolonged culture,²⁹ although hemidesmosomes form within six days if human type IV collagen is included in the dermal equivalent.³⁰ Moreover, the take of the graft may be very variable in patients with burns.^{25 26} Another important problem is the lack of an ideal dressing for the tenuously adherent epidermis. Clearly, the technique requires further development, but with improvements in the structure of the dermal component and inducing formation of the basement membrane in vitro the stage is set for the production of a true skin equivalent. The incorporation of skin adnexae remains an elusive dream, but the aim of providing banked skin allograft in unlimited quantities for the severely burnt patient should be attainable.

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