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The history of paediatric surgery in the United Kingdom and the influence of the national health service on its development

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Abstract Details of the modern history of paediatric surgery in the United Kingdom with particular emphasis on the 3 main training centres in England in the 1960s to 1970s are discussed. The genesis of the National Health Service and of the British Association of Paediatric Surgeons and their influence on the establishment and siting of regional centres, education and training, and centralization of rare conditions is highlighted.

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The appointment of Denis Browne as full-time Consultant Paediatric Surgeon to The Hospital for Sick Children, Great Ormond Street (GOS), London in 1928 marked the inception of Paediatric Surgery in England. Prior to 1928, and for some decades after, much of the surgery of childhood was practiced by general surgeons with an interest in paediatric surgery.

Denis Browne (D.B) (1892-1967) (Fig. 1) was the father of Paediatric surgery in England and was the UK equivalent of William Ladd and Robert Gross. He was born and educated in Australia and served with the Australian Army Medical Corps, as Captain, in Gallipoli in the First World War. He was a giant of a man, who excelled at sport including playing tennis at Wimbledon. He was an innovative surgeon whose interests covered a wide area including cleft lip and palate, tonsillectomy, talipes and congenital dislocation of the hip, hypospadias, undescended testes and neonatal surgery. According to Innes Williams, a pioneer of paediatric urological surgery, Denis Browne was “a remarkable character, opinionated, provocative and original, prepared to study problems afresh without regard to previous prejudice, enjoying controversy but jealous of his own ideas” [1]. He devised many instruments, including a needle holder and an abdominal ring retractor which many of his trainees used throughout their careers.

DB trained a generation of Paediatric Surgeons many of whom become leaders in the field, to name a few: Harold Nixon, David Waterston, Peter Rickham, Barry O’Donnell, John Scott, and Joe Cohen. Denis Browne was Founder Member of the British Association of Paediatric Surgeons.
(BAPS) and its first President. The Denis Browne Gold Medal, established in his memory, is awarded annually for outstanding contribution to the Specialty.

Denis Browne was succeeded by Andrew Wilkinson, who became the first Nuffield Professor of Paediatric Surgery at the University of London, in 1957. The Nuffield Chair of Paediatric Surgery was one of a number of chairs endowed by Lord Nuffield, founder of Morris Motors. Most of the Nuffield Professorships are based at Oxford University but there are 2 at The Institute of Child Health, London, one each in Child Health and Paediatric Surgery. The 2 other Consultant Paediatric Surgeons at GOS at that time were HH Nixon and David Waterston, whose expertise included cardiac surgery as well as oesophageal atresia and oesophageal replacement.

I was fortunate in receiving part of my training with Harold Nixon (Fig. 2), a highly intelligent and innovative surgeon who made major contributions to anorectal malformations, Hirschsprung’s Disease, and neonatal intestinal obstruction. In 1979, I was appointed as the second Nuffield Professor of Paediatric Surgery, Institute of Child Health and University College, London, and inherited the large oesophageal practice from Waterston as well as having to unite a dysfunctional department and re-establish its international standing. I was joined by Ed Kiely in 1984, David Drake in 1988 and Agostino Pierro in 1994. Agostino succeeded me as Nuffield Professor in 2004. The close working relationship, the openness of discussion of problem cases and critical appraisal of complications and the ability of being able to call for help in difficult situations has characterised the department and established it as a model for other units around the world.

The Hospital for Sick Children, renamed subsequently as Great Ormond Street Hospital for Sick Children NHS Trust, was founded in 1852 by Dr Charles West whose 3 principal aspirations were (1) the provision of health care in all fields to the children of the poor, (2) the encouragement of clinical research in paediatrics, and (3) the training of paediatric nurses. West was of the opinion at the time that “there were no surgical problems which demanded special skill or study”; thus, no surgical appointment was made then. Edmund Owens was, however, appointed to the staff as a surgeon in 1877. He performed tracheostomies on children with croup, drained empyema, and treated intussusception by “kneading” the abdomen under chloroform anaesthesia along with the injection of air or water per rectum.

Initially, the hospital was regarded as a suspect innovation but West was fortunate in having as a friend, the great Victorian novelist, Charles Dickens, who strongly promoted the hospital personally and with his article “The Drooping Buds” published in 1852. Funding for new developments was enhanced by Sir James Barry, who endowed the

![Fig. 1 Denis Browne.](image1)

![Fig. 2 H.H. Nixon.](image2)
copyright income in perpetuity from his classic novel, Peter Pan, to the hospital. The hospital was badly damaged in the Blitz when on September 11, 1942, it was hit by 5 German bombs. A more recent highly successful fund-raising campaign was the Wishing Well Appeal, supported by Prince Charles and Princess Diana. In 1989 Diana, Princess of Wales, became President of the Hospital. The construction of the new development, the Variety Club Building, involved moving the hospital Chapel (Fig. 3), a Grade 1 listed building, 20 meters to a new site within the redevelopment.

Peter Paul Rickham (Fig. 4) joined Isabella Forshall in Liverpool in 1952 at the Alder Hey Children’s Hospital, which was founded in 1914 and is one of the largest children’s hospitals in Europe. Miss Forshall had pioneered the development of Paediatric Surgery in Liverpool in 1947. Peter Rickham was a commanding force who did not tolerate fools kindly but for those young surgeons whom he liked he would go to extraordinary lengths to promote their careers. He established the first Neonatal Surgical Intensive Care Unit in the world at Alder Hey in 1953. This unit became the benchmark for similar units around the world and immediately resulted in an improvement in the survival of newborn infants undergoing surgery from 22% to 74%.

A major shortcoming of the Unit was that parents were only allowed to view their newborn babies via a video link until the infant was fit enough to be transferred to a regular ward. Peter researched the metabolic response of the newborn infant to surgery, devised the Rickham reservoir for hydrocephalus shunting and edited Neonatal Surgery, published in 1969, which was for many years the standard text for the specialty throughout the world.

He was a potent force in the founding of BAPS and was President in 1966-1968. Peter was the recipient of numerous awards including the Denis Browne Gold Medal, Chevalier Legion d’Honneur, Commander Cross (Germany), and Ladd Medal of the Surgical Section of the American Academy of Pediatrics, which I proudly received on his behalf in 2002 when he was unable to attend owing to a stroke.

I trained with Peter Rickham in 1970, and he became a close friend, my mentor and ardent supporter. Peter left Liverpool in 1971 to take up the appointment of Professor of Pediatric Surgery at the University Children’s Hospital in Zurich where he remained until retirement in 1983. He was succeeded by James Lister in 1974, who was subsequently appointed the second professor of paediatric surgery in England, and by David Lloyd in 1988.

Robert Zachary (Fig. 5) was appointed Consultant Paediatric Surgeon to The Children’s Hospital, Sheffield in 1948. He had a severe congenital kyphoscoliosis and was turned down from employment by the Royal Insurance Company as it was considered that he would be unlikely to withstand the “hectic pace in an insurance office for the full course of 40 years.” He initially studied pharmacy before qualifying in medicine at Leeds with honours in medicine and surgery. He trained in paediatric surgery at The Children’s Hospital, Boston. He was the only one amongst

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**Fig. 3** Chapel at Great Ormond Street Hospital.

**Fig. 4** Peter Rickham.
his peers in England who was not trained by Denis Browne. He was a superb technical surgeon and a champion of the surgery of the newborn. His major contribution was in spina bifida, the management of which Sheffield became the leading international centre. The Children’s Hospital, Sheffield was then the main tertiary referral centre for the whole of mid-England. Tuesday was “combined clinic” day with an average of 50 children with spina bifida scheduled to see the Paediatric Surgeons (Zachary and Lister/Spitz), the Paediatrician (Lorber), Orthopaedic Surgeon (Sharard), and the orthotists and physiotherapists.

Lorber proposed 5 criteria based on the degree of expected neurological impairment for selection of treatment while Zachary firmly believed that all infants with spina bifida should be actively treated. Zachary was one of the founder members of BAPS and its President in 1961-1963 as well as founder and president of The Association of Spina Bifida and Hydrocephalus. He was joined in 1963 by James Lister, who in 1974, was appointed to the Chair in Liverpool. At the instigation of Peter Rickham, I succeeded Lister in Sheffield and remained there from 1974 to 1979 before leaving for Great Ormond Street.

In Manchester, Ambrose Jolleys was appointed Consultant Paediatric Surgeon in 1952. His main interests were cleft lip and palate and neonatal surgery. He was joined in 1963 by Joe Cohen whose main interest was urology. The service in Manchester suffered from being split between 3 sites, making life extremely difficult. The dream of a single tertiary referral Children’s Hospital has only recently been realised.

John Scott established a unit in Newcastle, Sean Corkery the unit in Birmingham and Leela Kapila in Nottingham. All three were Presidents of BAPS and Denis Browne Medal holders.

The BAPS was established in 1953 [2]. Denis Browne was elected President and the committee comprised JJ Mason Brown, HH Nixon, DJ Waterston, and PP Rickham. Actively involved in the establishment of the Association were Bob Zachary, David Vervat (Rotterdam), and Theodore Ehrenpreis (Stockholm). The stated primary aim of the association was to “set a standard of care of paediatric surgical practice.” The Denis Browne Gold Medal clearly states that “The aim of paediatric surgery is to set a standard not to seek a monopoly.” It is now accepted that all neonatal and complex surgery of childhood should be managed by paediatric surgeons.

BAPS was the first truly international association of paediatric surgery and even to this day has more “overseas members” than members from the United Kingdom. In addition to organising the Annual International Meeting, it has a major commitment for training and is closely affiliated with the Royal Colleges and with the Department of Health. In 1963, Paediatric Surgery was officially recognised by the Royal Colleges of Surgery as a separate specialty.

The inauguration of the National health Service (NHS) in 1948, more of which later, together with the formation of BAPS were the stimuli for the establishment of other paediatric surgical units throughout England and Wales (Fig. 6). All these units are in regional and teaching hospitals.

Much has been written previously on the development of paediatric surgery in Scotland [3,4].

In keeping with the practice in many countries, surgeons appointed to Children’s Hospitals in Scotland before the end of the Second World War, were primarily general surgeons with an interest in paediatric surgery. Notable among them was Harold Styles, who performed a pyloromyotomy on an infant in 1911, 1 year before Ramstedt. Unfortunately, the child died on the fourth postoperative day and Styles did not report the case. Others included Norman Dott who classified malrotation and subsequently went on to a distinguished career in neurosurgery and Ian Aird who later separated several sets of conjoined twins at the Royal Postgraduate Medical School in Hammersmith, London. The Scottish Surgical Paediatric Society was established in 1948. The main protagonists were JJ Mason Brown from Edinburgh and Wallace Dennison from Glasgow with strong support from Sir John Fraser and Gertrude Herzfeld (the first woman consultant paediatric surgeon in the United Kingdom, appointed in 1925).
The Royal Hospital for Sick Children, Edinburgh opened in 1860. JJ Mason Brown was appointed in 1936. He was concurrently president of the Royal College of Surgeons of Edinburgh and of BAPS but died while still in office. FH Robarts was the third Scottish paediatric surgeon to be elected to the presidency of BAPS and currently that post is occupied by Gordon MacKinlay. Sir John Bruce in his Mason Brown Memorial lecture in 1974 stated “I believe that much (children’s surgery) could and should be carried out by general surgeons. After the age of 3 years, paediatric surgery is the surgery of young adults.” He did, however, retrieve the situation by saying that paediatric surgeons must “reign supreme in the field of neonatal surgery.”

The Royal Hospital for Sick Children, Glasgow was founded in 1882 in Scott Street. The restrictions on the site and limited number of beds rapidly became a problem and a new Children’s Hospital was opened in Yorkhill in 1914. Surgeons appointed to the hospital in the early days were mainly “dispensary surgeons” who used their time at the Children’s Hospital to boost their CVs in anticipation of more prestigious appointments in adult surgery. Wallace Dennison was appointed in 1936 and he stayed there for the remainder of his career. Dennison, John Bentley, Dan Young, and Peter Raine all became Presidents of BAPS. Young and Raine had each previously served as Honorary Secretary of the Association and Young was Editor for the United Kingdom for the Journal of Pediatric Surgery for many years.

The only centre for paediatric surgery in Northern Ireland is in Belfast. Its establishment was largely owing to the efforts of Sir Ian Fraser, Professor of Surgery and past President of the Royal College of Surgeons in Ireland, who was appointed to the Royal Belfast Hospital for Sick Children in 1927. The first specialist paediatric surgeon in Northern Ireland was Brian Smyth in 1959. In 1977, Victor Boston was appointed Consultant paediatric surgeon to the RBHSC, Belfast City Hospital and Ulster Hospital. Victor was President of BAPS (2005-2006) and Editor for the United Kingdom for the Journal of Pediatric Surgery.

Although not part of the United Kingdom, Dublin, Ireland, forms an integral part of the UK training scheme. Paediatric Surgery is spread over a number of hospitals in Dublin. In 1956, Our Lady’s Hospital for Sick Children was inaugurated and Barry O’Donnell appointed as the full-time paediatric surgeon. He was joined by Eddie Guiney in 1966, Ray Fitzgerald in 1979 and Prem Puri, who also became Director of the Children’s Research Centre, in 1991. This latter appointment has been an outstanding success and has led to the publication of a vast number of papers in basic and clinical research covering a wide variety of conditions including the “String” procedure for vesicoureteric reflux. Prem is currently President of the European Pediatric Surgical Association and of the World Federation of Pediatric Surgical Associations and Editor of Pediatric Surgery International. Both he and Barry have been recipients of the Denis Browne Gold Medal.

1. The National Health Service

The genesis of the NHS stretches back to the mid 19th century when it was believed that access to health care was part of the structure of a civilized society. In the First World War, the army medical services showed the benefits of organisation and transport. In the Second World War, an emergency medical service was instantly created as the country came under command and control. This provided evidence of what could be achieved.

Lord Beveridge in 1942 envisaged a National Health Service as “essential to a satisfactory system of social security.” However, it was Aneurin Bevan (Labour) in 1945, who worked out the details and command structure. Central to the concept was that medical care under the NHS would be rendered free to the consumer at the point of consumption. The country around that time was under considerable stress—1947 was a testing year, the coldest winter for many years followed by the heaviest flooding for over 50 years. The country was in the midst of a financial and housing crisis, and food rationing was even worse than during the war.

Bevan opted for a salary for the doctors rather than fee-for-services, thereby eliminating unnecessary treatment. In addition, he conceded the right to private practice and agreed to additional payments for merit. It is said that he
achieved agreement “by stuffing the doctor’s mouth with gold.” The NHS was to be financed almost 100% from central taxation—the rich paying more than the poor.

On the July 5, 1948, the NHS was born and on that day 1143 voluntary hospitals with 90,000 beds and 1,545 municipal hospitals with 390,000 beds were absorbed into the NHS BUT there were no extra doctors or nurses. Hospital Services were divided into Regional and Teaching Hospitals with national responsibility and District General Hospitals serving the local population of around 125,000. Paediatric Surgical Units have always been based in the larger Regional hospitals. The NHS has undergone numerous reviews and changes under successive governments. As for paediatrics in 1948, babies were under the care of obstetricians and parental visits restricted to one hour on Saturday and Sunday only. The Platt report in 1959 on the emotional needs of children in hospital introduced open access to parents. The Court report (1976) recognised that “children have special health care needs because they are physically and emotionally different from adults” [5].

In the 1980s, it became clear that the NHS would never get the resources necessary to provide unlimited access to the latest medical treatments especially in the context of an aging population. Paediatric surgery in the United Kingdom does not appear to have suffered unduly from the financial restrictions. Although private health insurance is available, only a small percentage of the child population is covered. This is partly owing to the high standard of care generally available to children and, aside from employer health schemes; few parents have attained sufficient resources to purchase insurance for their children. Neonates and children with complex conditions have always had access to specialist units even if they may have been required to travel long distances to gain admission to a unit with a vacant cot. There is no evidence that transport over long distances is detrimental to the condition of the infant/child provided adequate facilities are in place. This has been achieved by the CATS (Children’s Acute Transport Service) which comprise a dedicated team to go out to the referral hospital, stabilise the patient locally and then transport the patient back to the base hospital in a fully equipped ambulance with full intensive care facilities.

The NHS, in collaboration with the BAPS, has been instrumental in strategically siting paediatric surgery only in regional and teaching hospitals serving a population of around 2.5 million. This provides a critical case load essential for the maintenance of clinical skills and for teaching and research. It has also been instrumental in directing services of rare conditions to a limited number of centres with the expectation that by concentrating expertise clinical outcome would improve. This has been proven dramatically successful in biliary atresia where prior to 1995, 15 centres were undertaking surgery for this condition. The 5-year native liver survival in the 2 centres with “high” volume was 61% compared with 14% in the 13 centres operating on less than 5 cases per year. This led to legislation in 1995 that in the future only 3 centres would be designated to carry out surgery on biliary atresia. The results for biliary atresia in the 3 centres since their designation as Special Centres continues to be highly satisfactory with an 89% overall survival and a 5-year survival of 51% with the native liver [6]. Recently, 7 other paediatric surgical conditions have been allocated supraregional status. These are bladder extrophy, extracorporeal membrane oxygenation, paediatric cardiology, paediatric oncology, craniofacial deformities, spinal deformities, cleft lip and palate, and the management of hyperinsulinaemic hypoglycaemia. Resection of major liver tumours is currently under discussion. The common theme for all is volume, specialisation and the team approach.

Teaching and training is an essential component of the service under the NHS and a major commitment of the BAPS Training and Education Committee. BAPS recommends that all trainees must be exposed to training in more than one specialist centre. To avoid major disruption involved with relocation, training centres have been grouped into 6 consortia in which trainees will spend their entire 6 years. Unfortunately, this has removed the ability of centres of excellence from selecting the brightest candidates and having to accept trainees from the rotation in the particular consortium.

Training has undergone a massive upheaval in recent years, first with the Calman recommendations and more recently with the implementation of the European Working Time Directive. In the 1960s, when I trained, a full training in General Surgery was a requirement before entering Paediatric Surgery. In the United Kingdom, this comprised a minimum of 2 years as a registrar followed by competitive entry to a Senior Registrar post which virtually guaranteed progress to a Consultant appointment but after a variable time which could extend for many years. Calman proposed shortening the training period, eliminating the competitive entry to the Senior Registrar level and replacing it with a run-through training of 6 years (“full” training in General Surgery had already been downgraded to 2-3 years as a junior trainee). The current training programme is a variation on this theme and includes an extended period of training in a sub-specialty.

The European Working Time Directive (EWTD) promulgated in Brussels proposed reducing the permitted hours of work to 65, to 56, and finally in 2009 to 48 hours per week [7]. The EWTD was designed for truck drivers in the European community and not for professionals and particularly not for surgeons. Patients were never considered. England has rigidly applied the Directive whereas other European countries have been much more lax in enforcing the rules. The Jaeger Ruling states that “any doctor who is resident on-call is working even if asleep or otherwise resting.” The Royal College of Surgeons of England has always campaigned against the EWTD and has recently recommended as a compromise 65 working hours per week.

The 48-hour working week has resulted in the implementation of a shift system of trainee doctor’s duties with set
rotas on-call. The reduction in hours on duty and exposure to operative procedures as well as the need for 1 to 3 handovers per 24 hours meant that continuity of care is no longer possible at trainee level and it is only the consultant who can effectively deliver this vital package of care. Handovers are solely dependant on the content and quality and are a clear risk factor for disasters.

The reduction in operative exposure of trainees has been carefully evaluated. An orthopaedic registrar estimated that the EWTD reduced the hours of exposure from 30,000 to 6-8,000 hours during the training period. Rees looked at operative experience over a one month period in 2008 compared with the same period in 2009 and found no difference in exposure to total number of operations or of emergency appendicectomies or inguinal herniotomies despite the reduction in working hours from 56 to 48 hours. Despite this, 47% of trainees and 77% of consultants considered that the EWTD has had a negative effect on training.

The present coalition Government is introducing yet another major re-organisation owing to be implemented in 2013. A significant shift will be to the General Practitioners who will form consortia and have control over 80% of the £120bn annual NHS budget.

Despite all the changes, the financial cutbacks and constant reorganisations, satisfaction with the NHS remains high. Satisfaction with the NHS improved from 30% in 1997 to 60% in 2009 compared with banks where there was a dramatic reduction from 90% in 1983 to 20% in 2009. Trust in doctors is rated as high as 89% compared with lawyers at 24% and bankers and estate agents at around 2%.

In conclusion, the advantages and disadvantages of the NHS are set out in Table 1.

### Table 1 | Evaluation of the NHS

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<th>Advantages</th>
<th>Disadvantages</th>
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<td>Rising patient expectations</td>
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<td>No child refused treatment</td>
<td>Government control</td>
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<td>Insufficient finances</td>
<td>Political interference</td>
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<td>Lack of facilities</td>
<td>Multiple reorganizations</td>
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<td>Paediatric surgery</td>
<td>Regulations—waiting times</td>
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<td>Centred in teaching hospitals</td>
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<td>Grouped in consortia</td>
<td>Administration—too powerful</td>
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### References


