

Original Article

Review of paediatric cardiology services in district general hospitals in the United Kingdom

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Abstract: Following the *Safe and Sustainable* review of Paediatric Services in 2012/2013, National Health Service England recommended that local paediatric cardiology services should be provided by specially trained paediatricians with expertise in cardiology in all non-specialist hospitals. **Aim:** To understand the variation in local paediatric cardiology services provided across district general hospitals in the United Kingdom. **Study design and methods:** An internet-based questionnaire was sent out via the Paediatrician with Expertise in Cardiology Special Interest Group and the Neonatologists with Interest in Cardiology and Haemodynamics contact databases and the National Health Service directory. Non-responders were followed-up via telephone. **Results:** The response rate was 80% (141 of 177 hospitals), and paediatricians with expertise in cardiology were available in 68% of those. Local cardiology clinics led by paediatricians with expertise in cardiology were provided in 96 hospitals (68%), whereas specialist outreach clinics were held in 123 centres (87%). A total of 11 hospitals provided neither specialist outreach clinics nor any local cardiology clinics led by paediatricians with expertise in cardiology. Paediatric echocardiography services were provided in 83% of the hospitals, 12-lead electrocardiogram in 96%, Holter electrocardiogram in 91%, and exercise testing in only 47% of the responding hospitals. Telemedicine facilities were established in only 52% of the centres, where sharing echocardiogram images via picture archiving and communication system was used most commonly. **Conclusion:** There has been a substantial increase in the availability of paediatricians with expertise in cardiology since 2008. Most of the hospitals are well-supported by specialist cardiology centres via outreach clinics; however, there remains significant variation in the local paediatric cardiology services provided across district general hospitals in the United Kingdom.

Keywords: Paediatric cardiology services in district general hospitals; paediatricians with expertise in cardiology; echocardiography

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FOLLOWING THE *SAFE AND SUSTAINABLE* REVIEW OF Paediatric Services in 2012/2013, there have been significant changes to the services for children with CHDs.¹ A new care model has been created for the delivery of services at three levels within seven co-ordinated Congenital Heart Networks – Specialist Children's Surgical Centres (Level

1 services), Specialist Children's Cardiology Centres (Level 2 services), and Local Children's Cardiology Centres (Level 3 services).¹ The National Health Service England has supported this model. The service standards and specifications have been developed for all three levels, and the outcome of the recent public consultation on these standards is awaited.²

District Children's Cardiology Services provide paediatric cardiology services outside the specialist centres, and these services are provided at the district general hospitals or teaching hospitals with no specialists in cardiology. The definition and

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nomenclature of these services have changed frequently in recent years; therefore, in order to avoid any confusion, we have referred to them as paediatric cardiology services in district general hospitals.

A paediatrician with expertise in cardiology is a consultant paediatrician who has developed additional expertise in the care of children with heart conditions. It is envisaged that paediatricians with expertise in cardiology will be at the heart of the new National Health Service England care model in providing high-quality children's cardiology services near home, irrespective of where a child lives.^{1,2} At present, in the United Kingdom, paediatric cardiology services are delivered at 12 specialist centres, and increasing number of paediatric cardiology services in the district general hospitals are led by paediatricians with expertise in cardiology.

In 2008, a national survey reported that paediatricians with expertise in cardiology were present in only 35% of non-specialist hospitals across the United Kingdom.³ It also reported that specialist outreach clinics were conducted in 87% of the hospitals, whereas telemedicine links were established in only 31% of the hospitals.³ This study demonstrated inconsistency between the quality of services available to children with CHDs across the United Kingdom. Since then, the Royal College of Paediatrics and Child Health has introduced a specialist interest module in cardiology to specifically train paediatricians with expertise in cardiology. A training curriculum with specific training standards has been developed in collaboration with the Paediatrician with Expertise in Cardiology Special Interest Group and the British Congenital Cardiac Association.^{4,5} The Paediatricians with Expertise in Cardiology Special Interest Group is now well-established, and works in close collaboration with the British Congenital Cardiac Association and the Royal College of Paediatrics and Child Health.

The standards for paediatric cardiology services at district general hospitals were developed by Paediatricians with Expertise in Cardiology Special Interest Group and have been endorsed by the British Congenital Cardiac Association and the Royal College of Paediatrics and Child Health. We were intrigued to understand the impact of these various advancements upon the children's cardiology services' provision at district general hospitals.

Aims: the aims of our study were as follows:

- To review the availability of paediatricians with expertise in cardiology across the non-specialist centres in the United Kingdom.
- To understand the variation in local paediatric cardiology services provided across district general hospitals in the United Kingdom.

Methods

In July and August, 2013, we sent a previously piloted, structured, web-based questionnaire to all contacts on the Paediatrician with Expertise in Cardiology Special Interest Group and the Neonatologists with Interest in Cardiology and Haemodynamics databases. Consultant paediatricians in the hospitals with no representation within these databases were contacted via hospital directories. A total of 177 hospitals providing children's services were identified. The 12 specialist paediatric cardiology centres were excluded from the study. Non-responders were contacted via telephone between December, 2013 and April, 2014, and responses were accepted from consultant paediatricians only. Data were analysed using Microsoft Excel.

Results

The response rate was 80% – 141/177 contacted hospitals.

Availability of paediatricians with expertise in cardiology

Overall, 68% (96/141) of the responding hospitals providing paediatric cardiology services in the district general hospitals had at least one paediatrician with expertise in cardiology in each centre. In the remaining 32% (45/141), local paediatric cardiology services were delivered and/or co-ordinated by neonatologists, general consultant paediatricians, and rarely by adult cardiologists (Table 1).

Echocardiography services in non-specialist cardiology centres

In total, 83% (117/141) of the non-specialist centres offered paediatric echocardiography services, and paediatricians with expertise in cardiology performed echocardiography in 79% (92/117) of the centres. Support for this service was offered by consultant paediatricians and/or neonatologists in 30% (35/117) of the hospitals; however, specialist technicians

Table 1. Availability of paediatricians with expertise in cardiology at non-specialist cardiac centres in the United Kingdom.

Number of paediatricians with expertise in cardiology per hospital	Number of hospitals	Percentage
0	45	32
1	69	49
2	24	17
>2	3	2
Total	141	100

performed paediatric echocardiograms in only 12% (14/117) of the hospitals. Overall, 17% (24/141) of the hospitals did not offer paediatric echocardiography.

Local cardiac clinics led by paediatricians with expertise in cardiology and specialist outreach clinics

Paediatricians with expertise in cardiology led local cardiac outpatient clinics in 96 hospitals. Overall, 47% (66/141) of the hospitals held such clinics weekly or twice weekly, 11% (16/141) fortnightly, and a further 10% (14/141) monthly or less frequently. The remaining 32% (45/141) held no local paediatric cardiology clinics.

The median time for new patient appointments at clinics led by paediatricians with expertise in cardiology was 30 minutes – with a range from 20 to 45 minutes – and the median duration for follow-up appointments was 20 minutes – with a range from 20 to 30 minutes.

In addition, 87% (123/141) of the hospitals held specialist outreach clinics led by a visiting paediatric cardiologist from specialist centres. The majority of these clinics (72%, 88/123) were held at least monthly, and the remaining 28% (35/123) were held less frequently. A total of 19 hospitals had no provision of such specialist outreach clinics, and interestingly 11 of these centres also had no local cardiology clinics led by paediatricians with expertise in cardiology.

Non-echocardiography paediatric cardiology services

Paediatric cardiology services in most of the district general hospitals did offer other non-interventional diagnostic services including 12-lead electrocardiogram in 96%, Holter electrocardiogram in 91%, and 24-hour ambulatory blood pressure monitoring in 74% of the hospitals. Fewer centres, however, provided long-term external cardiac monitoring (54%) and exercise testing (47%).

Nursing and administrative support

Less than half of the local paediatric cardiology services in district general hospitals (48%, 68/141) had dedicated secretarial support for paediatric cardiology, 14% (20/141) had dedicated nursing staff, and 7% (10/141) offered psychological support for patients and their families. Interestingly, 45% (63/141) of the hospitals had neither secretarial nor specialist nursing support for paediatric cardiology services in the district general hospitals.

Telemedicine services

Some form of telemedicine facility, used for paediatric cardiology purposes, was available in 52% (74/141) of

Table 2. Availability of telemedicine facilities in the district general hospitals providing paediatric cardiology services in the United Kingdom.

Telemedicine facilities	Frequency	Percentage
Picture archiving and communication system	34	24
Other examples MEDCON, EchoPAC	20	14
Live echo image transfer	20	14
None	67	48

the hospitals. Picture archiving and communication system was the most commonly used form of telemedicine link (24%, 34/141) (Table 2).

Discussion

The *Safe and Sustainable* review proposed, as one of its objectives, an increment in the total number of trained paediatricians with expertise in cardiology operating in the United Kingdom with the aim that all children, no matter where they lived, received consistent and high-quality care.¹ It was suggested that at least one paediatrician with expertise in cardiology should be available in every district general hospital to provide paediatric cardiology services locally.¹ A previous national survey (2008) had highlighted a significant shortfall in the availability of paediatricians with expertise in cardiology. Therefore, it is reassuring to see that the number of centres with paediatricians with expertise in cardiology has increased to at least 96, at the time of this survey (2013/2014), from 67 in 2008.³ This increment is reflected in the fact that now 83% (117/141) of the centres provide echocardiography services locally by paediatricians with expertise in cardiology.

The specialist paediatric cardiology centres provide fairly comprehensive support in running outreach cardiac clinics; however, at least 11 hospitals in the United Kingdom provide neither local paediatric cardiology services nor any specialist outreach clinics. We anticipate that the 36 district general hospitals who did not respond to the survey are also likely to lack paediatricians with expertise in cardiology or local paediatric cardiology services. This is a limitation of the study. If the bias holds true, then the number of hospitals without any specialist cardiology input from either paediatricians with expertise in cardiology or paediatric cardiologists may actually be greater than that reported in this study.

Our study demonstrates that 19% of the hospitals had two or more paediatricians with expertise in cardiology. It is envisaged that some of the Local District Children's Cardiology Services are very busy and the availability of one paediatrician with

expertise in cardiology may not be adequate. This study was not aimed at assessing the burden of workload and adequacy of paediatricians with expertise in cardiology across the centres. The delivery or admission rate is not always representative of the cardiology throughput. Multiple confounding factors such as whether the centres are regional or teaching hospitals also play a role. A comprehensive review of services would be necessary to assess the adequacy of the number of paediatricians with expertise in cardiology and care provision.

Our study demonstrates that paediatricians with expertise in cardiology are providing most of the non-interventional services, particularly echocardiography, for children with CHDs at non-specialist centres; however, there remains some variation in the provision of other non-echocardiographic diagnostic services. This inconsistency could reflect different models of care according to local geographical and organisational needs. The proposed new service standards and development of regional cardiology networks may help in eliminating such inconsistencies.

Our study also demonstrates that telemedicine services for sharing images between centres are poorly established. With the recent exponential advancement in technology, there is great potential for the expansion and progression of telemedicine services. Telemedicine facilities can help clinicians to make timely and accurate diagnoses, avoid unnecessary transfers, and therefore can decrease pressure on bed availability at the already-stretched specialist centres.

Conclusion

Our study demonstrates that the availability of paediatricians with expertise in cardiology is increasing in the United Kingdom, although there still remains some regional inconsistency in the provision of local paediatric cardiology services across district general hospitals. Increasing the number of dedicated posts for training paediatricians with expertise in cardiology and implementing service standards and specifications for paediatric cardiology services may help in eliminating inconsistencies across the centres. It is envisaged that a busy paediatric cardiology service in some district general hospitals will need more

than one paediatrician with expertise in cardiology to deliver services safely. Further development of telemedicine services is likely to play an important role in the future. A collaborative approach between all the centres providing care to children with CHDs and strengthening regional paediatric cardiology networks should be a focus for future improvement.

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Conflicts of Interests

None.

Provenance and Peer Review

Not commissioned.

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