

A17/S(HSS)f

**2013/14 NHS STANDARD CONTRACT
FOR BARDET-BIEDL SYNDROME SERVICE (ALL AGES)**

PARTICULARS, SCHEDULE 2 – THE SERVICES, A – SERVICE SPECIFICATION

Service Specification No.	A17/S(HSS)f
Service	Bardet-Biedl syndrome service (All Ages)
Commissioner Lead	
Provider Lead	
Period	12 months
Date of Review	

1. Population Needs

1.1 National/local context and evidence base

Bardet-Biedl syndrome (BBS) is a debilitating and life threatening association of obesity, blindness and renal failure. BBS gives rise to several problems some of which are life threatening and therefore requires the input of many medical specialist and several non-clinical services. Affected families often feel isolated with few opportunities to benefit from emotional support of others.

The purpose of the service is to improve the quality of care for patients with Bardet-Biedl syndrome by offering dedicated multi-disciplinary outpatient review to patients and their families on an annual basis.

Description of the disease/condition

BBS is a highly debilitating condition leading to early blindness, renal failure, obesity, diabetes, global learning difficulties, Hirschsprung disease, urological problems and neurological deficits. Patients require input from many services including ophthalmology, nephrology, urology, dietetics, endocrinology, clinical genetics and gynaecology. One third of patients will develop renal failure and about 10% will progress to end-stage renal failure requiring dialysis and/or transplantation. BBS is a very rare inherited (autosomal recessive) disorder the prevalence of which (in UK) is estimated to be ~1 in 160,000. Some communities, predominantly Pakistani (e.g. around Birmingham area) have higher incidences owing to consanguineous marriages. 280 cases are known to BBS leading consultant and the patient support group, the Laurence-Moon-Bardet-Biedl Society (LMBBS) which keeps a database of members.

Bardet-Biedl Syndrome

The natural history of the disease and the clinical sequelae that patients face involves multiple organ systems and considerable morbidity and mortality (Green et al 1988; Beales et al. 1999; Moore et al 2005).

Rare genetic diseases

The service structure is based on well-validated models of comprehensive multi-disciplinary care aimed at promoting the health and well-being of people with rare chronic genetic disorders (Baker et al 2005; Grosse et al 2009).

Renal failure is a major cause of mortality in BBS (Riise 1996). Control of blood pressure and reduction of proteinuria can prevent deterioration in renal function. Angiotensin II inhibitors lower proteinuria, and slow the rate of disease progression in both diabetic and non-diabetic renal disease (Chiurchiu et al 2005). Abnormalities in mineral metabolism and changes in skeletal histology may contribute to growth impairment in children with chronic renal failure. The judicious management of mineral abnormalities and bone disease in BBS patients will therefore benefit growth in children and adolescents (Sanchez et al. 2008).

Patients commonly develop **type 2 diabetes and hypertension**. Large long-term clinical trials have demonstrated that improved blood glucose (the DCCT Research Group (1993), UK Prospective Diabetes Study (UKPDS) Group (1998)) and blood pressure (Lewis et al 1993, 2001; Brenner et al 2001) control slows the development and/or progression of diabetic nephropathy. Thus, it is paramount that that early problems are recognised and interventions initiated to prolong renal function.

Obesity is a major component of BBS and results in several co-morbidities including cardiovascular disease. Multi-disciplinary interventions are required for successful weight reduction which will result in general health benefits and decreased risk of cardiovascular disease (Keiss et al 2001).

Patients with BBS may also develop **Hirschsprung's disease**. Research has shown that failure to diagnose Hirschsprung's disease early, results in a considerable proportion of infants developing serious complications such as acute enterocolitis or toxic megacolon (Pini Prato et al. 2008, Martucciello 2008). Furthermore, the common occurrence of chronic constipation and continence problems in later life will adversely affect the quality of life of the individual (Mills et al 2008).

Many patients with BBS develop **urological problems**. Early diagnosis of the causes and relevant interventions will reduce the risk of infection and improve quality of life (Johal et al 2008).

Children with BBS develop multiple **pituitary hormone deficiencies** (Soliman et al 1996). Comprehensive endocrine assessment throughout childhood and adolescent is warranted. Evidence from similar genetic disorders indicates that growth hormone supplementation, for example is valuable and effective (Stafler 2008; Versteegh et al 2007).

2. Scope

2.1 Aims and objectives of service

Key objectives of the BBS service are to:

- monitor and manage disease progression;
- coordinate care and management of patients with BBS;
- provide support for local healthcare providers;
- provide genetic counselling, a national genetic testing service and prenatal diagnosis opportunities;
- establish disease specific centres of excellence and expertise;
- provide a national reference network of specialist centres for the clinical management of the syndrome.

In addition, the infrastructure will provide an opportunity for families to meet, share experiences and offer each other emotional support. Although not a primary objective, the service will also facilitate audit and evaluation of research into optimal therapies to prevent or delay the onset of complications.

2.2 Service description/care pathway

The BBS service will be limited to the out-patient based structure outlined below. It is primarily a diagnostic and monitoring programme with a remit to provide advice, oversee and coordinate management but it will not deliver any in-patient or specialist therapies. These will remain within the local NHS services from which the patient has been referred.

Structure of service

Each paediatric centre will provide five clinics per annum. Each clinic can accommodate up to eight children (i.e. max 40 patients per centre per annum). Each adult centre will hold seven clinics (10-12 per clinic) per annum (total of 84 patients per centre).

Each patient will have access to at least the following six specialists at each visit to include: ophthalmologist, clinical geneticist, endocrinologist, nephrologist, clinical psychologist & dietician.

The clinics will be supported by dedicated nurses experienced in of the needs of this group of unique patients.

Investigations

Each patient should receive the following baseline investigations:

- laboratory

- biochemistry: renal function, liver function, bone chemistry, cholesterol and triglycerides
- haematology: full blood count, erythrocyte sedimentation rate (ESR)
- cardiac
- ECG (cardiomyopathy/LVH) and/or echocardiogram (as appropriate)
- lung function (as required)
- sleep studies (as required)

Imaging

- annual renal, liver and pelvic ultrasound scan (cystic disease)
- intravenous pyelogram (calyceal dilation/tubular cysts) – as required
- chest X-ray (situs inversus) – as required
- brain magnetic resonance imaging (MRI) (cerebral atrophy, cerebellar/pituitary lesion)

Electrophysiology

- electroretinogram and visually evoked responses
- visual acuity

Genetic testing

15 genes are associated with BBS and mutation testing will be available for each patient following the taking of appropriate consent. A dedicated Clinical Pathology Accreditation (CPA) service based in the Molecular Genetics Department at Great Ormond Street Hospital for Children NHS Trust (GOSH) will provide national testing facilities. Testing will follow a Two-Phase algorithm whereby the first phase will test for known genes using a microarray platform. ~45-50% of mutations are expected to be discovered in this manner. If mutations are not forthcoming, then the sample will proceed to Phase II as summarised:

- Phase I - a first pass microarray-based (chip) “known mutation only” screen (AsperBio) will be implemented for each sample.
- Phase II - those samples for which mutations are not found on preliminary screening will be subject to direct sequencing using in-house capillary sequencing facilities.

Analysis and reporting

The senior scientist will analyse the data and in consultation with the lead clinician, will prepare a clinical report. The service will be based in within the North Thames Regional Molecular Genetics Clinical Laboratory (Clinical Pathology Accredited) at Great Ormond Street Hospital for Children NHS Trust (GOSH). Although the BBS diagnostic service will be managed by the senior scientist, the service will fall under the general management of the pathology service and be subject to common audit.

Management of syndrome

As a genetic disease, overall cure is not possible but treatment aimed at alleviating

organ-specific problems is achievable. These will include the following within the realms of the BBS service:

- identification of high blood pressure and dispense advice/therapy on reduction in collaboration with GP;
- identification of hyper-triglyceridemia and dispense advice/therapy on reduction in collaboration with GP;
- identification of hypercholesterolemia and dispense advice/therapy on reduction in collaboration with GP;
- identification of hormonal imbalance/deficiency and implementation of replacement where appropriate;
- provision of dietary advice for weight maintenance;
- implementation of behaviour altering protocols (e.g. for obsessive compulsive disorder) where appropriate.

Other specialist treatments and management will be sought through appropriate referral to other specialties outside of the BBS Service. The costs of those subsequent therapies will not be borne by the BBS Service.

This care pathway has been developed for patients attending the specialist BBS Service comprising centres in London (Great Ormond Street Hospital for Children NHS Foundation Trust (GOSH) & Guys and St. Thomas' NHS Foundation Trust (GSTT)) and Birmingham (Birmingham Children's Hospital NHS Foundation Trust (BCH) and University Hospitals Birmingham NHS Foundation Trust (UHB)).

The Bardet-Biedl medical clinic

This will be out-patient based; staffed by the designated consultants (ophthalmology, endocrinology, nephrologist, genetics, child development) and specialist nurse; dietician; clinical psychologist; and Laurence-Moon-Bardet-Biedl syndrome (LMBBS) family liaison officer. The patient will be allocated a clinic room in which they will remain for each of their consultations by rotating specialists. These systems work well and avoid the need for patients to constantly change rooms. In addition, the clinicians will meet in the team room to discuss issues as they arise.

- adult clinics – held seven times per annum in each centre from 08.30–18.00;
- children's clinics – held five times per annum in each centre from 08.30–18.00.

The exact day chosen will vary from centre to centre.

2.3 Population covered

This service covers patients registered with an English or Scottish General Practitioner, resident in the European Union and eligible for treatment in the NHS under reciprocal arrangements. Patients from Wales and Northern Ireland are not part of this commissioned service and the trust must have separate funding arrangements.

Referrals

The source of new out-patient referrals is predominantly from paediatricians, ophthalmologists, clinical geneticists and the LMBBS seeking diagnosis, counselling and management advice.

2.4 Any acceptance and exclusion criteria

The service is accessible to all patients with a suspected BBS regardless of sex, race or gender. Providers require staff to attend mandatory training on equality and diversity and the facilities provided offer appropriate disabled access for patients, family and carers. When required the providers will use translators and printed information is available in multiple languages. Special provision will be made for children with BBS.

Referral criteria, sources and routes

Diagnostic criteria: the presence of four primary features alone or three primary and two secondary would raise a high index of suspicion of a diagnosis of BBS (adapted from Beales et al. J Med Gen 1999).

Referral criteria: children will be accepted into children's clinics if they are less than 18 years old. All others will attend adult clinics. They can be:

- referred from a clinician with a prior diagnosis of Bardet-Biedl syndrome
- referred from a clinician with a diagnosis of a syndrome that overlaps or is confused with Bardet-Biedl syndrome
- referred from a clinician with a suspected diagnosis of Bardet-Biedl syndrome
- referred from LMBBS.

Referrals will be accepted by the LMBBS National Coordinator in consultation with the designated lead consultant in the centre closest to the patient's home. The National Coordinator will liaise with individual trusts to ensure appointment letters are sent, inviting the adult or child and carer to attend the Clinic, together with:

- an information leaflet for parents and children describing the purpose of the clinic and the professionals who will see them
- a letter from the LMBBS family liaison officer introducing the charity and its services
- a description of what investigations to expect e.g. leaflet explaining the possibility of blood tests, fundoscopy, ERG.

The secretary/administrator will collate hospital notes with the assessment protocol for new referrals inserted therein. This includes a body mass index (BMI) chart, structured questionnaires, examination and investigation proforma for ease of entry into a dedicated database; this will be used for the purposes of audit and another for DNA banking and testing in accord with the Data Protection Act.

Exclusion criteria

Patients may be excluded from the service if:

- the individual clearly has an alternative diagnosis;
- the individual has Alström syndrome (differential diagnosis) – he/she will be referred directly to the Alström service in Birmingham;
- the patient is resident outside England and Scotland. Other devolved administrations (Wales & Northern Ireland) the provider must make individual arrangements with referrers;
- there is a very low index of suspicion;
- or children, in their 17th year, arrangements will be made to transition to the adult service (Guys or QEH).

Response time & detail and prioritisation

Waiting and referral response times for appointments will be subject to national and local policies. As the first appointment includes confirmation of diagnosis, for the majority this will be confirmed clinically but occasionally will require molecular test confirmation. Because diagnosis of BBS is notoriously difficult, GP/clinician diagnosis will be treated as tentative until otherwise proven by service.

Prioritisation of clinic appointments within the first year of service will be made according to current waiting lists. Those patients awaiting appointments in accord with waiting time stipulation will be called first. Where possible a mix of patients based on geography will make up the clinic list.

The screening process will use a simple referral questionnaire to ascertain that published diagnostic criteria have been met or nearly met. This will be sent to referring clinicians or ascertained by the clinic administrator by phone call prior to invitation to the clinic. In difficult or borderline cases, the centre lead clinician will make the decision.

The provider has a duty to co-operate with the commissioner in undertaking Equality Impact Assessments as a requirement of race, gender, sexual orientation, religion and disability equality legislation.

2.5 Interdependencies with other services

The BBS service lies within four NHS trusts; Birmingham Children's Hospital NHS Foundation Trust (BCH), Queen Elizabeth Hospital NHS Trust (Birmingham), Guys and St Thomas' NHS Foundation Trust and Great Ormond Street Hospital for Children NHS Trust Foundation Trust (London). These centres have been strategically placed to take advantage of existing expertise and experience of BBS care and management and to provide geographic access to patients in North and South of England. The four partners are joined by the national patient support group, the LMBBS, in a unique partnership which will deliver unrivalled and comprehensive care to this group of patients. LMBBS representatives (each a parent of a sufferer) will be present at every clinic to provide a pastoral care role, a listening ear and advise on grants and benefits. The society will play a central role in coordinating clinic attendance, organising transport, chaperones and accommodation if required.

The development of DNA-based diagnostic tests forms a central part of this service and a new accredited laboratory will be created to serve each of the centres. Confirmation of the clinical suspicion is important so as to provide accurate genetic counseling to family members, afford carrier testing opportunities and prenatal diagnostics.

The service will also serve as a national centre of expertise to which primary care teams or hospital-based services may seek advice or refer patients for diagnosis and management. It will collate clinical information from all patients in the UK, informing on the natural history of the syndrome, complications and prognosis. In turn, these data will serve to improve upon care pathways and management protocols.

The multi-disciplinary team will ensure thorough assessment of primary medical problems associated with the syndrome such as delayed growth and puberty, hypogonadism, pituitary disorders, diabetes mellitus, obesity, lipid profile, renal function, retinal function, cognition and behaviour. Centralisation of blood test results will prevent unnecessary repeat testing and maintain consistency of measurements. The service will work closely with schools, education services, social services, speech and language therapy services, physiotherapy, child development teams and services for the blind.

As each patient is assessed annually, the service will rely on close communication and more frequent monitoring by general practitioners and other specialist services (e.g. nephrology in case of renal failure or transplant).

Finally, the service in general and the LMBBS in particular will play a role in educating patients, carers and healthcare professionals by producing information pamphlets, creating a dedicated website and lecturing/workshops.

The LMBBS patient support group is a partner in the BBS Service providing pastoral care to patients. The LMBBS National Clinic Coordinator will have responsibility for coordinating the clinics, updating the patient database, arranging their transport and overnight accommodation. It is envisaged that the existing close and personal relationship between the society and patient will foster a unique level of trust and encourage near 100% attendance rates. A patient liaison officer (usually a parent of a BBS sufferer) from the LMBBS will also be present at each clinic to provide support, advice on disability allowances and serve as an advocate within the service.

LMBBS will attempt to liaise with the three regionalised ethnic communities in which BBS is prevalent assessing the future need for dedicated multi-cultural workers.

3. Applicable Service Standards

3.1 Applicable national standards e.g. National Institute of Health and Care Excellence (NICE), Royal College

The nationally designated BBS providers must be fully integrated into their trust's

corporate and clinical governance arrangements and must fully comply fully with Clinical Negligence Scheme for Trusts (CNST) and Care Quality Commission (CQC) requirements in terms of quality and governance. The hub centres are responsible for overseeing the governance arrangement of any spoke clinic provided under sub-contractual arrangements.

Each centre will ensure that there are:

- regular meetings with patient representatives;
- all practitioners will participate in continuous professional development and networking;
- patient outcome data is recorded and audited across the service.

The commissioners and service will conduct a formal Joint Service Review at least every six months. All centres must participate in the national audit commissioned by NHS England - audit meetings should address:

- clinical performance and outcome
- process-related indicators, e.g. efficiency of the assessment process, prescribing policy, bed provision and occupancy, out-patient follow up etc.
- stakeholder satisfaction including feedback from patients, their families, referring surgeon and General Practitioners.

NHS England Bardet Biedl syndrome service will work with providers to develop National Service Standards in 2013/14

4. Key Service Outcomes

- mean age at diagnosis of referred patients to fall compared with published average;
- genetic test results to provide confirmation of diagnosis, prenatal diagnostic test options, accurate genetic counselling and carrier status determination in relatives;
- all patients who are developing diabetes or renal disease are identified and treated;
- all patients over 10 years screened for glucose abnormalities with HbA1c and home blood glucose monitoring;
- monitoring of serum cholesterol and implementation of practical measures to manage dyslipidaemia where appropriate;
- satisfaction ratings of care by patients to reach high levels;
- improved survival rate for patients with BBS – long term;
- all patients have detailed age appropriate renal function documented, with alb; creatinine ratio, ambulatory BP monitoring, eGFR, and USS scan kidneys;
- BMI plotted on age and sex appropriate chart and documented provision of dietary and exercise advice.

Quality Performance Indicator	Threshold	Method of measurement	Consequence of breach	Report Due
Change in BMI	Significant variation from the national average or, in services with one or two national centres, significant variation from the outcomes achieved in the previous three years			
Reduction in end stage renal failure				
Reduction in age at diagnosis				

5. Location of Provider Premises

To provide geographically convenient access, four centres (one for adults and another for children) in two cities are proposed.
Proposed centres:

Birmingham

- (Children's Service) Birmingham Children's Hospital NHS Foundation Trust (BCH)
- (Adult's Service) University Hospitals Birmingham NHS Foundation Trust

London

- (Children's Service) Great Ormond Street Hospital for Children NHS Trust Foundation Trust
- (Adult's Service) Guys and St Thomas' NHS Foundation Trust