



User Manual

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**Laboratory operating hours Monday-Friday 8.30am-5pm
Out of Hours Service is unavailable.**



Accredited Medical Laboratory

Reference No: 2282

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General Information

The **Dundee Molecular Genetics Laboratory** was set up in 1985 and is part of the Scottish Genetic Laboratories Consortium **which comprises of a four centre service provided by Aberdeen, Dundee, Glasgow and Edinburgh**. Each laboratory offers analysis for a number of common conditions for its local population and a Scottish service for other rarer disorders. Samples received for disorders not offered by the Dundee laboratory will be forwarded as appropriate. More details of conditions for which analysis is offered in Scotland can be found on pages 7-49.

Analysis for other disorders not listed in this manual may be available from **other laboratories**. Please contact the Dundee laboratory in the first instance **for appropriate information** as certain sample types, or samples from particular family members may be required for the analysis.

Sample referrals

All samples should be accompanied by a Human Genetics request form, **which can be downloaded from NHS Tayside Intranet either via the Human Genetics website, or from the Human Genetics section of Clinical Pathways/Information**. It is also available on the Human Genetics Unit Internet web site hosted by the University of Dundee.

It is the duty of the clinician/or other health professional to obtain consent from the patient (or patient's representative) for genetic testing to be carried out. In submitting a sample, the clinician confirms that consent has been obtained: (a) for testing and storage, (b) for the use of this sample and the information generated from it to be shared with members of the patient's family and their healthcare professionals (if appropriate).

The following information **must** be supplied **legibly** with **each** sample:

Patient's surname and forename (on sample and form)
Patient's date of birth and gender or CHI (on sample and form)

Name and address of the **healthcare professional requiring report** (on form)
Analysis requested and reason for request (on form)

Samples received without this information may be rejected.

If you are sending in a sample **from an individual** with a known family history please provide **specific details of any known index case and mutation details if available**.

Please note that additional forms are required to be completed for some **conditions** eg breast and colon cancer, diabetes studies, familial hypercholesterolaemia and long QT syndrome. Please contact **the Dundee Molecular Genetics Laboratory** for details. Information can also be found on Staffnet at:
<http://staffnet.tayside.scot.nhs.uk/OurWebsites/HumanGenetics/index.htm>

Sample types

For most molecular **genetic** analysis, a venous blood sample (3ml) in potassium EDTA (purple/lilac top vacutainer) is sufficient; **for** paediatric cases at least 1ml is required. There are exceptions however, and the requirements for each disorder are included in this manual. Note that 10ml of blood **in EDTA** is required for FSHMD analysis.

Samples that are clotted will be rejected.

High Risk Specimens

It should be noted that blood samples from patients who are likely to be Hepatitis B antigen or HIV positive, who have infectious hepatitis or who are jaundiced without obvious cause are potentially dangerous to all who handle them. Blood from febrile, undiagnosed patients, especially from abroad, may also be dangerous. Great care should be observed when submitting these samples for laboratory investigations, with strict adherence to the recognised methods of handling, particularly:

- 1. Forms and sample bottles must be clearly labelled as high risk preferably with a red sticker**
- 2. The sample must be sealed in a plastic bag. The accompanying form must not come into contact with the sample.**

For high-risk samples, a mouth wash is preferable to a blood sample although this may not be suitable for all analyses - please contact the laboratory for advice, prior to sampling.

Please note the laboratory does not have the containment facility to handle samples from individuals with confirmed or suspected prion diseases (eg vCJD) and tuberculosis.

Sample transport

Samples sent through the internal mail systems should be placed in sealed plastic bags, with the accompanying form in a separate compartment.

To send blood samples through the post proper Royal Mail approved packaging must be used. This is available from the laboratory on request. All samples should be sent to the address shown on the front cover of this manual. Samples from Highland are delivered by DX Couriers, with certain duplicate samples sent via Royal Mail. Microbiology maintains a generic policy for van transport (NB141) of samples between PRI and Ninewells, with Genetics and other laboratories as copyholders.

For optimum DNA extraction blood samples should preferably be received by the laboratory within 5 working days of being taken and stored in the fridge prior to sending.

Sample storage

Most DNA samples will be stored indefinitely unless otherwise requested. Please contact the laboratory for details.

Please note additional testing may be requested on stored samples by contacting the duty scientist e-mail account Tay-UHB.moleculargenetics@nhs.net

Reporting guidelines

Written results will be sent to the healthcare professional requesting the report as indicated on the request form.

Faxing reports

In exceptional circumstances, eg prenatal diagnosis, a report may be faxed to the referring clinician if requested. Please note the patient's surname will be removed so that there is some degree of anonymity. The fax will only be sent if there is an assurance the location is secure and the laboratory is informed of receipt/non-receipt.

e-mail reports

In exceptional circumstances, eg prenatal diagnosis, a report may be e-mailed to the referring clinician if requested.

A written report will always be sent as confirmation.

Dundee's Service

Disease / disorder	Common Trisomy screen
Sample type requested	At least 2ml of amniotic fluid plus 3ml of maternal blood in EDTA. From April 2011 CVS samples will be accepted as part of the first trimester screening program. A maternal blood sample (in EDTA) must accompany the sample.
Analysis offered	Microsatellite dosage analysis for trisomy 13, 18 and 21 Sex testing for Turners in appropriate cases
Reporting time	Within 24-48 hours (samples received on Friday will be reported on Monday or Tuesday) If we are unable to get a result, then full karyotype results should be available from Cytogenetics within 8-14 days
Notes	Referrals only accepted from Obs+Gynae consultants in Tayside or through Inverness screening service. We may not be able to report fluids/ CVS which show maternal cell contamination (MCC). The laboratory participates in an appropriate EQA scheme

Disease / disorder	Cystic Fibrosis
Sample type requested	3ml of venous blood in EDTA (>1ml from infants)
Analysis offered	CF29v2 kit will detect 29 of the most common mutations in the Northern European population (p.Phe508del; p.Gly542X; p.Gly551Asp; c.489+1G>T; p.Arg553X; p.Arg117His; p.Arg1162X; p.Arg334Trp; c.1585-1G>A; p.Trp1282X; p.Asn1303Lys; c.3727+10kbC>T; p.Ala445Glu; c.2051_2052delAAinsG; c.3528delC; c.948delT; p.Ile507del; p.Arg347Pro; p.Ser1251Asn, p.Glu60X, p.Asp1152His, c.2988+1G>A, c.2657+5G>A, c.1766+1 G>A, c.579+1G>T, p.Gly85Glu, c.2052delA, c.262delTT, p.Arg560Thr).
Pick-up rate	Detects >80% of CF mutations in Scottish Caucasian population Please provide details of the individual's ethnic origin when referring them for CF testing.
Reporting time	Within 20 working days Prenatal or urgent referrals will be reported within 5 working days
Notes	If only 1 mutation is detected, further mutation analysis can be arranged in a specialist laboratory The laboratory participates in appropriate EQA schemes

Disease / disorder	Haemochromatosis
Sample type requested	3ml of venous blood in EDTA (mouthwash acceptable Oragene/Invitek)
Analysis offered	Pyrosequence analysis to detect p.C282Y and p.H63D mutations in HFE gene
Pick-up rate	Approximately 90% of affected individuals are homozygous (carry 2 copies) for the p.C282Y mutation
Reporting time	Within 20 working days
Notes	Oragene/Invitek Mouthwash samples should be provided from suspected high-risk and/or recently transfused individuals The laboratory participates in an appropriate EQA scheme

Disease / disorder	Thrombophilia
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Factor V Leiden mutation (p.Arg506Gln) Prothrombin g.20210G>A mutation
Pick-up rate	Both of these mutations are relatively common in the population.
Reporting time	Within 20 working days
Notes	The laboratory participates in an appropriate EQA scheme

Disease / disorder	Gilbert Syndrome
Sample type requested	3ml of venous blood in EDTA
Analysis offered	PCR analysis of TA repeat in promoter region of the UGT1 gene
Pick-up rate	The majority of Caucasian Gilbert patients carry the 7/7 genotype.
Reporting time	Within 20 working days
Notes	In severe cases of jaundice where the Gilbert screen is negative, screening for Crigler-Najjar may be offered. In patients of Asian origin a number of variants in the UGT1A gene can be associated with Gilbert Syndrome.

Disease / disorder	Crigler Najjar Types I + II
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Mutation analysis of exon 1A1 and exons 2-5 of the UGT1A1 gene.
Pick-up rate	
Reporting time	Within 40 working days
Notes	

Disease / disorder	Medium chain acyl-CoA dehydrogenase (MCAD) deficiency
Sample type requested	3ml of venous blood in EDTA (>1ml from infants)
Analysis offered	Sequence analysis of entire coding region of ACADM gene
Pick-up rate	Approx. 80% of patients with MCAD deficiency are homozygous for the mutation at position c.985
Reporting time	Within 40 working days Urgent referrals and referrals from neonatal screening will be reported within 5 working days for the common c.985A>G mutation. Appropriate extended mutation screening will be reported as soon as possible.
Notes	The laboratory participates in an appropriate EQA scheme

Disease / disorder	Myotonic Dystrophy
Sample type requested	3ml of venous blood in EDTA
Analysis offered	PCR analysis of CTG repeat in DMPK gene
Pick-up rate	
Reporting time	Within 20 working days
Notes	The laboratory participates in an appropriate EQA scheme

Disease / disorder	Neurofibromatosis Type 1
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Linkage only - polymorphic intragenic markers in families with at least 2 clinically affected members. Mutation analysis is not available for NF1 in Dundee
Pick-up rate	At least one intragenic marker will be informative in >90% of families tested.
Reporting time	Within 40 working days
Notes	Mutation analysis for NF1 can be arranged elsewhere in the UK but there would be a considerable cost implication.

Disease / disorder	Polycystic kidney disease – adult onset (ADPKD)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Linkage analysis in families with at least 2 clinically affected members. Markers available for both the chromosome 4 + 16 loci (PKD2 and PKD1).
Pick-up rate	
Reporting time	Within 40 working days
Notes	Mutation analysis is available out with Scotland for ADPKD and has cost implications.

Disease / disorder	Polycystic kidney disease – infantile (ARPKD)
Sample type requested	3ml of venous blood in EDTA (or at least 100ul of DNA with concentration >50ng/ul)
Analysis offered	Mutation analysis for PKHD1 (recessive childhood form). Full sequence of coding region (73 fragments) + MLPA for large deletions
Pick-up rate	
Reporting time	Within 40 working days
Notes	

Disease / disorder	Hereditary non-polyposis colorectal cancer (HNPCC) – high risk family history
Sample type requested	All patients suspected of having HNPCC should be referred to Clinical Genetics for an assessment of the significance of their family history
Analysis offered	Those samples accepted for screening will be analysed for MLH1 mutations and / or examined for MSI instability and immunohistochemistry performed for MLH1, MSH2, MSH6 and PMS2. Samples showing MSI and loss of MLH1 will also be screened for the BRAF p.V600E mutation.
Pick-up rate	Around 15% of classical HNPCC families will have a detectable MLH1 mutation
Reporting time	Within 40 working days
Notes	Part of any sample accepted for MLH1 screening will also be sent to Edinburgh for MSH2 and MSH6 mutation screening The laboratory participates in appropriate EQA schemes

Disease / disorder	Hereditary non-polyposis colorectal cancer (HNPCC) – medium risk family history
Sample type requested	All patients suspected of having HNPCC should be referred to Clinical Genetics for an assessment of the significance of their family history
Analysis offered	Tumour tissue will be analysed for MSI instability and immunohistochemistry performed for MLH1, MSH2, MSH6 and PMS2. Samples showing MSI and loss of MLH1 will also be screened for the BRAF p.V600E mutation.
Pick-up rate	
Reporting time	Within 40 working days
Notes	If MSI and loss of expression is detected, a DNA sample (from blood) will be requested for the appropriate mutation analysis. The laboratory participates in appropriate EQA schemes

Disease / disorder	Familial Adenomatous Polyposis Coli (FAP)
Sample type requested	Patients suspected of having FAP should be referred to Clinical Genetics for assessment of the significance of their family history
Analysis offered	Samples accepted for analysis will be analysed by direct sequencing for small mutations and by MLPA for large rearrangements
Pick-up rate	
Reporting time	within 40 working days
Notes	This service was transferred from the Aberdeen laboratory to Dundee as from January 2009 The laboratory participates in an appropriate EQA scheme

Disease / disorder	MYH (MutYH) Polyposis coli
Sample type requested	Patients suspected of having MYH should be referred to Clinical Genetics for assessment of the significance of their family history
Analysis offered	Samples accepted for analysis will be analysed by direct sequencing for the two common mutations (p.Tyr179Cys and p.Gly396Asp). If one mutation is found then further screening will be performed.
Pick-up rate	The two mutations above account for ~82% of mutant alleles in the UK Caucasian population
Reporting time	Within 40 working days
Notes	The laboratory participates in an appropriate EQA scheme

Disease / disorder	KRAS mutation status
Sample type requested	Fixed tissue tumour samples (x2) will be accepted (by referral from oncologists) from patients with metastatic colorectal cancer
Analysis offered	Samples accepted for analysis will be analysed by pyrosequencing for the common mutations in codons 12, 13 and 61 of the KRAS gene.
Pick-up rate	KRAS mutations are detected in 40-50% of these cases
Reporting time	within 5 working days
Notes	We may not detect mutations in samples where less than 40-50% of the tissue is tumour The laboratory is participating in an appropriate EQA scheme

Disease / disorder	cKIT and PDGFRA mutation status
Sample type requested	Fixed tissue tumour samples (x2) will be accepted (by referral from pathologists) from patients with GISTs or melanomas
Analysis offered	Samples accepted will be sequenced for mutations in exons 9, 11, 13 and 17 of cKIT and exons 12,14 and 18 of PDGFRA. KIT exon 18 may be screened in melanoma cases, while KIT exons 14,15,16+18 can be screened for resistance mutations. KIT exon 10 is available for aggressive fibromatosis. BRAF mutational status can also be done on request
Pick-up rate	Mutations are detected in around 73% of GIST cases
Reporting time	within 40 working days
Notes	We may not detect mutations in samples where less than 40-50% of the tissue is tumour The laboratory is participating in an appropriate EQA scheme

Disease / disorder	Lymphoma (B- and T-cell clonality)
Sample type requested	Paraffin fixed tissue sections of tumour DNA (fresh tissue can also be tested)
Analysis offered	Clonal rearrangements of FR1, FR2 and FR3 regions of the IgH locus and J-gamma and Jp-gamma regions of the TCR locus
Reporting time	Within 40 days, urgent cases with 10 days

Disease / disorder	Multiple Endocrine Neoplasia Type 1 (MEN1)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Mutation analysis of exons 2-10 of the Menin gene
Pick-up rate	Over 90% of familial cases with MEN1 have a detectable mutation in the Menin gene
Reporting time	Within 40 working days
Notes	In families with an undetectable mutation, as long as they meet the Brandi guidelines, a DNA sample can be sent to Exeter for MLPA analysis (has cost implications)

Disease / disorder	Multiple Endocrine Neoplasia Type 2A/2B + FMTC / Hirschsprung disease
Sample type requested	3ml of venous blood in EDTA
Analysis offered	PCR and sequence analysis of exons 10,11,13,14, 15 and 16 of RET gene
Pick-up rate	Approximately: 95% of MEN2A cases 98% of MEN2B cases 85% of FMTC cases
Reporting time	Within 40 working days
Notes	In families with an undetectable mutation, or in Hirschsprung cases, sequence analysis of the entire RET coding sequence can be carried out. The laboratory participates in an appropriate EQA scheme

Disease / disorder	SDHB /SDHC/SDHD screen (paraganglioma / phaeo)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Mutation analysis (sequencing and MLPA) of SDHB, SDHC and SDHD genes
Reporting time	Up to 40 working days (for SDHB+D)
Notes	Screening of these genes may be performed as part of a wider screening strategy according to the clinical details provided (eg in addition to RET and VHL screening) SDHC screening will only be performed for paraganglioma cases unless otherwise requested

Disease / disorder	Von Hippel Lindau (VHL)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Sequence analysis of exons 1-3 of VHL gene plus MLPA kit for large deletions
Reporting time	Within 40 working days
Notes	VHL screening may be performed in addition to other genes as considered appropriate according to the clinical details provided The laboratory participates in an appropriate EQA scheme

Disease / disorder	Marfan Syndrome
Sample type requested	3ml of venous blood in EDTA (or at least 100ul of DNA with concentration >50ng/ul)
Analysis offered	Sequence analysis of FBN1 gene (65 exons) and MLPA assay for gene deletions.
Pick-up rate	
Reporting time	Within 40 working days
Notes	Cases where FBN1 screening is negative will be screened for TGFBR1 and 2 gene mutations (up to another 40 working days)

Disease / disorder	Pelizaeus Merzbacher Disease
Sample type requested	3ml of venous blood in EDTA
Analysis offered	MLPA assay for PLP gene duplication If -ve for duplication, sequence analysis will be carried out on the coding region.
Pick-up rate	50-60% of cases have a duplication of the PLP gene 30% of remaining cases have a point mutation
Reporting time	Up to 40 working days
Notes	To date, no duplications have been observed in clinically affected females. Point mutations have been detected in manifesting carriers. Screening of GJA12 (Cx46.6) gene can also be carried out if requested.

Disease / disorder	Leber's Hereditary Optic Neuropathy (LHON)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Mitochondrial mutations (11778, 3460, 14484 and 14459)
Pick-up rate	>90% of LHON mutations in Caucasian population
Reporting time	Within 40 working days
Notes	The laboratory participates in an appropriate EQA scheme

Disease / disorder	Mitochondrial Disorders (MELAS, MERRF, NARP Leighs)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	PCR for common mutations (3243, 8344 and 8993) plus some rarer mutations SURF1 analysis for Leigh's cases
Pick-up rate	The majority of MELAS and MERRF cases are caused by the 3243 and 8344 mutations respectively
Reporting time	Within 40 working days
Notes	Many mitochondrial point mutations (including MELAS 3243) exhibit differences in tissue distribution and may not be detectable in blood samples. The sensitivity of these tests is therefore not 100%. Urine samples may be required at a later stage for further analysis of adult patients. The laboratory participates in an appropriate EQA scheme

Disease / disorder	Pendred Syndrome
Sample type requested	3ml venous blood in EDTA
Analysis offered	Sequence analysis of the coding region of the SLC26A4 gene (21 fragments) and MLPA analysis for large deletions.
Pick-up rate	
Reporting time	Within 40 working days
Notes	

Disease / disorder	Non-syndromic deafness
Sample type requested	3ml venous blood in EDTA
Analysis offered	Sequence analysis of Connexin 26 gene including 35delG mutation. Also screen for the 309kb and 232kb deletions in Connexin 30. Mitochondrial mutation 1555A>G if requested
Pick-up rate	Approximately 70% of non-syndromic deafness cases are homozygous for the 35delG mutation.
Reporting time	Within 40 working days
Additional notes	Mitochondrial mutation 1555A>G may be screened for if evidence of aminoglycoside use or maternally inherited transmission The laboratory participates in an appropriate EQA scheme

Disease / disorder	Hypokalemic Periodic Paralysis (HOKPP1) and Hyperkalemic Periodic Paralysis (HYPP)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	HOKPP1-Sequence analysis for known mutations in the CACNA1S gene (p.Arg528, Arg897 and Arg1239). Also sequence analysis of exon 13 of the SCN4A gene (includes p.Arg669 and Arg672 mutations) HYPP- Sequence analysis of exons 12, 13 and 24 of SCN4A gene (inc p.Thr704 and Met1592 mutations)
Pick-up rate	HOKPP1-approx 80% of cases will have one of the screened for mutations HYPP- approx 705 of cases will have one of the screened for mutations
Reporting time	Within 40 working days
Notes	

Disease / disorder	Keratin Disorders (including EBS, BCIE, IBS, PPK and others)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Sequence analysis for Keratins 1,2,5,9,10 and 14 offered as part of UKGTN (United Kingdom Genetic Testing Network)
Pick-up rate	Approx 80% of clinically identified EBS patients will have a mutation in KRT5 or KRT14.
Reporting time	Within 40 working days
Notes	Requests for other keratin genes may be forwarded to Prof Irwin McLean's research laboratory

Disease / disorder	Acral Peeling Skin Syndrome
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Sequence analysis of the TGM5 gene
Pick-up rate	approx 76% of the individuals clinically diagnosed as peeling skin syndrome are found to carry TGM5 mutations
Reporting time	Within 40 working days
Notes	

Disease / disorder	Autosomal recessive congenital ichthyosis
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Sequence analysis of the TGM1 and ALOX12B genes
Pick-up rate	Mutations in TGM1 are detected in approx 35% of the individuals diagnosed with lamellar ichthyosis or non-bullous ichthyosis
Reporting time	Within 40 working days
Notes	

Disease / disorder	Ichthyosis vulgaris
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Analysis of the common mutations of the FLG gene
Pick-up rate	
Reporting time	Within 40 working days
Notes	

Disease / disorder	CBAVD / Azoospermia(CFTR mutations)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	CF29 kit (plus Poly T testing may be performed if one mutation identified) Y-chromosome microdeletion screening will also be performed if received from Ward 35
Pick-up rate	
Reporting time	Within 20 working days
Notes	NB:- Samples from partners of CBAVD patients should be referred for screening at the same time Please provide details of the individual's ethnic origin when referring them for CF testing. If only one mutation is identified, sample may be sent to a specialist laboratory for further screening. The laboratory participates in an appropriate EQA scheme

Disease / disorder	CBAVD / Azoospermia (Y-deletions)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Y-chromosome microdeletion screening for deletions of the AZFa, AZFb and AZFc regions
Pick-up rate	
Reporting time	Within 20 working days
Note	The laboratory participates in an appropriate EQA scheme

Disease / disorder	Oculopharyngeal muscular dystrophy (OPMD)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Detection of GCN expansion in the PABPN1 gene Sequence for two reported mutations in exon 1
Reporting time	Within 20 working days
Notes	(GCN ₁₀) is the normal repeat length. Affected individuals will have an allele with (GCN ₁₂₋₁₇) repeats. Rarely, affected individuals may be homozygous for (GCN ₁₁)

Disease / disorder	Primary Torsion Dystonia
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Detection of 3bp deletion in DYT1 gene
Pick-up rate	This mutation is a common cause of torsion dystonia in the Ashkenazi Jewish population
Reporting time	Normally within 20 working days
Notes	

Disease/Disorder	Cerebral Cavernous Malformations
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Mutation analysis of CCM2, KRIT1 and CCM3 genes Also MLPA assay for large gene rearrangements
Pick-up rate	Over 75% in familial cases
Reporting time	Normally within 40 working days
Notes	

Disease/Disorder	Parkinsons disease (Early onset)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	Sequence analysis of PARK2 gene plus MLPA analysis for deletions of PARK1, PARK2, PARK5, PARK6, PARK7, PARK8 and ATP13A2 genes (kit can also detect LRRK2 p.Gly2019Ser mutation)
Pick-up rate	
Reporting time	Within 40 working days
Notes	Referrals accepted from consultant neurologists only

Services provided by other Scottish laboratories

Disease / disorder	Familial breast and/or ovarian cancer
Sample type requested	Patients suspected of familial breast/ovarian cancer should be referred to Clinical Genetics for assessment of the significance of their family history
Analysis offered	Samples accepted for analysis will be sent to Aberdeen and Glasgow for BRCA1 and BRCA2 mutation analysis.
Pick-up rate	Full screening will only detect around 10% of familial cases
Reporting time	Within 2 months
Notes	Samples from individuals in lower-risk families will be extracted and stored.

Disease / disorder	Duchenne or Becker Muscular Dystrophy
Sample type requested	3ml of venous blood in EDTA
Analysis offered	DNA sent to Glasgow for dosage and intragenic marker analysis of dystrophin gene.
Pick-up rate	
Reporting time	Within 2 months
Notes	Sequence analysis of the dystrophin gene is available

Disease / disorder	DRPLA (dentatorubral-pallidoluysian atrophy)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	DNA will be sent to Edinburgh for analysis of the CAG repeat number
Pick-up rate	
Reporting time	Usually within 1 month
Notes	Patients (or their legal representative) should be advised regarding the implications of DRPLA test results, for themselves and their families, before proceeding with the diagnostic test

Disease / disorder	Fragile X syndrome (FraXA) / Developmental delay screen
Sample type requested	3ml of venous blood in EDTA (>1ml from infants)
Analysis offered	DNA will be sent to Glasgow for analysis of the CGG repeat number. For dev del cases samples will also be screened for subtelomeric deletions and microdeletions of specific regions.
Pick-up rate	Technique will detect full- and pre-mutation carriers. Will not detect rare cases where there is a point mutation in FMR1
Reporting time	Within 1-2 months
Notes	Although heparinised blood can be used for the PCR method, it is not really suitable for southern blotting, therefore EDTA samples should be obtained wherever possible

Disease / disorder	Friedreich's Ataxia
Sample type requested	3ml of venous blood in EDTA
Analysis offered	DNA sent to Glasgow for GAA repeat analysis of the Frataxin gene
Pick-up rate	
Reporting time	Within 2 months
Notes	Patients (or their legal representative) should be advised regarding the implications of Friedreich's Ataxia test results, for themselves and their families, before proceeding with the diagnostic test

Disease / disorder	Hereditary Motor and Sensory Neuropathy (HMSN) / HNPP
Sample type requested	3ml of venous blood in EDTA
Analysis offered	The DNA will be sent to Aberdeen for dosage analysis of the PMP22 gene
Pick-up rate	
Reporting time	within 2 months
Notes	Non-PMP22 duplication patients with confirmed HMSN1 can be screened for P ₀ , PMP22 and Connexin32 mutations if adequate clinical details and family history are provided. MFN2 screening can be offered for the axonal form (HMSN Type 2)

Disease / disorder	Huntington's Disease
Sample type requested	3ml venous blood in EDTA
Analysis offered	DNA will be sent to Edinburgh for analysis of CAG repeat size.
Pick-up rate	
Reporting time	Usually within 1 month
Notes	Patients (or their legal representative) should be advised regarding the implications of HD test results, for themselves and their families, before proceeding with the diagnostic test

Disease / disorder	Haemophilia A + B
Sample type requested	Patients seeking pre-symptomatic or predictive testing should be referred to the clinical genetics service
Analysis offered	Samples accepted for testing will be sent to Edinburgh for mutation analysis and/or linkage analysis
Pick-up rate	
Reporting time	Usually within 2 months
Notes	If possible arrange to have blood samples sent to us on Monday-Wednesday as the Edinburgh laboratory prefer to receive the samples as blood rather than DNA.

Disease / disorder	Prader-Willi / Angelman's syndromes
Sample type requested	3ml of venous blood in EDTA from the patient and both parents
Analysis offered	DNA will be sent to Glasgow for deletion and UPD analysis
Pick-up rate	
Reporting time	within 2 months
Notes	A small proportion of familial AS cases are caused by mutations in the UBE3A gene. A screening service for these patients is now available in Glasgow.

Disease / disorder	Spinocerebellar Ataxias (SCA1,2,3,6 and 7)
Sample type requested	3ml of venous blood in EDTA
Analysis offered	DNA sent to Edinburgh for CAG repeat analysis
Pick-up rate	
Reporting time	Within 1-2 months
Notes	Patients (or their legal representative) should be advised regarding the implications of SCA test results, for themselves and their families, before proceeding with the diagnostic test

Disease / disorder	Spinal Muscular Atrophy
Sample type requested	3ml of venous blood in EDTA
Analysis offered	DNA sent to Edinburgh for deletion analysis of the SMN gene
Pick-up rate	
Reporting time	Usually within 4-6 weeks
Notes	

Disease / disorder	CADASIL
Sample type requested	3ml of venous blood in EDTA
Analysis offered	DNA sent to Glasgow will be screened for mutations in exons 2-6, 10, 18 and 22 of the NOTCH3 gene
Pick-up rate	
Reporting time	Within 2 months
Notes	Samples will <u>not</u> be sent to Glasgow unless there is MRI evidence to support diagnosis of CADASIL.

Additional Tests offered by other Scottish laboratories

Additional tests offered by the Scottish Genetics Laboratory Consortium and other special notes

Aberdeen:

Myotonic Dystrophy Type 2

Glucocorticoid remediable aldosteronism

Long QT Syndrome (KCNQ1, KCNH2, SCN5A, KCNE1, KCNE2)

Download Aberdeen proforma [here](#)

Familial Hypercholesterolaemia (LDLR gene and common ApoB and PCSK9 mutations)

Download Aberdeen proforma [here](#)

Arrhythmogenic right ventricular cardiomyopathy (PKP2)

Edinburgh:

Hereditary Haemorrhagic Telangiectasia (ENG, ACVRL1)

Ornithine Transcarbamylase Deficiency

Achondroplasia; FGFR3

HOCM Familial hypertrophic cardiomyopathy

Glasgow:

SCN1A (severe myoclonic epilepsy of infancy)

Download Glasgow proforma [here](#)

CHARGE (CHD7 screen)

Download Glasgow proforma [here](#)

Nephronophthisis (Familial juvenile)

SBMA (Kennedy Disease)

Melanoma (CDKN2A)

Newcastle:

Facioscapulohumeral Muscular Dystrophy (FSHMD).

A **10ml** sample of blood in EDTA is required for this analysis – the blood is sent directly to Newcastle

Referral Laboratories in Scotland

North of Scotland Regional Genetics Service

Polwarth Building,
University of Aberdeen
Medical School,
Foresterhill,
Aberdeen
AB25 2ZD

Phone 01224 553893

South East Scotland Genetics Service

Molecular Medicine Centre
Western General Hospital
Crewe Road
Edinburgh
EH4 2XU

Phone 0131 651 1045 / 1046

West of Scotland Regional Genetics Service

**Duncan Guthrie Institute of Medical Genetics,
NHSGGC**
Yorkhill
Glasgow
G3 8SJ

Phone 0141 201 0377

Addresses / Contact details of other UK laboratories

Addresses / Contact details of other UK **laboratories** which we refer samples to can be obtained by contacting us directly, or follow this link to UKGTN:
[UK Genetic Testing Network](#)