Appendix 1) Investigations for Developmental Delay; Blood tests costs (2014) and what results could indicate?

1st / 2nd/ 3rd Line	Test	Cost £	What is it looking for in relation to developmental delay?	Extra information
1,2	Acyl Carnitine profile*	£87.14	Diagnose Metabolic disorders eg fatty acid oxidation disorder or organic aciduria	Particularly if motor delay, seizures, lethargy
2	Ammonia	£17.14	Metabolic disorders eg Urea cycle defect, Organic aciduria	
1	Biotinidase*	£30.63	Biotinidase Deficiency	Treatable with Biotin. Rare to present with LD later. Usually sig neuro complications in neonatal period. **Under 2 only.** Maybe under 5 – v rare.
1,2	Calcium*	£1.62	Velo-cardio-facial Syndrome Williams Syndrome Pseudohypoparathyroidism	
1	Creatinine Kinase	£0.90	Duchenne Muscular Dystrophy Metabolic disorders eg Mitochondrial disease	
1,2	FBC, Ferritin	£4.14 + £5.80	Iron deficiency anaemia Global DD	Treatable & Contributory
1	**Genetics**: CGH microarray	£338	Genetic conditions including 22q, Williams, Angelman and Prader Willi. These small aberrations cannot be detected using cytogenetics or conventional CGH, but can be readily detected using array CGH.	Outcomes – 1) normal, 2) benign known variants, 3) known abnormal variants, 4) unknown variants – for further testing with parental samples. This will pick up deletion and duplication, cannot detect polyploidy, low level mosaicism and balanced chromosomal abnormalities such as reciprocal translocations inversion or ring chromosomes
2	**Genetics**: Fragile X	£112	Fragile X	Look at clinical features, large head. Girls can have this. If CGH array normal, have clinical suspicion.

2	**Genetics**: Molecular testing	£500 For Rett's gene, £200- UPD testing	MEPC2 (gene for Retts) UPD – (Uniparental disomy- Angelman –AS and Prader Willi- PWS) Myotonic Dystrophy	Angelman/PWS can be caused by microdeletion. An array would exclude this as a cause but would not detect the methylation/UPD/mutation mechanisms that also cause a proportion of AS/PWS.
1	**Genetics**: Karyotype*	£197	If Down's suspected. Usually would have been tested postnatally	QF-PCR(Quantitative Fluorescence Polymerase Chain Reaction- Rapid test For Trisomy-13, 18, 20- neonatal period- positive result confirmed by karyotype
2	**Genetics** referral	£400	Consider Dysmorphism Abnormal growth Sensory impairment Unusual behaviours Family history. Eg Prader-Willi Myotonic Dystrophy	
2	Homocysteine	£24.72	Homocysteinuria	
3	Iso-electric focussed transferrin (carbohydrate deficient transferrin)	£50.00	Congenital disorders of glycosylation (CDG) e.g. type 1a	
2 3	Lactate (plasma) or Paired CSF and plasma lactate	£8.60	Metabolic disorders eg Mitochondrial disease. Non ketotic hyperglycinaemia.(this will require paired CSF and plasma Glycine)	Concerns about growth, multisystem involvement, seizures – episodes of crisis, visual and hearing impairments, abnormal head size +/- MRI
1,2	Lead*	£24.49	Global developmental delay. Pica Low levels = mild cog impairments.	Consider in Pica, ASD, cog impairments. Potentially treatable with chelation. **Under 5 mainly.** Consider second line if older. Approx 10% children with dev delay and risk factor for lead exposure have elevated levels.

2	**Neuroimaging:** MRI w/o contrast (plus GA) CT w/o contrast	Approx. £443 (+£200) £259	Metabolic and genetic conditions Structural problems (CP/Storage disorders, cerebral dysgenesis)	MRI if abnormal neurology, abnormal head size, seizures, vision problems. CT only for suspected cerebral calcification e.g. in perinatal infection or to abnormality of skull bones.
2	**Neurophysiology:** Standard EEG 24hr EEG (plus admission cost)	Approx. £194 £400 (+£140)	Epilepsy	Seizures Speech regression (Landau-Kleffner)
2	Plasma Amino Acid	£67.18	Metabolic disorders	consider total homocysteine , if high index of suspiscion as plasma AA may not pick this up- marfanoid, habitus- lens , beh isuues, CVA
3	Paired Plasma Creatinine sample with urine Guanidinoacetate	£73.50	Disorders of Creatine metabolism and synthesis	
3	7-dehydrocholesterol	£24.55	Smith-Lemli-Opitz	
1	Thyroid Function Test	£10.15	Hypothyroidism -> Global DD. Chromosomal abnormalities also associated with hypothyroidism e.g. Turners, Velo-cardio-facial, Down's.	Treatable & common in those with chromosomal abnormalities e.g. Downs. Regular testing recommended despite neonatal screening being normal as features of hypothyroidism are harder to distinguish in patients with developmental delay and is also contributory by itself.
2	TORCH Screen*	£22.65	Looks for Toxoplasma, Rubella, CMV, and HSV(not tested routinely)	IUGR, microcephaly, sensory impairments.
1,2	U&E* LFT* Blood Gas or Chloride to calculate anion gap	£2.64 £3.81 £0.56-Chloride	For completeness	LFTs – particularly if child has seizures and may require antiepileptics. Anion gap is helpful in directing metabolic tests
1	Urate	£0.66	Purine Metabolism Disorders	More stable than lactate and ammonia. Particularly test in self mutilating behaviour.

1	**Urine** MPS screen GlycosoaminoglycansGAGs*	£35.74+ £45.95 if 2D electropho-resisis performed	Mucopolysaccharidoses e.g. MPS type III San Filippo syndrome.	Think if family history or clinical features. NB. In San Fillipo syndrome may have isolated cognitive delay and normal facies.
2	**Urine:** Organic Acid Sialyloligosaccharides	£60.69 £25.52	Metabolic disease.	Organic acidurias are often associated with acute decompensation episodes with hypoglycaemia and lactic acidosis.
2	VLCFA (Very long chain fatty acids)	£85.91	Peroxisomal disorders e.g. adrenoleukodystrophy	
2	White Cell Enzymes	£178.68	Lysosomal storage disorders	

References:

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