Supplementary Table 2. List of IMDs affecting respiratory tract, laboratory investigations, OMIM references and IEMbase IDs.

n=181	*Gene*	Respiratory failure (including insufficiency)	Restrictive lung disease	Interstitial lung disease	Lower airway disease (including wheezing; bronchitis; recurrent pneumonia; aspiration pneumonia)	Upper airway obstruction	Apnea (including obstructive sleep apnea syndrome; sleep disordered breathing)	Other	Laboratory investigatioins	OMIM no.	IEMbase ID
DISORDERS OF NITROGEN-CONTAINING COMPOUNDS (n = 20)											
Disorders of sulfur amino acid and sulfide metabolism											
Adenosine kinase deficiency	*ADK*				X[4]				SAM/SAH (P), ASAT/ALAT (P), Glucose (S), Amino acids (P), Purines (U), Total/direct bilirubin (S)	614300	IEM0101
S-adenosylhomocysteine hydrolase deficiency	*AHCY*	X							SAM/SAH (P), ASAT/ALAT (P), Glucose (S), Amino acids (P), Purines (U), Total/direct bilirubin (S)	613752	IEM0100
Disorders of glycine and serine metabolism											
Nonketotic hyperglycinemia due to glycine decarboxylase deficiency	*GLDC*						X[5]		Amino acids (P, CSF)	238300	IEM0185
Nonketotic hyperglycinemia due to aminomethyltransferase deficiency	*AMT*						X[5]		Amino acids (P, CSF)	605899	IEM0186
Glycine encephalopathy due to H protein deficiency	*GCSH*	X							Amino acids (P)	605899	IEM1120
Organic acidurias											
Methylmalonic aciduria due to methylmalonyl-CoA mutase deficiency	*MMUT*	X							Amino acids (P); Organic acids (U); Acylcarnitines (U, P, DBS); Anion gap	251000	IEM0127
Mitochondrial short-chain enoyl-CoA hydratase 1 deficiency	*ECHS1*						X[5]		Organic acids (U), 2-Methyl-2,3-dihydroxybutyrate (U), Lactate (P), Pyruvate (P), S-(2-carboxypropyl)-cysteine (U)	616277	IEM0119
Glutaryl-CoA dehydrogenase deficiency	*GCDH*				X[7]				ASAT/ALAT (P); Organic acids (U); Acylcarnitines (U, P, DBS)	231670	IEM0134
Disorders of branched-chain amino acid metabolism											
Mitochondrial short-chain enoyl-CoA hydratase 1 deficiency	*ECHS1*						X[5]		Organic acids (U), 2-Methyl-2,3-dihydroxybutyrate (U), Lactate (P), Pyruvate (P), S-(2-carboxypropyl)-cysteine (U)	616277	IEM0119
Propionic acidemia due to propionyl-CoA carboxylase subunit alpha deficiency	*PCCA*	X							Acyglycines (U), Amino acids (P), Organic acids (U), Acylcarnitines (P,DBS)	232000	IEM0124
Propionic acidemia due to propionyl-CoA carboxylase subunit beta deficiency	*PCCB*	X							Acyglycines (U), Amino acids (P), Organic acids (U), Acylcarnitines (P,DBS)	232000	IEM0125
Branched-chain ketoacid dehydrogenase E1 alpha deficiency	*BCKDHA*						X[5]		Amino acids (P), Organic acids (U)	248600	IEM0108
Branched-chain ketoacid dehydrogenase E1 beta deficiency	*BCKDHB*						X[5]		Amino acids (P), Organic acids (U)	248600	IEM0109
Dihydrolipoyl transacylase deficiency	*DBT*						X[5]		Amino acids (P), Organic acids (U), Acylcarnitines (DBS, P), Acylglycines (U), ASAT/ALAT (P), CK (P), Lactate (P), Ammonia (P), Glucose (S), Urinalysis	248600	IEM0110
Disorders of proline and ornithine metabolism											
Prolidase deficiency	*PEPD*							X[1]	Amino acids (U)	170100; 613230	IEM0144
Disorder of glutamate/glutamine and aspartate/asparagine metabolism											
Asparagine synthetase deficiency	*ASNS*	X							Amino acids (P)	615574	IEM0180
Glutaminase deficiency	*GLS*	X							Amino acids (U, CSF)	618328	IEM1083
Disorders of amino acid transport											
Lysinuric protein intolerance	*SLC7A7*	X		X[3]				X[8]	Amino acids (P, U), Ammonia (P), Ferritin (S), Lipid panel (S), Orotic acid (U)	222700	IEM0070
Glutamate neurotransmitter disorders											
Thorase deficiency	*ATAD1*	X							GABA free (CSF)	618011	IEM0175
Glycine neurotransmitter disorders											
Glycine transporter 1 deficiency	*SLC6A9*						X[5]		Glycine (CSF), Glycine (CSF) / Glycine (P) ratio	617301	IEM0187

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DISORDERS OF VITAMINS, COFACTORS, METALS AND MINERALS (n = 23)											
Disorders of tetrahydrobiopterin metabolism											
6-Pyruvoyl-tetrahydropterin synthase deficiency	*PTS*				X[7]				Amino acids (P); Pterins (DBS,U); DHPR activity (DBS); Biogenic amines (CSF), 5-methyl-THF (CSF)	261640	IEM0085
Dihydropteridine reductase deficiency	*QDPR*				X[7]				Amino acids (P); Pterins (DBS,U); DHPR activity (DBS); Biogenic amines (CSF), 5-methyl-THF (CSF)	261630	IEM0087
Disorders of lipoic acid and iron-sulfur metabolism											
IBA57 deficiency	*IBA57*	X							Lactate (P), Amino acids (P)	615330	IEM0198
NFS1 deficiency	*NFS1*	X							Lactate (P)	603485	IEM1123
Lipoyltransferase 2 deficiency	*LIPT2*							X[6, 9]	Amino acids (CSF, P), Lactate (P)	617668	IEM0192
Lipoyltransferase 1 deficiency	*LIPT1D*							X[6, 9]	Amino acids (CSF, P), Lactate (P)	616299	IEM0194
BOLA3 deficiency	*BOLA3*							X[6]	Amino acids (CSF, P), Lactate (P)	614299	IEM0196
ISD11 deficiency	*LYRM4*							X[6, 10]	Lactate (P)	615595	IEM1122
NFU1 deficiency	*NFU1*							X[9]	Amino acids (P), Organic acids (U), Lactate (P, U, CSF), Protein bound lipoic acid (FB)	605711	IEM0195
Disorders of biotin metabolism											
Biotinidase deficiency	*BTD*							X[10]	Acyglycines (U), Lactate (P), Organic acids (U), Acylcarnitines (P,DBS)	253260	IEM0227
Disorders of folate metabolism											
5,10-methylenetetrahydrofolate reductase deficiency	*MTHFR*	X					X[5]		Amino acids (P); Homocysteine (P); 5-Methyltetrahydrofolate (CSF), Folate (S)	236250	IEM0223
Disorders of riboflavin metabolism											
Riboflavin transporter 2 deficiency	*SLC52A3*	X							Flavins (B), Organic acids (U), Acylcarnitines (P,DBS)	211530	IEM0234
Riboflavin transporter 3 deficiency	*SLC52A2*	X							Flavins (B), Organic acids (U), Acylcarnitines (P,DBS)	614707	IEM0235
Disorders of molybdenum cofactor metabolism											
Cyclic pyranopterin monophosphate synthase deficiency	*MOCS1*						X[5]		Uric acid (P), Sulfite (U), a-aminosemialdehyde (CSF), PLP (CSF), Purines and pyrimidines (U), Amino acids (P)	603707	IEM0275
Gephyrin deficiency	*GPHN*						X[5]		Uric acid (P), Sulfite (U), a-aminosemialdehyde (CSF), PLP (CSF), Purines and pyrimidines (U), Amino acids (P)	603930	IEM0277
Disorders of niacin and NAD metabolism											
NAD(P)HX epimerase deficiency	*NAXE*	X							Cyclic NADHX (F)	617186	IEM0243
Disorders of pyridoxine metabolism											
Alpha-amino adipic semialdehyde (AASA) dehydrogenase deficiency	*AASA*	X							B6 vitaminers (CSF, P), Pipecolic acid (CSF, P, U), Delta1-piperideine-6-carboxylate (CSF, U)	266100	IEM0131
Pyridox(am)ine 5´- phosphate oxidase deficiency	*PNPO*	X							B6 vitaminers (CSF, P)	610090	IEM0250
Tissue-nonspecific alkaline phosphatase deficiency	*HOPS*	X							PLP (P), ALP (P), Calcium (P), Phosphate (P)	616683	IEM1227
Pyridoxal 5'-phosphate binding protein deficiency	*PLPBP*							X[6]	B6 vitaminers (CSF, P), Biogenic amines (CSF)	610090	IEM0250
Other disorders of vitamin metabolism											

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Vitamin A receptor deficiency	*STRA6*	X						X[11]	DNA	601186	IEM0256
Retinoic acid receptor β deficiency	*RARB*							X[11]	DNA	615524	IEM1067
Disorders of cobalamin metabolism											
Combined methylmalonic acidemia and homocysteinemia	*MMACHC*			X				X[9]	Homocysteine, total (P), B12 (S), Blood count, Organic acids (U), Acylcarnitines (DBS, P), Amino acids (P)	609831	IEM0213
DISORDERS OF CARBOHYDRATES (n=8)											
Disorders of insulin secretion and signaling											
Kabuki syndrome	*KMT2D*				X[7]			X[1]	DNA	147920	IEM1492
Beckwith Wiedemann syndrome	*H19;CDKN1C;KCNQ1*						X[12]		DNA	130650	IEM1513
Disorders of gluconeogenesis											
Fructose-1,6-bisphosphatase deficiency	*FBP1*							X[13]	Fatty acids and ketones (P, U), Triglyceride (S), Amino acids (P)	130650	IEM1513
Cytosolic phosphoenolpyruvate carboxykinase deficiency	*PCK1*						X[5]		Fatty acids and ketones (P, U), Triglyceride (S)	261680	IEM0373
Disorders of glycogen metabolism											
Glucose-6-phosphatase deficiency	*G6PC*							X[9, 13]	ASAT/ALAT (P), Lactate (P), Glucose (S), Glycogen (L), Biotinidase (P)	232200	IEM0370
Glucose-6-phosphate transporter deficiency	*SLC37A4*							X[9, 13]	ASAT/ALAT (P), CK (P), Lactate (P), Glucose (P), Biotinidase (P)	232220	IEM0355
Alpha-glucosidase deficiency (Pompe disease)	*GAA*	X					X[12]	X[1, 14]	ASAT/ALAT (P), CK (P), Glycogen (M)	232300	IEM0356
HOIL1 interacting protein deficiency	*RNF31*							X[6]	DNA	612487	IEM1135
MITOCHONDRIAL DISORDERS OF ENERGY METABOLISM (n=30)											
Disorders of the Krebs cycle											
ATP-specific succinyl-CoA ligase β subunit deficiency	*SUCLA2*							X[6]	Organic acids (U), Acylcarnitines (U, Lactate (P))	612073	IEM0399
GTP-specific succinyl-CoA ligase α subunit deficiency	*SUCLG1*						X[5]	X[1, 6]	Organic acids (U), Acylcarnitines (DBS, P), ASAT/ALAT (P), Lactate (P)	245400	IEM0400
Cytosolic NADP+-dependent isocitrate dehydrogenase 1 superactivity	*IDH1*							X[1]	Organic acids (U)	147700	IEM1090
Alpha-ketoglutarate dehydrogenase deficiency	*OGDH*							X[6]	Organic acids (U), Glucose (P), Lactate (P), Fatty acids and ketones (P, U)	203740	IEM1137
Disorders of mitochondrial carriers											
Mitochondrial citrate carrier deficiency	*SLC25A1*	X						X[10, 12, 15]	Organic acids (U, P, CSF)	615182	IEM0411
Mitochondrial ATP-Mg-phosphate transporter deficiency	*SLC25A24*	X						X[9, 11]	DNA	612289	IEM0412
Mitochondrial aspartate-glutamate carrier isoform 1 deficiency	*SLC25A12*						X[5]		Lactate (P)	612949	IEM0408
Disorders of complex I subunits and assembly factors											
FOXRED1 deficiency	*FOXRED1*							X[9]	Lactate (P)	618241	IEM0443
Disorders of complex IV subunits											
Cytochrome c oxidase subunit NDUFA4 (COXFA4) deficiency	*NDUFA4*	X							Lactate (P)	603833	IEM1149

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SCO1 deficiency	*SCO1*							X[6]	Lactate (P)	220110	IEM0473
SCO2 deficiency	*SCO2*	X							Lactate (P)	604377, 608908	IEM0474
SURF1 deficiency	*SURF1*	X							Lactate (P)	256000, 616684	IEM0475
COX11 deficiency	*COX11*							X[6]	Lactate (P), Glucose (P)	603648	IEM1938
Cytochrome c oxidase subunit 8A deficiency	*COX8A*							X[9]	DNA	220110	IEM1145
Disorders of complex V subunits											
Transmembrane protein 70 deficiency	*TMEM70*	X							CK (P), Lactate (P), Ammonia (P), 3-Methylglutaconic acid (U)	614052	IEM0486
DAPIT deficiency	*ATP5MD*	X							Lactate (P), Amino acids (P)	615204	IEM1034
Disorders of mitochondrial DNA depletion, multiple deletion, or intergenomic communication											
Mitochondrial genome maintenance exonuclease 1 deficiency	*MGME1*	X						X[15]	Lactate (P)	615084	IEM0501
Disorders of mtDNA replication and maintenance											
DNA2 helicase deficiency	*DNA2*						X[5]	X[15]	DNA	615156	IEM0499
Mitochondrial ribonuclease H1 deficiency	*RNASEH1*	X						X[14, 15]	Lactate (P)	615156	IEM0500
Disorders of mitochondrial transcript processing and modification											
Mitochondrial poly(A) exoribonuclease deficiency	*PDE12*						X[5]		Lactate (P), Pyruvate (P), Amino acids (P), Organic acids (U)	616519	IEM1154
Mitochondrial encephalomyopathy with complex I and IV deficiency (SLIRP)	*SLIRP*							X[10]	Lactate (P, CSF)	610211	IEM1905
Disorders of mitochondrial membrane biogenesis and remodeling											
PNPLA4 deficiency	*PNPLA4*	X							DNA	300102	IEM1160
Tafazzin deficiency	*TAZ*							X[6]	Organic acids (U), Lipid panel (S), Urinalysis, 3-Methylglutaconic acid (U), 3-Methylglutaric acid (U), Carnitine, free (P), Blood count	302060	IEM0583
Disorders of mitochondrial protein quality control											
LONP1 deficiency	*LONP1*	X							DNA	600373	IEM0596
HTRA2 deficiency	*HTRA2*	X[16]							Lactate (P), Organic acids (U)	617248	IEM0602
HSP60 deficiency (recessive)	*HSPD1*						X[5]		Lactate (P), Organic acids (U)	612233, 605280	IEM0598
Disorders of mitochonfrial cofactor biosynthesis											
Coenzyme Q7 hydroxylase deficiency	*COQ7*							X[6, 9]	Lactate (P), Organic acids (U)	616733	IEM0623
Coenzyme Q4 deficiency	*COQ4*	X							Lactate (P), CoQ10 (M, P, WBC)	616276	IEM0621
Prenyl diphosphate synthase subunit 1 deficiency	*PDSS1*							X[9]	DNA	607429, 607426	IEM0618
Disorders of mitochondrial aminoacyl-tRNA synthetases											
Mitochondrial seryl-tRNA synthetase deficiency	*SARS2*							X[9]	Lactate (P), Uric acid (S)	613845	IEM0563
DISORDERS OF LIPIDS (n=20)											

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Disorders of phosphoinositide metabolism											
Immunodeficiency 97 with autoinflammation	*PIK3CG*			X					LDH (P), Ferritin (S), Cytokines (S)	619802	IEM1920
Phosphatidylinositol 4,5-bisphosphate phospholipase C β4 deficiency	*PLCB4*						X[5]		DNA	614669	IEM0708
Disorders of glycerophospholipid metabolism											
Phosphatidylinositol 4-phosphate 5-kinase deficiency	*PIP5K1C*	X							DNA	611369	IEM0703
Myotubularin 1 deficiency	*MTM1*	X[17]						X[6]	DNA	310400	IEM0694
Catalytic phosphatidylinositol 3-kinase δ subunit superactivity	*PIK3CD*							X[1]	IgG; IgM (S)	615513	IEM0699
Phosphatidylinositol 3-kinase regulatory subunit 1 deficiency	*PIK3R1*				X[18]			X[1]	IgG; IgA; IgM (S)	269880, 616005	IEM0700
Phosphatidylinositol 3,4,5-trisphosphate 5-phosphatase deficiency	*INPPL1*							X[1]	Phosphate (P), DNA	258480	IEM0705
Phosphatidylinositol 4,5-bisphosphate phospholipase C β3 deficiency	*PLCB3*	X							DNA	600230	IEM1138
Phosphatidylinositol 3,5-bisphosphate-5-phosphatase deficiency, neuroskeletal phenotype	*FIG4*							X[9]	DNA	216340	IEM0691
Disorders of cholesterol biosynthesis											
Chondrodysplasia punctata 2, recessive (Conradi-Hünermann syndrome)	*EBP*							X[19]	Sterols (P)	302960	IEM0749
Smith-Lemli-Opitz syndrome	*DHCR7*							X[11, 20]	ASAT/ALAT (P), Lipid panel (S), 7/8-Dehydrocholesterol (P)	270400	IEM0753
Geranylgeranyl pyrophosphate synthase deficiency	*GGPS1*	X							CK (P)	606982	IEM1185
Desmosterolosis	*DHCR24*							X[11]	Sterols (P)	602398	IEM0752
Sterol C14 reductase deficiency	*LBR*							X[11, 22]	Sterols (FB)	215140	IEM0745
Disorders of steroid metabolism											
Cytochrome P450 oxidoreductase deficiency (Antley-Bixler syndrome)	*POR*	X							Steroids (P, U)	610377	IEM0740
Mevalonate kinase deficiency (severe)	*MVK*					X		X[6]	Leucotriens (P), Organic acids (U)	201750	IEM0760
Disorders of bile acid metabolism											
Sterol 27-hydroxylase deficiency	*CYP27A1*	X							Lipid panel (S); Sterols (P); Cholestane pentol glucuronide (U); 25-Hydroxy-Vitamin D (P)	213700	IEM0782
Disorders of bilirubin metabolism and biliary transport											
ATP8B1 deficiency (Byler disease)	*ATP8B1*				X[7]				Bile acids (P,U), Chloride (sweat)	211600	IEM0805
Disorders of ketone body metabolism											
3-Hydroxy-3-methylglutaryl-CoA lyase deficiency	*HMGCL*							X[6]	Amino acids (P), Organic acids (U), Acylcarnitines (DBS, P), ASAT/ALAT (P), Lactate (P), Ammonia (P)	246450	IEM0122
Isolated deficiency of long-chain 3-ketoacyl CoA thiolase (1 patient)	*HADHB*							X[23]	Organic acids (U), Acylcarnitines (DBS, P), ASAT/ALAT (P), CK (P), Lactate (P), Ammonia (P), Glucose (S), Dicarboxylic acids (U)	143450	IEM1247
STORAGE DISORDERS (n=30)											
Disorders of autophagy											
EPG5 deficiency (Vici syndrome)	*EPG5*							X[1]	DNA	242840	IEM0811

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CHMP2B deficiency	*CHMP2B*	X							DNA	614696	IEM1243
TBCK deficiency	*TBCK*	X							DNA	616899	IEM1236
Spatacsin deficiency	*SPG11*	X							DNA	602099	IEM0814
DCTN1 deficiency	*DCTN1*	X							DNA	168605	IEM1241
TECPR2 deficiency	*TECPR2*						X		DNA	615031	IEM0817
Sphingolipidoses											
Glucocerebrosidase deficiency (Gaucher disease)	*GBA*		X					X[9]	Glucosylsphingosine (S); Chitotriosidase (B)	230800	IEM0832
Acid sphingomyelinase deficiency (Niemann-Pick type A)	*SMPD1*			X[24]					Lysosomal enzymes (DBS)	257200; 607616	IEM0834
Acid sphingomyelinase deficiency, visceral type (Niemann-Pick type B)	*SMPD1*			X[3]				X[1, 15]	Lysosomal enzymes (DBS)	257200; 607616	IEM0834
Niemann-Pick Diesease Type C2	*NPC2*	X		X[3]				X[25]	Oxysterols (P); Filipin staining (F)	607625	IEM0871
Beta-galactosylceramidase deficiency (Krabbe disease)	*GALC*	X						X[1]	DNA	245200	IEM0839
Krabbe disease-like disorder due to saposin A deficiency	*PSAP*	X					X[5]		Sulfatides (U), Protein (CSF), Lysosomal enzymes (DBS)	611722	IEM0833
Alpha-galactosidase A deficiency (Fabry disease)	*GLA*					X		X[1, 15]	Globotriaosylceramide (P); Globotriaosylsphingosine (P)	301500	IEM0844
Acid ceramidase deficiency, primary neurologic phenotype (Farber disease)	*ASAH1*	X			X[26]			X[1]	Lysosomal enzymes (DBS)	228000	IEM0845
Oligosaccharidoses											
Alpha-L-fucosidase deficiency	*FUCA1*							X[1]	Enzyme activity (DBS,WBC), Fucose (U)	230000	IEM0853
Mucopolysaccharidoses											
Alpha-iduronidase deficiency (Hurler syndrome)	*IDUA*		X			X	X[12]		Total GAGs (U), Dermatan sulfate (U), Heparan sulfate (U), Enzyme activity (WBC)	607014; 607015; 607016	IEM0858
Iduronate 2-sulfatase deficiency (Hunter disease)	*IDS*		X			X	X[12]		Total GAGs (U), Dermatan sulfate (U), Heparan sulfate (U), Enzyme activity (WBC)	309900	IEM0859
Heparan N-sulfatase deficiency (Sanfilippo A disease)	*SGSH*							X[27]	Mucopolysaccharides (U); Enzyme assay (DBS, L, F)	252900	IEM0860
N-acetylglucosaminidase deficiency (Sanfilippo B disease)	*NAGLU*							X[27]	Mucopolysaccharides (U); Enzyme assay (DBS, S, F)	252920	IEM0861
Heparan-alpha-glucosaminide N-acetyltransferase deficiency (Sanfilippo syndrome type C)	*HGSNAT*		X					X[27]	Mucopolysaccharides (U); Enzyme assay (DBS, L, F)	252930	IEM0862
N-acetylgalactosamine 6-sulfatase deficiency (Morquio A disease)	*GALNS*		X		X[7]			X[27]	Total GAGs (U), Keratan sulfate (U), Enzyme activity (WBC)	252930	IEM0864
Beta-galactosidase deficiency, GM1 gangliosidosis phenotype	*GLB1*		X						Oligosaccharides (U), Lysosomal enzymes (DBS)	253010	IEM0835
N-acetylgalactosamine 4-sulfatase deficiency (MPS6) (Maroteaux - Lamy disease)	*ARSB*					X	X[12]		Total GAGs (U), Dermatan sulfate (U), Enzyme activity (WBC)	253200	IEM0866
Mucopolysaccharidosis-plus syndrome	*VPS33A*	X			X			X[1, 6]	Mucopolysaccharides (U), Oligosaccharides (U)	617303	IEM0869
Disorders of lysosome-related organelle biogenesis											
Hermansky-Pudlak syndrome type 1	*HPS1*		X		X[28]				DNA	203300	IEM1383
Hermansky-Pudlak syndrome type 2	*AP3B1*				X[7, 28]				DNA	608233	IEM1384
Hermansky-Pudlak syndrome type 4	*HPS4*		X		X[28]				DNA	614073	IEM1386

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Hermansky-Pudlak syndrome type 6	*HPS6*							X[27]	DNA	614075	IEM1388
Hermansky-Pudlak syndrome type 10	*AP3D1*			X			X[5]	X[1]	DNA	617050	IEM1392
Disorders of complex molecule degradation											
Lysosomal acid lipase deficiency (Wolman syndrome)	*LIPA*							X[9]	Lipid panel (S), , Enzyme activity (S)	278000	IEM0872
DISORDERS OF PEROXISOMES (n=8)											
Disorders of plasmalogen synthesis											
Peroxisomal targeting signal 2 receptor deficiency	*PEX7*	X			X[7]				Plasmalogens (RBC)	215100	IEM0878
Glycerone 3-phosphate acyltransferase deficiency	*GNPAT*				X[7]			X[1]	VLCFA (P), Plasmalogens (P)	602744	IEM0879
Alkylglycerone 3-phosphate synthase deficiency	*AGPS*				X[7]			X[1]	VLCFA (P), Plasmalogens (P)	600121	IEM0880
Disorders of peroxisomal β-oxidation											
X-linked adrenoleukodystrophy and adrenomyeloneuropathy	*ABCD1*				X[29]				VLCFA (P)	300100	IEM0883
Disorders of peroxisomal biogenesis											
Peroxin 1 deficiency (Zellweger 1A)	*PEX1*							X[11, 25]	VLCFA (P), Pipecolic acid (P)	234580; 214100; 601539	IEM0889
Peroxin 5 deficiency (Zellweger 2A)	*PEX5*						X[5]		ASAT/ALAT (P), VLCFA (P), Pipecolic acid (P, U)	214110	IEM0882
Peroxin 6 deficiency (Zellweger 4A)	*PEX6*	X							VLCFA (P), Pipecolic acid (P)	614862; 614863; 616617	IEM0893
Peroxin 13 deficiency (Zellweger 11A)	*PEX13*						X[5]		VLCFA (P), Pipecolic acid (P)	614883; 614885	IEM0897
CONGENITAL DISORDERS OF GLYCOSYLATION (n=22)											
Disorders of N-linked glycosylation											
RFT1-CDG	*RFT1*	X							Sialotransferins (S), ASAT/ALAT (P), coagulation factors (P)	612015	IEM0917
ALG12-CDG	*ALG12*							X[1]	ASAT/ALAT (P), Glucose (S), Lipid panel (S), Sialotransferins (S), IGF BP3, Antithrombin III (P)	607143	IEM0920
MGAT2-CDG	*MGAT2*	X							ASAT/ALAT (P), CK (P), Sialotransferins (S), Factor IX and XII (B), Antithrombin III (P)	212066	IEM0931
STT3B-CDG	*STT3B*	X							Sialotrasferrins (S)	615597	IEM1193
FUT8-CDG	*FUT8*				X[30]				Glucose (P); Blood count	618005	IEM0932
ALG11-CDG	*ALG11*							X[11]	Factor XI (B), Antithrombin III (P), Sialotrasferrins (S)	613661	IEM0916
GCS1-CDG	*MOGS*	X					X[5]		ASAT/ALAT (P), Oligosaccharide (U), Sialotransferins (S)	606056	IEM0927
PGM1-CDG	*PGM1*							X[11]	ASAT/ALAT (P), CK (P), Ammonia (P), Sialotransferrins (S), Antithrombin III (P)	614921	IEM1003
DPM2-CDG	*DPM2*							X[1, 6]	ASAT/ALAT (P), CK (P), Sialotransferrins (S)	615042	IEM0996
MAN2B2-CDG	*MAN2B2*				X[7]				Sialotransferrins (S), C-reaktive protein, CRP (P), IgE (S)		
SSR3-CDG	*SSR3*							X[6]	DNA	606213	IEM1548
Disorders of O-linked protein glycosylation											

Supplementary Table 2. List of IMDs affecting respiratory tract, laboratory investigations, OMIM references and IEMbase IDs.

n=181	*Gene*	Respiratory failure (including insufficiency)	Restrictive lung disease	Interstitial lung disease	Lower airway disease (including wheezing; bronchitis; recurrent pneumonia; aspiration pneumonia)	Upper airway obstruction	Apnea (including obstructive sleep apnea syndrome; sleep disordered breathing)	Other	Laboratory investigatioins	OMIM no.	IEMbase ID
NDST1-CDG	*NDST1*					X		X[1]	DNA	616116	IEM1041
Disorders of lipid glycosylation											
PGAP1-CDG	*PGAP1*						X[5]		DNA	615802	IEM0984
Disorders of O-mannosylation											
FKTN-CDG A	*FKRP*	X							CK (P), DNA	253800	IEM0940
FKRP-CDG C	*FKRP*	X							CK (P), DNA	606596	IEM0941
Disorders of O-xylosylation and glycosaminoglycan synthesis											
Glycosaminoglycan xylosylkinase deficiency	*FAM20B*							X[6]	DNA	611063	IEM1550
Sulfate transporter deficiency	*SLC26A2*	X							DNA	222600	IEM0960
Disorders of nucleotide-sugar synthesis											
GMPPA-CDG	*GMPPA*							X[25]	DNA	615510	IEM1006
GMPPB-CDG	*GMPPB*	X	X						CK (P), Sialotrasferrins (S)	615350, 615350, 615351, 615352	IEM1007
Disorders of vesicular trafficking											
AP4E1deficiency	*AP4E1*		X					X[32, 33]	DNA	607244	IEM1235
COPA deficiency	*COPA*			X				X[15]	DNA	616414	IEM1403
Disorders of multiple glycosylation pathways											
UDP-GlcNAc epimerase-kinase deficiency	*GNE*	X[34]							CK (P), Sialotransferrins (S)	600737, 605820	IEM0999
METABOLISM OF HETEROCYCLIC COMPOUNDS (n=20)											
Disorders of purine metabolism											
Phosphoribosyl pyrophosphate synthetase 1 deficiency	*PRPS1*							X[1]	Lactate (P), DNA	311850	IEM0008
Disorders of ectonucleotide and nucleic acid metabolism											
Ectonucleotide pyrophosphatase-phosphodiesterase 1 deficiency	*ENPP1*							X[2]	ALP (P); Calcium (P); Phosphate (P)	208000	IEM0037
2',5'-Oligoadenylate synthetase 1 deficiency	*OAS1*				X[3]			X[1]	IgG(S), Leukocytes (B)	222100	IEM0035
STING superactivity	*TMEM173*			X	X[28]			X[1, 13]	CRP (P); Interferon-stimulated genes or interferon signature (PBMC); Erythrocyte sedimentation rate; IgG (S)	615934	IEM0034
Ribonuclease H2 subunit C deficiency	*RNASEH2C*							X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF), C26:0 fatty acids (P)	610329	IEM0028
Ribonuclease H2 subunit B deficiency	*RNASEH2B*							X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF), C26:0 fatty acids (P)	610181	IEM0027
Ribonuclease H2 subunit A deficiency	*RNASEH2A*	X						X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF), C26:0 fatty acids (P)	610333	IEM0029
3' Repair exonuclease 1 deficiency	*TREX1*							X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF), C26:0 lysophosphatidylcholine	225750	IEM0026
SAMHD1 deficiency	*SAMHD1*							X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF), C26:0 fatty acids (P)	612952	IEM0031
RNA-specific adenosine deaminase deficiency	*ADAR*							X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF)	615010	IEM0032

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MDA5 superactivity	*IFIH1*							X[9]	ASAT/ALAT (P), Blood count (B), Interferon-alpha (B), Pterins (CSF), C26:0 fatty acids (P)	615846	IEM0033
Disorders of non-mitochondrial tRNA processing and aminoacyl-tRNA synthetases											
Methionyl-tRNA synthetase 1 deficiency	*MARS1*	X		X[3]	X[27]			X[31]	DNA	156560	IEM1312
Phenylalanyl-tRNA synthetase subunit alpha deficiency	*FARSA*			X					DNA	619013	IEM1313
Phenylalanyl-tRNA synthetase subunit beta deficiency	*FARSB*			X					DNA	613658	IEM1314
Mitochondrial valyl-tRNA synthetase deficiency	*VARS2*							X[1]	Lactate (P)	615917	IEM0565
Disorders of ribosomal biogenesis											
Treacher Collins syndrome type 1	*TCOF1*							X[35]	DNA	154500	IEM1322
Treacher Collins syndrome type 4	*POLR1B*	X							DNA	618939	IEM1325
Diamond-Blackfan anemia type 6	*RPL5*							X[36]	Reticulocytes (B)	300946	IEM1355
Diamond-Blackfan anemia type 10	*RPS26*							X[6]	Reticulocytes (B)	613309	IEM1351
Diamond-Blackfan anemia type 15	*RPS28*							X[6]	Reticulocytes (B)	606164	IEM1356

Notes

1 Recurrent respiratory infections

2 Pulmonary hypertension - case report: Farquhar J, Makhseed N, Sargent M, Taylor G, Osiovich H. Idiopathic infantile arterial calcification and persistent pulmonary hypertension. Am J Perinatol. 2005 Apr;22(3):121-5. doi: 10.1055/s-2005-863787. PMID: 15838744.

3 Pulmonary alveolar proteinosis

4 Aspiration pneumonia - case report:Shakiba M, Mahjoub F, Fazilaty H, Rezagholizadeh F, Shakiba A, Ziadlou M, Gahl WA, Behnam B. Adenosine kinase deficiency with neurodevelopemental delay and recurrent hepatic dysfunction: A case report. Adv Rare Dis. 2016;3:2. doi: 10.12715/ard.2014.3.2. Epub 2016 Jul 21. PMID: 27500280; PMCID: PMC4975537.

5 Apnea

6 Respiratory distress

7 Pneumonia

8 Pulmonar hemorrhages

9 Pulmonary hypertension

10 Inspiratory stridor

11 Pulmonary hypoplasia

12 Obstructive Sleep Apneas

13 Tachypnea/polypnea (e.g. Kussmaul breathing)

14 Orthopnea

15 Dyspnea

16 Respiratory failure (case report: Kovacs-Nagy R, Morin G, Nouri MA, Brandau O, Saadi NW, Nouri MA, van den Broek F, Prokisch H, Mayr JA, Wortmann SB. HTRA2 Defect: A Recognizable Inborn Error of Metabolism with 3-Methylglutaconic Aciduria as Discriminating Feature Characterized by Neonatal Movement Disorder and Epilepsy-Report of 11 Patients. Neuropediatrics. 2018 Dec;49(6):373-378. doi: 10.1055/s-0038-1667345. Epub 2018 Aug 16. PMID: 30114719.)

17 Respiratory failure, diaphragm dysfunction

18 Bronchiectasis

19 Respiratory compromise secondary to calcification of the laryngotracheobronchial tree (Hochman M, Fee WE Jr. Conradi-Hunerman syndrome. Case report. Ann Otol Rhinol Laryngol. 1987 Sep-Oct;96(5):565-8. doi: 10.1177/000348948709600517. PMID: 3674654)

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	20	Abnormal pulmonary lobation									
	21	Laryngeal/tracheal calcification									
	22	Underdeveloped lungs									
	23	Pulmonary edema									
	24	Pulmonary interstitial changes									
	25	Neonatal respiratory distress									
	26	Lung infiltrates									
	27	Recurrent upper respiratory tract infections									
	28	Pulmonary fibrosis									
	29	Cystic lung disease - case report: Abdulhamid I, Saadeh S, Cakan N. A three-year-old boy with X-linked adrenoleukodystrophy and congenital pulmonary adenomatoid malformation: a case report. J Med Case Rep. 2009 Dec 14;3:9329. doi: 10.1186/1752-1947-3-9329. PMID: 20090870; PMCID: PMC2809071.									
	30	Bronchopneumonia									
	31	Dyspnea (Donoghue SE, White SM, Tan TY, Kowalski R, Morava E, Yaplito-Lee J. Galactose treatment of a PGM1 patient presenting with restrictive cardiomyopathy. JIMD Rep. 2020 Oct 19;57(1):29-37. doi: 10.1002/jmd2.12177. PMID: 33473337; PMCID: PMC7802629.)									
	32	Aspiration									
	33	Pulmonary infections									
	34	Respiratory dysfunction									
	35	Hypoplasia of the pharynx									
	36	Tracheomalacia									