Phosphorus Diagnostics

Cardiology Panel List

Panel	Description	# of Genes	Genes	ICD-10 Suggestions*
LIPIDEMIAS				
Familial Hypercholesterolemia				
Familial Hypercholesterolemia	Includes the genes most commonly associated with familial hypercholesterolemia.	4	APOB, LDLR, LDLRAP1, PCSK9	E78.01 Familial hypercholesterolemia Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease Z86.74 Personal history of sudden cardiac arrest
ARRHYTHMIAS				
Brugada Syndrome				
Brugada Syndrome	Includes the genes most commonly associated with Brugada syndrome.	10	ABCC9, CACNA1C, CACNB2, GPD1L, HCN4, KCNE3, KCNH2, PKP2, SCN10A, SCN5A	Q23.8 Brugada syndrome R55 Syncope and collapse R94.31 Abnormal electrocardiogram (ECG or EKG) Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to Brugada syndrome.	10	CACNA2D1, KCND3, KCNE5, KCNJ8, RANGRF, SCN1B, SCN2B, SCN3B, SLMAP, TRPM4	
Catecholaminergic Polymorphic Ventricular Tachycardia				
Catecholaminergic Polymorphic Ventricular Tachycardia	Includes the genes most commonly associated with catecholaminergic polymorphic ventricular tachycardia syndrome.	8	ANK2, CALM1, CALM2, CALM3, CASQ2, KCNJ2, RYR2, TRDN	I49.9 Catecholaminergic polymorphic ventricular tachycardia (CPVT) I46.2 Cardiac arrest R55 Syncope and collapse R94.31 Abnormal electrocardiogram (ECG or EKG) Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Long QT Syndrome				
Long QT Syndrome	Includes the genes most commonly associated with long QT syndrome.	15	ANK2, CACNA1C, CALM1, CALM2, CALM3, CAV3, KCNE1, KCNE2, KCNH2, KCNJ2, KCNQ1, SCN4B, SCN5A, SNTA1, TRDN	I45.81 Long QT syndrome I46.2 Cardiac arrest R55 Syncope and collapse R94.31 Abnormal electrocardiogram (ECG or EKG) Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to long QT syndrome.	2	AKAP9, KCNJ5	
Short QT Syndrome				
Short QT Syndrome	Includes the genes most commonly associated with short QT syndrome.	6	CACNA1C, CACNA2D1, CACNB2, KCNH2, KCNJ2, KCNQ1	I49.9 Short QT syndrome R55 Syncope and collapse R94.31 Abnormal electrocardiogram (ECG or EKG) Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Pan Arrhythmia				
Pan Arrhythmia	Includes the genes most commonly associated with heritable arrhythmias, including long QT syndrome, short QT syndrome, arrhythmogenic cardiomyopathy, catecholaminergic polymorphic ventricular tachycardia, and Brugada syndrome.	42	ABCC9, ACTN2, ANK2, CACNA1C, CACNA2D1, CACNB2, CALM1, CALM2, CALM3, CASQ2, CAV3, DES, DSC2, DSG2, DSP, EMD, GPD1L, HCN4, JUP, KCNE1, KCNE2, KCNE3, KCNH2, KCNJ2, KCNQ1, LDB3, LMNA, PKP2, PLN, PRKAG2, RBM20, RYR2, SCN10A, SCN4B, SCN5A, SNTA1, TGFB3, TMEM43, TNNI3, TNNT2, TRDN, TTN	I45.81 Long QT syndrome Q23.8 Brugada syndrome I49.9 Catecholaminergic polymorphic ventricular tachycardia (CPVT) I49.9 Short QT syndrome R55 Syncope and collapse R94.31 Abnormal electrocardiogram (ECG or EKG) Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is emerging evidence that mutations in these genes are related to heritable arrhythmias.	14	AKAP9, ANKRD1, CTNNA3, KCND3, KCNE5, KCNJ5, KCNJ8, PDLIM3, RANGRF, SCN1B, SCN2B, SCN3B, SLMAP, TRPM4	
CARDIOMYOPATHIES				
Arrhythmogenic Cardiomyopathy				
Arrhythmogenic Cardiomyopathy	Includes genes that cause disorders that can present with both arrhythmias and cardiomyopathies, including arrhythmogenic right ventricular dysplasia/cardiomyopathy (ARVC).	20	ACTN2, DES, DSC2, DSG2, DSP, EMD, JUP, LDB3, LMNA, PKP2, PLN, PRKAG2, RBM20, RYR2, SCN5A, TGFB3, TMEM43, TNNI3, TNNT2, TTN	I42.9 Cardiomyopathy, unspecified I43 Syndromic cardiomyopathy I51.7 Ventricular hypertrophy Z86.74 Personal history of sudden cardiac arrest I49.8 Other specified cardiac arrhythmias R94.31 Abnormal electrocardiogram (ECG or EKG) I47.2 Ventricular tachycardia Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to arrhythmogenic cardiomyopathy.	3	ANKRD1, CTNNA3, PDLIM3	
Dilated Cardiomyopathy				
Dilated Cardiomyopathy	Includes the genes most commonly involved in dilated cardiomyopathy (DCM). Includes genes that cause primary DCM as well as syndromic conditions with DCM as a symptom, including Danon disease, Duchenne and Becker muscular dystrophy, Emery-Dreifuss muscular dystrophy, and transthyretin amyloidosis.	42	ABCC9, ACTC1, ACTN2, BAG3, CAV3, CRYAB, CSRP3, DES, DMD, DOLK, DSC2, DSG2, DSP, EMD, EYA4, FKRP, FKTN, FLNC, JUP, LAMP2, LDB3, LMNA, MYBPC3, MYH7, PKP2, PLN, RAF1, RBM20, RYR2, SCN5A, SGCD, SLC22A5, TAZ, TCAP, TMEM43, TNNC1, TNNI3, TNNT2, TPM1, TTN, TTR, VCL	I42.0 Dilated cardiomyopathy I42.9 Cardiomyopathy, unspecified I43 Syndromic cardiomyopathy I51.7 Ventricular hypertrophy Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to DCM.	20	ANKRD1, CHRM2, CTF1, FHL2, GATA4, GATA6, GATAD1, ILK, LAMA4, LRRC10, MYH6, MYPN, NEBL, NEXN, NKX2-5, NPPA, PLEKHM2, PDLIM3, TMPO, TXNRD2	
Recessive Pediatric Syndromes	Add-on genes related to recessive, pediatric-onset syndromes that may have DCM as a symptom.	6	ACADVL, ALMS1, CPT2, DNAJC19, SDHA, TMEM70	

*This list is not comprehensive and it is the ordering provider's responsibility to select the most appropriate ICD-10 code.

Phosphorus Diagnostics

Cardiology Panel List

Panel	Description	# of Genes	Genes	ICD-10 Suggestions*
CARDIOMYOPATHIES, CONTINUED				
Hypertrophic Cardiomyopathy				
Hypertrophic Cardiomyopathy	Includes the genes most commonly involved in hypertrophic cardiomyopathy (HCM). Includes genes that cause primary HCM as well as syndromic conditions with HCM as a feature, including Danon disease, Fabry disease, and Pompe disease.	27	ACTC1, ACTN2, AGL, BAG3, CACNA1C, CAV3, CSRP3, DES, FHL1, FLNC, GAA, GLA, LAMP2, LDB3, MYBPC3, MYH7, MYL2, MYL3, PLN, PRKAG2, TCAP, TNNC1, TNNI3, TNNT2, TPM1, TTR, VCL	I42.1 Hypertrophic obstructive cardiomyopathy I42.2 Hypertrophic non-obstructive cardiomyopathy I42.5 Cardiomyopathy, other restrictive I43 Syndromic cardiomyopathy Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to HCM.	11	ANKRD1, CALR3, GATA4, JPH2, MYH6, MYLK2, MYOM1, MYOZ2, MYPN, NEXN, PDLIM3	
RASopathies	Add-on RASopathy genes, a related group of disorders, including Noonan syndrome and cardiofaciocutaneous syndrome, that often include HCM as a feature.	18	A2ML1, BRAF, CBL, HRAS, KRAS, MAP2K1, MAP2K2, NF1, NRAS, PTPN11, RAF1, RASA1, RIT1, RRAS, SHOC2, SOS1, SOS2, SPRED1	
Recessive Pediatric Syndromes	Add-on genes related to recessive, pediatric-onset syndromes that may have hypertrophic cardiomyopathy as a feature.	4	ACADVL, CPT2, ELAC2, MTO1	
Left Ventricular Noncompaction				
Left Ventricular Noncompaction	Includes genes most commonly involved in left ventricular noncompaction (LVNC).	17	ACTC1, ACTN2, DSP, HCN4, LAMP2, LDB3, LMNA, MYBPC3, MYH7, PLN, RYR2, SCN5A, TAZ, TNNI3, TNNT2, TPM1, VCL	I42.0 Dilated cardiomyopathy I42.9 Cardiomyopathy, unspecified I43 Syndromic cardiomyopathy I51.7 Ventricular hypertrophy Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to LVNC.	2	DTNA, PLEKHM2	
Restrictive Cardiomyopathy				
Restrictive Cardiomyopathy	Includes genes most commonly involved with restrictive cardiomyopathy.	8	ACTC1, BAG3, DES, MYBPC3, MYH7, TNNI3, TNNT2, TTR	I42.5 Cardiomyopathy, other restrictive I42.9 Cardiomyopathy, unspecified I43 Syndromic cardiomyopathy I51.7 Ventricular hypertrophy Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is initial evidence that mutations in these genes may be related to Brugada syndrome.	2	FLNC, MYPN	
Pan Cardiomyopathy				
Pan Cardiomyopathy	Includes genes most commonly associated with heritable cardiomyopathies, including dilated cardiomyopathy, hypertrophic cardiomyopathy, arrhythmogenic cardiomyopathy, left ventricular noncompaction, and restrictive cardiomyopathy.	52	ABCC9, ACTC1, ACTN2, AGL, BAG3, CACNA1C, CAV3, CRYAB, CSRP3, DES, DMD, DOLK, DSC2, DSG2, DSP, EMD, EYA4, FHL1, FKRP, FKTN, FLNC, GAA, GLA, HCN4, JUP, LAMP2, LDB3, LMNA, MYBPC3, MYH7, MYL2, MYL3, PKP2, PLN, PRKAG2, RAF1, RBM20, RYR2, SCN5A, SGCD, SLC22A5, TAZ, TCAP, TGFB3, TMEM43, TNNC1, TNNI3, TNNT2, TPM1, TTN, TTR, VCL	I42.1 Hypertrophic obstructive cardiomyopathy I42.0 Dilated cardiomyopathy I42.2 Hypertrophic non-obstructive cardiomyopathy I42.5 Cardiomyopathy, other restrictive I42.8 Other cardiomyopathies I42.9 Cardiomyopathy, unspecified I43 Syndromic cardiomyopathy R55 Syncope and collapse Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is emerging evidence that mutations in these genes are related to heritable cardiomyopathies.	27	ANKRD1, CALR3, CHRM2, CTF1, CTNNA3, DTNA, FHL2, GATA4, GATA6, GATAD1, ILK, JPH2, LAMA4, LRRC10, MYH6, MYLK2, MYOM1, MYOZ2, MYPN, NEBL, NEXN, NKX2-5, NPPA, PDLIM3, PLEKHM2, TMPO, TXNRD2	
RASopathies	Add-on RASopathy genes for a related group of disorders, including Noonan syndrome and cardiofaciocutaneous syndrome, that often include HCM as a feature.	17	A2ML1, BRAF, CBL, HRAS, KRAS, MAP2K1, MAP2K2, NF1, NRAS, PTPN11, RASA1, RIT1, RRAS, SHOC2, SOS1, SOS2, SPRED1	
Recessive Pediatric Syndromes	Add-on genes related to recessive, pediatric-onset syndromes that may have cardiomyopathy as a feature.	8	ACADVL, ALMS1, CPT2, DNAJC19, ELAC2, MTO1, SDHA, TMEM70	
ARRHYTHMIAS AND CARDIOMYOPATHIES				
Pan Arrhythmia and Cardiomyopathy				
Pan Arrhythmia and Cardiomyopathy	Includes the genes most commonly associated with heritable arrhythmias and cardiomyopathies, including long QT syndrome, short QT syndrome, arrhythmogenic cardiomyopathy, catecholaminergic polymorphic ventricular tachycardia, Brugada syndrome, hypertrophic cardiomyopathy, dilated cardiomyopathy, left ventricular noncompaction, and restrictive cardiomyopathy.	70	ABCC9, ACTC1, ACTN2, AGL, ANK2, BAG3, CACNA1C, CACNA2D1, CACNB2, CALM1, CALM2, CALM3, CASQ2, CAV3, CRYAB, CSRP3, DES, DMD, DOLK, DSC2, DSG2, DSP, EMD, EYA4, FHL1, FKRP, FKTN, FLNC, GAA, GLA, GPD1L, HCN4, JUP, KCNE1, KCNE2, KCNE3, KCNH2, KCNJ2, KCNQ1, LAMP2, LDB3, LMNA, MYBPC3, MYH7, MYL2, MYL3, PKP2, PLN, PRKAG2, RAF1, RBM20, RYR2, SCN10A, SCN4B, SCN5A, SGCD, SLC22A5, SNTA1, TAZ, TCAP, TGFB3, TMEM43, TNNC1, TNNI3, TNNT2, TPM1, TRDN, TTN, TTR, VCL	I42.1 Hypertrophic obstructive cardiomyopathy I42.0 Dilated cardiomyopathy I42.2 Hypertrophic non-obstructive cardiomyopathy I42.5 Cardiomyopathy, other restrictive I42.8 Other cardiomyopathies I42.9 Cardiomyopathy, unspecified I43 Syndromic cardiomyopathy I45.81 Long QT syndrome Q23.8 Brugada syndrome I49.9 Catecholaminergic polymorphic ventricular tachycardia (CPVT) I49.9 Short QT syndrome R55 Syncope and collapse R94.31 Abnormal electrocardiogram (ECG or EKG) Z86.74 Personal history of sudden cardiac arrest Z82.41 Family history of sudden cardiac death Z84.81 Family history of carrier of genetic disease
Emerging Evidence Genes	Add-on genes for which there is emerging evidence that mutations in these genes are related to heritable arrhythmias.	38	AKAP9, ANKRD1, CALR3, CHRM2, CTF1, CTNNA3, DTNA, FHL2, GATA4, GATA6, GATAD1, ILK, JPH2, KCND3, KCNE5, KCNJ5, KCNJ8, LAMA4, LRRC10, MYH6, MYLK2, MYOM1, MYOZ2, MYPN, NEBL, NEXN, NKX2-5, NPPA, PDLIM3, PLEKHM2, RANGRF, SCN1B, SCN2B, SCN3B, SLMAP, TMPO, TRPM4, TXNRD2	
RASopathies	Add-on RASopathy genes for a related group of disorders, including Noonan syndrome and cardiofaciocutaneous syndrome, that often include HCM as a symptom.	17	A2ML1, BRAF, CBL, HRAS, KRAS, MAP2K1, MAP2K2, NF1, NRAS, PTPN11, RASA1, RIT1, RRAS, SHOC2, SOS1, SOS2, SPRED1	
Recessive Pediatric Syndromes	Add-on genes related to recessive, pediatric-onset syndromes that may have cardiomyopathy as a symptom.	8	ACADVL, ALMS1, CPT2, DNAJC19, ELAC2, MTO1, SDHA, TMEM70	

*This list is not comprehensive and it is the ordering provider's responsibility to select the most appropriate ICD-10 code

Phosphorus Diagnostics

Cardiology Custom Panel Form

CUSTOM PANELS

Cardiomyopathies

- ABCC9
- ACTC1
- AGL
- BAG3
- CACNA1C
- CAV3
- CRYAB
- CSRP3
- DMD
- DOLK
- EYA4
- FHL1
- FKRP
- FKTN
- FLNC
- GAA
- GLA
- HCN4
- LAMP2
- MYBPC3
- MYH7
- MYL2
- MYL3
- RAF1
- SGCD
- SLC22A5
- TAZ
- TCAP
- TNNC1
- TPM1
- TTR
- VCL

Emerging Evidence Genes

- CALR3
- CHRM2
- CTF1
- DTNA
- FHL2
- GATA4
- GATA6
- GATAD1
- ILK
- JPH2
- LAMA4
- LRRC10
- MYH6
- MYLK2
- MYOM1
- MYOZ2
- MYPN
- NEBL
- NEXN
- NKX2-5
- NPPA
- PLEKHM2
- TMPO
- TXNRD2

Rasopathies

- A2ML1
- BRAF
- CBL
- HRAS
- KRAS
- MAP2K1
- MAP2K2
- NF1
- NRAS
- RASA1
- PTPN11
- RIT1
- RRAS
- SHOC2
- SOS1
- SOS2
- SPRED1

Recessive Pediatric Syndromes

- ACADVL
- ALMS1
- CPT2
- DNAJC19
- ELAC2
- MTO1
- SDHA
- TMEM70

Cardiomyopathy and Arrhythmia

- ACTN2
- DES
- DSC2
- DSG2
- DSP
- EMD
- JUP
- LDB3
- LMNA
- PKP2
- PLN
- PRKAG2
- RBM20
- RYR2
- SCN5A
- TGFB3
- TMEM43
- TNNI3
- TNNT2
- TTN

Emerging Evidence Genes

- ANKRD1
- CTNNA3
- PDLIM3

Familial Hypercholesterolemia

- APOB
- LDLR
- LDLRAP1
- PCSK9

Arrhythmia

- ANK2
- CACNA2D1
- CACNB2
- CALM1
- CALM2
- CALM3
- CASQ2
- GPD1L
- KCNE1
- KCNE2
- KCNE3
- KCNH2
- KCNJ2
- KCNQ1
- SCN10A
- SCN4B
- SNTA1
- TRDN

Emerging Evidence Genes

- AKAP9
- KCND3
- KCNE5
- KCNJ5
- KCNJ8
- RANGRF
- SCN1B
- SCN2B
- SCN3B
- SLMAP
- TRPM4