PAYMENT POLICY STATEMENT

Original Effective Date	Next Annual Review Date	Last Review / Revision Date
08/08/2016	8/18/2017	09/26/2016

Policy Name	Policy Number
Genetic Testing – Polymerase Chain Reaction	PY-0101

Policy Type		
☐ Medical	☐ Administrative	☒ Payment

Payment Policies prepared by CSMG Co. and its affiliates (including CareSource) are intended to provide a general reference regarding billing, coding and documentation guidelines. Coding methodology, regulatory requirements, industry-standard claims editing logic, benefits design and other factors are considered in developing Payment Policies.

In addition to this Policy, payment of services is subject to member benefits and eligibility on the date of service, medical necessity, adherence to plan policies and procedures, claims editing logic, provider contractual agreement, and applicable referral, authorization, notification and utilization management guidelines. Medically necessary services include, but are not limited to, those health care services or supplies that are proper and necessary for the diagnosis or treatment of disease, illness, or injury and without which the patient can be expected to suffer prolonged, increased or new morbidity, impairment of function, dysfunction of a body organ or part, or significant pain and discomfort. These services meet the standards of good medical practice in the local area, are the lowest cost alternative, and are not provided mainly for the convenience of the member or provider. Medically necessary services also include those services defined in any federal or state coverage mandate, Evidence of Coverage documents, Medical Policy Statements, Provider Manuals, Member Handbooks, and/or other policies and procedures.

This Policy does not ensure an authorization or payment of services. Please refer to the plan contract (often referred to as the Evidence of Coverage) for the service(s) referenced herein. If there is a conflict between this Policy and the plan contract (i.e., Evidence of Coverage), then the plan contract (i.e., Evidence of Coverage) will be the controlling document used to make the determination.

CSMG Co. and its affiliates may use reasonable discretion in interpreting and applying this Policy to services provided in a particular case and may modify this Policy at any time.

A. SUBJECT

Genetic Testing – Polymerase Chain Reaction

B. BACKGROUND

Polymerase Chain Reaction (PCR) is a genetic amplification technique that only requires small quantities of DNA, for example, 0.1 mg or DNA from a single cell, to achieve DNA analysis in a shorter laboratory processing time period. Knowing the gene sequence, or at minimum the borders of the target segment of DNA to be amplified, is a prerequisite to a successful PCR amplification of DNA.

PCR plays a diagnostic role when selected pathogens pose difficulties for specimen collection or culture characteristics (time, environment, or substrate constraints). For example, evaluating viral

load by PCR technique for HIV helps gauge response to therapies. However, the technique is also so sensitive that amplified contaminant DNA is problematic to achieving valid test results. False positive results may also occur if DNA from one specimen contaminates another. The technique cannot distinguish DNA from colonizing organisms, or even DNA from dead microbes in a specimen, from those causing clinically significant infections. In fact, for many types of microbes the test sensitivities, specificities, and predictive values of PCR gene testing are not reported for large patient groups.

Repeated cycles of synthesizing complementary strands of DNA are performed in a stepwise manner up to 30 times to achieve adequate gene amplification for diagnosis. Cycles involve 1) denaturing DNA with heat to create single strands, 2) annealing PCR primers of oligonucleotides (short pieces of DNA of 20-30 base pairs each) to the DNA to be amplified, and 3) enzymatic synthesis of complementary DNA with Taq polymerase or Pfu polymerase.

C. DEFINITIONS

Polymerase Chain Reaction (PCR) - a genetic amplification technique also known as a Nucleic Acid Amplification Test (NAAT)

D. POLICY

I. A Prior Authorization is not required for selected PCR tests.

II. CareSource considers nucleic acid amplification testing (NAAT) by polymerase chain reaction (PCR) to be medically necessary for the following indications in oncology and heritable conditions:

A. For chronic lymphocytic leukemia (CLL), sequence variants in the immunoglobulin heavy variable group (IgHV; also known as IgVH) gene cluster is a marker for good prognosis. This cluster of genes encodes immune response antibodies and is located on the long arm of chromosome 14 at band 32.33 (14q32.33). Survival for patients with IgHV sequence variants is beyond 20 years versus 8 years for those without IgHV sequence variants.[1]

B. BCR-ABL testing for Chronic Myelogenous Leukemia (CML) is part of the evaluation of individuals with suspected CML by quantitative PCR and for evaluating response to therapy.[2] in individuals with CML by quantitative RT-PCR (RQ-PCR). An BCR-ABL oncogene is a fusion product from translocation of DNA between the breakpoint cluster region (BCR) gene on chromosome 22 at band q22.21 and the Abelson murine leukemia viral oncogene homolog 1 (ABL) tyrosine kinase gene on chromosome 9 at band q34.1. The resulting extra short chromosome 22 is known as the Philadelphia (Ph) chromosome[3] and can be visualized by either karyotyping or fluorescence in situ hybridization (FISH).[4] Currently, the standard treatment for CML is tyrosine kinase inhibitor (TKI) therapy. These include the first TKI to be approved, imatinib (Gleevec®; Novartis), and 2 other TKIs, dasatinib (Sprycel®; Bristol-Myers Squibb) and nilotinib (Tasigna®; Novartis) that received approval from the Food and Drug Administration (FDA) for the treatment of adult patients with CML who cannot tolerate or are resistant to prior therapies, including imatinib.

C. Mucosa-Associated Lymphoid Tissue (MALT) such as gastric MALToma is intimately associated with Helicobacter pylori. H. pylori is present in over 90 % of MALTomas specimens. Treatment of gastrointestinal MALT lymphomas includes antibiotics to eradicate H. pylori. The National Comprehensive Cancer Network[5] on non-Hodgkin's lymphoma report that PCR testing in patients with non-diagnostic atypical lymphoid infiltrates that are positive for H. pylori infection helps in categorizing those with MALT lymphomas and marginal zone lymphomas. Detection by PCR of a t(11;18) gene

rearrangement, identifies antibiotic non-responders for H. pylori infection, and alternative oncologic treatment should be considered.

D. The National Comprehensive Cancer Network (NCCN) has guidelines for evaluating of high-risk familial/genetic colorectal cancer including detection, prevention, and risk reduction. The Panel recommends that selected patients be screened for Lynch syndrome, which occurs in 1 of every 35 patients and is the most common form of hereditary colorectal cancer.[6] Colorectal cancer patients with tumor mutations involving chromosome 18 deletions have a shorter disease-free survival period when compared to patients with 2 copies of this chromosome, and are more likely to recur with standard oncologic therapies, and tumors should be tested with chromosome 18q assays.[7]
E. The BRAF mutation involving protein kinase genes is commonly tested in pathology specimens for evaluation of malignancies. This mutation is seen in colorectal carcinoma, gliomas, hepatobiliary carcinomas, melanoma, papillary thyroid carcinoma, ovarian teratomas and serous tumors, and hairy-cell leukemia (HCL). The most common related BRAF mutation, BRAF V600E is detected by DNA sequencing and immunohistochemistry in pathology specimens. Detection of BRAF V600E mutation has clinical utility for diagnosis and prognosis in the management of selected cancers.[8, 9]
F. The use of PCR gene testing for persons who meet criteria has been demonstrated in a variety of heritable conditions and is supported by published literature or are endorsed by consensus professional societies. These include certain primary thrombophilias[10], Tay-Sachs and Canavan diseases[11], Fabry disease[12], Gaucher disease[13], Niemann-pick disease[14], Hemochromatosis[15], Rett syndrome[16], Huntington's disease[17], Celiac disease[18], Ankylosing spondylitis[19], Prader-Willi or Angelman syndrome, and other short-stature syndromes[20], Fragile X syndrome[21], sickle-cell disease[22]. Applications of selected PCR techniques are also part of the workup and management of candidates for donating of organs and tissues.[23, 24] The first-line screening test for Tay-Sachs remains an enzyme activity test rather than genotyping. Genotyping is used for preimplantation diagnosis and confirmatory testing. In contrast, DNA-based testing is the basis for Canavan screening and diagnosis. However, MTHFR polymorphism testing has little clinical utility and does not meet medical necessity criteria as meta-analyses have disproven an association between elevated homocysteine and risk for coronary artery disease and between MTHFR polymorphisms and risk for venous thromboembolism.[25]

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III. CareSource considers nucleic acid amplification testing (NAAT) by polymerase chain reaction (PCR) to be medically necessary for the following indications in Infectious disease management:
   A. The CDC reported in 2009 that Shiga toxin--producing Escherichia coli (STEC) are a leading cause of bacterial enteric infections in the United States. Prompt, accurate diagnosis of STEC infection is important because appropriate treatment early in the course of infection might decrease the risk for serious complications such as renal damage and improve overall patient outcome.[26]
   B. Guidelines by the Infectious Diseases Society of America (IDSA) recommend that PCR is a preferred method of diagnosing C. difficile enterocolitis. Algorithms are proposed where PCR either supplements or replaces immunoassays or toxin testing.[27-29]
   C. The sensitivity and specificity of conventional microscopy on a single stool specimen for Entamoeba species suboptimal and less than 10% specific. The E. histolytica antibody diagnostic test in intestinal disease has only a sensitivity 65%. Antigen detection in stool is greater than 95% sensitive and specific compared with amebic culture and isoenzyme analysis as a gold standard. However, PCR detection of parasite DNA in stool may even be more sensitive than antigen detection, especially in a situation where the infection has

been partially treated. The combination of a serologic test with detection of the parasite (by antigen detection or PCR), thus, may offer the best approach to diagnosis.[30, 31]

D. The IDSA has also developed guidelines where PCR plays a role in diagnoses of infectious diseases such as tuberculosis[32], and Staphylococcus aureus[33].
E. Actinomyces species may be identified in tissue specimens with a 16s rRNA sequencing and PCR assay.[34, 35]
F. Serum serology, skin biopsy with immunohistochemistry, or PCR analysis of skin biopsy specimens are complementary approaches to diagnosing tick-borne Rocky Mountain spotted fever caused by Rickettsia species, and PCR has diagnostic utility for other tick-borne illnesses.[36]
G. Dengue is a mosquito-borne febrile illness and diagnosis requires laboratory confirmation by culture, NAAT or testing for dengue specific antibodies.[37] For other mosquito-borne illnesses such as West Nile virus and Zika, PCR also has diagnostic utility, including in saliva tests.[38] Ebola may diagnosed by PCR techniques on plasma.[39]
H. CareSource considers viral PCR testing in conjunction with a CLIA-approved reference lab as medically necessary for indications endorsed in a primary or supplemental diagnostic approach as described by the IDSA.[40] Many molecular diagnostic tests for viral pathogens include PCR techniques, offered by Clinical Laboratory Improvement Amendments (CLIA)-certified reference laboratories. Viral syndromes are considered based on the patient's age, history, immune status, and other variables. According to the IDSA, diagnostic samples are obtained and tested for the most likely agents.[40] Samples are commonly held frozen in the microbiology laboratory for additional testing if necessary, given that it is not cost-effective to test initial samples broadly for multiple viruses.[40]
    1. Viral PCR techniques may diagnose not only the pathogen virus, but also subtypes. PCR techniques are applied to diagnose Herpes virus infections [41, 42], Varicella and Zoster[43], Measles[44], Mumps[45], Cytomegalovirus[40], Adenovirus[40], Enterovirus[42], and Parvovirus[40].
    2. According to the CDC, HIV testing involves combination of antigen/antibody testing for HIV-1 and HIV-2 antibodies and p24 antigen, subsequent differentiation immunoassays. For persons with positive HIV ½ antigen/antibody combination immunoassays and either HIV-1 negative or indeterminate HIV-2 differentiation immunoassay, PCR testing is indicated.[40, 46, 47]
    3. The diagnosis of hepatitis B (HBV) or C (HCV) typically begins with an antibody test for screening or in the presence of acute hepatitis. For hepatitis B, PCR viral genetic assays may be applied to determine viral genotype, detecting genotypic drug resistance mutations, and identifying core promoter/precore mutations.[48] For hepatitis C, persons with positive screening test results should undergo confirmatory or supplemental testing for HCV RNA by molecular test methods.[40] According to the IDSA, “hepatitis C virus RNA can be detected by NAATs soon after infection as well as in chronic infection. NAAT for HCV can be performed qualitatively (by reverse-transcription PCR or transcription-mediated amplification) or quantitatively (by reverse-transcription PCR or branched DNA). Prior to and during treatment, quantification of HCV RNA (by PCR or branched-DNA assay methods) is necessary to monitor rapid and early virologic response to antiviral therapy, while qualitative or quantitative HCV RNA detection is used to determine end-of-therapy and sustained virologic response to therapy.”[40] Refer to the CareSource formulary policy on hepatitis C treatment for additional details regarding monitoring of hepatitis C virus during treatment.
I. PCR techniques have been developed for a variety of respiratory pathogens and may be included in diagnostic algorithms for affected persons in the pediatric and adult populations. The Infectious Diseases Society of America/American Thoracic Society

(IDSA/ATS) consensus guidelines on the management of community-acquired pneumonia in adults report that testing is optional for persons who are not hospitalized[49]. However, patients who requiring hospitalization should have pretreatment blood cultures, culture and Gram stain of good-quality samples of expectorated sputum and, if disease is severe, urinary antigen tests for S. pneumoniae and Legionella pneumophila where available.[49] Evaluation of bronchoscopically obtained samples and/or thoracentesis-obtained samples of pleural fluid may be necessary for diagnosis in hospitalized persons unable to produce a sputum sample. PCR testing may be applied in selected cases where microorganisms are suspected based upon age, history, immune status, and other variables. PCR testing is available for Mycoplasma[49]

J. CareSource considers PCR testing for pathogens of other types or in other anatomic sites medically necessary as described by the IDSA and the American Society for Microbiology (ASM) in "A Guide to Utilization of the Microbiology Laboratory for Diagnosis of Infectious Diseases: 2013 Recommendations by the Infectious Diseases Society of America (IDSA) and the American Society for Microbiology (ASM)".[40] Guidelines were developed by both laboratory and clinical expert and "provides information on which tests are valuable and in which contexts, and on tests that add little or no value for diagnostic decisions."[40]

K. For many pathogens, while a PCR test is available, the clinical utility is not clearly defined by available evidence, evidence is insufficient or inconclusive, or there is no support for quantification PCR testing. For Bartonella henselae and quintona species, immunofluorescent antibody assay serology is sensitive and specific, and there is no inconclusive evidence of an indication for quantification.[50, 51] For candidiasis, vaginitis is evaluated clinically by pH testing, and/or with wet preparation testing. While DNA tests for candidiasis are commercially available, current guidelines from the CDC and the American College of Obstetricians and Gynecologists (ACOG) do not include recommendations for a PCR test for diagnosis or quantification.[52, 53] For many pathogens, such as Chlamydia pneumoniae, Gardnerella vaginalis, Hepatitis G, HSV, Herpes virus-6, Legionella pneumophilia, Mycobacteria avium-intracellulare, Mycoplasma pneumoniae, Neisseria gonorrhoeae, and Streptococcus, group A guidelines from the IDSA do not have a recommendation for quantification.[40]

L. For sexually transmitted infections including Chlamydia, Gonorrhea, Syphilis, and other pathogens, refer to the CareSource Sexually Transmitted Infection (STI) policy.

The following CPTs and ICD-10 codes related to cancer, heritable illnesses, and donor immunology are eligible for coverage if selection criteria are met:

CPT	CPT Description
81206 - 81208	BCR/ABL1 (t(9;22)) (eg, chronic myelogenous leukemia) translocation analysis
81210	BRAF (b-raf proto-oncogene, serine/threonine kinase) (eg, colon cancer, melanoma), gene analysis, V600 variant(s)
81261	IGH@ (Immunoglobulin heavy chain locus) (eg, leukemias and lymphomas, B- cell), gene rearrangement analysis to detect abnormal clonal population(s); amplified methodology (eg, polymerase chain reaction)
81264	IGK@ (Immunoglobulin kappa light chain locus) (eg, leukemia and lymphoma, B-cell), gene rearrangement analysis, evaluation to detect abnormal clonal population(s)
81270	JAK2 (Janus kinase 2) (eg, myeloproliferative disorder) gene analysis, p.Val617Phe (V617F) variant

81292 - 81294	MLH1 (mutL homolog 1, colon cancer, nonpolyposis type 2) (eg, hereditary non-polyposis colorectal cancer, Lynch syndrome) gene analysis
81295 - 81297	MSH2 (mutS homolog 2, colon cancer, nonpolyposis type 1) (eg, hereditary non-polyposis colorectal cancer, Lynch syndrome) gene analysis
81298 - 81300	MSH6 (mutS homolog 6 [E. coli]) (eg, hereditary non-polyposis colorectal cancer, Lynch syndrome) gene analysis
81315 - 81316	PML/RARalpha, (t(15;17)), (promyelocytic leukemia/retinoic acid receptor alpha) (eg, promyelocytic leukemia) translocation analysis
81317 - 81319	PMS2 (postmeiotic segregation increased 2 [S. cerevisiae]) (eg, hereditary non-polyposis colorectal cancer, Lynch syndrome) gene analysis
81340 - 81342	TRB@ (T cell antigen receptor, beta) (eg, leukemia and lymphoma), gene rearrangement analysis to detect abnormal clonal population(s)
81370 - 81377	HLA Class I and II typing, low resolution (eg, antigen equivalents)
81378 - 81383	HLA Class I typing, high resolution (ie, alleles or allele groups)
81400 - 81408	Molecular pathology
86711	Antibody; JC (John Cunningham) virus
86828 - 86835	Antibody to human leukocyte antigens (HLA), solid phase assays (eg, microspheres or beads, ELISA, flow cytometry)
81519	Oncology (breast), mRNA, gene expression profiling by real-time RT-PCR of 21 genes, utilizing formalin-fixed paraffin embedded tissue, algorithm reported as recurrence score

The following CPT code is not covered for indications in this policy:

81291	MTHFR (5,10-methylenetetrahydrofolate reductase) (eg, hereditary hypercoagulability) gene analysis, common variants (eg, 677T, 1298C)

The following ICD-10 codes are covered if selection criteria are met

ICD10	ICD10 Description
C18.0 - C20	Malignant neoplasm of colon, rectosigmoid junction, and rectum
C43.0 - C43.9	Malignant melanoma of skin
C50	Malignant neoplasm of breast
C81.00 - C81.99	Hodgkin lymphoma
C82.00 - C82.99	Follicular lymphoma
C83.10 - C83.19	Mantle cell lymphoma
C83.30 - C83.39	Diffuse large B-cell lymphoma
C83.70 - C83.79	Burkitt lymphoma
C84.00 - C84.09	Mycosis fungoides
C84.40 - C84.49	Peripheral T-cell lymphoma, not classified
C84.60 - C84.79	Anaplastic large cell lymphoma
C88.4	Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue (MALT-lymphoma) [Diffuse large B cell lymphoma (DLBCL)]
C91.00 - C91.02	Acute lymphoblastic leukemia [ALL]
C91.10 - C91.12	Chronic lymphoid leukemia

C91.40 - C91.42	Hairy-cell leukemia
C92.00 - C92.02	Acute myeloblastic leukemia
C92.10 - C92.12	Chronic myeloid leukemia, BCR/ABL-positive
D12.0 - D12.6	Benign neoplasm of colon
D68.51 - D68.59	Primary thrombophilia
E75.02	Tay-sachs disease
E75.21	Fabry (-Anderson) disease
E75.22	Gaucher disease
E75.240 - E75.249	Niemann-pick disease
E83.110 - E83.119	Hemochromatosis
F84.2	Rett syndrome
G10	Huntington's disease
K90.0	Celiac disease
M45.0 -M45.9	Ankylosing spondylitis
Q87.1	Congenital malformation syndromes predominantly associated with short stature [Prader-Willi syndrome]
Q93.5	Other deletions of part of a chromosome [Angelman syndrome]
Q99.2	Fragile X chromosome
Z13.0	Encounter for screening for disease of the blood and blood-forming organs and certain disorders involving the immune mechanism [sickle-cell disease or trait]
Z52.00 - Z52.9	Donors of organs and tissues

The following CPTs and ICD-10 codes related to infectious diseases are eligible for coverage if selection criteria are met:

87150	Culture, typing; identification by nucleic acid (DNA or RNA) probe, amplified probe technique, per culture or isolate, each organism probed
87471	Infectious agent detection by nucleic acid (DNA or RNA); Bartonella henselae and Bartonella quintana, amplified probe technique
87486	Chlamydia pneumoniae, amplified probe technique
87493	Clostridium difficile, toxin gene(s), amplified probe technique [not covered for asymptomatic persons or for "test of cure"]

87496	Cytomegalovirus, amplified probe technique
87498	Enterovirus, amplified probe technique
87501	Infectious agent detection by nucleic acid (DNA or RNA); influenza virus, includes reverse transcription, when performed, and amplified probe technique, each type or subtype
87502	Infectious agent detection by nucleic acid (DNA or RNA); influenza virus, for multiple types or sub-types, includes multiplex reverse transcription, when performed, and multiplex amplified probe technique, first 2 types or sub-types
87503	Each additional influenza virus type or sub-type
87516	Hepatitis B virus, amplified probe technique
87521	Hepatitis C virus, amplified probe technique
87529	Herpes simplex virus, amplified probe technique
87532	Herpes virus-6, amplified probe technique
87535	HIV-1, amplified probe technique
87538	HIV-2, amplified probe technique
87556	Mycobacterium tuberculosis, amplified probe technique
87581	Mycoplasma pneumoniae, amplified probe technique
87631 - 87633	Infectious agent detection by nucleic acid (DNA or RNA); respiratory virus (eg, adenovirus, influenza virus, coronavirus, metapneumovirus, parainfluenza virus, respiratory syncytial virus, rhinovirus), includes multiplex reverse transcription, when performed, and multiplex amplified probe technique, multiple types or subtypes
87641	Infectious agent detection by nucleic acid (DNA or RNA); Staphylococcus aureus, methicillin resistant, amplified probe technique
87651	Streptococcus, group A, amplified probe technique
87653	Streptococcus, group B, amplified probe technique
87798	Infectious agent detection by nucleic acid (DNA or RNA), not otherwise specified; amplified probe technique, each organism
87801	Infectious agent detection by nucleic acid (DNA or RNA), multiple organisms; amplified probe(s) technique

87910	Infectious agent genotype analysis by nucleic acid (DNA or RNA); cytomegalovirus
87912	Hepatitis B virus
CPT codes not covered for indications listed in the policy:	
87476	Infectious agent detection by nucleic acid (DNA or RNA); Borrelia burgdorferi, amplified probe technique
87481	Candida species, amplified probe technique
87505 - 87507	Gastrointestinal pathogen (eg, Clostridium difficile, E. coli, Salmonella, Shigella, norovirus, Giardia), includes multiplex reverse transcription, when performed, and multiplex amplified probe technique, multiple types or subtypes
87511	Gardnerella vaginitis, amplified probe technique
87526	Hepatitis G virus, amplified probe technique
87541	Legionella pneumophilia, amplified probe technique
87551	Mycobacteria species, amplified probe technique
87561	Mycobacteria avium-intracellulare, amplified probe technique

ICD-10 codes covered if selection criteria are met:	
A03.0 - A03.9	Shigellosis [not covered for plesiomonas shigelloides]
A04.7	Enterocolitis due to Clostridium difficile
A06.0 - A06.9	Amebiasis
A15.0 - A19.9	Tuberculosis
A21.0 - A21.9	Tularemia
A23.0 - A23.9	Brucellosis
A24.1 - A24.9	Melioidosis [when caused by Burkholderia infection]
A28.1	Cat-scratch disease
A37.00 - A37.91	Whooping cough
A39.0	Meningococcal menigitis [Neisseria meningitis]
A41.01 - A41.02	Sepsis due to Staphylococcus aureus

A42.0 - A42.2, A42.81 - A42.89	Actinomycosis
A44.0 - A44.9	Bartonellosis [not covered for Bartonella baciliformis]
A49.01 - A49.02	Methicillin susceptible and resistant Staphylococcus aureus infection, unspecified site
A49.2	Hemophilus influenzae infection, unspecified site
A50.01 - A53.9	Syphilis
A54.00 - A54.9	Gonococcal infections
A55	Chlamydial lymphogranuloma (venereum)
A57	Chancroid
A59.00 - A59.9	Trichomoniasis
A69.8	Other specified spirochetal infections [Borrelia miyamotoi, acute phase]
A70	Chlamydia psittaci infections
A71.0 - A71.9	Trachoma
A74.0	Chlamydial conjunctivitis
A74.81 - A74.89	Other chlamydial diseases
A74.9	Chlamydial infection, unspecified
A75.0	Epidemic louse-borne typhus fever due to Rickettsia prowazekii
A75.2	Typhus fever due to rickettsia typhi
A77.0 - A77.3 A77.9	Spotted fever [tick-borne rickettsioses]
A77.40 - A77.49	Ehrlichiosis
A78	Q Fever
A80.0 - A80.9	Acute poliomyelitis
A81.2	Progressive multifocal leukoencephalopathy
A87.0	Enteroviral meningitis
A90	Dengue fever [classical dengue]
A91	Dengue hemorrhagic fever

A92.30 - A92.39	West Nile virus infection
A92.4	Rift Valley fever
A92.8	Other specified mosquito-borne viral fevers [Zika]
A93.2	Colorado tick fever
A95.0 - A95.9	Yellow fever
A98.0	Crimean-Congo hemorrhagic fever
A98.4	Ebola virus disease
B00.0 - B00.9	Herpesviral [herpes simplex] infections
B01.0 - B01.9	Varicella [chickenpox]
B02.0 - B02.9	Zoster [herpes zoster]
B05.0 - B05.9	Measles
B06.00 - B06.9	Rubella [German measles]
B08.21	Exanthema subitum [sixth disease] due to human herpesvirus 6
B10.01	Human herpesvirus 6 encephalitis
B10.81	Human herpesvirus 6 infection
B16.0 - B16.9	Acute hepatitis B
B17.10 - B17.11	Acute hepatitis C
B18.0 - B18.1	Chronic viral hepatitis B
B18.2	Chronic viral hepatitis C
B19.10 - B19.11	Unspecified viral hepatitis B
B19.20 - B19.21	Unspecified viral hepatitis C
B20	Human immunodeficiency virus [HIV] disease
B25.0 - B25.9	Cytomegaloviral disease
B26.0 - B26.9	Mumps
B34.0, B97.0	Adenovirus infection, unspecified and as the cause of diseases classified elsewhere
B34.1	Enterovirus infection, unspecified [Group A and B]

B34.3	Parvovirus infection, unspecified [not covered for persons with autoimmune neutropenia]
B47.1	Actinomycetoma
B47.9	Mycetoma, unspecified
B50.0 - B54	Malaria
B55.0 - B55.9	Leishmaniasus
B58.00 - B58.9	Toxoplasmosis
B60.0	Babesiosis
B95.1	Streptococcus group B, as the cause of diseases classified elsewhere
B95.61 - B95.62	Methicillin susceptible or resistant Staphylococcus aureus infection as the cause of diseases classified elsewhere
B96.0	Mycoplasma pneumoniae [M. pneumoniae] as the cause of diseases classified elsewhere
B96.3	Hemophilus influenzae [H. influenzae] as the cause of diseases classified elsewhere
B96.81	Helicobacter pylori [H pylori] as the causes of diseases classified elsewhere
B97.11	Coxackievirus as the cause of diseases classified elsewhere
B97.12	Echovirus as the cause of diseases classified elsewhere
B97.21	SARS-associated coronavirus as the cause of diseases classified elsewhere
B97.30 - B97.39	Retrovirus as the cause of diseases classified elsewhere
D45	Polycythemia vera
D47.z1	Post-transplant lymphoproliferative disorder (PTLD)
G93.89	Other specified disorders of brain [intracranial calcification in infants born to women who traveled to or resided in an area with Zika virus transmission while pregnant]
J02.0	Streptococcal pharyngitis
J09.x1 - J09.x9	Influenza due to identified novel influenza A virus
J10.00 - J10.89	Influenza due to other identified influenza virus
J11.00 - J11.89	Influenza due to unidentified influenza virus
J15.212	Pneumonia due to methicillin resistant Staphylococcus aureus
J16.0	Chlamydial pneumonia

J20.0	Acute bronchitis due to Mycoplasma pneumoniae
J20.1	Acute bronchitis due to Hemophilus influenzae
J20.3	Acute bronchitis due to coxsackievirus
J20.7	Acute bronchitis due to echovirus
J21.0	Acute bronchiolitis due to respiratory syncytial virus
K90.81	Whipple's disease
M02.30 - M02.39	Reiter's disease
O09.00 - O09.93	Supervision of high risk pregnancy [antepartum screening with broth enrichment for group B streptococcal infection in pregnant women at 35 to 37 weeks gestation]
O20.0 - 029.93	Other maternal disorders predominantly related to pregnancy [antepartum screening with broth enrichment for group B streptococcal infection in pregnant women at 35 to 37 weeks gestation]
O98.511 - O98.53	Other viral diseases complicating pregnancy, childbirth and the puerperium
P35.0	Congenital rubella syndrome
Q02	Microcephaly [infants born to women who traveled to or resided in an area with Zika virus transmission while pregnant]
R05	Cough
R19.7	Diarrhea, unspecified [for Clostridium difficile diagnosis]
R75	Inconclusive laboratory evidence of human immunodeficiency virus [HIV]
R87.610 - R87.613, R87.619	Abnormal cytological findings in specimens from cervix uteri
R87.810	Cervical high risk human papillomavirus [HIV] DNA test positive
Z01.42	Encounter for cervical smear to confirm findings of recent normal smear following initial abnormal smear
Z11.1	Encounter for screening respiratory tuberculosis
Z11.3	Encounter for screening for infections with a predominantly sexual mode of transmission [not covered for routine screening of trichomonas in asymptomatic men and women]

Z11.4	Encounter for screening for human immunodeficiency virus [HIV]
Z11.59	Encounter for screening for other viral diseases
Z11.8	Encounter for screening for other infectious and parasitic diseases [not covered for routine screening of trichomonas in asymptomatic women]
Z16.11	Resistance to penicillins
Z20.4	Contact with and (suspected) exposure to rubella
Z20.5	Contact with and (suspected) exposure to viral hepatitis
Z20.6	Contact with and (suspected) exposure to human immunodeficiency virus [HIV]
Z20.820	Contact with and (suspected) exposure to varicella
Z20.828	Contact with and (suspected) exposure to other viral communicable diseases [includes Zika virus]
Z20.89	Contact with and (suspected) exposure to other communicable diseases
Z21	Asymptomatic human immunodeficiency virus [HIV] infection status
Z22.4	Carrier of infections with a predominatly sexual mode of transmission
Z22.51	Carrier of viral hepatitis B
Z22.52	Carrier of viral hepatitis C
Z34.00 - Z34.92	Encounter for supervision of normal pregnancy [antepartum screening with broth enrichment for group B streptococcal infection in pregnant women at 35 to 37 weeks gestation]
Z36	Encounter for antenatal screening of mother [antepartum screening with broth enrichment for group B streptococcal infection in pregnant women at 35 to 37 weeks gestation]
Z72.51 - Z72.53	High risk sexual behavior
Z77.21	Contact with and (suspected) exposure to potentially hazardous body fluids [women at high risk for infection, who have new or multiple partners, a history of STDs, exchange sex for payment]
Z94.0	Kidney transplant status
ICD-10 codes not covered for indications listed in the policy (not all-inclusive):	
A02.0 - A02.9	Other salmonella infections
A04.5	Campylobacter enteritis

A04.6	Enteritis due to Yersinia enterocolitica
A04.8	Other specified bacterial intestinal infections [Enterobacter aerogenes]
A05.3	Foodborne Vibrio parahaemolyticus intoxication
A07.1	Giardiasis [lambliasis]
A07.2	Cryptosporidiosis
A07.4	Cyclosporiasis
A08.32	Astrovirus enteritis
A27.0 - A27.9	Leptospirosis
A32.0 - A32.9	Listeriosis
A40.3	Sepsis due to Streptococcus, pneumoniae
A41.51	Sepsis due to Escherichia coli [E. coli]
A41.52	Sepsis due to Pseudomonas
A41.53	Sepsis due to serratia
A49.01	Methicillin susceptible Staphylococcus aureus infection, unspecified site [Staphylococcus saprophyticus]
A49.1	Streptococcus infection [other than group B]
A58	Granuloma inguinale
A69.20 - A69.29	Lyme disease
A81.00 - A81.09	Creutzfeldt-Jakob disease
B08.1	Molluscum contagiosum
B08.20	Exanthema subitum [sixth disease], unspecified
B08.22	Exanthema subitum [sixth disease] due to human herpesvirus 7
B09	Unspecified viral infection characterized by skin and mucous membrane lesion
B10.09	Other human herpesvirus encephalitis
B10.82	Human herpesvirus 7 infection
B10.89	Other human herpesvirus infection
B17.8	Other specified acute viral hepatitis
B35.1	Tinea unguium
B36.2	White piedra

B37.0 - B37.9	Candidiasis
B38.0 - B38.9	coccidioidomycosis
B39.0 - B39.5	Histoplasmosis
B40.0 - B40.9	Blastomycosis
B42.0 - B42.9	Sporotrichosis
B44.0 - B44.7, B44.89 - B44.9	Aspergillosis
B45.0 - B45.9	Cryptococcosis
B48.8	Other specified mycoses [Cochliobolus spicifer, Cochliobolus lunatus]
B59	Pneumocystosis
B95.0 B95.3 - B95.5	Streptococcus as the cause of diseases classified elsewhere [other than group B]
B95.7 - B95.8	Other and unspecified staphylococcus as the cause of diseases classified elsewhere [Staphylococcus saprophyticus] [Staphylococcus lugdunensis]
B96.20 - B96.29	Escherichia coli [E.coli] as the cause of diseases classified elsewhere
B96.4	Proteus (mirabilis) (morganii) as the cause of diseases classified elsewhere
B96.5	Pseudomonas (aeruginosa) (mallei) (pseudomallei) as the cause of diseases classified elsewhere
B96.6	Bacteroides fragilis [B. fragilis] as the cause of diseases classified elsewhere
B96.89	Other specified bacterial agents as the cause of diseases classified elsewhere [Acinetobacter baumannii, Enterobacter cloacae, Stenotrophomonas maltophilia, Vibrio vulnificus, Vibrio cholerae, Eggerthella, Prevotella bivia]
B97.29	Other coronavirus as the cause of diseases classified elsewhere
B97.7	Papillomavirus as the cause of diseases classified elsewhere
C46.0 - C46.9	Kaposi's sarcoma
D06.0 - D06.9	Carcinoma in situ of cervix uteri
D89.82	Autoimmune lymphoproliferative syndrome [ALPS]
G30.0 - G30.9	Alzheimer's disease
I25.10 - I25.119	Athersclerotic heart disease of native coronary artery

I25.700 - I25.812	Atherosclerosis of coronary artery bypass graft(s)
I70.0 - I70.92	Atherosclerosis
J13	Pneumonia due to Streptococcus pneumoniae
J15.0	Pneumonia due to Klebsiella pneumoniae
J15.1	Pneumonia due to Pseudomonas
J15.4	Pneumonia due to other streptococci
J45.20 - J45.998	Asthma
K25.0 - K28.9	Gastric, duodenal, peptic or gastrojejunal ulcer
M00.10 - M00.19	Pneumococcal arthritis and polyarthritis
M30.3	Mucocutaneous lymph node syndrome [Kawasaki]
N76.0 - N76.3	Acute, subacute, chronic vaginitis and vulvitis [bacterial vaginosis associated bacteria 2 (BVAB2), megasphaera type 2]
N77.1	Vaginitis, vulvitis and vulvovaginitis in diseases classified elsewhere [bacterial vaginosis associated bacteria 2 (BVAB2), megasphaera type 2]
N87.0 - N87.9	Dysplasia of cervix uteri
O98.611 - O98.619	Protozoal diseases complicating pregnancy
P35.1	Congenital cytomegalovirus infection
R53.0 - R53.83	Malaise and fatigue
R87.810	Cervical high risk human papillomavirus (HPV) DNA test positive
Z00.00 - Z00.01	Encounter for general adult medical examination [not covered for routine screening of trichomonas in asymptomatic women]
Z01.411 - Z01.419	Encounter for gynecological examination (general) (routine) [not covered for routine screening of trichomonas in asymptomatic women]
Z11.2	Encounter for screening for other bacterial diseases [not covered for routine screening of trichomonas in asymptomatic men and women]
Z11.51	Encounter for screening for human papillomavirus (HPV)
Z11.6	Encounter for screening for other protozoal diseases and helminthiases [malaria]

Z11.8	Encounter for screening for other infectious and parasitic diseases [not covered for routine screening of trichomonas in asymptomatic women]
Z11.8	Encounter for screening for other infectious and parasitic diseases
Z13.6	Encounter for screening for cardiovascular disorders
Z13.89	Encounter for screening for other disorder [genitourinary]
Z16.21 - Z16.22	Resistance to vancomycin and vancomycin related antibiotics
Z30.40 - Z30.9	Encounter for surveillance of contraceptives [not covered for routine screening of trichomonas in asymptomatic men and women]
Z34.00 - Z34.93	Encounter for supervision of normal pregnancy [not covered for routine screening of trichomonas in asymptomatic men and women]
Z85.41	Personal history of malignant neoplasm of cervix uteri
Z87.11	Personal history of peptic ulcer disease
PCR testing for microbial identification and quantification:	
CPT codes covered if selection criteria are met:	
87497	Infectious agent detection by nucleic acid (DNA or RNA); cytomegalovirus, quantification
87517	hepatitis B virus, quantification
87522	hepatitis C virus, quantification
87533	Herpes virus-6 quantification
87536	HIV-1, quantification
87539	HIV-2, quantification
87799	Infectious agent detection by nucleic acid (DNA or RNA), not otherwise specified; quantification, each organism
CPT codes not covered for indications listed in the policy:	
87472	Infectious agent detection by nucleic acid (DNA or RNA); Bartonella (B. henselae, B Quintana), quantification
87477	Borrelia burgdorferi, quantification
87482	Candida species, quantification
87487	Chlamydia pneumoniae, quantification
87512	Gardnerella vaginalis, quantification
87527	hepatitis G, quantification

87530	Herpes simplex virus, quantification
87533	Herpes virus-6, quantification
87542	Legionella pneumophilia, quantification
87562	Mycobacteria avium-intracellulare, quantification
87582	Mycoplasma pneumoniae, quantification
87592	Neisseria gonorrhoeae, quantification
87652	Streptococcus, group A, quantification
ICD-10 codes covered if selection criteria are met:	
B01.0 - B01.9	Varicella [chickpox] [for diagnosis and also to distinguish wild-type virus from vaccination in previously immunized persons with signs or symptoms of varicella-zoster infection]
B08.21	Exanthema subitum [sixth disease] due to human herpesvirus 6
B10.01	Human herpesvirus 6 encephalitis
B10.81	Human herpesvirus 6 infection
B16.0 - B16.9	Acute hepatitis B
B17.10 - B17.11	Acute hepatitis C
B18.0 - B18.1	Chronic viral hepatitis B with or without delta-agent
B18.2	Chronic viral hepatitis C
B19.10 - B19.11	Unspecified viral hepatitis B with or without hepatic coma
B19.20 - B19.21	Unspecified viral hepatitis C with or without hepatic coma
B20	Human immunodeficiency virus [HIV] disease
B25.0 - B29.9	Cytomegaloviral disease
B34.0, B97.0	Adenovirus infection, unspecified and as the cause of diseases classified elsewhere
P35.1	Congenital cytomegalovirus infection
T86.10 - T86.19	Complications of kidney transplant
Z21	Asymptomatic human immunodeficiency virus [HIV] infection status
Z94.0	Kidney transplant status

Z94.84	Stem cells transplant status
ICD-10 codes not covered for indications listed in the policy:	
A31.0 - A31.9	Diseases due to other mycobacterium
A44.0 - A44.9	Bartonellosis
A48.1	Legionnaires' disease
A48.8	Other specified bacterial disease [gardnerella vaginalis]
A49.3	Mycoplasma infection, unspecified site
A54.00 - A54.9	Gonococcal infections
A69.20 - A69.29	Lyme disease
A74.89	Other chlamydial diseases
A74.9	Chlamydial infection, unspecified
A98.5	Hemorrhagic fever with renal syndrome
B00.0 - B00.9	Herpesviral [herpes simplex] infections
B02.0 - B02.9	Zoster [herpes zoster]
B08.21	Exanthema subitum [sixth disease]due to human herpesvirus 6
B08.22	Exanthema subitum [sixth disease]due to human herpesvirus 7
B10.01	Human herpesvirus 6 infection
B10.09	Other human herpesvirus encephalitis
B10.81	Human herpesvirus 6 infection
B10.82	Human herpesvirus 7 infection
B10.89	Other human herpesvirus infection
B17.8, B18.8 - B18.9	Other and unspecified viral hepatitis [GB virus type C]
B33.4	Hantavirus (cardio)-pulmonary syndrome [HPS] [HCPS]
B34.3	Parvovirus infection, unspecified
B37.0 - B37.9	Candidiasis
J09.X1 - J11.89	Influenza due to certain or other identified or unidentified influenza viruses
J16.0	Chlamydial pneumonia
N76.0 - N76.3	Acute, subacute, chronic vaginitis and vulvitis
N77.1	Vaginitis, vulvitis and vulvovaginitis in diseases classified elsewhere
R53.82	Chronic fatigue, unspecified

CONDITIONS OF COVERAGE

AUTHORIZATION PERIOD

E. RELATED POLICIES/RULES
Also refer to: Genetic Testing, Genetic Screening and Genetic Counseling (MM-0003)

F. REVIEW/REVISION HISTORY

Date Issued:	8/16/2016
Date Reviewed:	8/16/2016, 11/15/2016
Date Revised:	8/16/2016, 09/26/2016 – Remove Cystic Fibrosis criteria and reference.

G. REFERENCES

[1] D. Kienle, A. Benner, C. Laufle, D. Winkler, C. Schneider, A. Buhler*, et al.*, "Gene expression factors as predictors of genetic risk and survival in chronic lymphocytic leukemia," *Haematologica,* vol. 95, pp. 102-9, Jan 2010.

[2] F. Notta, C. G. Mullighan, J. C. Wang, A. Poeppl, S. Doulatov, L. A. Phillips*, et al.*, "Evolution of human BCR-ABL1 lymphoblastic leukaemia-initiating cells," *Nature,* vol. 469, pp. 362-367, 2011.

[3] A. A. Darji and P. D. Bharadia, "CHRONIC MYELOGENOUS LEUKEMIA: A REVIEW AND UPDATE OF CURRENT AND FUTURE THERAPY," *International Journal of Pharmacy and Pharmaceutical Sciences,* vol. 8, 2016.

[4] M. W. Deininger, "Molecular monitoring in CML and the prospects for treatment-free remissions," *Hematology Am Soc Hematol Educ Program,* vol. 2015, pp. 257-63, 2015.

[5] A. D. Zelenetz, J. S. Abramson, R. H. Advani, C. B. Andreadis, J. C. Byrd, M. S. Czuczman*, et al.*, "NCCN Clinical Practice Guidelines in Oncology: non-Hodgkin's lymphomas," *J Natl Compr Canc Netw,* vol. 8, pp. 288-334, Mar 2010.

[6] H. Hampel, "NCCN increases the emphasis on genetic/familial high-risk assessment in colorectal cancer," *J Natl Compr Canc Netw,* vol. 12, pp. 829-31, May 2014.

[7] K. M. Chin, B. Wessler, P. Chew, and J. Lau, "Genetic Tests for Cancer," in *Genetic Tests for Cancer*, ed Rockville (MD), 2006.

[8] P. G. Febbo, M. Ladanyi, K. D. Aldape, A. M. De Marzo, M. E. Hammond, D. F. Hayes*, et al.*, "NCCN Task Force report: Evaluating the clinical utility of tumor markers in oncology," *Journal of the National Comprehensive Cancer Network,* vol. 9, pp. S-1-S-32, 2011.

[9] S. Pakneshan, A. Salajegheh, R. A. Smith, and A. K. Lam, "Clinicopathological relevance of BRAF mutations in human cancer," *Pathology,* vol. 45, pp. 346-56, Jun 2013.

[10] S. Moll, "Who should be tested for thrombophilia?," *Genet Med,* vol. 13, pp. 19-20, 01//print 2011.

[11] A. Colaianni, S. Chandrasekharan, and R. Cook-Deegan, "Impact of gene patents and licensing practices on access to genetic testing and carrier screening for Tay-Sachs and Canavan disease," *Genet Med,* vol. 12, pp. S5-S14, 04//print 2010.

[12] R. Schiffmann, M. Fuller, L. A. Clarke, and J. M. F. G. Aerts, "Is it Fabry disease?," *Genet Med,* 05/19/online 2016.

[13] C. R. Scott, G. Pastores, H. Andersson, J. Charrow, P. Kaplan, E. Kolodny*, et al.*, "The clinical expression of Gaucher disease correlates with genotype: Data from 570 patients," *Genet Med,* vol. 2, pp. 65-65, 01//print 2000.

[14] R. Y. Wang, O. A. Bodamer, M. S. Watson, and W. R. Wilcox, "Lysosomal storage diseases: Diagnostic confirmation and management of presymptomatic individuals," *Genet Med,* vol. 13, pp. 457-484, 05//print 2011.

[15] C. Mura, O. Raguenes, V. Scotet, S. Jacolot, A.-Y. Mercier, and C. Ferec, "A 6-year survey of HFE gene test for hemochromatosis diagnosis," *Genet Med,* vol. 7, pp. 68-73, 01//print 2005.

[16] T. Bienvenu and J. Chelly, "Molecular genetics of Rett syndrome: when DNA methylation goes unrecognized," *Nat Rev Genet,* vol. 7, pp. 415-426, 06//print 2006.
[17] W. H. Rogowski, S. D. Grosse, and M. J. Khoury, "Challenges of translating genetic tests into clinical and public health practice," *Nat Rev Genet,* vol. 10, pp. 489-495, 07//print 2009.
[18] G. J. Tack, W. H. M. Verbeek, M. W. J. Schreurs, and C. J. J. Mulder, "The spectrum of celiac disease: epidemiology, clinical aspects and treatment," *Nat Rev Gastroenterol Hepatol,* vol. 7, pp. 204-213, 04//print 2010.
[19] L.-S. Tam, J. Gu, and D. Yu, "Pathogenesis of ankylosing spondylitis," *Nat Rev Rheumatol,* vol. 6, pp. 399-405, 07//print 2010.
[20] S. B. Cassidy, S. Schwartz, J. L. Miller, and D. J. Driscoll, "Prader-Willi syndrome," *Genet Med,* vol. 14, pp. 10-26, 01//print 2012.
[21] D. C. Crawford, J. M. Acuna, and S. L. Sherman, "FMR1 and the fragile X syndrome: Human genome epidemiology review," *Genet Med,* vol. 3, pp. 359-371, 09//print 2001.
[22] M. Bender and G. D. Seibel, "Sickle cell disease," 2014.
[23] N. Kamani, S. Spellman, C. K. Hurley, J. N. Barker, F. O. Smith, M. Oudshoorn*, et al.*, "State of the art review: HLA matching and outcome of unrelated donor umbilical cord blood transplants," *Biol Blood Marrow Transplant,* vol. 14, pp. 1-6, Jan 2008.
[24] L. D'Orsogna, S. Fidler, A. Irish, B. Saker, H. Moody, and F. T. Christiansen, "HLA donor-specific antibody detected by solid phase assay identifies high-risk transplantation pairs irrespective of CDC crossmatch results: case reports and literature review," *Clin Transpl,* pp. 497-501, 2006.
[25] S. E. Hickey, C. J. Curry, and H. V. Toriello, "ACMG Practice Guideline: lack of evidence for MTHFR polymorphism testing," *Genet Med,* vol. 15, pp. 153-6, Feb 2013.
[26] L. H. Gould, C. Bopp, N. Strockbine, R. Atkinson, V. Baselski, B. Body*, et al.*, "Recommendations for diagnosis of shiga toxin--producing Escherichia coli infections by clinical laboratories," *MMWR Recomm Rep,* vol. 58, pp. 1-14, Oct 16 2009.
[27] S. H. Cohen, D. N. Gerding, S. Johnson, C. P. Kelly, V. G. Loo, L. C. McDonald*, et al.*, "Clinical practice guidelines for Clostridium difficile infection in adults: 2010 update by the society for healthcare epidemiology of America (SHEA) and the infectious diseases society of America (IDSA)," *Infect Control Hosp Epidemiol,* vol. 31, pp. 431-55, May 2010.
[28] S. B. Selvaraju, M. Gripka, K. Estes, A. Nguyen, M. A. Jackson, and R. Selvarangan, "Detection of toxigenic Clostridium difficile in pediatric stool samples: an evaluation of Quik Check Complete Antigen assay, BD GeneOhm Cdiff PCR, and ProGastro Cd PCR assays," *Diagnostic Microbiology and Infectious Disease,* vol. 71, pp. 224-229, 11// 2011.
[29] M. H. Wilcox, T. Planche, F. C. Fang, and P. Gilligan, "What is the current role of algorithmic approaches for diagnosis of Clostridium difficile infection?," *J Clin Microbiol,* vol. 48, pp. 4347-53, Dec 2010.
[30] S. Roy, M. Kabir, D. Mondal, I. K. M. Ali, W. A. Petri, and R. Haque, "Real-time-PCR assay for diagnosis of Entamoeba histolytica infection," *Journal of clinical microbiology,* vol. 43, pp. 2168-2172, 2005.
[31] S. Solaymani-Mohammadi, C. M. Coyle, S. M. Factor, and W. A. Petri Jr, "Amebic colitis in an antigenically and serologically negative patient: usefulness of a small-subunit ribosomal RNA gene-based polymerase chain reaction in diagnosis," *Diagnostic Microbiology and Infectious Disease,* vol. 62, pp. 333-335, 11// 2008.
[32] P. Nahid, S. E. Dorman, N. Alipanah, P. M. Barry, J. L. Brozek, A. Cattamanchi*, et al.*, "Official American Thoracic Society/Centers for Disease Control and Prevention/Infectious Diseases Society of America Clinical Practice Guidelines: Treatment of Drug-Susceptible Tuberculosis," *Clinical Infectious Diseases,* p. ciw376, 2016.
[33] D. L. Stevens, A. L. Bisno, H. F. Chambers, E. P. Dellinger, E. J. Goldstein, S. L. Gorbach*, et al.*, "Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America," *Clinical Infectious Diseases,* vol. 59, pp. e10-e52, 2014.

[34] M. J. Belmont, P. M. Behar, and M. K. Wax, "Atypical presentations of actinomycosis," *Head & neck,* vol. 21, pp. 264-268, 1999.
[35] T. Hansen, M. Kunkel, E. Springer, C. Walter, A. Weber, E. Siegel*, et al.*, "Actinomycosis of the jaws--histopathological study of 45 patients shows significant involvement in bisphosphonate-associated osteonecrosis and infected osteoradionecrosis," *Virchows Arch,* vol. 451, pp. 1009-17, Dec 2007.
[36] C. L. Schroeder, H. P. Narra, M. Rojas, A. Sahni, J. Patel, K. Khanipov*, et al.*, "Bacterial small RNAs in the Genus Rickettsia," *BMC Genomics,* vol. 16, p. 1075, 2015.
[37] M. G. Teixeira and M. L. Barreto, "Diagnosis and management of dengue," *BMJ,* vol. 339, 2009.
[38] D. Musso, C. Roche, T. X. Nhan, E. Robin, A. Teissier, and V. M. Cao-Lormeau, "Detection of Zika virus in saliva," *J Clin Virol,* vol. 68, pp. 53-5, Jul 2015.
[39] J. R. Spengler, A. K. McElroy, J. R. Harmon, U. Stroher, S. T. Nichol, and C. F. Spiropoulou, "Relationship Between Ebola Virus Real-Time Quantitative Polymerase Chain Reaction-Based Threshold Cycle Value and Virus Isolation From Human Plasma," *J Infect Dis,* vol. 212 Suppl 2, pp. S346-9, Oct 1 2015.
[40] E. J. Baron, J. M. Miller, M. P. Weinstein, S. S. Richter, P. H. Gilligan, R. B. Thomson*, et al.*, "A Guide to Utilization of the Microbiology Laboratory for Diagnosis of Infectious Diseases: 2013 Recommendations by the Infectious Diseases Society of America (IDSA) and the American Society for Microbiology (ASM)a," *Clinical Infectious Diseases,* vol. 57, pp. e22-e121, August 15, 2013 2013.
[41] D. W. Kimberlin, "Diagnosis of herpes simplex virus in the era of polymerase chain reaction," *The Pediatric infectious disease journal,* vol. 25, pp. 841-842, 2006.
[42] R. L. DeBiasi and K. L. Tyler, "Molecular methods for diagnosis of viral encephalitis," *Clinical microbiology reviews,* vol. 17, pp. 903-925, 2004.
[43] P. A. Thomas and P. Geraldine, "Infectious keratitis," *Current opinion in infectious diseases,* vol. 20, pp. 129-141, 2007.
[44] R. S. van Binnendijk, S. van den Hof, H. van den Kerkhof, R. H. G. Kohl, F. Woonink, G. A. M. Berbers*, et al.*, "Evaluation of Serological and Virological Tests in the Diagnosis of Clinical and Subclinical Measles Virus Infections during an Outbreak of Measles in The Netherlands," *Journal of Infectious Diseases,* vol. 188, pp. 898-903, September 15, 2003 2003.
[45] C. H. Krause, K. Eastick, and M. M. Ogilvie, "Real-time PCR for mumps diagnosis on clinical specimens—comparison with results of conventional methods of virus detection and nested PCR," *Journal of clinical virology,* vol. 37, pp. 184-189, 2006.
[46] CDC. (2014, Quick reference guide - Laboratory testing for the diagnosis of HIV infection : updated recommendations. *CDC Stacks*. Available: https://stacks.cdc.gov/view/cdc/23446
[47] G. Murphy and C. Aitken, "HIV testing—the perspective from across the pond," *Journal of Clinical Virology,* vol. 52, pp. S71-S76, 2011.
[48] A. Valsamakis, "Molecular testing in the diagnosis and management of chronic hepatitis B," *Clinical microbiology reviews,* vol. 20, pp. 426-439, 2007.
[49] L. A. Mandell, R. G. Wunderink, A. Anzueto, J. G. Bartlett, G. D. Campbell, N. C. Dean*, et al.*, "Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults," *Clinical Infectious Diseases,* vol. 44, pp. S27-S72, March 1, 2007 2007.
[50] P. E. Fournier, J. L. Mainardi, and D. Raoult, "Value of microimmunofluorescence for diagnosis and follow-up of Bartonella endocarditis," *Clin Diagn Lab Immunol,* vol. 9, pp. 795-801, Jul 2002.
[51] L. M. Mofenson, M. T. Brady, S. P. Danner, K. L. Dominguez, R. Hazra, E. Handelsman*, et al.*, "Guidelines for the Prevention and Treatment of Opportunistic Infections among HIV-exposed and HIV-infected children: recommendations from CDC, the National Institutes of Health, the HIV Medicine Association of the Infectious Diseases Society of America, the Pediatric Infectious Diseases Society, and the American Academy of Pediatrics," *MMWR Recomm Rep,* vol. 58, pp. 1-166, Sep 4 2009.

[52] K. A. Workowski, S. Berman, C. Centers for Disease, and Prevention, "Sexually transmitted diseases treatment guidelines, 2010," *MMWR Recomm Rep,* vol. 59, pp. 1-110, Dec 17 2010.
[53] ACOG, "ACOG Practice Bulletin. Clinical management guidelines for obstetrician-gynecologists, Number 72, May 2006: Vaginitis," *Obstet Gynecol,* vol. 107, pp. 1195-1206, May 2006.

The Payment Policy Statement detailed above has received due consideration as defined in the Payment Policy Statement Policy and is approved.