Flow Cytometry

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Introduction

Flow cytometry testing is addressed by this guideline.

Procedures addressed

The inclusion of any procedure code in this table does not imply that the code is under management or requires prior authorization. Refer to the specific Health Plan's procedure code list for management requirements.

Procedures addressed by this guideline	Procedure codes
Flow cytometry, cell cycle or DNA analysis	88182
Flow cytometry, cell surface, cytoplasmic, or nuclear marker, technical component only; first marker	88184
Flow cytometry, cell surface, cytoplasmic, or nuclear marker, technical component only; each additional marker (List separately in addition to code for first marker)	88185
Flow cytometry, interpretation; 2 to 8 markers	88187
Flow cytometry, interpretation; 9 to 15 markers	88188
Flow cytometry, interpretation; 16 or more markers	88189

What is flow cytometry

Definition

Flow cytometry is a method that uses lasers to detect cell characteristics, including their cell surface or cytoplasmic antigens, size, and granularity, by employing fluorescently-labeled antibodies. Specimens are most commonly fluids such as blood or bone marrow, but it is also possible to test ground-up solid samples.

Flow cytometry procedure coding

The following combination(s) of CPT codes may be used unless more specific CPT codes exist (e.g., 86355-86367, 86828-86835). Any deviation from these CPT coding standards is subject to review and denial if not properly coded.

- 88184 is used to describe the technical component of the first marker applied (maximum one unit).
- 88185 is used for each additional marker applied and billed with the applicable number of units. Therefore, 88185 should not be billed without 88184.
- Because these two codes describe only the technical component, there are three other interpretation codes that may be applied based on the number of markers assessed (each billed with a maximum of one unit):
    - 88187 for evaluating 2 to 8 markers
    - 88188 for evaluating 9 to 15 markers
    - 88189 for evaluating 16 or more markers

Common uses

A variety of disorders are associated with distinct biomarker patterns, which can be used to diagnose, subtype, or monitor these disorders.[1] The following are common uses of flow cytometry in medicine:

Hematopoietic neoplasm evaluation and monitoring

Hematopoietic neoplasm evaluation and monitoring is the most common use, which includes leukemia and lymphoma phenotyping and minimal residual disease (MRD) detection. MRD is when individuals with acute leukemia appear to be in remission having levels of disease below morphologic detection on bone marrow samples but detectable through flow cytometry. Initial panels are generally smaller and made to account for all major cell populations while more extensive flow cytometry evaluation should be reserved for those cases with a higher likelihood of a new diagnosis of leukemia/lymphoma based on initial panel/evaluation.[2,3] In MRD, a limited panel based upon the patient's original disease immunophenotype may be employed.

HIV infection monitoring

Flow cytometry is used for HIV infection monitoring to accurately and reliably evaluate the number of CD4 positive T lymphocytes.[4]

Immunodeficiency

Flow cytometry is used for immunodeficiencies, which may be associated with absent or impaired cell proteins (primary disease), leukocyte dysfunction, and markers of immune status in lymphocytes (secondary disease).[1]

Paroxysmal nocturnal hemoglobinuria

Paroxysmal nocturnal hemoglobinuria (PNH), a rare stem cell disorder, is diagnosed through the detection of deficient antigens on red blood cells, monocytes, and/or granulocytes by flow cytometry.[1]

Criteria

Introduction

Requests for flow cytometry testing are reviewed using these criteria. This guideline addresses common clinical applications of flow cytometry-based tests that are billed using CPT codes 88184-88189. It is not intended to encompass flow cytometry-based tests billed using more specific CPT codes (e.g., 86355-86367, 86828-86835).

Hematopoietic Neoplasm Evaluation and Monitoring

Medical necessity requirements:

Because the flow cytometry markers used to evaluate a sample are necessarily different based on clinical indication, information from other evaluations (e.g., morphology), sample type, and the laboratory setting, this guideline addresses general principles of marker panel selection.[2] Of note, many labs are now using ≥8 color flow cytometry panels; increased color panels provide more accuracy in identifying different cell populations, better sensitivity in detecting low levels of minimal residual disease (the finding of which can affect patient outcomes), and the ability to better analyze even very small or paucicellular specimens.[3,5]

- In the initial evaluation of suspected hematopoietic neoplasm:
  - Common non-neoplastic causes of the clinical presentation (e.g., infection or asplenia with leukocytosis, etc.) should be reasonably ruled out before flow cytometry is employed.
  - A limited but sufficient number of markers should be used in the initial evaluation that allows identification of all major categories of neoplasia (B, T, myeloid, or plasma cell lineages) under consideration based on the clinical indication.
  - Testing with additional markers is indicated to further characterize disease when the initial evaluation is suggestive.

- For staging or evaluating residual disease in patients with a known diagnosis of hematopoietic neoplasm, a limited panel of markers characteristic of that neoplasm should be used.

Billing and reimbursement considerations:

Most presentations, even non-specific indications that require evaluation of several lineages (e.g., anemia, thrombocytopenia, etc.), should rarely require more than 23 flow cytometry markers.[2] In those cases in which a new leukemia diagnosis needs confirmation and further characterization, up to 27 flow cytometry markers are usually employed.[6] Monitoring of a known hematopoietic neoplasia diagnosis requires fewer flow cytometry markers, usually less than 18.[7] Therefore:

- In addition to the one marker represented by CPT 88184, reimbursement will routinely be limited to 22 units of CPT 88185 for non-new leukemic cases, 26 units of CPT 88185 for new leukemia diagnoses, and 17 units of CPT 88185 for disease monitoring.
- ICD code information may be compared with units billed to identify cases with possible excess units that will require post-service medical necessity review. Expected unit number is based on the required cell lineage evaluation by medical indication outlined in reported flow cytometry guidelines.[2,6,7]
- When a laboratory routinely bills more than an average of 20 markers, claims from that laboratory will be subject to post-service medical necessity review.

HIV Monitoring

Medical necessity requirements:

- Flow cytometry is an important method for determining the percentage of lymphocytes that express antigens used to identify CD4+ T cells, and to directly measure absolute T cell counts in the case of single-platform technology (SPT).[4]
- Four antibodies are routinely required (CD45, CD3, CD4, CD8), which may be applied in three- or four-color antibody panels.
- For pediatric patients, additional antibodies may be required to determine CD19+ B-cell values, which is an indicator of immune status in this population.

Billing and reimbursement considerations:

- The most commonly required flow cytometry studies for HIV are represented by marker-specific CPT codes (e.g., 86355-86367). The non-specific flow cytometry codes should not be used when a more specific code exists.
- Therefore, the non-specific CPT codes addressed in this policy should not routinely be required for HIV monitoring. Post-service medical necessity review may be employed when such codes are used for HIV monitoring as indicated by the following ICD codes:

- ICD10 Codes:
  - ICD10 Codes Indicating HIV Positive Status

Non-Reimbursed Clinical Indications

Medical necessity requirements:

Flow cytometry procedures will not be reimbursed for the evaluation of the following indications:

- Detection of sexually transmitted organisms, such as human papillomavirus
- Hypertension or cardiovascular disease risk

Billing and reimbursement considerations:

Flow cytometry will not be reimbursed when billed with any of the following ICD codes:

- ICD10 Codes:
  - ICD10 Codes Indicating Testing for STIs
  - ICD10 Codes Indicating Testing for Hypertension or Cardiovascular Disease Screening

Other Clinical Indications

Medical Necessity Requirements:

Flow cytometry has a variety of applications that cannot all be adequately addressed by this guideline. All flow cytometry studies must be performed for well-validated and medically necessary indications.

Billing and reimbursement considerations:

When flow cytometry is billed with ICD codes that do not suggest one of the other clinical indications addressed in this policy, post-service medical necessity review may be employed. See the Reimbursement Policy that addresses *Post-Service Medical Necessity Determination* for more information.

ICD10 Codes

ICD10 codes in this section may be used to support or refute medical necessity as described in the above criteria.

ICD10 Codes Indicating HIV Positive Status

ICD10 Code or Range	Description
B20	Human immunodeficiency virus [HIV] disease

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ICD10 Code or Range	Description
B97.35	Human immunodeficiency virus, type 2 [HIV-2]
O98.7X	Human immunodeficiency virus [HIV] disease complicating pregnancy, childbirth and the puerperium
R75	Inconclusive laboratory evidence of human immunodeficiency virus [HIV]
Z21	Asymptomatic human immunodeficiency virus [HIV] infection status

ICD10 Codes Indicating Testing for STIs

ICD10 Code or Range	Description
A50.X	Congenital syphilis
A51.X	Early syphilis
A52.X	Late syphilis
A53.X	Other and unspecified syphilis
A54.X	Gonococcal infection
A55	Chlamydial lymphogranuloma (venereum)
A56.X	Other sexually transmitted chlamydial diseases
A57	Chancroid
A58	Granuloma inguinale
A59.X	Trichomoniasis
A60.X	Anogenital herpesviral [herpes simplex] infections
A63.X	Other predominantly sexually transmitted diseases, not elsewhere classified
A64	Unspecified sexually transmitted disease
A74.89	Other chlamydial diseases
A74.9	Chlamydial infection, unspecified (includes childbirth and postpartum)
B37.3	Candidiasis of vulva and vagina
B37.4X	Candidiasis of other urogenital sites
B97.7	Papillomavirus as the cause of diseases classified elsewhere

ICD10 Code or Range	Description
L29.3	Anogenital pruritus, unspecified
M02.30	Reiter's disease, unspecified site
N34.X	Urethritis and urethral syndrome
N35.111	Postinfective urethral stricture, not elsewhere classified, male, meatal
N37	Urethral disorders in diseases classified elsewhere
N39.0	Urinary tract infection, site not specified
N39.9	Disorder of urinary system, unspecified
N70.X	Salpingitis and oophoritis
N71.X	Inflammatory disease of uterus, except cervix
N72	Inflammatory disease of cervix uteri
N73.X	Other female pelvic inflammatory diseases
N74	Female pelvic inflammatory disorders in diseases classified elsewhere
N75.X	Diseases of Bartholin's gland
N76.X	Other inflammation of vagina and vulva
N77.X	Vulvovaginal ulceration and inflammation in diseases classified elsewhere
N94.1	Dyspareunia
O09.X	Supervision of high risk pregnancy
O23.X	Infections of genitourinary tract in pregnancy
O86.1X	Other infection of genital tract following delivery
O86.2X	Urinary tract infection following delivery
R87.5	Abnormal microbiological findings in specimens from female genital organs
R87.6X	Abnormal cytological findings in specimens from female genital organs
R87.8X	Other abnormal findings in specimens from female genital organs

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ICD10 Code or Range	Description
Z00.00	Encounter for general adult medical examination without abnormal findings
Z00.8	Encounter for other general examination
Z01.4X	Encounter for gynecological examination
Z11.3	Encounter for screening for infections with a predominantly sexual mode of transmission
Z11.51	Encounter for screening for human papillomavirus (HPV)
Z11.59	Encounter for screening for other viral diseases
Z11.8	Encounter for screening for other infectious and parasitic diseases
Z11.9	Encounter for screening for infectious and parasitic diseases, unspecified
Z12.4	Encounter for screening for malignant neoplasm of cervix
Z20.2	Contact with and (suspected) exposure to infections with a predominantly sexual mode of transmission
Z20.6	Contact with and (suspected) exposure to human immunodeficiency virus [HIV]
Z20.818	Contact with and (suspected) exposure to other bacterial communicable diseases
Z20.828	Contact with and (suspected) exposure to other viral communicable diseases
Z20.89	Contact with and (suspected) exposure to other communicable diseases
Z20.9	Contact with and (suspected) exposure to unspecified communicable disease
Z30.X	Encounter for contraceptive management
Z31.X	Encounter for procreative management
Z32.X	Encounter for pregnancy test and childbirth and childcare instruction
Z33.X	Pregnant state
Z34.X	Encounter for supervision of normal pregnancy

ICD10 Code or Range	Description
Z36	Encounter for antenatal screening of mother
Z39.X	Encounter for maternal postpartum care and examination
Z64.0	Problems related to unwanted pregnancy
Z64.1	Problems related to multiparity
Z71.7	Human immunodeficiency virus [HIV] counseling
Z72.5X	High risk sexual behavior
Z77.9	Other contact with and (suspected) exposures hazardous to health
Z97.5	Presence of (intrauterine) contraceptive device

ICD10 Codes Indicating Testing for Hypertension or Cardiovascular Disease Screening

ICD10 Code or Range	Description
I10	Essential (primary) hypertension
I11.X	Hypertensive heart disease
I12.X	Hypertensive chronic kidney disease
I13.X	Hypertensive heart and chronic kidney disease
I15.X	Secondary hypertension
I20.X	Angina pectoris
I21.X	ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction
I22.X	Subsequent ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction
I23.X	Certain current complications following ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction (within the 28 day period)
I24.X	Other acute ischemic heart diseases
I25.X	Chronic ischemic heart disease
R07.2	Precordial pain

ICD10 Code or Range	Description
R07.8X	Other chest pain
R07.9	Chest pain, unspecified
R09.89	Other specified symptoms and signs involving the circulatory and respiratory systems
R94.3X	Abnormal results of cardiovascular function studies
Z13.6	Encounter for screening for cardiovascular disorders
Z82.4X	Family history of ischemic heart disease and other diseases of the circulatory system

References

Introduction

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