

09-J1000-81

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## Subject: Carfilzomib (Kyprolis<sup>®</sup>) Injection

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### DESCRIPTION:

Carfilzomib (Kyprolis) is a tetrapeptide epoxy-ketone proteasome inhibitor that irreversibly binds to the N-terminal threonine-containing active sites of the 20S proteasome, the proteolytic core particle within the 26S proteasome. Carfilzomib has antiproliferative and proapoptotic activities *in vitro* in solid and hematologic tumor cells. It was approved by the US Food and Drug Administration (FDA) in July 2012 for treatment of persons with [multiple myeloma](#) (MM) who have received at least 2 prior therapies, including bortezomib (Velcade<sup>®</sup>) and an immunomodulatory drug, and demonstrated disease progression on or within 60 days of completion of the last therapy. In July 2014, the indication was expanded to include treatment of patients with relapsed multiple myeloma who have received one to three prior lines of therapy when used in combination with lenalidomide and dexamethasone (i.e., triplet therapy). In addition, use as a single agent was added using the requirements of the original indication. In January 2016, the indication was again expanded to include use of carfilzomib in combination with dexamethasone as doublet therapy for relapsed or refractory MM. Also, use as a single agent was moved from third-line to second-line treatment of relapsed or refractory MM. Carfilzomib was previously granted orphan designation by the FDA for the treatment of MM in 2008.

Multiple myeloma is a malignant neoplasm of plasma cells that accumulate in bone marrow, leading to bone destruction and marrow failure. Although MM is typically sensitive to a variety of cytotoxic drugs, both as initial treatment or as treatment of relapsed disease, the durability of the response is transient and a cure for MM remains elusive. Persons diagnosed with MM are classified as either having [smoldering \(asymptomatic\)](#) disease or active (symptomatic) disease. Those classified with active MM are initially treated with primary therapy and in selected cases primary therapy is followed by high-dose chemotherapy with stem cell transplant (SCT). Therapy for previously treated MM will eventually be required for persons with relapsed disease after allogeneic or autologous SCT, primary progressive

disease after initial allogeneic or autologous SCT, or persons who are non-transplant candidates who have progressive or relapsing disease after primary therapy.

Among the numerous preferred regimens for previously-treated relapsed or refractory MM, the National Comprehensive Cancer Network (NCCN) Guidelines for MM (Version 2.2019) list the triplet regimen of carfilzomib + lenalidomide + dexamethasone and the doublet regimen of carfilzomib (twice weekly) + dexamethasone as category 1 recommendations under “Preferred Regimens”. The doublet regimen of carfilzomib (weekly) + dexamethasone is listed as a category 2A recommendation under “Preferred Regimens”. The following regimens are all category 2A recommendations listed under “Other Recommended Regimens”: triplet regimen of carfilzomib + pomalidomide + dexamethasone, triplet regimen of carfilzomib + cyclophosphamide + dexamethasone, and doublet regimen of carfilzomib + panobinostat. Among the various options for primary therapy for transplant candidates, the triplet regimen of carfilzomib + lenalidomide + dexamethasone is listed as a category 2A recommendation under “Other Recommended Regimens”. For non-transplant candidates this same regimen as well as carfilzomib + cyclophosphamide + dexamethasone are listed as a category 2A recommendation under “Other Recommended Regimens”. All carfilzomib regimens have a foot note stating that treatment “can potentially cause cardiac and pulmonary toxicity, especially in elderly patients”. In contrast to carfilzomib, various bortezomib-containing treatments are listed as preferred regimens for primary therapy. Lastly, the NCCN Guidelines for Waldenström's Macroglobulinemia/Lymphoplasmacytic Lymphoma (2.2019) list carfilzomib as a component of the CaRD (carfilzomib, rituximab, and dexamethasone) regimen as a category 2A recommendation under “Other Recommended Regimens” as primary therapy for previously untreated Waldenström's macroglobulinemia or as retreatment for patients who had an initial beneficial response to CaRD and have experienced a disease relapse 24 or more months following initial treatment.

## **POSITION STATEMENT:**

**Note:** For all dosage calculations the body surface area (BSA) should never exceed 2.2 m<sup>2</sup>

The initiation of carfilzomib (Kyprolis) **meets the definition of medical necessity** for the following indications (“1”, “2”, “3”, and “4”) when **ALL** of the associated criteria are met:

1. Primary therapy for previously untreated active (symptomatic) multiple myeloma (MM) when **ALL** of the following criteria are met (“a” to “e”):
  - a. **ONE** of the following (“i” or “ii”):
    - i. Member is a stem cell transplant candidate as determined by the treating physician, **AND** carfilzomib will be used in combination with both lenalidomide (Revlimid) and dexamethasone
    - ii. Member is **NOT** a stem cell transplant candidate as determined by the treating physician, **AND** carfilzomib will be used in combination with either lenalidomide and dexamethasone **OR** cyclophosphamide and dexamethasone
  - b. A bortezomib-containing regimen is determined to be clinically inappropriate as first-line primary therapy for the member (the specific reason must be provided)
  - c. Carfilzomib will **NOT** be used in combination with another proteasome inhibitor [e.g., bortezomib or ixazomib (Ninlaro)].
  - d. The member's baseline (i.e., within 90 days prior to initiating treatment with carfilzomib) serum monoclonal protein (M-protein) level, as detected by [serum protein electrophoresis](#), (SPEP) is provided\*

*\*If the M-protein is undetectable by SPEP, baseline serum free light chain (SFLC) levels (kappa and lambda), as detected by serum free light chain assay (SFLCA), must also be provided*

- e. The dosage does not exceed the following based on the medications used in combination:
  - i. With lenalidomide + dexamethasone: 36 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle.
  - ii. With cyclophosphamide + dexamethasone: 36 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle.
2. Relapsed or refractory multiple myeloma when **ALL** of the following criteria are met:
  - a. The member has previously received one or more lines of therapy for their MM
  - b. **ANY** of the following regimens will be used (“i”, “ii”, “iii”, “iv”, or “v”):
    - i. Carfilzomib will be used in combination with dexamethasone as doublet therapy
    - ii. Carfilzomib will be used in combination with panobinostat as doublet therapy (all requirements for the use of panobinostat must also be met)
    - iii. Carfilzomib will be used in combination with pomalidomide plus dexamethasone as triplet therapy (all requirements for the use of pomalidomide must also be met)
    - iv. Carfilzomib will be used in combination with lenalidomide plus dexamethasone as triplet therapy (all requirements for the use of lenalidomide must also be met)
    - v. Carfilzomib will be used in combination with cyclophosphamide plus dexamethasone as triplet therapy
  - c. The member’s MM was not previously refractory (i.e., disease progression on treatment or progression within 60 days after the last dose of a given therapy) to a carfilzomib-containing treatment regimen
  - d. Carfilzomib will **NOT** be used in combination with another proteasome inhibitor [e.g., bortezomib (Velcade) or ixazomib (Ninlaro)].
  - e. The member’s baseline (i.e., within 90 days prior to initiating treatment with carfilzomib) serum monoclonal protein (M-protein) as detected by serum protein electrophoresis (SPEP) is provided\*

*\*If the M-protein is undetectable by SPEP, baseline serum free light chain (SFLC) levels (kappa and lambda), as detected by serum free light chain assay (SFLCA), must also be provided*
  - f. The dosage does not exceed the following based on the medications used in combination:
    - i. With cyclophosphamide + dexamethasone: 36 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle. The first two doses (days 1 and 2) in week 1 should be 20 mg/m<sup>2</sup>.
    - ii. With lenalidomide + dexamethasone: 27 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle for the first 12 cycles. The first two doses (days 1 and 2) in week 1 should be 20 mg/m<sup>2</sup>.
    - iii. With dexamethasone: 56 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle until disease progression or unacceptable toxicity. The first two doses (days 1 and 2) in week 1 should be 20 mg/m<sup>2</sup>.

- iv. With panobinostat: 45 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/ m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle until disease progression or unacceptable toxicity. The first two doses (days 1 and 2) in week 1 should be 20 mg/m<sup>2</sup>.
  - v. With pomalidomide + dexamethasone: 27 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/ m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle until disease progression or unacceptable toxicity. The first two doses (days 1 and 2) in week 1 should be 20 mg/m<sup>2</sup>.
3. Waldenström's macroglobulinemia (a.k.a., lymphoplasmacytic lymphoma) when **ALL** of the following criteria are met:
- a. Member is symptomatic (e.g., hyperviscosity, neuropathy, symptomatic adenopathy or organomegaly, amyloidosis, cryoglobulinemia, cold agglutinin disease, presence of cytopenia)
  - b. Carfilzomib will be used in combination with **BOTH** rituximab (Rituxan) and dexamethasone (i.e., the CaRD regimen).
  - c. **EITHER** of the following ("i" or "ii"):
    - i. Primary therapy for previously untreated disease
    - ii. Disease relapse occurring 24 or more months after an initial beneficial response to primary therapy with a CaRD regimen
  - d. Carfilzomib will **NOT** be used in combination with another proteasome inhibitor [e.g., bortezomib (Velcade) or ixazomib (Ninlaro)]
  - e. The member's baseline (i.e., within 90 days prior to initiating treatment with carfilzomib) serum IgM level is provided
  - f. The dosage does not exceed the following:
    - i. Cycles 1 to 6: 36 mg/ m<sup>2</sup> twice weekly for 2 weeks (4 doses total; e.g., days 1, 2, 8 and 9) of a 21-day cycle
    - ii. After cycle 6: 36 mg/ m<sup>2</sup> once daily for 2 days (2 total doses; e.g., days 1 and 2) of an 8-week cycle
4. Other FDA-approved or NCCN supported diagnosis (not previously listed above), and **BOTH** of the following ("a" and "b"):
- a. **EITHER** of the following is met:
    - i. Member is diagnosed with a condition that is consistent with an indication listed in the product's FDA-approved prescribing information (or package insert) AND member meets any additional requirements listed in the "Indications and Usage" section of the FDA-approved prescribing information (or package insert)
    - ii. Indication **AND** usage is recognized in NCCN Drugs and Biologics Compendium as a Category 1 or 2A recommendation
  - b. The dosage of carfilzomib does not exceed the maximum recommended in the FDA-approved prescribing information or the maximum recommended by the applicable NCCN guidelines for the diagnosis

**Approval duration:** 6 months

The continuation of carfilzomib (Kyprolis) **meets the definition of medical necessity** when **ALL** of the following criteria are met:

1. Authorization or reauthorization for carfilzomib has been previously approved by Florida Blue or another health plan in the past 2 years for the treatment of multiple myeloma, Waldenström's macroglobulinemia, or other FDA-approved or NCCN supported diagnosis; **OR** the member previously met **ALL** indication-specific initiation criteria.
2. Documentation of a favorable response to treatment, is provided (see indication specific criteria below):
  - a. Multiple myeloma:
    - i. If less than 18 months of treatment - a serum M-protein level decrease of 25% or more\* compared to baseline, or M-protein is undetectable, **AND** no increase in the size or number of lytic bone lesions after at least two cycles of treatment with carfilzomib<sup>†,#</sup>
    - ii. If 18 or more months of treatment - provider attestation that the member has not had disease progression during carfilzomib treatment

*\*If the M-protein was undetectable by SPEP at baseline and a baseline SFLC level is available, a decrease of 25% or more in the difference between the light chain produced by the myeloma cells (lambda or kappa) and the other light chain must be achieved*

*†If the M-protein was undetectable by SPEP at baseline and a baseline SFLC level is available, a follow-up SFLC level must be submitted*

*#An exception is permitted if a baseline M-protein level **AND** SFLC level are unavailable. In these cases the physician may provide an attestation of a beneficial clinical response which must include no increase in the size or number of lytic bone lesions.*
  - b. Waldenström's macroglobulinemia or other FDA-approved or NCCN supported diagnosis: provider attestation that the member has **NOT** had disease progression during carfilzomib treatment
3. Carfilzomib will **NOT** be used in combination with another proteasome inhibitor [e.g., bortezomib (Velcade) or ixazomib (Ninlaro)].
4. The dosage does not exceed the following indication- and regimen-specific limits:
  - a. Primary therapy for previously untreated MM:
    - i. With lenalidomide + dexamethasone:
      - Cycles 1 to 8: 36 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle
      - Cycles 9 and beyond: 36 mg/m<sup>2</sup> twice weekly every 2 weeks (weeks 1 and 3; 4 total doses; e.g., days 1, 2, 15 and 16) or 70 mg/m<sup>2</sup> every 2 weeks (weeks 1 and 3; 2 total doses; e.g., days 1 and 15) of a 28-day cycle
    - ii. With cyclophosphamide + dexamethasone:
      - 36 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle
  - b. Relapsed or refractory MM:
    - i. With lenalidomide + dexamethasone:
      - Cycles 2 to 12: 27 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle

- Cycles 13 and beyond: 27 mg/m<sup>2</sup> twice weekly every 2 weeks (weeks 1 and 3; 4 total doses; e.g., days 1, 2, 15 and 16) or 70 mg/ m<sup>2</sup> every 2 weeks (weeks 1 and 3; 2 total doses; e.g., days 1 and 15) of a 28-day cycle
- ii. With cyclophosphamide + dexamethasone:
    - 36 mg/ m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/ m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle
  - iii. With dexamethasone:
    - 56 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle
  - iv. With panobinostat:
    - 45 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/ m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle
  - v. With pomalidomide + dexamethasone:
    - 27 mg/m<sup>2</sup> twice weekly for 21 days (6 total doses; e.g., days 1, 2, 8, 9, 15, and 16) or 70 mg/m<sup>2</sup> once weekly for 21 days (3 total doses; e.g., days 1, 8, and 15) of a 28-day cycle
- c. Waldenström's macroglobulinemia:
    - i. Cycles 1 to 6: 36 mg/m<sup>2</sup> twice weekly for 2 weeks (4 doses total; e.g., days 1, 2, 8 and 9) of a 21-day cycle.
    - ii. After cycle 6: 36 mg/m<sup>2</sup> once daily for 2 days (2 total doses; e.g., days 1 and 2) of an 8-week cycle.
  - d. Other FDA-approved or NCCN-supported diagnosis (not listed above) - the dosage of carfilzomib does not exceed the maximum recommended in the FDA-approved prescribing information or the maximum recommended by the applicable NCCN guideline for the specific diagnosis

**Approval duration:** 1 year

## **DOSAGE/ADMINISTRATION:**

**THIS INFORMATION IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND SHOULD NOT BE USED AS A SOURCE FOR MAKING PRESCRIBING OR OTHER MEDICAL DETERMINATIONS. PROVIDERS SHOULD REFER TO THE MANUFACTURER'S FULL PRESCRIBING INFORMATION FOR DOSAGE GUIDELINES AND OTHER INFORMATION RELATED TO THIS MEDICATION BEFORE MAKING ANY CLINICAL DECISIONS REGARDING ITS USAGE.**

**FDA-approved:** carfilzomib in combination with dexamethasone or with lenalidomide and dexamethasone is indicated for the treatment of patients with relapsed or refractory multiple myeloma who have received one to three prior lines of therapy. It is also indicated as a single agent for treatment of persons with relapsed or refractory multiple myeloma who have received one or more lines of therapy. The dose is calculated using the member's body surface area (BSA) at baseline. Members with a BSA greater than 2.2 m<sup>2</sup> should receive a dose based upon a BSA of 2.2 m<sup>2</sup>. Dose adjustments do not need to be made for weight changes of less than or equal to 20%. Thromboprophylaxis is recommended for patients being treated with the combination of carfilzomib, lenalidomide, and dexamethasone. There are numerous dosing regimens depending on if dexamethasone and/or lenalidomide are given concurrently,

and if the carfilzomib infusion is given over 10 minutes or 30 minutes. Please refer to the package insert for the specific dosage tables.

**Dosage Modifications:** View the product labeling for the recommend dose modification based on toxicities. No dosage adjustments are required in patients with renal impairment. Use in patients with hepatic impairment has not been evaluated. Patients with ALT/AST  $\geq 3$ -times the upper limit of normal (ULN) and bilirubin  $\geq 2$ -times the ULN were excluded from clinical trials. Patients with New York Heart Association Class III and IV heart failure were not eligible for the clinical trials, and safety in this population has not been evaluated.

**Drug Availability:** Carfilzomib is supplied as a 60-mg single-use vial of lyophilized powder that requires reconstitution. The vials should be stored refrigerated (2°C to 8°C; 36°F to 46°F), and kept in the original package to protect from light.

## PRECAUTIONS:

**Contraindications:** None

### Warnings:

- **Cardiac adverse reactions including heart failure and ischemia:** monitor for cardiac complications. Treat promptly and withhold carfilzomib. In patients 75 years of age or older, the risk of cardiac failure is increased. Patients with NYHA Class III and IV heart failure, recent MI, conduction abnormalities, angina, or arrhythmias uncontrolled by medications were not eligible for the clinical trials. These patients may be at greater risk for cardiac complications.
- **Acute renal failure:** Monitor serum creatinine regularly.
- **Pulmonary hypertension:** withhold dosing if suspected.
- **Pulmonary toxicity:** Acute Respiratory Distress Syndrome (ARDS), acute respiratory failure, and acute diffuse infiltrative pulmonary disease such as pneumonitis and interstitial lung disease have occurred. Discontinue if suspected.
- **Dyspnea:** monitor for and managed dyspnea immediately; interrupt carfilzomib until symptoms have resolved or returned to baseline.
- **Infusion reactions:** pre-medicate with dexamethasone to prevent or reduce severity. Advise members to seek immediate medical attention if symptoms develop.
- **Tumor lysis syndrome:** hydrate to prevent; monitor for tumor lysis syndrome and treat promptly.
- **Hypertension including hypertensive crisis:** Monitor blood pressure regularly. If hypertension cannot be adequately controlled, a risk-benefit decision on continued treatment is needed.
- **Venous thrombosis:** Thromboprophylaxis is recommended for patients being treated with the combination of Kyprolis with dexamethasone or with lenalidomide plus dexamethasone. The thromboprophylaxis regimen should be based on an assessment of the patient's underlying risks.
- **Hemorrhage:**
- **Thrombocytopenia:** Monitor platelet counts. Platelet nadirs are observed between Day 8 and Day 15 of each 28-day cycle; reduce or interrupt dosing as clinically indicated.
- **Hepatic toxicity and hepatic failure:** monitor liver enzymes and withhold dosing if suspected.
- **Thrombotic microangiopathy:** cases including thrombotic thrombocytopenic purpura/hemolytic uremic syndrome (TTP/HUS) have been reported. Monitor for signs and symptoms of TTP/HUS. Discontinue therapy if suspected.

- **Posterior reversible encephalopathy syndrome (PRES):** Consider neuro-radiological imaging (MRI) for onset of visual or neurological symptoms; discontinue carfilzomib if suspected.
- **Embryo-fetal toxicity:** carfilzomib can cause fetal harm. Females of reproductive potential should avoid becoming pregnant while being treated. Previously designated as Pregnancy Category D.

### **BILLING/CODING INFORMATION:**

The following codes may be used to describe:

#### **HCPCS Coding**

J9047	Injection, carfilzomib, 1 mg
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#### **ICD-10 Diagnosis Codes That Support Medical Necessity:**

C83.00 – C83.09	Small cell B-cell lymphoma
C88.0	Waldenström macroglobulinemia
C90.00	Multiple myeloma not having achieved remission
C90.02	Multiple myeloma in relapse
C90.10	Plasma cell leukemia not having achieved remission
C90.12	Plasma cell leukemia in relapse
C90.20	Extramedullary <a href="#">plasmacytoma</a> not having achieved remission
C90.22	Extramedullary plasmacytoma in relapse
C90.30	Solitary plasmacytoma not having achieved remission
C90.32	Solitary plasmacytoma in relapse

### **REIMBURSEMENT INFORMATION:**

Refer to section entitled [POSITION STATEMENT](#).

### **PROGRAM EXCEPTIONS:**

**Federal Employee Program (FEP):** Follow FEP guidelines.

**State Account Organization (SAO):** Follow SAO guidelines.

**Medicare Advantage Products:** No National Coverage Determination (NCD) and/or Local Coverage Determination (LCD) were found at the time of the last guideline review date.

### **DEFINITIONS:**

**Heavy chain** – the larger component of an immunoglobulin. There are five types: IgG, IgA, IgM, IgD, and IgE.

**Immunoglobulins (a.k.a., antibodies)** – proteins made by normal plasma cells that have an important role in fighting infection as part of the humoral immune response. Antibodies are composed of two heavy chains and two light chains that form a larger complex. Each plasma cell produces only one type of heavy chain and one type of light chain.

**Light chain** – the smaller component of an immunoglobulin. There are two types: kappa and lambda.



**Minimal response (MR) (according to the Revised Uniform Response Criteria by the International Myeloma Working Group) – ALL of the following:**

- $\geq 25\%$  but  $\leq 49\%$  reduction of serum M-protein
- Reduction in 24-hour urine M-protein by 50% to 89%
- In addition, if present at baseline, 25% to 49% reduction in size of soft tissue plasmacytomas is also required
- No increase in size or number of lytic bone lesions (development of compression fractures does not exclude response).

**Myeloma Protein (M-Protein)** – a nonfunctional immunoglobulin protein or protein fragment produced by malignant plasma cells (or myeloma cells). Since myeloma cells are monoclonal, the M-proteins for a given patient are structurally identical. Both portions of an immunoglobulin (the heavy chain and light chain) can be found in the serum, while only light chains can be found in the urine.

**Plasma cell** - a fully differentiated B lymphocyte (a type of white blood cell) that is specialized for immunoglobulin production and is found primarily in bone marrow.

**Primary refractory MM** - patients who never achieve at least a MR to initial induction therapy and progress while on therapy

**Progressive MM** - at least a 25% increase from nadir in the serum M-protein (absolute increase must be  $\geq 0.5$  g/dL) or urine M-protein (absolute increase must be  $\geq 200$ mg/24 hours), or in the difference between involved and uninvolved serum-free light-chain (FLC) levels (with an abnormal FLC ratio and FLC difference  $>100$  mg/L).

**Relapsed and refractory MM** - patients who never achieve at least a MR or who progress within 60 days of their last therapy

**Serum free light chain assay (SFLCA)** – a test that detects the amount of unbound or free light chains (i.e., not attached to a heavy chain) in the serum. Normal values - kappa: 3.3 to 19.4 mg/L, lambda: 5.71 to 26.3 mg/L, kappa/lambda ratio: 0.26–1.65 (0.37–3.1 if renal impairment).

**Serum Protein Electrophoresis (SPEP)** – a test that detects and quantifies the amount of M-protein in the serum. An serum M-protein of greater than 30 g/L is consistent with a diagnosis of MM.

**Smoldering (Asymptomatic) myeloma:** defined as M-protein in serum of 30 g/dL or more and/or bone marrow clonal plasma cells of 10% or more, but no related organ or tissue impairment (no end organ damage, including bone lesions) or symptoms.

## **RELATED GUIDELINES:**

[Allogeneic Bone Marrow and Stem Cell Transplantation, 02-38240-01](#)

[Bortezomib IV, 09-J0000-92](#)

[Daratumumab \(Darzalex\) IV, 09-J2000-49](#)

[Doxorubicin HCl Liposome \(Doxil®\) IV, 09-J0000-91](#)

[Elotuzumab \(Empliciti\) IV, 09-J2000-50](#)

[Ixazomib \(Ninlaro\), 09-J2000-51](#)

[Lenalidomide \(Revlimid\), 09-J0000-80](#)

[Panobinostat \(Farydak\), 09-J2000-37](#)

[Pomalidomide \(Pomalyst\) Capsule, 09-J1000-95](#)

[Thalidomide \(Thalomid\) Capsules, 09-J1000-56](#)

## **OTHER:**

None

## **REFERENCES:**

1. Berdeja JG, Hart LL, Mace JR, et al. Phase I/II study of the combination of panobinostat and carfilzomib in patients with relapsed/refractory multiple myeloma. *Haematologica*. 2015 May;100(5):670-6.
2. Berenson JR, Cartmell A, Bessudo A, et al. CHAMPION-1: a phase 1/2 study of once-weekly carfilzomib and dexamethasone for relapsed or refractory multiple myeloma. *Blood*. 2016 Jun 30;127(26):3360-8. Epub 2016 May 12.
3. Biran N, Siegel D, Berdeja JG, et al. Weekly carfilzomib, lenalidomide, and dexamethasone in relapsed or refractory multiple myeloma: A phase 1b study. *Am J Hematol*. 2019 Jul;94(7):794-802. Epub 2019 May 13.
4. Boccia RV, Bessudo A, Agajanian R, et al. A Multicenter, Open-Label, Phase 1b Study of Carfilzomib, Cyclophosphamide, and Dexamethasone in Newly Diagnosed Multiple Myeloma Patients (CHAMPION-2). *Clin Lymphoma Myeloma Leuk*. 2017 Jul;17(7):433-437.
5. Bringhen S, D'Agostino M, De Paoli L, et al. Phase 1/2 study of weekly carfilzomib, cyclophosphamide, dexamethasone in newly diagnosed transplant-ineligible myeloma. *Leukemia*. 2018 Apr;32(4):979-985.
6. Bringhen S, Mina R, Petrucci MT, et al. Once-weekly versus twice-weekly carfilzomib in patients with newly diagnosed multiple myeloma: a pooled analysis of two phase 1/2 studies. *Haematologica*. 2019 Feb 7. pii: haematol.2018.208272.. [Epub ahead of print]
7. Clinical Pharmacology [database online]. Tampa, FL: Gold Standard, Inc.; 2019. Available at [www.clinicalpharmacology-ip.com](http://www.clinicalpharmacology-ip.com). Accessed 5/24/19.
8. Dimopoulos MA, Goldschmidt H, Niesvizky R, et al. Carfilzomib or bortezomib in relapsed or refractory multiple myeloma (ENDEAVOR): an interim overall survival analysis of an open-label, randomised, phase 3 trial. *Lancet Oncol*. 2017 Oct;18(10):1327-1337.
9. Dytfeld D, Jasielc J, Griffith KA, et al. Carfilzomib, lenalidomide, and low-dose dexamethasone in elderly patients with newly diagnosed multiple myeloma. *Haematologica*. 2014 Sep;99(9):e162-4.
10. Jakubowiak AJ, Dytfeld D, Griffith KA, et al. A phase 1/2 study of carfilzomib in combination with lenalidomide and low-dose dexamethasone as a frontline treatment for multiple myeloma. *Blood* 2012;120(9):1801-9.
11. Kaufman JL, Mina R, Jakubowiak AJ, et al. Combining carfilzomib and panobinostat to treat relapsed/refractory multiple myeloma: results of a Multiple Myeloma Research Consortium Phase I Study. *Blood Cancer J*. 2019 Jan 4;9(1):3.
12. Korde N, Zingone A, Kwok M, et al. Phase II Clinical and Correlative Study of Carfilzomib, Lenalidomide, and Dexamethasone (CRd) in Newly Diagnosed Multiple Myeloma (MM) Patients

[abstract]. Blood 2012;120:Abstract 732. Available at:  
<http://abstracts.hematologylibrary.org/cgi/content/abstract/ashmtg;120/21/732>

13. Kyprolis (carfilzomib) [package insert]. Onyx Pharmaceuticals. South San Francisco (CA): February 2019.
14. Micromedex Healthcare Series [Internet Database]. Greenwood Village, Colo: Thomson Healthcare. Updated periodically. Accessed 05/24/19.
15. Moreau P, Mateos MV, Berenson JR, et al. Once weekly versus twice weekly carfilzomib dosing in patients with relapsed and refractory multiple myeloma (A.R.R.O.W.): interim analysis results of a randomised, phase 3 study. Lancet Oncol. 2018 May 31. pii: S1470-2045(18)30354-1. [Epub ahead of print].
16. National Comprehensive Cancer Network. Cancer Guidelines. Cancer Guidelines and Drugs and Biologics Compendium. Accessed 05/24/19.
17. National Comprehensive Cancer Network. Clinical Practice Guidelines in Oncology. Version 2.2019. Multiple Myeloma. Available at [http://www.nccn.org/professionals/physician\\_gls/PDF/myeloma.pdf](http://www.nccn.org/professionals/physician_gls/PDF/myeloma.pdf). Accessed 5/29/19.
18. National Comprehensive Cancer Network. Clinical Practice Guidelines in Oncology. Version 2.2019. Waldenström's Macroglobulinemia/Lymphoplasmacytic Lymphoma. Available at [https://www.nccn.org/store/login/login.aspx?ReturnURL=http://www.nccn.org/professionals/physician\\_gls/pdf/waldenstroms.pdf](https://www.nccn.org/store/login/login.aspx?ReturnURL=http://www.nccn.org/professionals/physician_gls/pdf/waldenstroms.pdf). Accessed 5/29/19.
19. Shah JJ, Stadtmauer EA, Abonour R, et al. Carfilzomib, pomalidomide, and dexamethasone for relapsed or refractory myeloma. Blood. 2015 Nov 12;126(20):2284-90.
20. Siegel DS, Martin T, Wang M, et al. A phase 2 study of single-agent carfilzomib (PX-171-003-A1) in patients with relapsed and refractory multiple myeloma. Blood. 2012 Oct 4;120(14):2817-25.
21. Stewart AK, Rajkumar SV, Dimopoulos MA, et al. Carfilzomib, lenalidomide, and dexamethasone for relapsed multiple myeloma. N Engl J Med. 2015 Jan 8;372(2):142-52
22. Treon SP, Tripsas CK, Meid K, et al. Carfilzomib, rituximab, and dexamethasone (CaRD) treatment offers a neuropathy-sparing approach for treating Waldenström's macroglobulinemia. Blood. 2014 Jul 24;124(4):503-10.

### **COMMITTEE APPROVAL:**

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Pharmacy Policy Committee on 06/12/19.

### **GUIDELINE UPDATE INFORMATION:**

12/15/12	New Medical Coverage Guideline.
07/15/13	Review and revision to guideline; consisting of revising position statement to include current NCCN category 1 and 2A recommendations; revising description, dosage/administration, program exceptions and precautions sections; updating references.
01/01/14	Revision to guideline; consisting of code update.
07/15/14	Review and revision to guideline; consisting of updating references.
07/15/15	Review and revision to guideline; consisting of updating description, position statement, dosage/administration, precautions, coding/billing, and references.
09/15/15	Revision to guideline; consisting of updating description, position statement, dosage/administration, and references based on a new FDA-approved indication.
11/01/15	Revision: ICD-9 Codes deleted.
03/15/16	Revision to guidelines consisting of updating description, position statement,

	dosage/administration, and references based on expanded FDA-approved indications.
07/15/16	Review and revision to guideline consisting of updating description section, position statement, billing/coding information, definitions, related guidelines, and references.
12/15/16	Revision to guideline consisting of updating the description section, position statement, and references based on updated NCCN guidelines for multiple myeloma.
02/16/17	Revision: Update to Position Statement.
07/15/17	Review and revision to guidelines consisting of updating the description section, position statement, precautions, and references.
07/15/18	Review and revision to guidelines consisting of updating the description section, position statement, dosage/administration, precautions, billing/coding information, and references.
07/15/19	Review and revision to guidelines consisting of updating the description section, position statement, dosage/administration, precautions, billing/coding information, and references.