

-E-

# Keytruda<sup>®</sup> (pembrolizumab) (Intravenous)

Document Number: MODA-0523

Last Review Date: 03/05/2024 Date of Origin: 06/02/2020

Dates Reviewed: 06/2020, 07/2020, 09/2020, 12/2020, 04/2021, 07/2021, 09/2021, 12/2021, 01/2022, 04/2022, 07/2022, 10/2022, 01/2023, 03/2023, 04/2023, 06/2023, 09/2023, 10/2023, 12/2023, 01/2024, 02/2024, 03/2024

0

0

0

0

0

0

0

0

0

0

0

0

0

0

Kaposi Sarcoma

Renal Cell Carcinoma (RCC)

Merkel Cell Carcinoma (MCC)

Non-Small Cell Lung Cancer (NSCLC)

**Primary Cutaneous Lymphomas** 

Ovarian, Fallopian Tube, and Primary

Cutaneous Squamous Cell Carcinoma (cSCC)

Endometrial Carcinoma (Uterine Cancer)

Tumor Mutational Burden-High (TMB-H)

Microsatellite Instability-High (MSI-H)

**Cutaneous Melanoma** 

**Adrenal Gland Tumors** 

**Peritoneal Cancer** 

Soft Tissue Sarcoma

Thymic Carcinoma

Cancer

Cancer

# **Table of Contents**

- Length of Authorization
- **Dosing Limits**
- Initial Approval Criteria
  - 0 Primary Mediastinal Large B-Cell Lymphoma (PMBCL)
  - Biliary Tract Cancer (Gallbladder Cancer or 0 Intra-/Extra-Hepatic Cholangiocarcinoma)
  - Urothelial Carcinoma (Bladder Cancer) 0
  - Triple Negative Breast Cancer (TNBC)
  - o Adult Central Nervous System (CNS) Cancer
  - o Cervical Cancer
  - Esophageal Cancer and 0 Esophagogastric/Gastroesophageal Junction Cancer
  - **Gastric Cancer** 0
  - Squamous Cell Carcinoma of the Head and 0 Neck (SCCHN)
  - Hepatocellular Carcinoma (HCC) 0
  - Adult Classical Hodgkin Lymphoma (cHL) 0
  - Pediatric Classical Hodgkin Lymphoma 0
- **Renewal Criteria**
- Dosing/Administration
- **Billing Code/Availability** •
- References (STANDARD)
- **References (ENHANCED)**
- Appendix I (ICD-10 Coding)
- Appendix II (Centers for Medicare and Medicaid Services CMS)
- Appendix III (Internal Use Only)
- Length of Authorization A 1-3,5,6,15-17,50,51,53,57,62,65,68,69,72,73,75-77,82,85-87,95,101,103,15e Ι.

Coverage will be provided for 6 months and may be renewed (unless otherwise specified).

Adrenal Gland Tumors, Biliary Tract Cancer (Gallbladder Cancer or Intra-/Extra-Hepatic Cholangiocarcinoma), Bladder Cancer/Urothelial Carcinoma, Cervical Cancer, cHL, Adult CNS Cancer, Cutaneous Melanoma (in combination with ipilimumab or lenvatinib), cSCC,







Endometrial Carcinoma (Uterine Neoplasms), Esophageal and Esophagogastric/Gastroesophageal Junction Cancer (first-line or subsequent therapy), Gastric Cancer (first-line therapy), HCC, MCC, MSI-H/dMMR Cancer, NSCLC (first-line or subsequent therapy), PMBCL, Primary Cutaneous Lymphomas, RCC (first-line or subsequent therapy), SCCHN, Thymic Carcinoma, TMB-H Cancer, and TNBC (recurrent unresectable or metastatic disease) can be authorized up to a maximum of twenty-four (24) months of therapy.\*

- Kaposi Sarcoma may not be renewed.
- Adjuvant therapy in Cutaneous Melanoma, NSCLC, and RCC can be authorized up to a maximum of twelve (12) months of therapy.\*
- Therapy for resectable NSCLC can be authorized for up to a maximum of twelve (12) weeks of neoadjuvant therapy and thirty-nine (39) weeks of adjuvant therapy.\*
- Neoadjuvant therapy in TNBC can be authorized up to a maximum of twenty-four (24) weeks of therapy.\*
- Adjuvant therapy in TNBC can be authorized up to a maximum of twenty-seven (27) weeks of therapy.\*
- Reinduction therapy in Cutaneous Melanoma can be authorized up to a maximum of twelve (12) months of therapy.\*

| *Note: The maximum number of doses is dependent on the dosing frequency and duration of therapy. Refer to Section V for exact dosage. |                           |                         |
|---|---------------------------|-------------------------|
| Dosing Frequency  | Maximum length of therapy | Maximum number of doses |
| 2 weeks   | 2 years                   | 52 doses                |
| 3 weeks   | 24 weeks                  | 8 doses                 |
|   | 27 weeks                  | 9 doses                 |
|   | 1 year                    | 18 doses                |
|   | 2 years                   | 35 doses                |
|   | 24 weeks                  | 4 doses                 |
| 6 weeks   | 27 weeks                  | 5 doses                 |
|   | 1 year                    | 9 doses                 |
|   | 2 years                   | 18 doses                |

#### II. Dosing Limits

#### A. Quantity Limit (max daily dose) [NDC Unit]:

• Keytruda 100 mg/4 mL single use vial: 12 vials per 14 day supply

#### B. Max Units (per dose and over time) [HCPCS Unit]:

| Indication | Billable   | Per unit    |
|------------|------------|-------------|
|            | Units (BU) | time (days) |





| Biliary Tract Cancer (Gallbladder Cancer or Intra-/Extra-<br>Hepatic Cholangiocarcinoma), Bladder/Urothelial, Cervical,<br>cHL, cSCC, Cutaneous Melanoma, Endometrial Carcinoma | 200 BU            | 21 days |
|---|-------------------|---------|
| (Uterine Neoplasms), Esophageal,<br>Esophagogastric/Gastroesophageal, Gastric, HCC, MCC, MSI-<br>H/dMMR Cancer, NSCLC, PMBCL, RCC, SCCHN, TMB-H<br>Cancer, & TNBC               | 400 BU            | 42 days |
| Adrenal Gland Tumors, Kaposi Sarcoma, Soft Tissue Sarcoma,<br>& Thymic  | 200 BU            | 21 days |
| Adult CNS Cancer  | $200 \mathrm{BU}$ | 21 days |
|   | 1,200 BU          | 14 days |
| Primary Cutaneous Lymphomas   | 300 BU            | 21 days |

# III. Initial Approval Criteria <sup>1,2</sup>

Coverage is provided in the following conditions:

• Patient is at least 18 years of age (unless otherwise specified); AND

#### Universal Criteria

 Patient has not received previous therapy with a programmed death (PD-1/PD-L1)-directed therapy (e.g., cemiplimab, avelumab, nivolumab, atezolizumab, durvalumab, dostarlimab, nivolumab/relatlimab, retifanlimab, toripalimab, etc.) unless otherwise specified <sup>A</sup>; AND

# Primary Mediastinal Large B-Cell Lymphoma (PMBCL) $\dagger \ddagger \Phi$ 1,2,6,34,82

- Used as single agent; **AND**
- Patient is at least 6 months of age; AND
- Patient has relapsed or refractory disease; AND
- Patient does not require urgent cytoreductive therapy; AND
- Used after autologous stem-cell transplant OR if ineligible for autologous stem-cell transplant, used after 2 or more prior lines of therapy

# Biliary Tract Cancers (Gallbladder Cancer or Intra-/Extra-Hepatic Cholangiocarcinoma) $\dagger \ddagger \Phi$ 1,2,94,1876

- Patient has unresectable, resected gross residual (R2), or metastatic disease; AND
- Used in combination with gemcitabine and cisplatin; AND
- Used as primary treatment

#### Urothelial Carcinoma (Bladder Cancer) † ± 1,2,8,10,35-37,88,93,99,54e-55e,134e,192e

- Used in combination with enfortumab vedotin; AND
  - Patient has locally advanced or metastatic urothelial carcinoma **†**; AND







- Used as first-line therapy; **OR**
- Patient has one of the following diagnoses:
  - Muscle invasive bladder cancer with local recurrence or persistent disease in a preserved bladder treated with curative intent **‡**
  - Metastatic or local bladder cancer recurrence post-cystectomy treated with curative intent **‡**
  - Metastatic primary carcinoma of the urethra ‡
  - Metastatic upper genitourinary (GU) tract tumors ‡
  - Metastatic urothelial carcinoma of the prostate **‡**; AND \_
  - Used as first-line therapy in cisplatin ineligible patients\*; **OR**
- Used as a single agent; AND
  - Patient has Bacillus Calmette-Guerin (BCG)-unresponsive\*\*, high-risk, non-muscle invasive bladder cancer (NMIBC) defined as one of the following **†**:
    - Persistent disease despite adequate BCG therapy
    - Disease recurrence after an initial tumor free state following an adequate BCG course of therapy
    - T1 disease following a single induction course of BCG therapy; **AND**
    - Patient has carcinoma in situ (CIS); AND .
    - Patient is ineligible for or has elected not to undergo cystectomy; **OR**
  - Patient has one of the following diagnoses: 0
    - Locally advanced or metastatic urothelial carcinoma \*
    - Muscle invasive bladder cancer with local recurrence or persistent disease in a preserved bladder treated with curative intent ‡
    - Metastatic or local bladder cancer recurrence post-cystectomy treated with curative intent **‡**
    - Recurrent or metastatic primary carcinoma of the urethra (excluding recurrence of stage T3-4 disease or palpable inguinal lymph nodes) **‡**
    - Primary carcinoma of the urethra that is stage T3-4 cN1-2 OR cN1-2 with palpable inguinal lymph nodes (*first-line therapy only*) **‡**
    - Metastatic upper genitourinary (GU) tract tumors **‡**; **AND**
    - Used for disease that progressed during or following platinum-containing chemotherapy\*; OR
    - Used as first-line therapy in cisplatin-ineligible patients\*; AND
      - > Patient is not eligible for any platinum-containing chemotherapy (i.e., both cisplatin and carboplatin-ineligible)\*





#### \* Note: 10,71,79

If patient was progression free for > 12 months after platinum therapy, consider re-treatment with platinum-based therapy if the patient is still platinum eligible (see below for cisplatin- or platinum-ineligible comorbidities).

- Cisplatin-ineligible comorbidities may include the following: CrCl < 60 mL/min, ECOG PS ≥ 2 or KPS ≤ 70%, hearing loss of ≥ 25 decibels (dB) at two contiguous frequencies, grade ≥ 2 peripheral neuropathy, or NYHA Heart Failure class ≥ 3. Carboplatin may be substituted for cisplatin particularly in those patients with a CrCl <60 mL/min or a PS of 2.</li>
- Platinum-ineligible comorbidities may include the following: CrCl < 30 mL/min, ECOG PS ≥ 3, grade ≥ 2 peripheral neuropathy, or NYHA Heart Failure class > 3, etc.

**\*\*** Adequate BCG therapy is defined as administration of at least five of six doses of an initial induction course AND at least two of three doses of maintenance therapy or at least two of six doses of a second induction course.

# Triple-Negative Breast Cancer (TNBC) $\ddagger \ddagger \Psi^{1,2,69}$

- Used as first-line therapy for recurrent unresectable or metastatic disease; AND
  - $\circ~$  Used in combination with albumin-bound paclitaxel, paclitaxel, or gemcitabine with carboplatin;  ${\bf AND}$
  - o Tumor expresses PD-L1 (combined positive score [CPS] ≥10) as determined by an FDAapproved or CLIA-compliant test ♦; OR
- Patient has high-risk early-stage (i.e., stage II-III) disease; AND
  - Used as neoadjuvant therapy in combination with carboplatin and paclitaxel, then in combination with cyclophosphamide and either doxorubicin or epirubicin; **OR**
  - Used as adjuvant therapy as a single agent following use as neoadjuvant therapy in combination with chemotherapy

# Adult Central Nervous System (CNS) Cancer ‡ 2,47,49,50

- Used as a single agent; AND
- Primary tumor is due to BRAF non-specific melanoma or PD-L1 positive (TPS ≥1%) non-small cell lung cancer (NSCLC); **AND** 
  - Used as initial treatment in patients with small asymptomatic brain metastases; **OR**
  - $\circ~$  Used for relapsed limited brain metastases with either stable systemic disease or reasonable systemic treatment options;  $\mathbf{OR}$
  - $\circ$   $\;$  Used for recurrent limited brain metastases; OR
  - Used for recurrent extensive brain metastases with stable systemic disease or reasonable systemic treatment options







#### Cervical Cancer † ‡ 1,2,42,70

- Patient has FIGO 2014 Stage III-IVA disease; AND
  - $\circ$  Used in combination with chemoradiotherapy (CRT); **OR**
- Tumor expresses PD-L1 (CPS ≥1) as determined by an FDA-approved or CLIA-compliant test�; AND
  - Used as a single agent; AND
    - Used as subsequent therapy for recurrent or metastatic disease; **OR**
  - Used in combination with cisplatin or carboplatin AND paclitaxel (with or without bevacizumab); AND
    - Patient has persistent, recurrent, or metastatic disease; AND
    - Used as first-line therapy; **AND**
    - Disease is not amenable to curative treatment (i.e., surgery and/or radiation)

#### 

- Patient is not a surgical candidate or has unresectable locally advanced, recurrent or metastatic disease; **AND** 
  - Used as first-line therapy; **AND** 
    - Patient has HER2-positive esophagogastric/gastroesophageal junction adenocarcinoma; AND
      - Used in combination with trastuzumab, fluorouracil or capecitabine, and oxaliplatin or cisplatin; **OR**
    - Patient has HER2-negative esophagogastric/gastroesophageal junction adenocarcinoma; AND
      - Used in combination with oxaliplatin or cisplatin AND either fluorouracil or capecitabine; **OR**
    - Patient has squamous cell carcinoma; AND
      - Used in combination with oxaliplatin or cisplatin AND either fluorouracil or capecitabine; **AND**
      - Tumor expresses PD-L1 (CPS  $\geq$  10) as determined by an FDA-approved or CLIA compliant test  $\clubsuit;$  OR
  - Used as subsequent therapy; **AND** 
    - Used as a single agent; **AND**
    - Patient has esophageal squamous cell carcinoma †; AND
    - Tumor expresses PD-L1 (CPS ≥ 10) as determined by an FDA-approved or CLIA compliant test\*; AND







• Patients with HER2-positive disease must have previously received HER2-directed therapy (e.g., trastuzumab, etc.)

### Gastric Cancer $\ddagger \ddagger \Phi$ <sup>1,2,39,67,95,98,103</sup>

- Patient is not a surgical candidate or has unresectable locally advanced, recurrent, or metastatic disease; **AND**
- Used as first-line therapy; **AND** 
  - Patient has HER2-positive adenocarcinoma; AND
    - Used in combination with trastuzumab, fluorouracil or capecitabine, and oxaliplatin or cisplatin; **OR**
  - Patient has HER2-negative adenocarcinoma; AND
    - Used in combination with oxaliplatin or cisplatin AND either fluorouracil or capecitabine

#### Squamous Cell Carcinoma of the Head and Neck (SCCHN) † ± 1,2,31,32,106,42e,188e

- Patient has Very Advanced Head and Neck Cancer\*; AND
- Patient has NON-nasopharyngeal cancer; AND
- Patient has unresectable, recurrent, persistent, or metastatic disease; AND
  - $\circ$  Used as a single agent; AND
    - Tumor expresses PD-L1 (CPS ≥1) as determined by an FDA-approved or CLIAcompliant test \$; AND
      - ➢ Used as first-line therapy **†**; OR
      - Used as subsequent therapy for disease that has progressed on or after platinum-containing chemotherapy; OR
  - $\circ$  Used in combination with cetuximab; AND
    - > Patient has a performance status 0-1; **AND**
    - > Patient has platinum-resistant disease or is platinum-ineligible; **OR**
  - Used in combination with carboplatin or cisplatin AND either fluorouracil, docetaxel, or paclitaxel as first-line therapy; **AND** 
    - Patient has a performance status 0-1

\* Very Advanced Head and Neck Cancer includes: Newly diagnosed locally advanced T4b (M0) disease; newly diagnosed unresectable regional nodal disease (typically N3); metastatic disease at initial presentation (M1); or recurrent or persistent disease.

#### Hepatocellular Carcinoma (HCC) $\dagger \ddagger \Phi$ <sup>1,2,43,107</sup>

• Used as a single agent; AND







- Patient has Child-Pugh Class A liver impairment *(i.e., excluding Child-Pugh Class B and C)*; AND
  - Disease is secondary to hepatitis B **†**; AND
    - Patient has received prior systemic therapy other than a PD-1/PD-L1- containing regimen; OR
  - Used as subsequent therapy for progressive disease **‡**; **AND** 
    - Patient has unresectable disease and is not a transplant candidate; **OR**
    - Patient has liver-confined disease that is inoperable by performance status, comorbidity, or with minimal or uncertain extrahepatic-disease; **OR**
    - Patient has metastatic disease or extensive liver tumor burden

#### Adult Classical Hodgkin Lymphoma (cHL) † ‡ $\Phi$ 1,2,33,61,96,97

- Patient has relapsed or refractory disease; AND
  - $\circ$  Used as a single agent;  $\mathbf{OR}$
  - Used in combination with GVD (gemcitabine, vinorelbine, liposomal doxorubicin) or ICE (ifosfamide, carboplatin, etoposide); AND
    - Patient is  $\leq 60$  years of age

#### Pediatric Classical Hodgkin Lymphoma $\dagger \ddagger \Phi^{1,2,33,61}$

- Patient is at least 6 months of age\*; AND
- Used as a single agent; AND
  - Patient has refractory disease **†**; **OR**
  - Patient has relapsed disease; AND
    - Used after two (2) or more prior lines of therapy **†**; **OR**
    - Used as subsequent therapy in patients heavily pretreated with platinum or anthracycline-based chemotherapy ‡; OR
    - Used as subsequent therapy in patients with an observed decrease in cardiac function ‡

\* Pediatric Classical Hodgkin Lymphoma may be applicable to adolescent and young adult (AYA) patients up to the age of 39 years.

#### Kaposi Sarcoma ‡ <sup>2,85,86</sup>

- Used as a single agent as subsequent therapy; AND
- Patient has endemic or classic disease; AND
- Used for relapsed/refractory advanced cutaneous disease; AND
- Disease has progressed on or has not responded to first-line systemic therapy; AND





- Disease has progressed on alternate first-line systemic therapy; AND
- Patient does not have multicentric Castleman disease (MCD) or KSHV–associated inflammatory cytokine syndrome (KICS)

#### Renal Cell Carcinoma (RCC) † ‡ 1,2,45,74-76

- Patient has clear cell histology; AND
  - $\circ$   $\;$  Used in combination with axitinib or lenvatinib; AND  $\;$ 
    - Used as first-line therapy for advanced, relapsed, or stage IV disease; OR
  - Used as a single agent; AND
    - Used as adjuvant therapy *†*; AND
      - > Patient has undergone a nephrectomy prior to receiving treatment; AND
        - Patient has stage II disease with grade 4 tumors (with or without sarcomatoid features); OR
        - Patient has stage III disease; OR
      - Patient has undergone a metastasectomy with complete resection of disease within one year of nephrectomy for relapsed or stage IV disease; OR
- Patient has non-clear cell histology; AND
  - Used as a single agent as first-line therapy for relapsed or stage IV disease **‡**

# Cutaneous Melanoma † ‡ $\Phi$ $^{1,2,22\text{-}24,65,68,87,15e}$

- Used as first-line therapy as a single agent for unresectable or metastatic\* disease; OR
- Used as subsequent therapy; AND
  - Used for metastatic\* or unresectable disease with progression or relapse following treatment with anti-PD-1 therapy; AND
    - Used as a single agent; AND
    - Used as re-induction therapy in patients who experienced stable disease or better after at least 24 months of pembrolizumab therapy OR a complete response after at least 6 months of pembrolizumab, but subsequently have disease progression after treatment discontinuation; **OR**
  - Used for metastatic\* or unresectable disease with progression, intolerance, and/or projected risk of progression with BRAF-targeted therapy (e.g., dabrafenib/trametinib, vemurafenib/cobimetinib, encorafenib/binimetinib, etc.); AND
    - Used as a single agent; AND
      - > Anti-PD-1 therapy was not previously used; **OR**
      - Used as re-induction therapy in patients who experienced stable disease or better after at least 24 months of pembrolizumab therapy OR a complete





response after at least 6 months of pembrolizumab, but subsequently have disease progression after treatment discontinuation; **OR** 

- Used in combination with ipilimumab; AND
  - Used after progression on single-agent anti-PD-1 therapy and combination ipilimumab/anti-PD-1 therapy was not previously used; OR
- Used as a single agent for adjuvant treatment; AND
  - Patient has stage IIB, IIC, or III melanoma following complete resection; AND
  - Patient is at least 12 years of age

\*Metastatic disease includes stage III unresectable/borderline resectable disease with clinically positive node(s) or clinical satellite/in-transit metastases, as well as unresectable local satellite/in-transit recurrence, unresectable nodal recurrence, and widely disseminated distant metastatic disease.

# Merkel Cell Carcinoma (MCC) $\dagger \ddagger \Phi$ <sup>1,2,9,44,22e</sup>

- Patient is at least 6 months of age; AND
- Used as first-line therapy as a single agent; AND
  - Patient has recurrent regional disease **‡**; AND
    - Both curative surgery and curative radiation therapy are not feasible; **OR**
  - Patient has recurrent locally advanced or metastatic disease \*

# Adrenal Gland Tumors ‡ 2,62,63,77,128e,129e

- Patient has locoregional unresectable or metastatic adrenocortical carcinoma (ACC); AND
- Used with or without mitotane

# Non-Small Cell Lung Cancer (NSCLC) † ‡ 1,2,11,25-29,120e,133e,136e,196e

- Used for stage III disease **†**; AND
  - Used as first-line therapy as a single-agent in patients who are not candidates for surgical resection or definitive chemoradiation; **AND**
  - ∪ Used in patients with tumors expressing PD-L1 (TPS ≥1%) as determined by an FDAapproved or CLIA compliant test and with no EGFR or ALK genomic tumor aberrations; OR
- Used as neoadjuvant therapy **†**; **AND** 
  - Patient has resectable stage II, IIIA, or IIIB (N2) disease (tumors ≥4 cm or node positive); AND
  - Used in combination with platinum-containing chemotherapy, and then continued as a single agent as adjuvant treatment after surgery; **OR**
- Used as adjuvant therapy; AND
  - $\circ$  Used as a single agent; AND







- Used following resection and previous adjuvant platinum-based chemotherapy;
   AND
  - > Patient has stage IB (T2a  $\geq$ 4 cm), II, or IIIA disease **†**; **OR**
- Used following previous neoadjuvant pembrolizumab plus chemotherapy and resection for stage II, IIIA, or IIIB (N2) disease; OR
- Used for recurrent, advanced, or metastatic disease (excluding locoregional recurrence or symptomatic local disease without evidence of disseminated disease) or mediastinal lymph node recurrence with prior radiation therapy; **AND** 
  - $\circ$  Used as first-line therapy; AND
    - Used for one of the following:
      - PD-L1 expression-positive (TPS ≥1%) tumors, as detected by an FDAapproved or CLIA compliant test\*, that are negative for actionable molecular biomarkers\*¥
      - Patients with performance status (PS) 0-1 who have tumors that are negative for actionable molecular biomarkers\*¥ and PD-L1 expression <1%</li>
      - Patients with PS 0-1 who are positive for one of the following molecular biomarkers: EGFR exon 20, BRAF V600E, NTRK1/2/3 gene fusion, MET exon 14 skipping, RET rearrangement, or ERBB2 (HER2); AND
    - Used in combination with pemetrexed <u>AND</u> either carboplatin or cisplatin for non-squamous cell histology; **OR**
    - Used in combination with carboplatin <u>AND</u> either paclitaxel or albumin-bound paclitaxel for squamous cell histology; **OR**
    - Used as a single agent (for PD-L1 expression-positive tumors ONLY) †; OR
  - Used as subsequent therapy; AND
    - Used in patients with tumors expressing PD-L1 (TPS ≥1%) as determined by an FDA-approved or CLIA compliant test in patients with disease progression on or after platinum-containing chemotherapy (patients with EGFR or ALK genomic tumor aberrations should also have disease progression on FDA-approved therapy§); AND
      - > Used as a single agent; **OR**
    - Used for one of the following:
      - Patients with PS 0-1 who are positive for one of the following molecular biomarkers\* and have received prior targeted therapy§: EGFR exon 19 deletion or L858R tumors, EGFR S768I, L861Q and/or G719X, ALK rearrangement, or ROS1 rearrangement





- Patients with PS 0-1 who are positive for one of the following molecular biomarkers\*: BRAF V600E, NTRK1/2/3 gene fusion, MET exon 14 skipping, or RET rearrangement; AND
- Used in combination with carboplatin <u>AND</u> either paclitaxel or albuminbound paclitaxel for squamous cell histology; **OR**
- Used in combination with pemetrexed <u>AND</u> either carboplatin or cisplatin for non-squamous cell histology; **OR**
- Used as continuation maintenance therapy in patients who have achieved tumor response or stable disease following initial systemic therapy; **AND** 
  - Used in combination with pemetrexed following a first-line pembrolizumab/pemetrexed/(carboplatin or cisplatin) regimen for non-squamous cell histology; OR
  - Used as a single agent following a first-line pembrolizumab/carboplatin/ (paclitaxel or albumin-bound paclitaxel) regimen for squamous cell histology; OR
  - Used as a single agent following a first-line pembrolizumab monotherapy regimen

\*Note: Actionable molecular genomic biomarkers include EGFR, KRAS, ALK, ROS1, BRAF, NTRK1/2/3, MET, RET, and ERBB2 (HER2). Complete genotyping for EGFR, KRAS, ALK, ROS1, BRAF, NTRK1/2/3, MET, RET, and ERBB2 (HER2), via biopsy and/or plasma testing. If a clinically actionable marker is found, it is reasonable to start therapy based on the identified marker. Treatment is guided by available results and, if unknown, these patients are treated as though they do not have driver oncogenes.

¥ May also be used for patients with KRAS G12C mutation positive tumors.

# Ovarian, Fallopian Tube, and Primary Peritoneal Cancer ‡ 2,104,105,197e,198e

- Patient has epithelial\* ovarian, fallopian tube, or primary peritoneal cancer; AND
- Used in combination with oral cyclophosphamide and bevacizumab; **AND**
- Patient has platinum-resistant disease; AND
  - o Patient has persistent or recurrent disease; AND
    - Patient is not experiencing an immediate biochemical relapse (i.e., rising CA-125 without radiographic evidence of disease); OR
  - Patient has recurrent disease *(low-grade serous carcinoma only)*

\* Epithelial subtypes include serous, endometrioid, carcinosarcoma (malignant mixed Müllerian tumors [MMMTs] of the ovary), clear cell, mucinous, and borderline epithelial tumors (also known as low malignant potential [LMP] tumors).

# Primary Cutaneous Lymphomas ‡ <sup>2,15,102e,104e,117e</sup>

• Used as a single agent; AND







- Patient has Mycosis Fungoides/Sezary Syndrome; AND
  - $\circ$   $\;$  Used as subsequent therapy for relapsed or persistent disease; AND  $\;$ 
    - Patient has one of the following:
      - Stage III Mycosis Fungoides
      - ➢ Stage IV Sezary Syndrome; OR
  - Used as subsequent therapy for disease refractory to multiple previous therapies *(excluding use in patients with stage IA Mycosis Fungoides)*

#### Soft Tissue Sarcoma ‡ <sup>2,56,83,89.90</sup>

- Used in combination with axitinib; **AND** 
  - $\circ$  Patient has alveolar soft part sarcoma (ASPS); **OR**
- Used as a single agent; AND
  - Patient has undifferentiated pleomorphic sarcoma (UPS); AND
    - Used as subsequent therapy for advanced/metastatic disease with disseminated metastases (Note: only applies to Extremity/Body Wall, Head/Neck\*), OR
    - Used as alternative systemic therapy for unresectable or progressive disease after initial therapy for unresectable or stage IV disease (*Note: only applies to Retroperitoneal/Intra-Abdominal\*\**); OR
    - Used as subsequent therapy for recurrent unresectable or recurrent stage IV disease (Note: only applies to Retroperitoneal/Intra-Abdominal\*\*)

\*For atypical lipomatous tumor/well-differentiated liposarcoma (ALT/WDLS) of the extremity, abdominal wall, trunk that was initially diagnosed as ALT and shows evidence of de-differentiation, treat as other soft tissue sarcomas.

**\*\***For well-differentiated liposarcoma (WDLS-retroperitoneum, paratesticular) with or without evidence of dedifferentiation, treat as other soft tissue sarcomas; risk of WDLS progression without de-differentiation is low and therefore single-agent systemic therapy is recommended.

#### Cutaneous Squamous Cell Carcinoma (cSCC) † ‡ 1,2,58,125e

- Used as a single agent; AND
- Patient has locally advanced, recurrent or metastatic disease that is not curable by surgery or radiation

#### Thymic Carcinoma ‡ 2,16,17

- Used as a single agent; AND
- Used as second-line therapy; AND
- Patient has unresectable or metastatic disease







#### Endometrial Carcinoma (Uterine Neoplasms) † ‡ 1,2,46,80,91

- Used in combination with lenvatinib; AND
  - Disease is mismatch repair proficient (pMMR) as determined by an FDA-approved or CLIA-compliant test or NOT microsatellite instability-high (MSI-H); AND
  - Patient received prior platinum-based therapy in any setting (including neoadjuvant or adjuvant therapy); **AND** 
    - Used as first-line therapy for recurrent disease *(excluding use in patients with isolated metastases)*; **OR**
    - Used as subsequent therapy for advanced, recurrent, or metastatic disease; **OR**
- Used in combination with carboplatin and paclitaxel, followed by single agent maintenance therapy; **AND** 
  - Patient has clear cell carcinoma, endometrioid adenocarcinoma, serous carcinoma, or undifferentiated/dedifferentiated carcinoma *(excluding use in carcinosarcoma)*; **AND** 
    - Used as primary or adjuvant therapy for patients with stage III-IV tumors; OR
    - Used as first-line therapy for recurrent disease (excluding use as first-line therapy in patients with isolated metastases); OR
- Used as a single agent as maintenance therapy following treatment with pembrolizumab in combination with carboplatin and paclitaxel

# Microsatellite Instability-High (MSI-H) or Mismatch Repair Deficient (dMMR) Cancer † ‡ 1,2,4,38,51

- Patient is at least 6 months of age; **AND**
- Patient has microsatellite instability-high (MSI-H) or mismatch repair deficient (dMMR) solid tumors, as determined by an FDA-approved or CLIA compliant test ; **AND**
- Patient has unresectable or medically inoperable, advanced, recurrent, persistent, or metastatic solid tumors; **AND** 
  - Used as a single agent; AND
    - Used for disease progression following prior treatment †; AND
      - Patient has Colorectal Cancer and was previously treated with a fluoropyrimidine AND either oxaliplatin or irinotecan; OR
      - > Patient has no satisfactory alternative treatment options; OR
    - Used as initial therapy **† ‡**; AND
      - > Patient has one of the following cancers:
        - Colorectal Cancer
        - Esophagogastric/Gastroesophageal Junction Cancer
        - Gastric Cancer; OR







- Used as neoadjuvant therapy \$\$; AND
  - > Patient has Colorectal Cancer; OR
- o Used in combination with oxaliplatin AND either fluorouracil or capecitabine; AND
  - Used as first-line therapy; **AND**
  - Patient has one of the following cancers:
    - > Esophagogastric/Gastroesophageal Junction Cancer
    - ➢ Gastric Cancer

# Tumor Mutational Burden-High (TMB-H) Cancer † ‡ 1,2,57

- Patient is at least 6 months of age; AND
- Patient has tumor mutational burden-high (TMB-H) [≥ 10 mutations/megabase (mut/Mb)] solid tumors, as determined by an FDA-approved or CLIA-compliant test�; **AND**
- Used as a single agent; AND
- Pediatric patients must not have a diagnosis of TMB-H central nervous system cancer; AND
- Patient does not have melanoma or non-small cell lung cancer (NSCLC); AND
- Patient has unresectable or medically inoperable, advanced, recurrent, persistent, or metastatic solid tumors; **AND**
- Used for disease progression following prior treatment **†**; **AND**
- Patient has no satisfactory alternative treatment options

Preferred therapies and recommendations are determined by review of clinical evidence. NCCN category of recommendation is taken into account as a component of this review. Regimens deemed equally efficacious (i.e., those having the same NCCN categorization) are considered to be therapeutically equivalent.

◆ If confirmed using an FDA-approved assay – <u>http://www.fda.gov/companiondiagnostics</u>

FDA Approved Indication(s); Compendia Recommended Indication(s); Orphan Drug

| Ψ ER Scoring Interpretation (following ER testing by validated IHC assay)                         |                       |  |
|---|-----------------------|--|
| <u>Results</u>  | <b>Interpretation</b> |  |
| - 0% – <1% of nuclei stain  | - ER-negative         |  |
| – 1%–10% of nuclei stain  | - ER-low-positive*    |  |
| <ul> <li>&gt;10% of nuclei stain</li> </ul>   | – ER-positive         |  |
| *Note: Patients with cancers with ER-low-positive (1%-10%) results are a heterogeneous group with |                       |  |

\*Note: Patients with cancers with ER-low-positive (1%–10%) results are a heterogeneous group with reported biologic behavior often similar to ER-negative cancers; thus, as such these cancers inherently

Moda Health Plan, Inc. Medical Necessity Criteria

Page 15/66



behave aggressively and may be treated similar to triple-negative disease. Individualized consideration of risks versus benefits should be incorporated into decision-making.

| § Genomic Aberration/Mutational Driver Targeted Therapies<br>(Note: <i>not all inclusive, refer to guidelines for appropriate use</i> )            |   |   |  |
|--|---|---|--|
| EGFR exon 19 deletion or exon<br>21 L858R tumors   | EGFR S768I, L861Q, and/or G719X mutation positive tumors  | <i>EGFR</i> exon 20 insertion mutation positive tumors  | NTRK1/2/3 gene fusion<br>positive tumors   |
| <ul> <li>Afatinib</li> <li>Erlotinib</li> <li>Dacomitinib</li> <li>Gefitinib</li> <li>Osimertinib</li> <li>Amivantamab</li> </ul>                  | <ul> <li>Afatinib</li> <li>Erlotinib</li> <li>Dacomitinib</li> <li>Gefitinib</li> <li>Osimertinib</li> <li>Amivantamab</li> </ul> | – Amivantamab   | — Larotrectinib<br>— Entrectinib   |
| ALK rearrangement-positive tumors  | ROS1 rearrangement-positive tumors  | BRAF V600E-mutation positive tumors   | ERBB2 (HER2) mutation<br>positive tumors   |
| <ul> <li>Alectinib</li> <li>Brigatinib</li> <li>Ceritinib</li> <li>Crizotinib</li> <li>Lorlatinib</li> </ul>                                       | <ul> <li>Ceritinib</li> <li>Crizotinib</li> <li>Entrectinib</li> <li>Lorlatinib</li> <li>Repotrectinib</li> </ul>                 | <ul> <li>Dabrafenib ± trametinib</li> <li>Encorafenib + binimetinib</li> <li>Vemurafenib</li> </ul> | <ul> <li>Fam-trastuzumab<br/>deruxtecan-nxki</li> <li>Ado-trastuzumab emtansine</li> </ul> |
| PD-L1 tumor<br>expression ≥ 1%   | MET exon-14 skipping mutations  | <i>RET</i> rearrangement-positive tumors  | KRAS G12C mutation<br>positive tumors  |
| <ul> <li>Pembrolizumab</li> <li>Atezolizumab</li> <li>Nivolumab + ipilimumab</li> <li>Cemiplimab</li> <li>Tremelimumab +<br/>durvalumab</li> </ul> | – Capmatinib<br>– Crizotinib<br>– Tepotinib   | <ul> <li>Selpercatinib</li> <li>Cabozantinib</li> <li>Pralsetinib</li> </ul>                        | – Sotorasib<br>– Adagrasib   |

# IV. Renewal Criteria 41-3,5,6,15-17,50,51,53,57,62,65,68,69,72,73,75-77,82,85-87,95,101,103,15e

Coverage may be renewed based upon the following criteria:

- Patient continues to meet the universal and other indication-specific relevant criteria identified in section III; **AND**
- Disease response with treatment as defined by stabilization of disease or decrease in size of tumor or tumor spread; **AND**
- Absence of unacceptable toxicity from the drug. Examples of unacceptable toxicity include: severe infusion-related reactions, severe immune-mediated adverse reactions (e.g., pneumonitis, hepatitis, colitis, endocrinopathies, nephritis with renal dysfunction, dermatologic adverse reactions/rash, etc.), hepatotoxicity when used in combination with axitinib, complications of allogeneic hematopoietic stem cell transplantation (HSCT), etc.; **AND**
- For the following indications, patient has not exceeded a maximum of twenty-four (24) months of therapy:
  - Adrenal Gland Tumors
  - Biliary Tract Cancer







- Bladder Cancer/Urothelial Carcinoma
- Cervical Cancer
- Classical Hodgkin Lymphoma (cHL)
- CNS Cancer
- Cutaneous Melanoma (in combination with ipilimumab or lenvatinib only)
- Cutaneous Squamous Cell Carcinoma (cSCC)
- Endometrial Carcinoma (Uterine Neoplasm)
- Esophageal Cancer and Esophagogastric/Gastroesophageal Junction Cancer (first-line or subsequent therapy)
- Gastric Cancer (first-line therapy)
- Hepatocellular Carcinoma (HCC)
- Merkel Cell Carcinoma (MCC)
- MSI-H/dMMR Cancer
- Non-Small Cell Lung Cancer (NSCLC) (first-line or subsequent therapy
- Primary Cutaneous Lymphomas
- Primary Mediastinal Large B-Cell Lymphoma (PMBCL)
- Renal Cell Carcinoma (RCC) (first-line or subsequent therapy)
- Squamous Cell Carcinoma of the Head and Neck (SCCHN)
- Thymic Carcinoma
- Tumor Mutational Burden-High Cancer
- Triple Negative Breast Cancer (recurrent unresectable or metastatic disease)

#### Kaposi Sarcoma

• Coverage may NOT be renewed

# NSCLC (adjuvant treatment)

• Patient has not exceeded a maximum of twelve (12) months of therapy

# NSCLC (resectable disease)

• Patient has not exceeded a maximum of twelve (12) weeks of neoadjuvant therapy and thirty-nine (39) weeks of adjuvant therapy

# Renal Cell Carcinoma (adjuvant treatment)

• Patient has not exceeded a maximum of twelve (12) months of therapy

# Triple Negative Breast Cancer (neoadjuvant treatment)

• Patient has not exceeded a maximum of twenty-four (24) weeks of therapy

# Triple Negative Breast Cancer (adjuvant treatment)

• Patient has not exceeded a maximum of twenty-seven (27) weeks of therapy





# Cutaneous Melanoma (subsequent treatment after prior anti-PD-1 immunotherapy or BRAF/MEK + anti-PD-1 immunotherapy) ‡

• Refer to Section III for criteria

### Cutaneous Melanoma (adjuvant treatment or re-induction therapy)

• Patient has not exceeded a maximum of twelve (12) months of therapy

#### NSCLC (continuous maintenance treatment)

• Refer to Section III for criteria

#### Endometrial Carcinoma (continuous maintenance treatment)

• Refer to Section III for criteria

#### $\Delta \underline{\text{Notes}}$ :

- Patients responding to therapy who relapse ≥ 6 months after discontinuation due to duration (i.e., receipt of 24 months of therapy) are eligible to re-initiate PD-directed therapy.
- Patients previously presenting with aggressive disease who are exhibiting stable disease on treatment as their best response (or if therapy improved performance status) may be eligible for continued therapy beyond the 24-month limit without interruption or discontinuation.
- Patients who complete adjuvant therapy and  $progress \ge 6$  months after discontinuation are eligible to re-initiate PD-directed therapy for metastatic disease.
- Patients whose tumors, upon re-biopsy, demonstrate a change in actionable mutation (e.g., MSS initial biopsy; MSI-H subsequent biopsy) may be eligible to re-initiate PD-directed therapy and will be evaluated on a case-by-case basis.
- Patients diagnosed with Renal Cell Carcinoma with clear cell histology who have received previous immuno-oncology therapy may be eligible for treatment with pembrolizumab as subsequent therapy and will be evaluated on a case-by-case basis.

# V. Dosage/Administration $\triangle$ <sup>1-6,8,12,13,15-17,22-48,50-57,62,65,68,72,73,75-77,82,83,85-87,91,92,95,101,103-106,15e</sup>

| Indication                   | Dose   |
|------------------------------|--|
| Biliary Tract Cancers,       | 200 mg intravenously every 3 weeks or 400 mg intravenously every |
| Bladder Cancer/Urothelial    | 6 weeks up to a maximum of 24 months in patients without disease |
| Carcinoma, Cervical, cSCC,   | progression or unacceptable toxicity                             |
| Endometrial Carcinoma/       |  |
| Uterine Neoplasms (excluding |  |







| <i>MSI-H/dMMR)</i> , HCC, &<br>SCCHN | *NMIBC treatment may continue up to a maximum of 24 months in<br>patients without persistent or recurrent high-risk disease, disease<br>progression, or unacceptable toxicity.   |
|--------------------------------------|--|
| Esophageal and<br>Esophagogastric/   | First-line or subsequent therapy:200 mg intravenously every 3 weeks or 400 mg intravenously every  |
| Gastroesophageal Junction<br>Cancer  | 6 weeks up to a maximum of 24 months in patients without disease progression or unacceptable toxicity  |
| Gastric Cancer                       | <u>First-line therapy:</u><br>200 mg intravenously every 3 weeks or 400 mg intravenously every<br>6 weeks up to a maximum of 24 months in patients without disease<br>progression or unacceptable toxicity   |
| NSCLC                                | <ul> <li>First-line, subsequent, or continuation maintenance therapy:</li> <li>200 mg intravenously every 3 weeks or 400 mg intravenously every</li> <li>6 weeks up to a maximum of 24 months in patients without disease progression or unacceptable toxicity</li> <li>Adjuvant treatment of resected NSCLC:</li> <li>200 mg intravenously every 3 weeks or 400 mg intravenously every</li> <li>6 weeks up to a maximum of 12 months in patients without disease recurrence or unacceptable toxicity</li> <li>Neoadjuvant and adjuvant treatment of resectable NSCLC:</li> <li>Neoadjuvant therapy: 200 mg intravenously every 3 weeks or 400 mg intravenously every 6 weeks in combination with chemotherapy for 12 weeks or until disease progression that precludes definitive surgery or unacceptable toxicity</li> <li>Adjuvant therapy: 200 mg intravenously every 3 weeks or 400 mg intravenously every 6 weeks in combination with chemotherapy for 12 weeks or until disease progression that precludes definitive surgery or unacceptable toxicity</li> <li>Adjuvant therapy: 200 mg intravenously every 3 weeks or 400 mg intravenously every 6 weeks as a single agent after surgery for 39 weeks or until disease recurrence or unacceptable toxicity</li> </ul> |
| RCC                                  | First-line or subsequent therapy:         200 mg intravenously every 3 weeks or 400 mg intravenously every         6 weeks up to a maximum of 24 months in patients without disease         progression or unacceptable toxicity         Adjuvant therapy:         200 mg intravenously every 3 weeks or 400 mg intravenously every         6 weeks up to a maximum of 12 months in patients without disease         recurrence or unacceptable toxicity   |
| TNBC                                 | Recurrent unresectable or metastatic disease:         200 mg intravenously every 3 weeks or 400 mg intravenously every         6 weeks up to a maximum of 24 months in patients without disease         progression or unacceptable toxicity         Neoadjuvant therapy:  |







|  | 200 mg intravenously every 3 weeks or 400 mg intravenously every<br>6 weeks up to a maximum of 24 weeks in patients without disease<br>progression or unacceptable toxicity (up to 8 doses of 200 mg every 3<br>weeks or 4 doses of 400 mg every 6 weeks) |
|--|---|
|  | Adjuvant therapy*:  |
|  | 200 mg intravenously every 3 weeks or 400 mg intravenously every<br>6 weeks up to a maximum of 27 weeks in patients without disease   |
|  | recurrence or unacceptable toxicity (up to 9 doses of 200 mg every 3 weeks or 5 doses of 400 mg every 6 weeks)  |
|  | * Patients who experience disease progression or unacceptable toxicity related to KEYTRUDA with neoadjuvant treatment in combination with chemotherapy should not receive adjuvant single agent KEYTRUDA.   |
| Adrenal Gland Tumors &<br>Thymic Carcinoma | 200 mg intravenously every 3 weeks up to a maximum of 24 months<br>in patients without disease progression or unacceptable toxicity   |
| Cutaneous Melanoma                         | Single-agent therapy (excluding adjuvant treatment or re-induction therapy):  |
|  | 200 mg intravenously every 3 weeks or 400 mg intravenously every<br>6 weeks until disease progression or unacceptable toxicity  |
|  | In combination with ipilimumab or lenvatinib:   |
|  | 200 mg intravenously every 3 weeks up to a maximum of 24 months   |
|  | in patients without disease progression or unacceptable toxicity  |
|  | Adjuvant treatment or re-induction therapy:   |
|  | <u>Adults</u> : 200 mg intravenously every 3 weeks or 400 mg<br>intravenously every 6 weeks up to a maximum of 12 months in<br>patients without disease recurrence or unacceptable toxicity   |
|  | <u>Pediatrics:</u> 2 mg/kg (up to 200 mg) intravenously every 3 weeks up<br>to a maximum of 12 months in patients without disease recurrence<br>or unacceptable toxicity  |
| cHL, MCC, MSI-H/dMMR                       | Adults:   |
| Cancer, PMBCL, & TMB-H<br>Cancer           | 200 mg intravenously every 3 weeks or 400 mg intravenously every<br>6 weeks up to a maximum of 24 months in patients without disease<br>progression or unacceptable toxicity  |
|  | <u>Pediatrics:</u><br>2 mg/kg (up to 200 mg) intravenously every 3 weeks up to a<br>maximum of 24 months in patients without disease progression or<br>unacceptable toxicity  |
| CNS Cancer                                 | <u>Adults:</u><br>10 mg/kg intravenously every 2 weeks for up to 24 months in<br>patients without disease progression or unacceptable toxicity<br><u>Pediatrics:</u>  |





|   | 2 mg/kg (up to 200 mg) intravenously every 3 weeks for up to 24<br>months in patients without disease progression or unacceptable<br>toxicity |
|---|---|
| Primary Cutaneous<br>Lymphomas                            | 2 mg/kg intravenously every 3 weeks up to a maximum of 24 months<br>in patients without disease progression or unacceptable toxicity          |
| Soft Tissue Sarcoma                                       | 200 mg intravenously every 3 weeks  |
| Ovarian, Fallopian Tube, and<br>Primary Peritoneal Cancer | 200 mg intravenously every 3 weeks until disease progression or unacceptable toxicity   |
| Kaposi Sarcoma  | 200 mg intravenously every 3 weeks, up to a maximum of 6 months<br>in patients without unacceptable toxicity                                  |

Dosing should be calculated using actual body weight and not flat dosing (as applicable) based on the following:

#### <u>Weight ≤ 55 kg</u>:

- Use 100 mg IV (2 mg/kg) every 21 days; **OR**
- Use 200 mg IV (4 mg/kg) every 42 days

#### <u>Weight is ≤ 82.5 kg:</u>

Use 300 mg IV (4 mg/kg) every 42 days

Note: This information is not meant to replace clinical decision making when initiating or modifying medication therapy and should only be used as a guide. Patient-specific variables should be taken into account.

# VI. Billing Code/Availability Information

#### HCPCS Code:

• J9271 – Injection, pembrolizumab, 1 mg; 1 billable unit = 1 mg

#### NDC:

• Keytruda 100 mg/4 mL single-dose vial: 00006-3026-xx

# VII. References (STANDARD)

- 1. Keytruda [package insert]. Rahway, NJ; Merck & Co, Inc; January 2024. Accessed February 2024.
- 2. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium®) pembrolizumab. National Comprehensive Cancer Network, 2024. The NCCN Compendium® is a derivative work of the NCCN Guidelines®. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, and NCCN GUIDELINES® are





trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.

- 3. Alley EW, Lopez J, Santoro A, et al. Clinical safety and activity of pembrolizumab in patients with malignant pleural mesothelioma (KEYNOTE-028): preliminary results from a non-randomised, open-label, phase 1b trial. Lancet Oncol. 2017 May;18(5):623-630.
- 4. Ott PA, Bang YJ, Berton-Rigaud D, et al. Safety and Antitumor Activity of Pembrolizumab in Advanced Programmed Death Ligand 1-Positive Endometrial Cancer: Results From the KEYNOTE-028 Study. J Clin Oncol. 2017 Aug 1;35(22):2535-2541.
- Ott PA, Piha-Paul SA, Munster P, et al. Safety and antitumor activity of the anti-PD-1 antibody pembrolizumab in patients with recurrent carcinoma of the anal canal. Ann Oncol. 2017 May 1;28(5):1036-1041. Doi: 10.1093/annonc/mdx029.
- Zinzani PL, Ribrag V, Moskowitz CH, et al. Safety and tolerability of pembrolizumab in patients with relapsed/refractory primary mediastinal large B-cell lymphoma. Blood. 2017 Jul 20;130(3):267-270. Doi: 10.1182/blood-2016-12-758383. Epub 2017 May 10.
- 7. U.S. Food and Drug Administrations (FDA). Division of Drug Information. Health Alert. https://www.fda.gov/drugs/drug-safety-and-availability/fda-alerts-health-care-professionalsand-oncology-clinical-investigators-about-efficacy-issue. Accessed August 2018
- Balar AV, Castellano D, O'Donnell PH, et al. First-line pembrolizumab in cisplatinineligible patients with locally advanced and unresectable or metastatic urothelial cancer (KEYNOTE-052): a multicenter, single-arm, phase 2 study. Lancet Oncol 2017; 18: 1483– 92.
- 9. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Merkel Cell Carcinoma. Version 1.2024. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 10. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Bladder Cancer. Version 1.2024. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 11. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Non-Small Cell Lung Cancer. Version 1.2024. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN





Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.

- 12. Ghorani E, Kaur B, Fisher RA, et al. Pembrolizumab is effective for drug-resistant gestational trophoblastic neoplasia. Lancet. 2017 Nov 25;390(10110):2343-2345.
- 13. Chung HC, Lopez-Martin JA, Kao S, et al. Phase 2 study of pembrolizumab in advanced small-cell lung cancer (SCLC): KEYNOTE-158. J Clin Oncol 2018;36: Abstract 8506
- 14. National Institutes of Health. Study of Pembrolizumab (MK-3475) Versus Placebo After Complete Resection of High-Risk Stage III Melanoma (MK-3475-054/KEYNOTE-054). Available at: http://clinicaltrials.gov/show/NCT02362594.
- Khodadoust M, Rook AH, Porcu P, et al. Pembrolizumab in Relapsed and Refractory Mycosis Fungoides and Sézary Syndrome: A Multicenter Phase II Study. J Clin Oncol. 2020 Jan 1;38(1):20-28. Doi: 10.1200/JCO.19.01056. Epub 2019 Sep 18.
- 16. Giaccone, G, Kim C, Thompson J, et al. Pembrolizumab in patients with thymic carcinoma: a single-arm, single-centre, phase 2 study. Lancet. Volume 19, ISSUE 3, P347-355, March 01, 2018.
- Cho J, Kim HS, Ku BM, et al. Pembrolizumab for Patients With Refractory or Relapsed Thymic Epithelial Tumor: An Open-Label Phase II Trial. J Clin Oncol. 2018 Jun 15:JCO2017773184. Doi: 10.1200/JCO.2017.77.3184. [Epub ahead of print]
- 18. Gupta S, Sonpavde G, Grivas P, et al. Defining "platinum-ineligible" patients with metastatic urothelial cancer (mUC). J Clin Oncol. 2019 Mar 1;37(7\_suppl):451.
- Fahrenbruch R, Kintzel P, Bott AM, et al. Dose Rounding of Biologic and Cytotoxic Anticancer Agents: A Position Statement of the Hematology/Oncology Pharmacy Association. J Oncol Pract. 2018 Mar;14(3):e130-e136.
- 20. Hematology/Oncology Pharmacy Association (2019). Intravenous Cancer Drug Waste Issue Brief. Retrieved from http://www.hoparx.org/images/hopa/advocacy/Issue-Briefs/Drug\_Waste\_2019.pdf
- 21. Bach PB, Conti RM, Muller RJ, et al. Overspending driven by oversized single dose vials of cancer drugs. BMJ. 2016 Feb 29;352:i788.
- 22. Schachter J, Ribas A, Long GV, et al. Pembrolizumab versus ipilimumab for advanced melanoma: final overall survival results of a multicentre, randomised, open-label phase 3 study (KEYNOTE-006). Lancet. 2017 Oct 21;390(10105):1853-1862. Doi: 10.1016/S0140-6736(17)31601-X. Epub 2017 Aug 16.
- 23. Ribas A, Puzanov I, Dummer R, et al. Pembrolizumab versus investigator-choice chemotherapy for ipilimumab-refractory melanoma (KEYNOTE-002): a randomised, controlled, phase 2 trial. Lancet Oncol. 2015 Aug;16(8):908-18. Doi: 10.1016/S1470-2045(15)00083-2. Epub 2015 Jun 23.





- 24. Eggermont AMM, Blank CU, Mandala M, et al. Adjuvant Pembrolizumab versus Placebo in Resected Stage III Melanoma. N Engl J Med. 2018 May 10;378(19):1789-1801. Doi: 10.1056/NEJMoa1802357. Epub 2018 Apr 15.
- 25. Gandhi L, Rodríguez-Abreu D, Gadgeel S, et al. Pembrolizumab plus Chemotherapy in Metastatic Non-Small-Cell Lung Cancer. N Engl J Med. 2018 May 31;378(22):2078-2092. Doi: 10.1056/NEJMoa1801005. Epub 2018 Apr 16.
- 26. Paz-Ares L, Luft A, Vicente D, et al. Pembrolizumab plus Chemotherapy for Squamous Non-Small-Cell Lung Cancer. N Engl J Med. 2018 Nov 22;379(21):2040-2051. Doi: 10.1056/NEJMoa1810865. Epub 2018 Sep 25.
- 27. Mok TSK, Wu YL, Kudaba I, et al. Pembrolizumab versus chemotherapy for previously untreated, PD-L1-expressing, locally advanced or metastatic non-small-cell lung cancer (KEYNOTE-042): a randomised, open-label, controlled, phase 3 trial. Lancet. 2019 May 4;393(10183):1819-1830. Doi: 10.1016/S0140-6736(18)32409-7. Epub 2019 Apr 4.
- Reck M, Rodríguez-Abreu D, Robinson AG, et al. Pembrolizumab versus Chemotherapy for PD-L1-Positive Non-Small-Cell Lung Cancer. N Engl J Med. 2016 Nov 10;375(19):1823-1833. Epub 2016 Oct 8.
- 29. Herbst RS, Baas P, Kim DW, et al. Pembrolizumab versus docetaxel for previously treated, PD-L1-positive, advanced non-small-cell lung cancer (KEYNOTE-010): a randomised controlled trial. Lancet. 2016 Apr 9;387(10027):1540-1550. Doi: 10.1016/S0140-6736(15)01281-7. Epub 2015 Dec 19.
- 30. Ott PA, Elez E, Hiret S, et al. Pembrolizumab in Patients With Extensive-Stage Small-Cell Lung Cancer: Results From the Phase Ib KEYNOTE-028 Study. J Clin Oncol. 2017 Dec 1;35(34):3823-3829. Doi: 10.1200/JCO.2017.72.5069. Epub 2017 Aug 16.
- Burtness B, Harrington KJ, Greil R, et al. Pembrolizumab alone or with chemotherapy versus cetuximab with chemotherapy for recurrent or metastatic squamous cell carcinoma of the head and neck (KEYNOTE-048): a randomised, open-label, phase 3 study. Lancet. 2019 Nov 23;394(10212):1915-1928. Doi: 10.1016/S0140-6736(19)32591-7. Epub 2019 Nov 1.
- 32. Chow LQM, Haddad R, Gupta S, et al. Antitumor Activity of Pembrolizumab in Biomarker-Unselected Patients With Recurrent and/or Metastatic Head and Neck Squamous Cell Carcinoma: Results From the Phase Ib KEYNOTE-012 Expansion Cohort. Antitumor Activity of Pembrolizumab in Biomarker-Unselected Patients With Recurrent and/or Metastatic Head and Neck Squamous Cell Carcinoma: Results From the Phase Ib KEYNOTE-012 Expansion Cohort.
- 33. Chen R, Zinzani PL, Fanale MA, et al. Phase II Study of the Efficacy and Safety of Pembrolizumab for Relapsed/Refractory Classic Hodgkin Lymphoma. J Clin Oncol. 2017 Jul 1;35(19):2125-2132. Doi: 10.1200/JCO.2016.72.1316. Epub 2017 Apr 25.





- 34. Armand P, Rodig S, Melnichenko V, et al. Pembrolizumab in Relapsed or Refractory Primary Mediastinal Large B-Cell Lymphoma. J Clin Oncol. 2019 Dec 1;37(34):3291-3299. Doi: 10.1200/JCO.19.01389. Epub 2019 Oct 14.
- 35. Powles T, Gschwend JE, Loriot Y, et al. Phase 3 KEYNOTE-361 trial: Pembrolizumab (pembro) with or without chemotherapy versus chemotherapy alone in advanced urothelial cancer. DOI: 10.1200/JCO.2017.35.15\_suppl.TPS4590 *Journal of Clinical Oncology* 35, no. 15\_suppl. Published online May 30, 2017.
- 36. Bellmunt J, de Wit R, Vaughn DJ, et al. Pembrolizumab as Second-Line Therapy for Advanced Urothelial Carcinoma. N Engl J Med. 2017 Mar 16;376(11):1015-1026. Doi: 10.1056/NEJMoa1613683. Epub 2017 Feb 17.
- 37. Balar AV, Kulkarni GS, Uchio, EM, et al. Keynote 057: Phase II trial of Pembrolizumab (pembro) for patients (pts) with high-risk (HR) nonmuscle invasive bladder cancer (NMIBC) unresponsive to bacillus calmette-guérin (BCG). DOI: 10.1200/JCO.2019.37.7\_suppl.350 *Journal of Clinical Oncology* 37, no. 7\_suppl (March 01, 2019) 350-350. Published online February 26, 2019.
- 38. Le DT, Kim TW, Van Cutsem E, et al. Phase II Open-Label Study of Pembrolizumab in Treatment-Refractory, Microsatellite Instability-High/Mismatch Repair-Deficient Metastatic Colorectal Cancer: KEYNOTE-164. J Clin Oncol. 2020 Jan 1;38(1):11-19. Doi: 10.1200/JCO.19.02107. Epub 2019 Nov 14.
- 39. Fuchs CS, Doi T, Jang RW, et al. Safety and Efficacy of Pembrolizumab Monotherapy in Patients With Previously Treated Advanced Gastric and Gastroesophageal Junction Cancer: Phase 2 Clinical KEYNOTE-059 Trial. JAMA Oncol. 2018 May 10;4(5):e180013. Doi: 10.1001/jamaoncol.2018.0013. Epub 2018 May 10.
- 40. Kojima T, Muro K, Francois E, et al. Pembrolizumab versus chemotherapy as second-line therapy for advanced esophageal cancer: Phase III KEYNOTE-181 study. DOI: 10.1200/JCO.2019.37.4\_suppl.2 *Journal of Clinical Oncology* 37, no. 4\_suppl (February 01, 2019) 2-2. Published online January 29, 2019.
- 41. Shah M, Kojima T, Hochhauser D, et al. Efficacy and Safety of Pembrolizumab for Heavily Pretreated Patients With Advanced, Metastatic Adenocarcinoma or Squamous Cell Carcinoma of the Esophagus: The Phase 2 KEYNOTE-180 Study. JAMA Oncol. .550-546:(4)5;2019Doi:10.1001/jamaoncol.2018.5441.
- 42. Chung HC, Ros W, Delord JP, et al. Efficacy and Safety of Pembrolizumab in Previously Treated Advanced Cervical Cancer: Results From the Phase II KEYNOTE-158 Study. J Clin Oncol. 2019 Jun 10;37(17):1470-1478. Doi: 10.1200/JCO.18.01265. Epub 2019 Apr 3.
- 43. Zhu AX, Finn RS, Edeline J, et al. Pembrolizumab in patients with advanced hepatocellular carcinoma previously treated with sorafenib (KEYNOTE-224): a non-randomised, open-label phase 2 trial. Lancet Oncol. 2018 Jul;19(7):940-952. Doi: 10.1016/S1470-2045(18)30351-6. Epub 2018 Jun 3.



- 44. Nghiem P, Bhatia S, Lipson EJ, et al. Durable Tumor Regression and Overall Survival in Patients With Advanced Merkel Cell Carcinoma Receiving Pembrolizumab as First-Line Therapy. J Clin Oncol. 2019 Mar 20;37(9):693-702. Doi: 10.1200/JCO.18.01896. Epub 2019 Feb 6.
- 45. Rini BI, Plimack ER, Stus V, et al. Pembrolizumab plus Axitinib versus Sunitinib for Advanced Renal-Cell Carcinoma. N Engl J Med. 2019 Mar 21;380(12):1116-1127. Doi: 10.1056/NEJMoa1816714. Epub 2019 Feb 16.
- 46. Makker V, Taylor MH, Aghajanian C, et al. Lenvatinib (LEN) and pembrolizumab (PEMBRO) in advanced endometrial cancer (EC). Annals of Oncology, Volume 30, Issue Supplement\_5, October 2019, MDZ250.002, <u>https://doi.org/10.1093/annonc/mdz250.002</u>.
- 47. Goldberg SB, Gettinger SN, Mahajan A, et al. Pembrolizumab for patients with melanoma or non-small-cell lung cancer and untreated brain metastases: early analysis of a nonrandomised, open-label, phase 2 trial. Lancet Oncol. 2016 Jul;17(7):976-983. Doi: 10.1016/S1470-2045(16)30053-5. Epub 2016 Jun 3.
- 48. Kwong YL, Chan TSY, Tan D, et al. PD1 blockade with pembrolizumab is highly effective in relapsed or refractory NK/T-cell lymphoma failing l-asparaginase. Blood. 2017 Apr 27;129(17):2437-2442. Doi: 10.1182/blood-2016-12-756841. Epub 2017 Feb 10.
- 49. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium®) Central Nervous System Cancers. Version 1.2023. National Comprehensive Cancer Network, 2024. The NCCN Compendium® is a derivative work of the NCCN Guidelines®. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, and NCCN GUIDELINES® are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 50. Kluger HM, Chiang V, Mahajan A, et al. Long-Term Survival of Patients With Melanoma With Active Brain Metastases Treated With Pembrolizumab on a Phase II Trial. J Clin Oncol. 2019 Jan 1;37(1):52-60. doi: 10.1200/JCO.18.00204. Epub 2018 Nov 8.
- 51. Marabelle A, Le DT, Ascierto PA, et al. Efficacy of Pembrolizumab in Patients With Noncolorectal High Microsatellite Instability/Mismatch Repair-Deficient Cancer: Results From the Phase II KEYNOTE-158 Study. J Clin Oncol. 2020 Jan 1;38(1):1-10. doi: 10.1200/JCO.19.02105. Epub 2019 Nov 4.
- 52. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium®) Anal Carcinoma. Version 1.2024. National Comprehensive Cancer Network, 2024. The NCCN Compendium® is a derivative work of the NCCN Guidelines®. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, and NCCN GUIDELINES® are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.





- 53. Kottschade LA, McWilliams RR, Markovic SN, et al. The Use of Pembrolizumab for the Treatment of Metastatic Uveal Melanoma. Melanoma Res. 2016 Jun;26(3):300-3. doi: 10.1097/CMR.00000000000242.
- 54. Algazi AP, Tsai KK, Shoushtari AN, et al. Clinical Outcomes in Metastatic Uveal Melanoma Treated With PD-1 and PD-L1 Antibodies. Cancer. 2016 Nov 15;122(21):3344-3353. doi: 10.1002/cncr.30258.
- 55. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Gestational Trophoblastic Neoplasia. Version 1.2024. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 56. Burgess MA, Bolejack V, Van Tine BA, et al. Multicenter phase II study of pembrolizumab (P) in advanced soft tissue (STS) and bone sarcomas (BS): Final results of SARC028 and biomarker analyses. J Clin Oncol 2017; 35, no. 15\_suppl (May 20, 2017) 11008-11008.
- 57. Marabelle A, Fakih M, Lopez J, et al. Association of Tumor Mutational Burden with Outcomes in Patients with Select Advanced Solid Tumors Treated with Pembrolizumab in KEYNOTE-158. Ann Oncol. 2019;30(suppl\_5):v475-v532. doi: 10.1093/annonc/mdz253.
- 58. Grob JJ, Gonzalez R, Basset-Seguin N, et al. Pembrolizumab Monotherapy for Recurrent or Metastatic Cutaneous Squamous Cell Carcinoma: A Single-Arm Phase II Trial (KEYNOTE-629). J Clin Oncol. 2020 Sep 1;38(25):2916-2925. doi: 10.1200/JCO.19.03054.
- 59. Andre T, Shiu KK, Kim TW, et al. Pembrolizumab versus chemotherapy for microsatellite instability-high/mismatch repair deficient metastatic colorectal cancer: The phase 3 KEYNOTE-177 Study. J Clin Oncol. 2020;38(18\_suppl):LBA4-LBA4.
- 60. Geoerger B, Kang HJ, Yalon-Oren M, et al. Pembrolizumab in paediatric patients with advanced melanoma or a PD-L1-positive, advanced, relapsed, or refractory solid tumour or lymphoma (KEYNOTE-051): interim analysis of an open-label, single-arm, phase 1-2 trial. Lancet Oncol. 2020;21(1):121-133. doi:10.1016/S1470-2045(19)30671-0.
- 61. Pembrolizumab Improves Progression-Free Survival in Relapsed/Refractory Hodgkin Lymphoma. Oncologist. 2020;25 Suppl 1(Suppl 1):S18-S19. doi:10.1634/theoncologist.2020-0561.
- 62. Raj N, Zheng Y, Kelly V, et al. PD-1 Blockade in Advanced Adrenocortical Carcinoma. J Clin Oncol. 2020 Jan 1;38(1):71-80. doi: 10.1200/JCO.19.01586.
- 63. Naing A, Meric-Bernstam F, Stephen B, et al. Phase 2 study of pembrolizumab in patients with advanced rare cancers [published correction appears in J Immunother Cancer. 2020 Apr;8(1):]. J Immunother Cancer. 2020;8(1):e000347. doi:10.1136/jitc-2019-000347.







- 64. Cortes J, Cescon DW, Rugo HS, et al. KEYNOTE-355: Randomized, double-blind, phase III study of pembrolizumab + chemotherapy versus placebo + chemotherapy for previously untreated locally recurrent inoperable or metastatic triple-negative breast cancer. Journal of Clinical Oncology38, no. 15\_suppl(May 20, 2020)1000-1000.
- 65. Olson D, Luke JJ, Poklepovic AS, et al. Significant antitumor activity for low-dose ipilimumab (IPI) with pembrolizumab (PEMBRO) immediately following progression on PD1 Ab in melanoma (MEL) in a phase II trial. J Clin Oncol 2020;38(15\_suppl): abstract 10004.
- 66. Kato K, Shah MA, Enzinger P, et al. KEYNOTE-590: Phase III study of first-line chemotherapy with or without pembrolizumab for advanced esophageal cancer. Future Oncol. 2019 Apr;15(10):1057-1066. doi: 10.2217/fon-2018-0609.
- 67. Chung HC, Bang YJ, S Fuchs C, et al. First-line pembrolizumab/placebo plus trastuzumab and chemotherapy in HER2-positive advanced gastric cancer: KEYNOTE-811. Future Oncol. 2021 Feb;17(5):491-501. doi: 10.2217/fon-2020-0737.
- 68. Carlino MS, Menzies AM, Atkinson V, et al. Long-term Follow-up of Standard-Dose Pembrolizumab Plus Reduced-Dose Ipilimumab in Patients with Advanced Melanoma: KEYNOTE-029 Part 1B. Clin Cancer Res. 2020 Oct 1;26(19):5086-5091. doi: 10.1158/1078-0432.CCR-20-0177.
- 69. Schmid P, Cortes J, Pusztai L, et al. Pembrolizumab for Early Triple-Negative Breast Cancer. N Engl J Med. 2020 Feb 27;382(9):810-821. doi: 10.1056/NEJMoa1910549.
- 70. Colombo N, Dubot C, Lorusso D, et al. Pembrolizumab for Persistent, Recurrent, or Metastatic Cervical Cancer. N Engl J Med. 2021 Sep 18. doi: 10.1056/NEJMoa2112435.
- 71. Bellmunt, J. (2023). Treatment of metastatic urothelial cancer of the bladder and urinary tract. In Lerner SP, Shah S (Eds.), *UptoDate*. Last updated: December 19, 2023. Accessed January 17, 2024. Available from <u>https://www.uptodate.com/contents/treatment-of-metastatic-urothelial-cancer-of-the-bladder-and-urinary-tract?search=cisplatin%20ineligible&source=search\_result&selectedTitle=1~150&usage\_ty\_pe=default&display\_rank=1.</u>
- 72. Chung HC, Piha-Paul SA, Lopez-Martin J, et al. Pembrolizumab After Two or More Lines of Previous Therapy in Patients With Recurrent or Metastatic SCLC: Results From the KEYNOTE-028 and KEYNOTE-158 Studies. J Thorac Oncol. 2020 Apr;15(4):618-627. doi: 10.1016/j.jtho.2019.12.109. Epub 2019 Dec 20.
- 73. Ott PA, Elez E, Hiret S, et al. Pembrolizumab in Patients With Extensive-Stage Small-Cell Lung Cancer: Results From the Phase Ib KEYNOTE-028 Study. J Clin Oncol. 2017 Dec 1;35(34):3823-3829. doi: 10.1200/JCO.2017.72.5069. Epub 2017 Aug 16.
- 74. Motzer R, Alekseev B, Rha SY, et al; CLEAR Trial Investigators. Lenvatinib plus Pembrolizumab or Everolimus for Advanced Renal Cell Carcinoma. N Engl J Med. 2021 Apr 8;384(14):1289-1300. doi: 10.1056/NEJMoa2035716.





- McKay RR, Bossé D, Xie W, et al. The Clinical Activity of PD-1/PD-L1 Inhibitors in Metastatic Non-Clear Cell Renal Cell Carcinoma. Cancer Immunol Res. 2018 Jul;6(7):758-765. doi: 10.1158/2326-6066.CIR-17-0475.
- 76. McDermott DF, Lee JL, Ziobro M, et al. Open-Label, Single-Arm, Phase II Study of Pembrolizumab Monotherapy as First-Line Therapy in Patients With Advanced Non-Clear Cell Renal Cell Carcinoma. J Clin Oncol. 2021 Mar 20;39(9):1029-1039. doi: 10.1200/JCO.20.02365.
- 77. Habra MA, Stephen B, Campbell M, et al. Phase II clinical trial of pembrolizumab efficacy and safety in advanced adrenocortical carcinoma. J Immunother Cancer. 2019 Sep 18;7(1):253. doi: 10.1186/s40425-019-0722-x.
- 78. Choueiri TK, Tomczak P, Park SH, et al; KEYNOTE-564 Investigators. Adjuvant Pembrolizumab after Nephrectomy in Renal-Cell Carcinoma. N Engl J Med. 2021 Aug 19;385(8):683-694. doi: 10.1056/NEJMoa2106391.
- 79. Gupta S, Bellmunt J, Plimack ER, et al. Defining "platinum-ineligible" patients with metastatic urothelial cancer (mUC). J Clin Oncol. 2022 June 1;40(16\_suppl):4577.
- 80. Makker V, Colombo N, Casado Herráez A, et al; Study 309-KEYNOTE-775 Investigators. Lenvatinib plus Pembrolizumab for Advanced Endometrial Cancer. N Engl J Med. 2022 Feb 3;386(5):437-448. doi: 10.1056/NEJMoa2108330. Epub 2022 Jan 19.
- 81. Cacciotti C, Choi J, Alexandrescu S, et al. Immune checkpoint inhibition for pediatric patients with recurrent/refractory CNS tumors: a single institution experience. J Neurooncol. 2020 Aug;149(1):113-122. doi: 10.1007/s11060-020-03578-6. Epub 2020 Jul 5. PMID: 32627129
- 82. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Pediatric Aggressive Mature B-Cell Lymphomas. Version 1.2023. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 83. Wilky BA, Trucco MM, Subhawong TK, et al. Axitinib plus pembrolizumab in patients with advanced sarcomas including alveolar soft-part sarcoma: a single-centre, single-arm, phase 2 trial. Lancet Oncol. 2019 Jun;20(6):837-848. doi: 10.1016/S1470-2045(19)30153-6.
- 84. O'Brien M, Paz-Ares L, Marreaud S, et al; EORTC-1416-LCG/ETOP 8-15 PEARLS/KEYNOTE-091 Investigators. Pembrolizumab versus placebo as adjuvant therapy for completely resected stage IB-IIIA non-small-cell lung cancer (PEARLS/KEYNOTE-091): an interim analysis of a randomised, triple-blind, phase 3 trial. Lancet Oncol. 2022 Oct;23(10):1274-1286. doi: 10.1016/S1470-2045(22)00518-6.





- 85. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Kaposi Sarcoma. Version 1.2024. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 86. Delyon J, Biard L, Renaud M, et al. PD-1 blockade with pembrolizumab in classic or endemic Kaposi's sarcoma: a multicentre, single-arm, phase 2 study. Lancet Oncol. 2022 Apr;23(4):491-500. doi: 10.1016/S1470-2045(22)00097-3.
- 87. Arance AM, de la Cruz-Merino L, Petrella TM, et al. Lenvatinib (len) plus pembrolizumab (pembro) for patients (pts) with advanced melanoma and confirmed progression on a PD-1 or PD-L1 inhibitor: Updated findings of LEAP-004. Journal of Clinical Oncology 2021 39:15\_suppl, 9504-9504.
- 88. Hoimes CJ, Petrylak DP, Flaig TW, et al. EV-103 study: A phase 1b dose-escalation and dose-expansion study of enfortumab vedotin in combination with immune checkpoint inhibitor (CPI) therapy for treatment of patients with locally advanced or metastatic urothelial cancer. Journal of Clinical Oncology 2018 36:6\_suppl, TPS532-TPS532.
- 89. Groisberg R, Hong DS, Behrang A, et al. Characteristics and outcomes of patients with advanced sarcoma enrolled in early phase immunotherapy trials. J Immunother Cancer. 2017 Dec 19;5(1):100. doi: 10.1186/s40425-017-0301-y.
- 90. Florou V, Rosenberg AE, Wieder E, et al. Angiosarcoma patients treated with immune checkpoint inhibitors: a case series of seven patients from a single institution. J Immunother Cancer. 2019 Aug 8;7(1):213. doi: 10.1186/s40425-019-0689-7.
- 91. Eskander R, Sill M, Beffa L, et al. Pembrolizumab plus Chemotherapy in Advanced Endometrial Cancer. N Engl J Med 2023; 388:2159-2170 DOI: 10.1056/NEJMoa2302312.
- 92. Marabelle A, Cassier PA, Fakih M, et al. Pembrolizumab for previously treated advanced anal squamous cell carcinoma: results from the non-randomised, multicohort, multicentre, phase 2 KEYNOTE-158 study. Lancet Gastroenterol Hepatol. 2022 May;7(5):446-454. doi: 10.1016/S2468-1253(21)00382-4.
- 93. Hoimes CJ, Flaig TW, Milowsky MI, et al. Enfortumab Vedotin Plus Pembrolizumab in Previously Untreated Advanced Urothelial Cancer. J Clin Oncol. 2023 Jan 1;41(1):22-31. doi: 10.1200/JCO.22.01643.
- 94. Kelley RK, Ueno M, Yoo C, et al; KEYNOTE-966 Investigators. Pembrolizumab in combination with gemcitabine and cisplatin compared with gemcitabine and cisplatin alone for patients with advanced biliary tract cancer (KEYNOTE-966): a randomised, double-blind, placebo-controlled, phase 3 trial. Lancet. 2023 Jun 3;401(10391):1853-1865.





- 95. Ludford K, Ho WJ, Thomas JV, et al. Neoadjuvant pembrolizumab in localized microsatellite instability high/deficient mismatch repair solid tumors. J Clin Oncol 2023;41:2181-2190.
- 96. Bryan LJ, Casulo C, Allen PB, et al. Pembrolizumab added to ifosfamide, carboplatin, and etoposide chemotherapy for relapsed or refractory classic Hodgkin lymphoma: A multiinstitutional phase 2 investigator-initiated nonrandomized clinical trial. JAMA Oncol 2023;9:683-691.
- 97. Moskowitz AJ, Shah G, Schöder H, et al. Phase II trial of pembrolizumab plus gemcitabine, vinorelbine, and liposomal doxorubicin as second-line therapy for relapsed or refractory classical Hodgkin lymphoma. J Clin Oncol 2021:39:3109-3117
- 98. Rha SY, Oh DY, Ya**ñ**ez P, et al. Pembrolizumab plus chemotherapy versus placebo plus chemotherapy for HER2-negative advanced gastric cancer (KEYNOTE-859): a multicentre, randomised, double-blind, phase 3 trial. Lancet. 2023 Oct 21; 24(11):1181-1195.
- 99. Hoimes CJ, Petrylak DP, Flaig TW, et al. EV-103 study: A phase 1b dose-escalation and dose-expansion study of enfortumab vedotin in combination with immune checkpoint inhibitor (CPI) therapy for treatment of patients with locally advanced or metastatic urothelial cancer. Journal of Clinical Oncology 36, no. 6\_suppl. DOI: 10.1200/JCO.2018.36.6\_suppl.TPS532.
- 100. Lorusso D, Colombo N, Coleman RL, et al., ENGOT-cx11/KEYNOTE-A18: A phase III, randomized, double-blind study of pembrolizumab with chemoradiotherapy in patients with high-risk locally advanced cervical cancer. JCO 38, TPS6096-TPS6096(2020). DOI:10.1200/JCO.2020.38.15\_suppl.TPS6096.
- 101. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium®) Esophageal and Esophagogastric Junction Cancers. Version 3.2023. National Comprehensive Cancer Network, 2024. The NCCN Compendium® is a derivative work of the NCCN Guidelines®. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, and NCCN GUIDELINES® are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 102. Metges JP, Kato K, Sun JM, et al. First-line pembrolizumab plus chemotherapy versus chemotherapy in advanced esophageal cancer: Longer-term efficacy, safety, and quality-of-life results from the phase 3 KEYNOTE-590 study.. JCO 40, 241-241(2022). DOI:10.1200/JCO.2022.40.4\_suppl.241.
- 103. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium®) Gastric Cancer. Version 2.2023. National Comprehensive Cancer Network, 2024. The NCCN Compendium® is a derivative work of the NCCN Guidelines®. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, and NCCN GUIDELINES® are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most

Page 31/66



recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.

- 104.Zsiros E, Lynam S, Attwood KM, et al. Efficacy and Safety of Pembrolizumab in Combination With Bevacizumab and Oral Metronomic Cyclophosphamide in the Treatment of Recurrent Ovarian Cancer: A Phase 2 Nonrandomized Clinical Trial. JAMA Oncol. 2021 Jan 1;7(1):78-85. doi: 10.1001/jamaoncol.2020.5945. PMID: 33211063; PMCID: PMC7677872.
- 105. Poblete S, Caulkins M, Loecher C, et al. Pembrolizumab in combination with bevacizumab and oral metronomic cyclophosphamide for recurrent epithelial ovarian, fallopian tube, or primary peritoneal cancer: Real-life clinical experience [abstract]. Ann Oncol 2022;33(Suppl): Abstract 569P. DOI:https://doi.org/10.1016/j.annonc.2022.07.697.
- 106. Sacco AG, Chen R, Worden FP, et al. Pembrolizumab plus cetuximab in patients with recurrent or metastatic head and neck squamous cell carcinoma: an open-label, multi-arm, non-randomised, multicentre, phase 2 trial. Lancet Oncol. 2021 Jun;22(6):883-892. doi: 10.1016/S1470-2045(21)00136-4. Epub 2021 May 11. PMID: 33989559.
- 107. Qin S, Chen Z, Fang W, et al. Pembrolizumab Versus Placebo as Second-Line Therapy in Patients From Asia With Advanced Hepatocellular Carcinoma: A Randomized, Double-Blind, Phase III Trial. J Clin Oncol. 2023 Mar 1;41(7):1434-1443. doi: 10.1200/JCO.22.00620.
  Epub 2022 Dec 1. PMID: 36455168; PMCID: PMC9995104.

# VIII. References (ENHANCED)

- 1e. Robert C, Schachter J, Long GV, et al. Pembrolizumab versus Ipilimumab in Advanced Melanoma. N Engl J Med. 2015 Jun 25;372(26):2521-32. doi: 10.1056/NEJMoa1503093.
- 2e. Robert C, Long GV, Brady B, et al. Nivolumab in previously untreated melanoma without BRAF mutation. N Engl J Med. 2015 Jan 22;372(4):320-30. doi: 10.1056/NEJMoa1412082.
- 3e. Ascierto PA, Long GV, Robert C, et al. Survival Outcomes in Patients With Previously Untreated BRAF Wild-Type Advanced Melanoma Treated With Nivolumab Therapy: Three-Year Follow-up of a Randomized Phase 3 Trial [published correction appears in JAMA Oncol. 2019 Feb 1;5(2):271]. JAMA Oncol. 2019;5(2):187–194. doi:10.1001/jamaoncol.2018.4514.
- 4e. Larkin J, Chiarion-Sileni V, Gonzalez R, et al. Combined Nivolumab and Ipilimumab or Monotherapy in Untreated Melanoma [published correction appears in N Engl J Med. 2018 Nov 29;379(22):2185]. N Engl J Med. 2015;373(1):23–34. doi:10.1056/NEJMoa1504030.
- 5e. Wolchok JD, Chiarion-Sileni V, Gonzalez R, et al. Overall Survival with Combined Nivolumab and Ipilimumab in Advanced Melanoma [published correction appears in N Engl J Med. 2018 Nov 29;379(22):2185]. N Engl J Med. 2017;377(14):1345–1356. doi:10.1056/NEJMoa1709684.





- 6e. Hamid O, Puzanov I, Dummer R, et al. Final analysis of a randomised trial comparing pembrolizumab versus investigator-choice chemotherapy for ipilimumab-refractory advanced melanoma. Eur J Cancer. 2017 Nov;86:37-45. doi: 10.1016/j.ejca.2017.07.022.
- 7e. Hodi FS, O'Day SJ, McDermott DF, et al. Improved survival with ipilimumab in patients with metastatic melanoma [published correction appears in N Engl J Med. 2010 Sep 23;363(13):1290]. N Engl J Med. 2010;363(8):711–723. doi:10.1056/NEJMoa1003466.
- 8e. Larkin J, Minor D, D'Angelo S, et al. Overall Survival in Patients With Advanced Melanoma Who Received Nivolumab Versus Investigator's Choice Chemotherapy in CheckMate 037: A Randomized, Controlled, Open-Label Phase III Trial. J Clin Oncol. 2018;36(4):383–390. doi:10.1200/JCO.2016.71.8023.
- 9e. Hersh EM, O'Day SJ, Ribas A, et al. A phase 2 clinical trial of nab-paclitaxel in previously treated and chemotherapy-naive patients with metastatic melanoma. Cancer. 2010 Jan 1;116(1):155-63.
- 10e. Kottschade LA, Suman VJ, Amatruda T 3rd, et al. A phase II trial of nab-paclitaxel (ABI-007) and carboplatin in patients with unresectable stage IV melanoma: a North Central Cancer Treatment Group Study, N057E(1). Cancer. 2011 Apr 15;117(8):1704-10.
- 11e. Agarwala SS, et al. Randomized phase III study of paclitaxel plus carboplatin with or without sorafenib as second-line treatment in patients with advanced melanoma. Journal of Clinical Oncology 2007 25:18\_suppl, 8510-8510.
- 12e. Rao RD, et al. Combination of paclitaxel and carboplatin as second-line therapy for patients with metastatic melanoma. Cancer. 2006 Jan 15;106(2):375-82.
- 13e. Middleton MR, et al. Randomized phase III study of temozolomide versus dacarbazine in the treatment of patients with advanced metastatic malignant melanoma. J Clin Oncol. 2000 Jan;18(1):158-66.
- 14e. Einzig AI, et al. A phase II study of taxol in patients with malignant melanoma. Invest New Drugs. 1991 Feb;9(1):59-64.
- 15e. Robert C, Ribas A, Schachter J, et al. Pembrolizumab versus ipilimumab in advanced melanoma (KEYNOTE-006): post-hoc 5-year results from an open-label, multicentre, randomised, controlled, phase 3 study. Lancet Oncol 2019; 20:1239.
- 16e. Eggermont AM, Chiarion-Sileni V, Grob JJ, et al. Prolonged Survival in Stage III Melanoma with Ipilimumab Adjuvant Therapy [published correction appears in N Engl J Med. 2018 Nov 29;379(22):2185]. N Engl J Med. 2016;375(19):1845–1855. doi:10.1056/NEJMoa1611299.
- 17e. Weber J, Mandala M, Del Vecchio M, et al. Adjuvant Nivolumab versus Ipilimumab in Resected Stage III or IV Melanoma. N Engl J Med. 2017 Nov 9;377(19):1824-1835. doi: 10.1056/NEJMoa1709030.
- 18e. Piulats JM, De La Cruz-Merino L, Curiel Garcia MT, et al. Phase II multicenter, single arm, open label study of Nivolumab in combination with Ipilimumab in untreated patients

Page 33/66



with metastatic uveal melanoma. Annals of Oncology (2018) 29 (suppl\_8): viii442-viii466. 10.1093/annonc/mdy289.

- 19e. Zimmer L, Vaubel J, Mohr P, et al. Phase II DeCOG-study of ipilimumab in pretreated and treatment-naïve patients with metastatic uveal melanoma. PLoS One. 2015;10(3):e0118564. Published 2015 Mar 11. doi:10.1371/journal.pone.0118564.
- 20e. Piulats Rodriguez JM, Ochoa de Olza M, Codes M, et al. Phase II study evaluating ipilimumab as a single agent in the first-line treatment of adult patients (Pts) with metastatic uveal melanoma (MUM): The GEM-1 trial. J Clin Oncol 2014; 32S:ASCO #9033.
- 21e. Luke JJ, Callahan MK, Postow MA, et al. Clinical activity of ipilimumab for metastatic uveal melanoma: a retrospective review of the Dana-Farber Cancer Institute, Massachusetts General Hospital, Memorial Sloan-Kettering Cancer Center, and University Hospital of Lausanne experience. Cancer. 2013;119(20):3687–3695. doi:10.1002/cncr.28282.
- 22e. Nghiem PT, Bhatia S, Lipson EJ, et al. PD-1 Blockade with Pembrolizumab in Advanced Merkel-Cell Carcinoma. N Engl J Med. 2016;374(26):2542–2552. doi:10.1056/NEJMoa1603702.
- 23e. D'Angelo SP, Russell J, Lebbé C, et al. Efficacy and Safety of First-line Avelumab Treatment in Patients With Stage IV Metastatic Merkel Cell Carcinoma: A Preplanned Interim Analysis of a Clinical Trial. JAMA Oncol. 2018;4(9):e180077. doi:10.1001/jamaoncol.2018.0077.
- 24e. Kaufman HL, Russell JS, Hamid O, et al. Updated efficacy of avelumab in patients with previously treated metastatic Merkel cell carcinoma after ≥1 year of follow-up: JAVELIN Merkel 200, a phase 2 clinical trial. J Immunother Cancer. 2018;6(1):7. Published 2018 Jan 19. doi:10.1186/s40425-017-0310-x.
- 25e. Topalian SL, Bhatia S, Hollebecque A, et al. Abstract CT074: Non-comparative, openlabel, multiple cohort, phase 1/2 study to evaluate nivolumab (NIVO) in patients with virusassociated tumors (CheckMate 358): Efficacy and safety in Merkel cell carcinoma (MCC). Cancer Res 2017;77(13 Suppl):Abstract nr CT074.
- 26e. Planchard D, Smit EF, Groen HJM, et al. Dabrafenib plus trametinib in patients with previously untreated BRAFV600E-mutant metastatic non-small-cell lung cancer: an openlabel, phase 2 trial. Lancet Oncol. 2017 Oct;18(10):1307-1316. doi: 10.1016/S1470-2045(17)30679-4.
- 27e. Planchard D, Kim TM, Mazieres J, et al. Dabrafenib in patients with BRAF(V600E)positive advanced non-small-cell lung cancer: a single-arm, multicentre, open-label, phase 2 trial. Lancet Oncol. 2016 May;17(5):642-50. doi: 10.1016/S1470-2045(16)00077-2.
- 28e. Gautschi O, Milia J, Cabarrou B, et al. Targeted Therapy for Patients with BRAF-Mutant Lung Cancer: Results from the European EURAF Cohort. J Thorac Oncol. 2015 Oct;10(10):1451-7. doi: 10.1097/JTO.000000000000625.





- 29e. Drilon A, Laetsch TW, Kummar S, et al. Efficacy of Larotrectinib in TRK Fusion-Positive Cancers in Adults and Children. N Engl J Med. 2018;378(8):731–739. doi:10.1056/NEJMoa1714448.
- 30e. Doebele R, Paz-Ares L, Farago AF, et al. Entrectinib in NTRK-fusion positive (NTRK-FP) non-small cell lung cancer (NSCLC): Integrated analysis of patients enrolled in three trials (STARTRK-2, STARTRK-1 and ALKA-372-001)[abstract]. AACR Annual Meeting. Atlanta, GA:Abstract CT131.
- 31e. Carbone DP, Reck M, Paz-Ares L, et al. First-Line Nivolumab in Stage IV or Recurrent Non-Small-Cell Lung Cancer. N Engl J Med. 2017;376(25):2415–2426. doi:10.1056/NEJMoa1613493.
- 32e. Hellmann MD, Ciuleanu TE, Pluzanski A, et al. Nivolumab plus Ipilimumab in Lung Cancer with a High Tumor Mutational Burden. N Engl J Med. 2018 May 31;378(22):2093-2104. doi: 10.1056/NEJMoa1801946.
- 33e. Brahmer J, Reckamp KL, Baas P, et al. Nivolumab versus Docetaxel in Advanced Squamous-Cell Non-Small-Cell Lung Cancer. N Engl J Med. 2015;373(2):123–135. doi:10.1056/NEJMoa1504627.
- 34e. Borghaei H, Paz-Ares L, Horn L, et al. Nivolumab versus Docetaxel in Advanced Nonsquamous Non-Small-Cell Lung Cancer. N Engl J Med. 2015;373(17):1627–1639. doi:10.1056/NEJMoa1507643.
- 35e. Barlesi F, Park K, Ciardiello F, et al. Primary analysis from OAK, a randomized phase III study comparing atezolizumab with docetaxel in 2L/3L NSCLC. Ann of Oncol 2016 Oct;27(suppl\_6):LBA44\_PR.
- 36e. Vermorken JB, Mesia R, Rivera F, et al. Platinum-Based Chemotherapy plus Cetuximab in Head and Neck Cancer. N Engl J Med 2008; 359:1116-1127.
- 37e. Mok TS, Wu Y-L, Ahn M-J, et al. Osimertinib or Platinum-Pemetrexed in EGFR T790M-Positive Lung Cancer. N Engl J Med. 2017;376(7):629–640. doi:10.1056/NEJMoa1612674.
- 38e. Solomon BJ, Besse B, Bauer TM, et al. Lorlatinib in patients with ALK-positive nonsmall-cell lung cancer: results from a global phase 2 study [published correction appears in Lancet Oncol. 2019 Jan;20(1):e10]. Lancet Oncol. 2018;19(12):1654–1667. doi:10.1016/S1470-2045(18)30649-1.
- 39e. Ou SH, Ahn JS, De Petris L, et al. Alectinib in Crizotinib-Refractory ALK-Rearranged Non-Small-Cell Lung Cancer: A Phase II Global Study. J Clin Oncol. 2016;34(7):661–668. doi:10.1200/jco.2015.63.9443.
- 40e. Huber RM, Hansen KH, Paz-Ares Rodríguez L, et al. Brigatinib in Crizotinib-Refractory ALK+ NSCLC: 2-Year Follow-up on Systemic and Intracranial Outcomes in the Phase 2 ALTA Trial. J Thorac Oncol. 2020;15(3):404–415. doi:10.1016/j.jtho.2019.11.004.
- 41e. Shaw AT, Kim TM, Crinò L, et al. Ceritinib versus chemotherapy in patients with ALKrearranged non-small-cell lung cancer previously given chemotherapy and crizotinib

Page 35/66



(ASCEND-5): a randomised, controlled, open-label, phase 3 trial. Lancet Oncol. 2017;18(7):874–886. doi:10.1016/S1470-2045(17)30339-X.

- 42e. Cohen EEW, Soulières D, Le Tourneau C, et al. Pembrolizumab versus methotrexate, docetaxel, or cetuximab for recurrent or metastatic head-and-neck squamous cell carcinoma (KEYNOTE-040): a randomised, open-label, phase 3 study. Lancet. 2019 Jan 12;393(10167):156-167.
- 43e. Cohen EE, Harrington KJ, Le Tourneau C, et al. LBA45\_PR Pembrolizumab (pembro) vs standard of care (SOC) for recurrent or metastatic head and neck squamous cell carcinoma (R/M HNSCC): Phase 3 KEYNOTE-040. Ann Oncol. 2017;28(suppl\_5):605-649. doi:10.1093/annonc/mdx440.
- 44e. Ferris RL, Blumenschein G Jr, Fayette J, et al. Nivolumab for Recurrent Squamous-Cell Carcinoma of the Head and Neck. N Engl J Med. 2016;375(19):1856–1867. doi:10.1056/NEJMoa1602252.
- 45e. Chen R, Zinzani PL, Lee HJ, et al. Pembrolizumab in relapsed or refractory Hodgkin lymphoma: 2-year follow-up of KEYNOTE-087. Blood. 2019;134(14):1144–1153. doi:10.1182/blood.2019000324.
- 46e. Armand P, Shipp MA, Ribrag V, et al. Programmed Death-1 Blockade With Pembrolizumab in Patients With Classical Hodgkin Lymphoma After Brentuximab Vedotin Failure. J Clin Oncol. 2016;34(31):3733–3739. doi:10.1200/JCO.2016.67.3467.
- 47e. Younes A, Santoro A, Shipp M, et al. Nivolumab for classical Hodgkin's lymphoma after failure of both autologous stem-cell transplantation and brentuximab vedotin: a multicentre, multicohort, single-arm phase 2 trial. Lancet Oncol. 2016;17(9):1283–1294. doi:10.1016/S1470-2045(16)30167-X.
- 48e. Moskowitz AJ, Hamlin PA Jr, Perales MA, et al. Phase II study of bendamustine in relapsed and refractory Hodgkin lymphoma. J Clin Oncol. 2013;31(4):456–460. doi:10.1200/JCO.2012.45.3308.
- 49e. Gopal AK, Press OW, Shustov AR, et al. Efficacy and safety of gemcitabine, carboplatin, dexamethasone, and rituximab in patients with relapsed/refractory lymphoma: a prospective multi-center phase II study by the Puget Sound Oncology Consortium. Leuk Lymphoma. 2010;51(8):1523–1529. doi:10.3109/10428194.2010.491137.
- 50e. Rodriguez MA, Cabanillas FC, Hagemeister FB, et al. A phase II trial of mesna/ifosfamide, mitoxantrone and etoposide for refractory lymphomas. Ann Oncol. 1995 Jul;6(6):609-11.
- 51e. Colwill R, Crump M, Couture F, et al. Mini-BEAM as salvage therapy for relapsed or refractory Hodgkin's disease before intensive therapy and autologous bone marrow transplantation. J Clin Oncol. 1995 Feb;13(2):396-402.
- 52e. Martín A, Fernández-Jiménez MC, et al. Long-term follow-up in patients treated with Mini-BEAM as salvage therapy for relapsed or refractory Hodgkin's disease. Br J Haematol. 2001 Apr;113(1):161-71.





- 53e. Armand P, Engert A, Younes A, et al. Nivolumab for Relapsed/Refractory Classic Hodgkin Lymphoma After Failure of Autologous Hematopoietic Cell Transplantation: Extended Follow-Up of the Multicohort Single-Arm Phase II CheckMate 205 Trial [published correction appears in J Clin Oncol. 2018 Sep 10;36(26):2748]. J Clin Oncol. 2018;36(14):1428–1439. doi:10.1200/JCO.2017.76.0793.
- 54e. Balar AV, Galsky MD, Rosenberg JE, et al. Atezolizumab as first-line treatment in cisplatin-ineligible patients with locally advanced and metastatic urothelial carcinoma: a single-arm, multicentre, phase 2 trial [published correction appears in Lancet. 2017 Aug 26;390(10097):848]. Lancet. 2017;389(10064):67–76. doi:10.1016/S0140-6736(16)32455-2.
- 55e. De Santis M, Bellmunt J, Mead G, et al. Randomized phase II/III trial assessing gemcitabine/carboplatin and methotrexate/carboplatin/vinblastine in patients with advanced urothelial cancer who are unfit for cisplatin-based chemotherapy: EORTC study 30986. J Clin Oncol. 2012;30(2):191–199. doi:10.1200/JCO.2011.37.3571.
- 56e. Apolo AB, Infante JR, Balmanoukian A, et al. Avelumab, an Anti-Programmed Death-Ligand 1 Antibody, In Patients With Refractory Metastatic Urothelial Carcinoma: Results From a Multicenter, Phase Ib Study. J Clin Oncol. 2017;35(19):2117–2124. doi:10.1200/JCO.2016.71.6795.
- 57e. Patel MR, Ellerton J, Infante JR, et al. Avelumab in metastatic urothelial carcinoma after platinum failure (JAVELIN Solid Tumor): pooled results from two expansion cohorts of an open-label, phase 1 trial. Lancet Oncol. 2018 Jan;19(1):51-64.
- 58e. Rosenberg JE, Hoffman-Censits J, Powles T, et al. Atezolizumab in patients with locally advanced and metastatic urothelial carcinoma who have progressed following treatment with platinum-based chemotherapy: a single-arm, multicentre, phase 2 trial. Lancet. 2016;387(10031):1909–1920. doi:10.1016/S0140-6736(16)00561-4.
- 59e. Powles T, Durán I, van der Heijden MS, et al. Atezolizumab versus chemotherapy in patients with platinum-treated locally advanced or metastatic urothelial carcinoma (IMvigor211): a multicentre, open-label, phase 3 randomised controlled trial. Lancet. 2018 Feb 24;391(10122):748-757. doi: 10.1016/S0140-6736(17)33297-X.
- 60e. Sharma P, Retz M, Siefker-Radtke A, et al. Nivolumab in metastatic urothelial carcinoma after platinum therapy (CheckMate 275): a multicentre, single-arm, phase 2 trial. Lancet Oncol. 2017 Mar;18(3):312-322. doi: 10.1016/S1470-2045(17)30065-7.
- 61e. Massard C, Gordon MS, Sharma S, et al. Safety and Efficacy of Durvalumab (MEDI4736), an Anti-Programmed Cell Death Ligand-1 Immune Checkpoint Inhibitor, in Patients With Advanced Urothelial Bladder Cancer. J Clin Oncol. 2016;34(26):3119–3125. doi:10.1200/JCO.2016.67.9761.
- 62e. Siefker-Radtke AO, Necchi A, Park SH, et al. First results from the primary analysis population of the phase 2 study of erdafitinib (ERDA; JNJ-42756493) in patients (pts) with metastatic or unresectable urothelial carcinoma (mUC) and FGFR alterations (FGFRalt). J Clin Oncol 2018;36(15\_suppl):4503.







- 63e. Overman MJ, McDermott R, Leach JL, et al. Nivolumab in patients with metastatic DNA mismatch repair-deficient or microsatellite instability-high colorectal cancer (CheckMate 142): an open-label, multicentre, phase 2 study [published correction appears in Lancet Oncol. 2017 Sep;18(9):e510]. Lancet Oncol. 2017;18(9):1182–1191. doi:10.1016/S1470-2045(17)30422-9.
- 64e. Lenz HJ, Lonardi S, Zagonel V, et al. Nivolumab (NIVO) + low-dose ipilimumab (IPI) as first-line (1L) therapy in microsatellite instability-high/DNA mismatch repair deficient (MSI-H/dMMR) metastatic colorectal cancer (mCRC): Clinical update [abstract]. Journal of Clinical Oncology 2019;37:3521-3521.
- 65e. Le DT, Uram JN, Wang H, et al. PD-1 Blockade in Tumors with Mismatch-Repair Deficiency. N Engl J Med. 2015;372(26):2509–2520. doi:10.1056/NEJMoa1500596.
- 66e. Tawbi HA, Burgess M, Bolejack V, et al. Pembrolizumab in advanced soft-tissue sarcoma and bone sarcoma (SARC028): a multicentre, two-cohort, single-arm, open-label, phase 2 trial. Lancet Oncol. 2017 Nov;18(11):1493-1501. doi: 10.1016/S1470-2045(17)30624-1.
- 67e. Le DT, Durham JN, Smith KN, et al. Mismatch repair deficiency predicts response of solid tumors to PD-1 blockade. Science. 2017;357(6349):409–413. doi:10.1126/science.aan6733.
- 68e. Adra N, Einhorn LH, Althouse SK, et al. Phase II trial of pembrolizumab in patients with platinum refractory germ-cell tumors: a Hoosier Cancer Research Network Study GU14-206. Ann Oncol. 2018 Jan 1;29(1):209-214. doi: 10.1093/annonc/mdx680.
- 69e. Shields LBE, Gordinier ME. Pembrolizumab in Recurrent Squamous Cell Carcinoma of the Vulva: Case Report and Review of the Literature. Gynecol Obstet Invest. 2019;84(1):94-98. doi: 10.1159/000491090.
- 70e. Gbolahan OB, Porter RF, Salter JT, et al. A Phase II Study of Pemetrexed in Patients with Recurrent Thymoma and Thymic Carcinoma. J Thorac Oncol. 2018 Dec;13(12):1940-1948.
- 71e. Palmieri G, Buonerba C, Ottaviano M, et al. Capecitabine plus gemcitabine in thymic epithelial tumors: final analysis of a Phase II trial. Future Oncol. 2014 Nov;10(14):2141-7.
- 72e. Thomas A, Rajan A, Berman A, et al. Sunitinib in patients with chemotherapy-refractory thymoma and thymic carcinoma: an open-label phase 2 trial [published correction appears in Lancet Oncol. 2015 Mar;16(3):e105]. Lancet Oncol. 2015;16(2):177–186. doi:10.1016/S1470-2045(14)71181-7.
- 73e. Zucali PA, De Pas T, Palmieri G, et al. Phase II Study of Everolimus in Patients With Thymoma and Thymic Carcinoma Previously Treated With Cisplatin-Based Chemotherapy. J Clin Oncol. 2018 Feb 1;36(4):342-349.
- 74e. Loehrer PJ Sr, Wang W, Johnson DH, et al. Octreotide alone or with prednisone in patients with advanced thymoma and thymic carcinoma: an Eastern Cooperative Oncology Group Phase II Trial. J Clin Oncol. 2004 Jan 15;22(2):293-9.





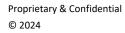


- 75e. Umemura S, Segawa Y, Fujiwara K, et al. A case of recurrent metastatic thymoma showing a marked response to paclitaxel monotherapy. Jpn J Clin Oncol. 2002 Jul;32(7):262-5.
- 76e. Alley EW, Lopez J, Santoro A, et al. Long-Term Overall Survival for Patients with Malignant Pleural Mesothelioma on Pembrolizumab Enrolled in KEYNOTE-028. J Thorac Oncol. 2017 Jan;12(1):S294.
- 77e. Metaxas Y, Rivalland G, Mauti LA, et al. Pembrolizumab as Palliative Immunotherapy in Malignant Pleural Mesothelioma. J Thorac Oncol. 2018 Nov;13(11):1784-1791.
- 78e. Jassem J, Ramlau R, Santoro A, et al, "Phase III Trial of Pemetrexed Plus Best Supportive Care Compared With Best Supportive Care in Previously Treated Patients With Advanced Malignant Pleural Mesothelioma," J Clin Oncol, 2008, 26(10):1698-704. [PubMed 18375898]
- 79e. Zucali PA, Simonelli M, Michetti G, et al. Second-line chemotherapy in malignant pleural mesothelioma: results of a retrospective multicenter survey. Lung Cancer. 2012 Mar;75(3):360-7.
- 80e. Scherpereel A, Mazieres J, Greillier L, et al. Nivolumab or nivolumab plus ipilimumab in patients with relapsed malignant pleural mesothelioma (IFCT-1501 MAPS2): a multicentre, open-label, randomised, non-comparative, phase 2 trial. Lancet Oncol. 2019 Feb;20(2):239-253.
- 81e. Scherpereel A, Mazieres J, Greillier L, et al. Second or 3rd line nivolumab (Nivo) versus nivo plus ipilimumab (Ipi) in malignant pleural mesothelioma (MPM) patients: Updated results of the IFCT-1501 MAPS2 randomized phase 2 trial. Ann Oncol. 2017 Sept;28(5):mdx440.074.
- 82e. Disselhorst MJ, Quispel-Janssen J, Lalezari F, et al. Ipilimumab and nivolumab in the treatment of recurrent malignant pleural mesothelioma (INITIATE): results of a prospective, single-arm, phase 2 trial. Lancet Respir Med. 2019 Mar;7(3):260-270.
- 83e. Quispel-Janssen J, van der Noort V, de Vries JF, et al. Programmed Death 1 Blockade With Nivolumab in Patients With Recurrent Malignant Pleural Mesothelioma. J Thorac Oncol. 2018 Oct;13(10):1569-1576.
- 84e. Popat S, Curioni-Fontecedro A, Polydoropoulou V, et al. A multicentre randomized phase III trial comparing pembrolizumab (P) versus single-agent chemotherapy (CT) for advanced pretreated malignant pleural mesothelioma (MPM): Results from the European Thoracic Oncology Platform (ETOP 9-15) PROMISE-meso trial. Ann Oncol 2019; 30S: ESMO #LBA91\_PR.
- 85e. Tawbi HA, Forsyth PA, Hodi S, et al. Efficacy and safety of the combination of nivolumab (NIVO) plus ipilimumab (IPI) in patients with symptomatic melanoma brain metastases (CheckMate 204). J Clin Oncol 2019; 37S.





- 86e. Long GV, Atkinson V, Lo S, et al. Combination nivolumab and ipilimumab or nivolumab alone in melanoma brain metastases: a multicentre randomised phase 2 study. Lancet Oncol 2018; 19:672.
- 87e. Margolin K, Ernstoff MS, Hamid O, et al. Ipilimumab in patients with melanoma and brain metastases: an open-label, phase 2 trial. Lancet Oncol. 2012 May;13(5):459-65. doi: 10.1016/S1470-2045(12)70090-6.
- 88e. Morris VK, Salem ME, Nimeiri H, et al. Nivolumab for previously treated unresectable metastatic anal cancer (NCI9673): a multicentre, single-arm, phase 2 study. Lancet Oncol. 2017;18(4):446–453. doi:10.1016/S1470-2045(17)30104-3.
- 89e. Chung HC, Piha-Paul SA, Lopez-Martin J, et al. Pembrolizumab After Two or More Lines of Previous Therapy in Patients With Recurrent or Metastatic SCLC: Results From the KEYNOTE-028 and KEYNOTE-158 Studies. J Thorac Oncol. 2020;15(4):618–627. doi:10.1016/j.jtho.2019.12.109.
- 90e. Antonia SJ, López-Martin JA, Bendell J, et al. Nivolumab alone and nivolumab plus ipilimumab in recurrent small-cell lung cancer (CheckMate 032): a multicentre, open-label, phase 1/2 trial. Lancet Oncol. 2016 Jul;17(7):883-895. doi: 10.1016/S1470-2045(16)30098-5.
- 91e. Reck M, Vicente D, Ciuleanu T, et al. LBA5: Efficacy and safety of nivolumab (nivo) monotherapy versus chemotherapy (chemo) in recurrent small cell lung cancer (SCLC): Results from CheckMate 331 [abstract]. Ann Oncol 2018;29:43.
- 92e. von Pawel J, Schiller JH, Shepherd FA, et al. Topotecan versus cyclophosphamide, doxorubicin, and vincristine for the treatment of recurrent small-cell lung cancer. J Clin Oncol. 1999 Feb;17(2):658-67.
- 93e. O'Brien ME, Ciuleanu TE, Tsekov H, et al. Phase III trial comparing supportive care alone with supportive care with oral topotecan in patients with relapsed small-cell lung cancer. J Clin Oncol. 2006 Dec 1;24(34):5441-7.
- 94e. Yamamoto N, Tsurutani J, Yoshimura N, et al. Phase II study of weekly paclitaxel for relapsed and refractory small cell lung cancer. Anticancer Res. 2006 Jan-Feb;26(1B):777-81.
- 95e. Smit EF, Fokkema E, Biesma B, Groen HJ, Snoek W, Postmus PE. A phase II study of paclitaxel in heavily pretreated patients with small-cell lung cancer. Br J Cancer. 1998;77(2):347–351. doi:10.1038/bjc.1998.54.
- 96e. Smyth JF, Smith IE, Sessa C, et al. Activity of docetaxel (Taxotere) in small cell lung cancer. The Early Clinical Trials Group of the EORTC. Eur J Cancer. 1994;30A(8):1058-60.
- 97e. Masuda N, Fukuoka M, Kusunoki Y, et al. CPT-11: a new derivative of camptothecin for the treatment of refractory or relapsed small-cell lung cancer. J Clin Oncol. 1992 Aug;10(8):1225-9.
- 98e. Pietanza MC, Kadota K, Huberman K, et al. Phase II trial of temozolomide in patients with relapsed sensitive or refractory small cell lung cancer, with assessment of







methylguanine-DNA methyltransferase as a potential biomarker. Clin Cancer Res. 2012 Feb 15;18(4):1138-45. doi: 10.1158/1078-0432.CCR-11-2059.

- 99e. El-Khoueiry AB, Sangro B, Yau T, et al. Nivolumab in patients with advanced hepatocellular carcinoma (CheckMate 040): an open-label, non-comparative, phase 1/2 dose escalation and expansion trial. Lancet. 2017 Jun 24;389(10088):2492-2502. doi: 10.1016/S0140-6736(17)31046-2.
- 100e. Crocenzi TS, El-Khoueiry AB, Yau T, et al. Nivolumab (nivo) in sorafenib (sor)-naive and -experienced pts with advanced hepatocellular carcinoma (HCC): CheckMate 040 study. J Clin Oncol 35, 2017 (suppl; abstr 4013).
- 101e. Qin S, Bai Y, Lim HY, et al. Randomized, multicenter, open-label study of oxaliplatin plus fluorouracil/leucovorin versus doxorubicin as palliative chemotherapy in patients with advanced hepatocellular carcinoma from Asia. J Clin Oncol. 2013 Oct 1;31(28):3501-8. doi: 10.1200/JCO.2012.44.5643.
- 102e. Bruix J, Qin S, Merle P, et al. Regorafenib for patients with hepatocellular carcinoma who progressed on sorafenib treatment (RESORCE): a randomised, double-blind, placebocontrolled, phase 3 trial. Lancet. 2017 Jan 7;389(10064):56-66.
- 103e. Abou-Alfa GK, Meyer T, Cheng AL, et al. Cabozantinib in Patients with Advanced and Progressing Hepatocellular Carcinoma. N Engl J Med. 2018 Jul 5;379(1):54-63.
- 104e. Zhu AX, Park JO, Ryoo BY, et al. Ramucirumab versus placebo as second-line treatment in patients with advanced hepatocellular carcinoma following first-line therapy with sorafenib (REACH): a randomised, double-blind, multicentre, phase 3 trial. Lancet Oncol. 2015 Jul;16(7):859-70.
- 105e. Zhu AX, Kang YK, Yen CJ, et al. Ramucirumab after sorafenib in patients with advanced hepatocellular carcinoma and increased α-fetoprotein concentrations (REACH-2): a randomised, double-blind, placebo-controlled, phase 3 trial. Lancet Oncol. 2019 Feb;20(2):282-296.
- 106e. Pulini S, Rupoli S, Goteri G, et al. Pegylated liposomal doxorubicin in the treatment of primary cutaneous T-cell lymphomas. Haematologica. 2007;92(5):686–689. doi:10.3324/haematol.10879.
- 107e. Dummer R, Quaglino P, Becker JC, et al. Prospective international multicenter phase II trial of intravenous pegylated liposomal doxorubicin monochemotherapy in patients with stage IIB, IVA, or IVB advanced mycosis fungoides: final results from EORTC 21012. J Clin Oncol. 2012;30(33):4091–4097.
- 108e. Duvic M, Talpur R, Wen S, Kurzrock R, David CL, Apisarnthanarax N. Phase II evaluation of gemcitabine monotherapy for cutaneous T-cell lymphoma. Clin Lymphoma Myeloma. 2006;7(1):51–58. doi:10.3816/CLM.2006.n.039.





- 109e. Sternberg CN, Davis ID, Mardiak J, et al. Pazopanib in locally advanced or metastatic renal cell carcinoma: results of a randomized phase III trial. J Clin Oncol. 2010 Feb 20;28(6):1061-8.
- 110e. Sternberg CN, Hawkins RE, Wagstaff J, et al. A randomised, double-blind phase III study of pazopanib in patients with advanced and/or metastatic renal cell carcinoma: final overall survival results and safety update. Eur J Cancer. 2013 Apr;49(6):1287-96.
- 111e. Motzer RJ, Hutson TE, Tomczak P, et al. Sunitinib versus interferon alfa in metastatic renal-cell carcinoma. N Engl J Med. 2007 Jan 11;356(2):115-24.
- 112e. Motzer RJ, Tannir NM, McDermott DF, et al. Nivolumab plus Ipilimumab versus Sunitinib in Advanced Renal-Cell Carcinoma. N Engl J Med. 2018;378(14):1277–1290.
- 113e. Choueiri TK, Halabi S, Sanford BL, et al. Cabozantinib Versus Sunitinib As Initial Targeted Therapy for Patients With Metastatic Renal Cell Carcinoma of Poor or Intermediate Risk: The Alliance A031203 CABOSUN Trial. J Clin Oncol. 2016;35(6):591– 597.
- 114e. Lorusso D, Ferrandina G, Colombo N, et al. Randomized phase II trial of carboplatinpaclitaxel (CP) compared to carboplatin-paclitaxel-bevacizumab (CP-B) in advanced (stage III-IV) or recurrent endometrial cancer: The MITO END-2 trial. Journal of Clinical Oncology 2015 33:15\_suppl, 5502-5502.
- 115e. Aghajanian C, Sill MW, Darcy KM, et al. Phase II trial of bevacizumab in recurrent or persistent endometrial cancer: a Gynecologic Oncology Group study. J Clin Oncol. 2011;29(16):2259–2265.
- 116e. Lincoln S, Blessing JA, Lee RB, Rocereto TF. Activity of paclitaxel as second-line chemotherapy in endometrial carcinoma: a Gynecologic Oncology Group study. Gynecol Oncol. 2003;88(3):277–281. doi:10.1016/s0090-8258(02)00068-9.
- 117e. Muggia FM, Blessing JA, Sorosky J, Reid GC. Phase II trial of the pegylated liposomal doxorubicin in previously treated metastatic endometrial cancer: a Gynecologic Oncology Group study. J Clin Oncol. 2002;20(9):2360–2364. doi:10.1200/JCO.2002.08.171.
- 118e. Oza AM, Elit L, Tsao MS, et al. Phase II study of temsirolimus in women with recurrent or metastatic endometrial cancer: a trial of the NCIC Clinical Trials Group. J Clin Oncol. 2011;29(24):3278–3285. doi:10.1200/JCO.2010.34.1578.
- 119e. Eckstein M, Cimadamore A, Hartmann A, et al. PD-L1 assessment in urothelial carcinoma: a practical approach. Ann Transl Med. 2019;7(22):690. doi:10.21037/atm.2019.10.24.
- 120e. Rittmeyer A, Barlesi F, Waterkamp D, et al. Atezolizumab versus docetaxel in patients with previously treated non-small-cell lung cancer (OAK): a phase 3, open-label, multicentre randomised controlled trial [published correction appears in Lancet. 2017 Apr 8;389(10077):e5]. Lancet. 2017;389(10066):255-265. doi:10.1016/S0140-6736(16)32517-X.



- 121e. Duvic M, Hymes K, Heald P, et al. Bexarotene is effective and safe for treatment of refractory advanced-stage cutaneous T-cell lymphoma: multinational phase II-III trial results. J Clin Oncol. 2001;19(9):2456-2471. doi:10.1200/JCO.2001.19.9.2456
- 122e. Groisberg R, Hong DS, Behrang A, et al. Characteristics and outcomes of patients with advanced sarcoma enrolled in early phase immunotherapy trials. J Immunother Cancer. 2017;5(1):100. Published 2017 Dec 19. doi:10.1186/s40425-017-0301-y.
- 123e. Maki RG, Wathen JK, Patel SR, et al. Randomized phase II study of gemcitabine and docetaxel compared with gemcitabine alone in patients with metastatic soft tissue sarcomas: results of sarcoma alliance for research through collaboration study 002 [corrected] [published correction appears in J Clin Oncol. 2007 Aug 20;25(24):3790]. J Clin Oncol. 2007;25(19):2755-2763. doi:10.1200/JCO.2006.10.4117.
- 124e. Judson I, Verweij J, Gelderblom H, et al. Doxorubicin alone versus intensified doxorubicin plus ifosfamide for first-line treatment of advanced or metastatic soft-tissue sarcoma: a randomised controlled phase 3 trial. Lancet Oncol. 2014;15(4):415-423. doi:10.1016/S1470-2045(14)70063-4.
- 125e. Migden MR, Rischin D, Schmults CD, et al. PD-1 Blockade with Cemiplimab in Advanced Cutaneous Squamous-Cell Carcinoma. N Engl J Med. 2018;379(4):341-351. doi:10.1056/NEJMoa1805131.
- 126e. Geoerger B, Kang HJ, Yalon-Oren M, et al. Pembrolizumab in paediatric patients with advanced melanoma or a PD-L1-positive, advanced, relapsed, or refractory solid tumour or lymphoma (KEYNOTE-051): interim analysis of an open-label, single-arm, phase 1-2 trial. Lancet Oncol. 2020 Jan;21(1):121-133. doi: 10.1016/S1470-2045(19)30671-0.
- 127e. Haak HR, Hermans J, van de Velde CJ, Lentjes EG, Goslings BM, Fleuren GJ, Krans HM. Optimal treatment of adrenocortical carcinoma with mitotane: results in a consecutive series of 96 patients. Br J Cancer. 1994 May;69(5):947-51. doi: 10.1038/bjc.1994.183.
- 128e. Berruti A, Terzolo M, Sperone P, et al. Etoposide, doxorubicin and cisplatin plus mitotane in the treatment of advanced adrenocortical carcinoma: a large prospective phase II trial. Endocr Relat Cancer. 2005 Sep;12(3):657-66. doi: 10.1677/erc.1.01025.
- 129e. Fassnacht M, Terzolo M, Allolio B, et al. FIRM-ACT Study Group. Combination chemotherapy in advanced adrenocortical carcinoma. N Engl J Med. 2012 Jun 7;366(23):2189-97. doi: 10.1056/NEJMoa1200966.
- 130e. Schmid P, Adams S, Rugo HS, et al. Atezolizumab and Nab-Paclitaxel in Advanced Triple-Negative Breast Cancer. N Engl J Med. 2018 Nov 29;379(22):2108-2121. doi: 10.1056/NEJMoa1809615.
- 131e. Moehler M, Shitara K, Garrido M, et al. Nivolumab (nivo) plus chemotherapy (chemo) versus chemo as first-line (1L) treatment for advanced gastric cancer/gastroesophageal junction cancer (GC/GEJC)/esophageal adenocarcinoma (EAC): First results of the





CheckMate 649 study. [abstract]. Presented at the Oral Presentation presented at the ESMO 2020 Annual Meeting; September 19-21, 2020; Virtual Meeting.

- 132e. Kato K, Sun JM, Shah M.A., et al. Pembrolizumab plus chemotherapy versus chemotherapy as first-line therapy in patients with advanced esophageal cancer: The phase 3 KEYNOTE-590 study. [abstract]. Presented at the Oral Presentation presented at the ESMO 2020 Annual Meeting; September 19-21, 2020; Virtual Meeting.
- 133e. Sezer A, Kilickap S, Gümüş M, et al. Cemiplimab monotherapy for first-line treatment of advanced non-small-cell lung cancer with PD-L1 of at least 50%: a multicentre, open-label, global, phase 3, randomised, controlled trial. Lancet. 2021 Feb 13;397(10274):592-604.
- 134e. Powles T, Park SH, Voog E, et al. Maintenance avelumab + best supportive care (BSC) versus BSC alone after platinum-based first-line (1L) chemotherapy in advanced urothelial carcinoma (UC): JAVELIN Bladder 100 phase III interim analysis. J Clin Oncol. 2020;38(18\_suppl):LBA1-LBA1.
- 135e. Graff JN, Alumkal JJ, Drake CG, et al. Early evidence of anti-PD-1 activity in enzalutamide-resistant prostate cancer. Oncotarget. 2016;7(33):52810-52817. doi:10.18632/oncotarget.10547.
- 136e. Spigel DR, De Marinis F, Giaccone G, et al. IMpower110: Interim overall survival (OS) analysis of a phase III study of atezolizumab (atezo) vs platinum-based chemotherapy (chemo) as first-line (1L) treatment (tx) in PD-L1–selected NSCLC [abstract]. Ann Oncol 2019;30(suppl\_5):Abstract 6256.
- 137e. Kato K, Cho BC, Takahashi M, et al. Nivolumab versus chemotherapy in patients with advanced esophageal squamous cell carcinoma refractory or intolerant to previous chemotherapy (ATTRACTION-3): a multicentre, randomised, open-label, phase 3 trial. Lancet Oncol. 2019;20(11):1506-1517. doi:10.1016/S1470-2045(19)30626-6.
- 138e. Wolf J, Seto T, Han JY, et al. Capmatinib in MET Exon 14-Mutated or MET-Amplified Non-Small-Cell Lung Cancer. N Engl J Med. 2020 Sep 3;383(10):944-957. doi: 10.1056/NEJMoa2002787.
- 139e. Paik PK, Felip E, Veillon R, et al. Tepotinib in Non-Small-Cell Lung Cancer with MET Exon 14 Skipping Mutations. N Engl J Med. 2020 Sep 3;383(10):931-943. doi: 10.1056/NEJMoa2004407.
- 140e. Oaknin A, Tinker AV, Gilbert L, et al. Clinical Activity and Safety of the Anti-Programmed Death 1 Monoclonal Antibody Dostarlimab for Patients With Recurrent or Advanced Mismatch Repair-Deficient Endometrial Cancer: A Nonrandomized Phase 1 Clinical Trial. JAMA Oncol. 2020 Oct 1. doi: 10.1001/jamaoncol.2020.4515. [Epub ahead of print]
- 141e. Motzer R, Alekseev B, Rha SY, et al. Lenvatinib plus Pembrolizumab or Everolimus for Advanced Renal Cell Carcinoma. N Engl J Med. 2021 Apr 8;384(14):1289-1300. doi: 10.1056/NEJMoa2035716.

Moda Health Plan, Inc. Medical Necessity Criteria

Page 44/66

Proprietary & Confidential © 2024



- 142e. Choueiri TK, Powles T, Burotto M, et al. 6960\_PR Nivolumab + cabozantinib vs sunitinib in first-line treatment for advanced renal cell carcinoma: First results from the randomized phase III CheckMate 9ER trial. Volume 31, SUPPLEMENT 4, S1159, September 01, 2020.
- 143e. Younes A, Gopal AK, Smith SE, et al. Results of a pivotal phase II study of brentuximab vedotin for patients with relapsed or refractory Hodgkin's lymphoma. J Clin Oncol. 2012;30(18):2183-2189. doi:10.1200/JCO.2011.38.0410.
- 144e. Gopal AK, Chen R, Smith SE, et al. Durable remissions in a pivotal phase 2 study of brentuximab vedotin in relapsed or refractory Hodgkin lymphoma. Blood. 2015;125(8):1236-1243. doi:10.1182/blood-2014-08-595801.
- 145e. Chen RW, Palmer J, Martin, et al. Results of a Phase II Trial of Brentuximab Vedotin As First Line Salvage Therapy in Relapsed/Refractory HL Prior to AHCT [abstract]. Blood 2014;124:Abstract 501.
- 146e. Zinzani PL, Ribrag V, Moskowitz CH, et al. Safety and tolerability of pembrolizumab in patients with relapsed/refractory primary mediastinal large B-cell lymphoma. Blood. 2017;130(3):267-270. doi:10.1182/blood-2016-12-758383.
- 147e. Powles T, Park SH, Voog E, et al. Maintenance avelumab + best supportive care (BSC) versus BSC alone after platinum-based first-line (1L) chemotherapy in advanced urothelial carcinoma (UC): JAVELIN Bladder 100 phase III interim analysis. J Clin Oncol. 2020;38(18\_suppl):LBA1-LBA1.
- 148e. McDermott DF, Lee JL, Ziobro M, et al. Open-Label, Single-Arm, Phase II Study of Pembrolizumab Monotherapy as First-Line Therapy in Patients With Advanced Non-Clear Cell Renal Cell Carcinoma. J Clin Oncol. 2021 Mar 20;39(9):1029-1039. doi: 10.1200/JCO.20.02365.
- 149e. Koshkin VS, Barata PC, Zhang T, et al. Clinical activity of nivolumab in patients with non-clear cell renal cell carcinoma. J Immunother Cancer. 2018;6(1):9. Published 2018 Jan 29. doi:10.1186/s40425-018-0319-9.
- 150e. Armstrong AJ, Halabi S, Eisen T, et al. Everolimus versus sunitinib for patients with metastatic non-clear cell renal cell carcinoma (ASPEN): a multicentre, open-label, randomised phase 2 trial. Lancet Oncol. 2016;17(3):378-388. doi:10.1016/S1470-2045(15)00515-X.
- 151e. Campbell MT, Bilen MA, Shah AY, et al. Cabozantinib for the treatment of patients with metastatic non-clear cell renal cell carcinoma: A retrospective analysis. Eur J Cancer. 2018 Nov;104:188-194. doi: 10.1016/j.ejca.2018.08.014.
- 152e. Hughes BG, Munoz-Couselo E, Mortier L, et al. Phase 2 study of pembrolizumab (pembro) for locally advanced (LA) or recurrent/metastatic (R/M) cutaneous squamous cell carcinoma (cSCC): KEYNOTE-629. Presented at: AACR Annual Meeting; April 10-15, 2021; Virtual. Abstract CT006.





- 153e. Rudin CM, Awad MM, Navarro A, et al. Pembrolizumab or Placebo Plus Etoposide and Platinum as First-Line Therapy for Extensive-Stage Small-Cell Lung Cancer: Randomized, Double-Blind, Phase III KEYNOTE-604 Study. J Clin Oncol. 2020;38(21):2369-2379. Doi:10.1200/JCO.20.00793.
- 154e. Powles T, Csőszi T, Özgüroğlu M, et al. Pembrolizumab alone or combined with chemotherapy versus chemotherapy as first-line therapy for advanced urothelial carcinoma (KEYNOTE-361): a randomised, open-label, phase 3 trial. Lancet Oncol. 2021 Jul;22(7):931-945. doi: 10.1016/S1470-2045(21)00152-2.
- 155e. Moskowitz AJ, Shah G, Schöder H, et al. Phase II Trial of Pembrolizumab Plus Gemcitabine, Vinorelbine, and Liposomal Doxorubicin as Second-Line Therapy for Relapsed or Refractory Classical Hodgkin Lymphoma. J Clin Oncol 2021:39:3109-3117.
- 156e. Bartlett NL, Niedzwiecki D, Johnson JL, et al. Gemcitabine, vinorelbine, and pegylated liposomal doxorubicin (GVD), a salvage regimen in relapsed Hodgkin's lymphoma: CALGB 59804. Ann Oncol. 2007 Jun;18(6):1071-9. doi: 10.1093/annonc/mdm090.
- 157e. Moskowitz CH, Bertino JR, Glassman JR, et al. Ifosfamide, carboplatin, and etoposide: a highly effective cytoreduction and peripheral-blood progenitor-cell mobilization regimen for transplant-eligible patients with non-Hodgkin's lymphoma. J Clin Oncol. 1999 Dec;17(12):3776-85. doi: 10.1200/JCO.1999.17.12.3776.
- 158e. Pires da Silva I, Ahmed T, Reijers ILM, et al. Ipilimumab alone or ipilimumab plus anti-PD-1 therapy in patients with metastatic melanoma resistant to anti-PD-(L)1 monotherapy: a multicentre, retrospective, cohort study. Lancet Oncol. 2021 Jun;22(6):836-847. doi: 10.1016/S1470-2045(21)00097-8.
- 159e. Gauvain C, Vauléon E, Chouaid C, et al. Intracerebral efficacy and tolerance of nivolumab in non-small-cell lung cancer patients with brain metastases. Lung Cancer. 2018 Feb;116:62-66. doi: 10.1016/j.lungcan.2017.12.008. Epub 2017 Dec 14. Erratum in: Lung Cancer. 2019 Oct;136:159.
- 160e. Goldman JW, Crino L, Vokes EE, et al. Nivolumab (nivo) in Patients (pts) With Advanced (adv) NSCLC and Central Nervous System (CNS) Metastases (mets). J Thorac Oncol 2016;11:S238-S239.
- 161e. Naumann RW, Hollebecque A, Meyer T, et al. Safety and Efficacy of Nivolumab Monotherapy in Recurrent or Metastatic Cervical, Vaginal, or Vulvar Carcinoma: Results From the Phase I/II CheckMate 358 Trial. J Clin Oncol. 2019 Nov 1;37(31):2825-2834.
- 162e. O'Malley DM, Bariani GM, Cassier PA, et al. Pembrolizumab in Patients With Microsatellite Instability-High Advanced Endometrial Cancer: Results From the KEYNOTE-158 Study. J Clin Oncol. 2022 Mar 1;40(7):752-761. doi: 10.1200/JCO.21.01874. Epub 2022 Jan 6.

Page 46/66





- 163e. Tawbi HA, Schadendorf D, Lipson EJ, et al. Relatlimab and Nivolumab versus Nivolumab in Untreated Advanced Melanoma. N Engl J Med. 2022 Jan 6;386(1):24-34. doi: 10.1056/NEJMoa2109970.
- 164e. Wilky BA, Trucco MM, Subhawong TK, et al. Axitinib plus pembrolizumab in patients with advanced sarcomas including alveolar soft-part sarcoma: a single-centre, single-arm, phase 2 trial. Lancet Oncol. 2019 Jun;20(6):837-848. doi: 10.1016/S1470-2045(19)30153-6. Epub 2019 May 8.
- 165e. Stacchiotti S, Negri T, Zaffaroni N, et al. Sunitinib in advanced alveolar soft part sarcoma: evidence of a direct antitumor effect. Ann Oncol. 2011 Jul;22(7):1682-1690. doi: 10.1093/annonc/mdq644. Epub 2011 Jan 17.
- 166e. Stacchiotti S, Mir O, Le Cesne A, et al. Activity of Pazopanib and Trabectedin in Advanced Alveolar Soft Part Sarcoma. Oncologist. 2018 Jan;23(1):62-70. doi: 10.1634/theoncologist.2017-0161. Epub 2017 Jul 28.
- 167e. Doki Y, Ajani JA, Kato K, et al. Nivolumab Combination Therapy in Advanced Esophageal Squamous-Cell Carcinoma. N Engl J Med. 2022 Feb 3;386(5):449-462. doi: 10.1056/NEJMoa2111380.
- 168e. Foss F, Horwitz SM, Coiffier B, et al. Pralatrexate is an effective treatment for relapsed or refractory transformed mycosis fungoides: a subgroup efficacy analysis from the PROPEL study. Clin Lymphoma Myeloma Leuk. 2012 Aug;12(4):238-43.
- 169e. Luke JJ, Rutkowski P, Queirolo P, et al. Pembrolizumab versus placebo as adjuvant therapy in completely resected stage IIB or IIC melanoma (KEYNOTE-716): a randomised, double-blind, phase 3 trial. Lancet. 2022 Apr 30;399(10336):1718-1729.
- 170e. Josting A, Rudolph C, Reiser M, et al. Time-intensified dexamethasone/cisplatin/cytarabine: an effective salvage therapy with low toxicity in patients with relapsed and refractory Hodgkin's disease. Ann Oncol. 2002 Oct;13(10):1628-35.
- 171e. Felip E, Altorki N, Zhou C, et al. Adjuvant atezolizumab after adjuvant chemotherapy in resected stage IB-IIIA non-small-cell lung cancer (IMpower010): a randomised, multicentre, open-label, phase 3 trial. Lancet. 2021 Oct 9;398(10308):1344-1357. doi: 10.1016/S0140-6736(21)02098-5. Epub 2021 Sep 20.
- 172e. Zer A, Icht O, Yosef L, et al. Phase II single-arm study of nivolumab and ipilimumab (Nivo/Ipi) in previously treated classical Kaposi sarcoma (cKS). Ann Oncol. 2022 Jul;33(7):720-727. doi: 10.1016/j.annonc.2022.03.012.
- 173e. Sun JM, Shen L, Shah MA, et al. Pembrolizumab plus chemotherapy versus chemotherapy alone for first-line treatment of advanced oesophageal cancer (KEYNOTE-590): a randomised, placebo-controlled, phase 3 study. Lancet. 2021 Aug 28;398(10302):759-771. doi: 10.1016/S0140-6736(21)01234-4.





- 174e. Ascierto PA, Lipson EJ, Dummer R, et al. Nivolumab and Relatlimab in Patients With Advanced Melanoma That Had Progressed on Anti-Programmed Death-1/Programmed Death Ligand 1 Therapy: Results From the Phase I/IIa RELATIVITY-020 Trial. J Clin Oncol. 2023 Feb 13:JCO2202072. doi: 10.1200/JCO.22.02072.
- 175e. Rossi E, Pagliara MM, Orteschi D, et al. Pembrolizumab as first-line treatment for metastatic uveal melanoma. Cancer Immunol Immunother. 2019 Jul;68(7):1179-1185. doi: 10.1007/s00262-019-02352-6. Epub 2019 Jun 7. PMID: 31175402; PMCID: PMC6584707.
- 176e. Gadgeel S, Dziubek K, Nagasaka M, et al. Pembrolizumab in Combination With Platinum-Based Chemotherapy in Recurrent EGFR/ALK-Positive Non-Small Cell Lung Cancer (NSCLC). 2021 Oct;16(suppl\_S863).
- 177e. Hoimes CJ, Flaig TW, Milowsky MI, et al. Enfortumab Vedotin Plus Pembrolizumab in Previously Untreated Advanced Urothelial Cancer. J Clin Oncol. 2023 Jan 1;41(1):22-31. doi: 10.1200/JCO.22.01643.
- 178e. Florou V, Rosenberg AE, Wieder E, et al. Angiosarcoma patients treated with immune checkpoint inhibitors: a case series of seven patients from a single institution. J
  Immunother Cancer. 2019 Aug 8;7(1):213. doi: 10.1186/s40425-019-0689-7. Erratum in: J
  Immunother Cancer. 2019 Nov 6;7(1):285.
- 179e. Marabelle A, Cassier PA, Fakih M, et al. Pembrolizumab for previously treated advanced anal squamous cell carcinoma: results from the non-randomised, multicohort, multicentre, phase 2 KEYNOTE-158 study. Lancet Gastroenterol Hepatol. 2022 May;7(5):446-454.
- 180e. Coleman RL, Lorusso D, Gennigens C, et al; innovaTV 204/GOG-3023/ENGOT-cx6 Collaborators. Efficacy and safety of tisotumab vedotin in previously treated recurrent or metastatic cervical cancer (innovaTV 204/GOG-3023/ENGOT-cx6): a multicentre, openlabel, single-arm, phase 2 study. Lancet Oncol. 2021 May;22(5):609-619.
- 181e. Kim SJ, Hyeon J, Cho I, Ko YH, Kim WS. Comparison of Efficacy of Pembrolizumab between Epstein-Barr Virus–Positive and –Negative Relapsed or Refractory Non-Hodgkin Lymphomas. Cancer Res Treat. 2019 Apr;51(2):611-622.
- 182e. Li X, Cheng Y, Zhang M, et al. Activity of pembrolizumab in relapsed/refractory NK/Tcell lymphoma. J Hematol Oncol. 2018 Jan 31;11(1):15.
- 183e. Mirza M, Chase D, Slomovitz B, et al. Dostarlimab for Primary Advanced or Recurrent Endometrial Cancer. March 27, 2023. doi: 10.1056/NEJMoa2216334.
- 184e. Wakelee H, Liberman M, Kato T, et al. Perioperative Pembrolizumab for Early-Stage Non-Small-Cell Lung Cancer. N Engl J Med. 2023 Aug 10;389(6):491-503. doi: 10.1056/NEJMoa2302983. Epub 2023 Jun 3. PMID: 37272513.
- 185e. Forde PM, Spicer J, Lu S, et al (2021). Nivolumab (NIVO) + platinum-doublet chemotherapy (chemo) vs chemo as neoadjuvant treatment (tx) for resectable (1B-IIIA) nonsmall cell lung cancer NSCLC in the phase 3 CheckMate 816 trial. American Association for Cancer Research Annual Meeting 2021. Abstract CT003.





- 186e. Shitara K, Van Cutsem E, Bang YJ, et al. Efficacy and Safety of Pembrolizumab or Pembrolizumab Plus Chemotherapy vs Chemotherapy Alone for Patients With First-line, Advanced Gastric Cancer: The KEYNOTE-062 Phase 3 Randomized Clinical Trial. JAMA Oncol 2020;6:1571-1580
- 187e. Referenced with permission from the NCCN Drugs & Biologics Compendium (NCCN Compendium<sup>®</sup>) Biliary Tract Cancers. Version 3.2023. National Comprehensive Cancer Network, 2024. The NCCN Compendium<sup>®</sup> is a derivative work of the NCCN Guidelines<sup>®</sup>. NATIONAL COMPREHENSIVE CANCER NETWORK<sup>®</sup>, NCCN<sup>®</sup>, and NCCN GUIDELINES<sup>®</sup> are trademarks owned by the National Comprehensive Cancer Network, Inc. To view the most recent and complete version of the Compendium, go online to NCCN.org. Accessed February 2024.
- 188e. Sacco AG, Chen R, Worden FP, et al Pembrolizumab plus cetuximab in patients with recurrent or metastatic head and neck squamous cell carcinoma: an open-label, multi-arm, non-randomised, multicentre, phase 2 trial. Lancet Oncol 2021;22:883-892.
- 189e. Sato J, Satouchi M, Itoh S, et al. Lenvatinib in patients with advanced or metastatic thymic carcinoma (REMORA): a multicentre, phase 2 trial. Lancet Oncol 2020; 21:843-850
- 190e. André T, Tougeron D, Piessen G, et al. Neoadjuvant Nivolumab Plus Ipilimumab and Adjuvant Nivolumab in Localized Deficient Mismatch Repair/Microsatellite Instability-High Gastric or Esophagogastric Junction Adenocarcinoma: The GERCOR NEONIPIGA Phase II Study. J Clin Oncol. 2023 Jan 10;41(2):255-265.
- 191e. Pietrantonio F, Raimondi A, Lonardi S, et al. INFINITY: A multicentre, single-arm, multi-cohort, phase II trial of tremelimumab and durvalumab as neoadjuvant treatment of patients with microsatellite instability-high (MSI) resectable gastric or gastroesophageal junction adenocarcinoma (GAC/ GEJAC). Journal of Clinical Oncology 2023;41:358-358
- 192e. Powles TB, Valderrama B, Gupta S, er al. LBA6 EV-302/KEYNOTE-A39: Open-label, randomized phase III study of enfortumab vedotin in combination with pembrolizumab (EV +P) vs chemotherapy in previously untreated locally advanced metastatic urothelial carcinoma (Ia/mUC). Annals of Oncology, Volume 34, Issue Supplement\_2, October 2023, MDZ250.002, https://doi.org/10.1016/j.annonc.2023.10.106.
- 193e. van der Heijden MS, Sonpavde G, Powles T, et al. Nivolumab plus Gemcitabine-Cisplatin in Advanced Urothelial Carcinoma. N Engl J Med. 2023 Nov 9;389(19):1778-1789.
- 194e. Dzienis M, Cundom J, Fuentes CS, et al. Pembrolizumab + carboplatin + paclitaxel as first-line therapy in recurrent/metastatic head and neck squamous cell carcinoma: Phase 4 KEYNOTE-B10 study. presented at european society for medical oncology (ESMO) congress; September 9-13, 2022; Paris, France.
- 195e. Grignani G, Rutkowski P, Lebbé C. A Phase 2 Study of Retifanlimab in Patients With Advanced or Metastatic Merkel Cell Carcinoma (POD1UM-201) Presented at the Society for Immunotherapy of Cancer's 36th Annual Meeting Washington, DC • November 10–14, 2021 [Epub ahead of print].





- 196e. Gogishvili M, Melkadze T, Makharadze T, et al. Cemiplimab plus chemotherapy versus chemotherapy alone in non-small cell lung cancer: a randomized, controlled, double-blind phase 3 trial. Nat Med. 2022 Nov;28(11):2374-2380.
- 197e. Markman M, Blessing J, Rubin SC, et al. Phase II trial of weekly paclitaxel (80 mg/m2) in platinum and paclitaxel-resistant ovarian and primary peritoneal cancers: a Gynecologic Oncology Group study. Gynecol Oncol. 2006 Jun;101(3):436-40.
- 198e. Gordon AN, Fleagle JT, Guthrie D, et al. Recurrent epithelial ovarian carcinoma: a randomized phase III study of pegylated liposomal doxorubicin versus topotecan. J Clin Oncol. 2001 Jul 15;19(14):3312-22.
- 199e. Naqash AR, O'Sullivan Coyne GH, Moore N, et al. Phase II study of atezolizumab in advanced alveolar soft part sarcoma (ASPS). Journal of Clinical Oncology 2021 39:15\_suppl, 11519-11519.
- 200e. Magellan Rx Management. Keytruda Clinical Literature Review Analysis. Last updated February 2024. Accessed February 2024.

| ICD-10 | ICD-10 Description  |
|--------|---|
| C00.0  | Malignant neoplasm of external upper lip                              |
| C00.1  | Malignant neoplasm of external lower lip                              |
| C00.2  | Malignant neoplasm of external lip, unspecified                       |
| C00.3  | Malignant neoplasm of upper lip, inner aspect                         |
| C00.4  | Malignant neoplasm of lower lip, inner aspect                         |
| C00.5  | Malignant neoplasm of lip, unspecified, inner aspect                  |
| C00.6  | Malignant neoplasm of commissure of lip, unspecified                  |
| C00.8  | Malignant neoplasm of overlapping sites of lip                        |
| C00.9  | Malignant neoplasm of lip, unspecified                                |
| C01    | Malignant neoplasm of base of tongue                                  |
| C02.0  | Malignant neoplasm of dorsal surface of tongue                        |
| C02.1  | Malignant neoplasm of border of tongue                                |
| C02.2  | Malignant neoplasm of ventral surface of tongue                       |
| C02.3  | Malignant neoplasm of anterior two-thirds of tongue, part unspecified |
| C02.4  | Malignant neoplasm of lingual tonsil                                  |
| C02.8  | Malignant neoplasm of overlapping sites of tongue                     |
| C02.9  | Malignant neoplasm of tongue, unspecified                             |
| C03.0  | Malignant neoplasm of upper gum                                       |
| C03.1  | Malignant neoplasm of lower gum                                       |
| C03.9  | Malignant neoplasm of gum, unspecified                                |

## Appendix 1 – Covered Diagnosis Codes







| ICD-10 | ICD-10 Description  |
|--------|---|
| C04.0  | Malignant neoplasm of anterior floor of mouth                         |
| C04.1  | Malignant neoplasm of lateral floor of mouth                          |
| C04.8  | Malignant neoplasm of overlapping sites of floor of mouth             |
| C04.9  | Malignant neoplasm of floor of mouth, unspecified                     |
| C05.0  | Malignant neoplasm of hard palate                                     |
| C05.1  | Malignant neoplasm of soft palate                                     |
| C05.8  | Malignant neoplasm of overlapping sites of palate                     |
| C05.9  | Malignant neoplasm of palate, unspecified                             |
| C06.0  | Malignant neoplasm of cheek mucosa                                    |
| C06.2  | Malignant neoplasm of retromolar area                                 |
| C06.80 | Malignant neoplasm of overlapping sites of unspecified parts of mouth |
| C06.89 | Malignant neoplasm of overlapping sites of other parts of mouth       |
| C06.9  | Malignant neoplasm of mouth, unspecified                              |
| C07    | Malignant neoplasm of parotid gland                                   |
| C08.0  | Malignant neoplasm of submandibular gland                             |
| C08.1  | Malignant neoplasm of sublingual gland                                |
| C08.9  | Malignant neoplasm of major salivary gland, unspecified               |
| C09.0  | Malignant neoplasm of tonsillar fossa                                 |
| C09.1  | Malignant neoplasm of tonsillar pillar (anterior) (posterior)         |
| C09.8  | Malignant neoplasm of overlapping sites of tonsil                     |
| C09.9  | Malignant neoplasm of tonsil, unspecified                             |
| C10.0  | Malignant neoplasm of vallecula                                       |
| C10.1  | Malignant neoplasm of anterior surface of epiglottis                  |
| C10.2  | Malignant neoplasm of lateral wall of oropharynx                      |
| C10.3  | Malignant neoplasm of posterior wall of oropharynx                    |
| C10.4  | Malignant neoplasm of branchial cleft                                 |
| C10.8  | Malignant neoplasm of overlapping sites of oropharynx                 |
| C10.9  | Malignant neoplasm of oropharynx, unspecified                         |
| C12    | Malignant neoplasm of pyriform sinus                                  |
| C13.0  | Malignant neoplasm of postcricoid region                              |
| C13.1  | Malignant neoplasm of aryepiglottic fold, hypopharyngeal aspect       |
| C13.2  | Malignant neoplasm of posterior wall of hypopharynx                   |
| C13.8  | Malignant neoplasm of overlapping sites of hypopharynx                |
| C13.9  | Malignant neoplasm of hypopharynx, unspecified                        |
| C14.0  | Malignant neoplasm of pharynx, unspecified                            |
| C14.2  | Malignant neoplasm of Waldeyer's ring                                 |







| ICD-10 | ICD-10 Description  |
|--------|---|
| C14.8  | Malignant neoplasm of overlapping sites of lip, oral cavity and pharynx |
| C15.3  | Malignant neoplasm of upper third of esophagus                          |
| C15.4  | Malignant neoplasm of middle third of esophagus                         |
| C15.5  | Malignant neoplasm of lower third of esophagus                          |
| C15.8  | Malignant neoplasm of overlapping sites of esophagus                    |
| C15.9  | Malignant neoplasm of esophagus, unspecified                            |
| C16.0  | Malignant neoplasm of cardia  |
| C16.1  | Malignant neoplasm of fundus of stomach                                 |
| C16.2  | Malignant neoplasm of body of stomach                                   |
| C16.3  | Malignant neoplasm of pyloric antrum                                    |
| C16.4  | Malignant neoplasm of pylorus   |
| C16.5  | Malignant neoplasm of lesser curvature of stomach, unspecified          |
| C16.6  | Malignant neoplasm of greater curvature of stomach, unspecified         |
| C16.8  | Malignant neoplasm of overlapping sites of stomach                      |
| C16.9  | Malignant neoplasm of stomach, unspecified                              |
| C17.0  | Malignant neoplasm of duodenum  |
| C17.1  | Malignant neoplasm of jejunum   |
| C17.2  | Malignant neoplasm of ileum   |
| C17.3  | Meckel's diverticulum, malignant  |
| C17.8  | Malignant neoplasm of overlapping sites of small intestine              |
| C17.9  | Malignant neoplasm of small intestine, unspecified                      |
| C18.0  | Malignant neoplasm of cecum   |
| C18.1  | Malignant neoplasm of appendix  |
| C18.2  | Malignant neoplasm of ascending colon                                   |
| C18.3  | Malignant neoplasm of hepatic flexure                                   |
| C18.4  | Malignant neoplasm of transverse colon                                  |
| C18.5  | Malignant neoplasm of splenic flexure                                   |
| C18.6  | Malignant neoplasm of descending colon                                  |
| C18.7  | Malignant neoplasm of sigmoid colon                                     |
| C18.8  | Malignant neoplasm of overlapping sites of colon                        |
| C18.9  | Malignant neoplasm of colon, unspecified                                |
| C19    | Malignant neoplasm of rectosigmoid junction                             |
| C20    | Malignant neoplasm of rectum  |
| C21.8  | Malignant neoplasm of overlapping sites of rectum, anus and anal canal  |
| C22.0  | Liver cell carcinoma  |
| C22.1  | Intrahepatic bile duct carcinoma  |







| ICD-10 | ICD-10 Description   |
|--------|--|
| C22.8  | Malignant neoplasm of liver, primary, unspecified as to type             |
| C22.9  | Malignant neoplasm of liver, not specified as primary or secondary       |
| C23    | Malignant neoplasm of gallbladder  |
| C24.0  | Malignant neoplasm of extrahepatic bile duct                             |
| C24.1  | Malignant neoplasm of ampulla of Vater                                   |
| C24.8  | Malignant neoplasm of overlapping sites of biliary tract                 |
| C24.9  | Malignant neoplasm of biliary tract, unspecified                         |
| C25.0  | Malignant neoplasm of head of pancreas                                   |
| C25.1  | Malignant neoplasm of body of the pancreas                               |
| C25.2  | Malignant neoplasm of tail of pancreas                                   |
| C25.3  | Malignant neoplasm of pancreatic duct                                    |
| C25.7  | Malignant neoplasm of other parts of pancreas                            |
| C25.8  | Malignant neoplasm of overlapping sites of pancreas                      |
| C25.9  | Malignant neoplasm of pancreas, unspecified                              |
| C31.0  | Malignant neoplasm of maxillary sinus                                    |
| C31.1  | Malignant neoplasm of ethmoidal sinus                                    |
| C32.0  | Malignant neoplasm of glottis  |
| C32.1  | Malignant neoplasm of supraglottis                                       |
| C32.2  | Malignant neoplasm of subglottis   |
| C32.3  | Malignant neoplasm of laryngeal cartilage                                |
| C32.8  | Malignant neoplasm of overlapping sites of larynx                        |
| C32.9  | Malignant neoplasm of larynx, unspecified                                |
| C33    | Malignant neoplasm of trachea  |
| C34.00 | Malignant neoplasm of unspecified main bronchus                          |
| C34.01 | Malignant neoplasm of right main bronchus                                |
| C34.02 | Malignant neoplasm of left main bronchus                                 |
| C34.10 | Malignant neoplasm of upper lobe, unspecified bronchus or lung           |
| C34.11 | Malignant neoplasm of upper lobe, right bronchus or lung                 |
| C34.12 | Malignant neoplasm of upper lobe, left bronchus or lung                  |
| C34.2  | Malignant neoplasm of middle lobe, bronchus or lung                      |
| C34.30 | Malignant neoplasm of lower lobe, unspecified bronchus or lung           |
| C34.31 | Malignant neoplasm of lower lobe, right bronchus or lung                 |
| C34.32 | Malignant neoplasm of lower lobe, left bronchus or lung                  |
| C34.80 | Malignant neoplasm of overlapping sites of unspecified bronchus and lung |
| C34.81 | Malignant neoplasm of overlapping sites of right bronchus and lung       |
| C34.82 | Malignant neoplasm of overlapping sites of left bronchus and lung        |







| ICD-10  | ICD-10 Description  |
|---------|---|
| C34.90  | Malignant neoplasm of unspecified part of unspecified bronchus or lung                      |
| C34.91  | Malignant neoplasm of unspecified part of right bronchus or lung                            |
| C34.92  | Malignant neoplasm of unspecified part of left bronchus or lung                             |
| C37     | Malignant neoplasm of thymus  |
| C40.00  | Malignant neoplasm of scapula and long bones of unspecified upper limb                      |
| C40.01  | Malignant neoplasm of scapula and long bones of right upper limb                            |
| C40.02  | Malignant neoplasm of scapula and long bones of left upper limb                             |
| C40.10  | Malignant neoplasm of short bones of unspecified upper limb                                 |
| C40.11  | Malignant neoplasm of short bones of right upper limb                                       |
| C40.12  | Malignant neoplasm of short bones of left upper limb  |
| C40.20  | Malignant neoplasm of long bones of unspecified lower limb                                  |
| C40.21  | Malignant neoplasm of long bones of right lower limb  |
| C40.22  | Malignant neoplasm of long bones of left lower limb   |
| C40.30  | Malignant neoplasm of short bones of unspecified lower limb                                 |
| C40.31  | Malignant neoplasm of short bones of right lower limb                                       |
| C40.32  | Malignant neoplasm of short bones of left lower limb  |
| C40.80  | Malignant neoplasm of overlapping sites of bone and articular cartilage of unspecified limb |
| C40.81  | Malignant neoplasm of overlapping sites of bone and articular cartilage of right limb       |
| C40.82  | Malignant neoplasm of overlapping sites of bone and articular cartilage of left limb        |
| C40.90  | Malignant neoplasm of unspecified bones and articular cartilage of unspecified limb         |
| C40.91  | Malignant neoplasm of unspecified bones and articular cartilage of right limb               |
| C40.92  | Malignant neoplasm of unspecified bones and articular cartilage of left limb                |
| C41.0   | Malignant neoplasm of bones of skull and face   |
| C41.1   | Malignant neoplasm of mandible  |
| C41.2   | Malignant neoplasm of vertebral column  |
| C41.3   | Malignant neoplasm of ribs, sternum and clavicle  |
| C41.4   | Malignant neoplasm of pelvic bones, sacrum and coccyx                                       |
| C41.9   | Malignant neoplasm of bone and articular cartilage, unspecified                             |
| C43.0   | Malignant melanoma of lip   |
| C43.111 | Malignant melanoma of right upper eyelid, including canthus                                 |
| C43.112 | Malignant melanoma of right lower eyelid, including canthus                                 |
| C43.121 | Malignant melanoma of left upper eyelid, including canthus                                  |
| C43.122 | Malignant melanoma of left lower eyelid, including canthus                                  |
| C43.20  | Malignant melanoma of unspecified ear and external auricular canal                          |
| C43.21  | Malignant melanoma of right ear and external auricular canal                                |
| C43.22  | Malignant melanoma of left ear and external auricular canal                                 |







| ICD-10   | ICD-10 Description  |
|----------|---|
| C43.30   | Malignant melanoma of unspecified part of face                                  |
| C43.31   | Malignant melanoma of nose  |
| C43.39   | Malignant melanoma of other parts of face                                       |
| C43.4    | Malignant melanoma of scalp and neck  |
| C43.51   | Malignant melanoma of anal skin   |
| C43.52   | Malignant melanoma of skin of breast  |
| C43.59   | Malignant melanoma of other part of trunk                                       |
| C43.60   | Malignant melanoma of unspecified upper limb, including shoulder                |
| C43.61   | Malignant melanoma of right upper limb, including shoulder                      |
| C43.62   | Malignant melanoma of left upper limb, including shoulder                       |
| C43.70   | Malignant melanoma of unspecified lower limb, including hip                     |
| C43.71   | Malignant melanoma of right lower limb, including hip                           |
| C43.72   | Malignant melanoma of left lower limb, including hip                            |
| C43.8    | Malignant melanoma of overlapping sites of skin                                 |
| C43.9    | Malignant melanoma of skin, unspecified   |
| C44.00   | Unspecified malignant neoplasm of skin of lip                                   |
| C44.02   | Squamous cell carcinoma of skin of lip  |
| C44.09   | Other specified malignant neoplasm of skin of lip                               |
| C44.121  | Squamous cell carcinoma of skin of unspecified eyelid, including canthus        |
| C44.1221 | Squamous cell carcinoma of skin of right upper eyelid, including canthus        |
| C44.1222 | Squamous cell carcinoma of skin of right lower eyelid, including canthus        |
| C44.1291 | Squamous cell carcinoma of skin of left upper eyelid, including canthus         |
| C44.1292 | Squamous cell carcinoma of skin of left lower eyelid, including canthus         |
| C44.221  | Squamous cell carcinoma of skin of unspecified ear and external auricular canal |
| C44.222  | Squamous cell carcinoma of skin of right ear and external auricular canal       |
| C44.229  | Squamous cell carcinoma of skin of left ear and external auricular canal        |
| C44.320  | Squamous cell carcinoma of skin of unspecified parts of face                    |
| C44.321  | Squamous cell carcinoma of skin of nose   |
| C44.329  | Squamous cell carcinoma of skin of other parts of face                          |
| C44.42   | Squamous cell carcinoma of skin of scalp and neck                               |
| C44.520  | Squamous cell carcinoma of anal skin  |
| C44.521  | Squamous cell carcinoma of skin of breast                                       |
| C44.529  | Squamous cell carcinoma of skin of other part of trunk                          |
| C44.621  | Squamous cell carcinoma of skin of unspecified upper limb, including shoulder   |
| C44.622  | Squamous cell carcinoma of skin of right upper limb, including shoulder         |
| C44.629  | Squamous cell carcinoma of skin of left upper limb, including shoulder          |







| ICD-10  | ICD-10 Description   |
|---------|--|
| C44.721 | Squamous cell carcinoma of skin of unspecified lower limb, including hip                       |
| C44.722 | Squamous cell carcinoma of skin of right lower limb, including hip                             |
| C44.729 | Squamous cell carcinoma of skin of left lower limb, including hip                              |
| C44.82  | Squamous cell carcinoma of overlapping sites of skin   |
| C44.92  | Squamous cell carcinoma of skin, unspecified   |
| C46.0   | Kaposi's sarcoma of skin   |
| C46.1   | Kaposi's sarcoma of soft tissue  |
| C46.2   | Kaposi's sarcoma of palate   |
| C46.3   | Kaposi's sarcoma of lymph nodes  |
| C46.4   | Kaposi's sarcoma of gastrointestinal sites   |
| C46.50  | Kaposi's sarcoma of unspecified lung   |
| C46.51  | Kaposi's sarcoma of right lung   |
| C46.52  | Kaposi's sarcoma of left lung  |
| C46.7   | Kaposi's sarcoma of other sites  |
| C46.9   | Kaposi's sarcoma, unspecified  |
| C48.0   | Malignant neoplasm of retroperitoneum  |
| C48.1   | Malignant neoplasm of specified parts of peritoneum  |
| C48.2   | Malignant neoplasm of peritoneum, unspecified  |
| C48.8   | Malignant neoplasm of overlapping sites of retroperitoneum and peritoneum                      |
| C49.0   | Malignant neoplasm of connective and soft tissue of head, face and neck                        |
| C49.10  | Malignant neoplasm of connective and soft tissue of unspecified upper limb, including shoulder |
| C49.11  | Malignant neoplasm of connective and soft tissue of right upper limb, including shoulder       |
| C49.12  | Malignant neoplasm of connective and soft tissue of left upper limb, including shoulder        |
| C49.20  | Malignant neoplasm of connective and soft tissue of unspecified lower limb, including hip      |
| C49.21  | Malignant neoplasm of connective and soft tissue of right lower limb, including hip            |
| C49.22  | Malignant neoplasm of connective and soft tissue of left lower limb, including hip             |
| C49.3   | Malignant neoplasm of connective and soft tissue of thorax                                     |
| C49.4   | Malignant neoplasm of connective and soft tissue of abdomen                                    |
| C49.5   | Malignant neoplasm of connective and soft tissue of pelvis                                     |
| C49.6   | Malignant neoplasm of connective and soft tissue of trunk, unspecified                         |
| C49.8   | Malignant neoplasm of overlapping sites of connective and soft tissue                          |
| C49.9   | Malignant neoplasm of connective and soft tissue, unspecified                                  |
| C4A.0   | Merkel cell carcinoma of lip   |
| C4A.10  | Merkel cell carcinoma of eyelid, including canthus   |
| C4A.111 | Merkel cell carcinoma of right upper eyelid, including canthus                                 |
| C4A.112 | Merkel cell carcinoma of right lower eyelid, including canthus                                 |







| ICD-10  | ICD-10 Description  |
|---------|---|
| C4A.121 | Merkel cell carcinoma of left upper eyelid, including canthus           |
| C4A.122 | Merkel cell carcinoma of left lower eyelid, including canthus           |
| C4A.20  | Merkel cell carcinoma of unspecified ear and external auricular canal   |
| C4A.21  | Merkel cell carcinoma of right ear and external auricular canal         |
| C4A.22  | Merkel cell carcinoma of left ear and external auricular canal          |
| C4A.30  | Merkel cell carcinoma of unspecified part of face                       |
| C4A.31  | Merkel cell carcinoma of nose   |
| C4A.39  | Merkel cell carcinoma of other parts of face                            |
| C4A.4   | Merkel cell carcinoma of scalp and neck                                 |
| C4A.51  | Merkel cell carcinoma of anal skin                                      |
| C4A.52  | Merkel cell carcinoma of skin of breast                                 |
| C4A.59  | Merkel cell carcinoma of other part of trunk                            |
| C4A.60  | Merkel cell carcinoma of unspecified upper limb, including shoulder     |
| C4A.61  | Merkel cell carcinoma of right upper limb, including shoulder           |
| C4A.62  | Merkel cell carcinoma of left upper limb, including shoulder            |
| C4A.70  | Merkel cell carcinoma of unspecified lower limb, including hip          |
| C4A.71  | Merkel cell carcinoma of right lower limb, including hip                |
| C4A.72  | Merkel cell carcinoma of left lower limb, including hip                 |
| C4A.8   | Merkel cell carcinoma of overlapping sites                              |
| C4A.9   | Merkel cell carcinoma, unspecified                                      |
| C50.011 | Malignant neoplasm of nipple and areola, right female breast            |
| C50.012 | Malignant neoplasm of nipple and areola, left female breast             |
| C50.019 | Malignant neoplasm of nipple and areola, unspecified female breast      |
| C50.021 | Malignant neoplasm of nipple and areola, right male breast              |
| C50.022 | Malignant neoplasm of nipple and areola, left male breast               |
| C50.029 | Malignant neoplasm of nipple and areola, unspecified male breast        |
| C50.111 | Malignant neoplasm of central portion of right female breast            |
| C50.112 | Malignant neoplasm of central portion of left female breast             |
| C50.119 | Malignant neoplasm of central portion of unspecified female breast      |
| C50.121 | Malignant neoplasm of central portion of right male breast              |
| C50.122 | Malignant neoplasm of central portion of left male breast               |
| C50.129 | Malignant neoplasm of central portion of unspecified male breast        |
| C50.211 | Malignant neoplasm of upper-inner quadrant of right female breast       |
| C50.212 | Malignant neoplasm of upper-inner quadrant of left female breast        |
| C50.219 | Malignant neoplasm of upper-inner quadrant of unspecified female breast |
| C50.221 | Malignant neoplasm of upper-inner quadrant of right male breast         |





| ICD-10  | ICD-10 Description  |
|---------|---|
| C50.222 | Malignant neoplasm of upper-inner quadrant of left male breast          |
| C50.229 | Malignant neoplasm of upper-inner quadrant of unspecified male breast   |
| C50.311 | Malignant neoplasm of lower-inner quadrant of right female breast       |
| C50.312 | Malignant neoplasm of lower-inner quadrant of left female breast        |
| C50.319 | Malignant neoplasm of lower-inner quadrant of unspecified female breast |
| C50.321 | Malignant neoplasm of lower-inner quadrant of right male breast         |
| C50.322 | Malignant neoplasm of lower-inner quadrant of left male breast          |
| C50.329 | Malignant neoplasm of lower-inner quadrant of unspecified male breast   |
| C50.411 | Malignant neoplasm of upper-outer quadrant of right female breast       |
| C50.412 | Malignant neoplasm of upper-outer quadrant of left female breast        |
| C50.419 | Malignant neoplasm of upper-outer quadrant of unspecified female breast |
| C50.421 | Malignant neoplasm of upper-outer quadrant of right male breast         |
| C50.422 | Malignant neoplasm of upper-outer quadrant of left male breast          |
| C50.429 | Malignant neoplasm of upper-outer quadrant of unspecified male breast   |
| C50.511 | Malignant neoplasm of lower-outer quadrant of right female breast       |
| C50.512 | Malignant neoplasm of lower-outer quadrant of left female breast        |
| C50.519 | Malignant neoplasm of lower-outer quadrant of unspecified female breast |
| C50.521 | Malignant neoplasm of lower-outer quadrant of right male breast         |
| C50.522 | Malignant neoplasm of lower-outer quadrant of left male breast          |
| C50.529 | Malignant neoplasm of lower-outer quadrant of unspecified male breast   |
| C50.611 | Malignant neoplasm of axillary tail of right female breast              |
| C50.612 | Malignant neoplasm of axillary tail of left female breast               |
| C50.619 | Malignant neoplasm of axillary tail of unspecified female breast        |
| C50.621 | Malignant neoplasm of axillary tail of right male breast                |
| C50.622 | Malignant neoplasm of axillary tail of left male breast                 |
| C50.629 | Malignant neoplasm of axillary tail of unspecified male breast          |
| C50.811 | Malignant neoplasm of overlapping sites of right female breast          |
| C50.812 | Malignant neoplasm of overlapping sites of left female breast           |
| C50.819 | Malignant neoplasm of overlapping sites of unspecified female breast    |
| C50.821 | Malignant neoplasm of overlapping sites of right male breast            |
| C50.822 | Malignant neoplasm of overlapping sites of left male breast             |
| C50.829 | Malignant neoplasm of overlapping sites of unspecified male breast      |
| C50.911 | Malignant neoplasm of unspecified site of right female breast           |
| C50.912 | Malignant neoplasm of unspecified site of left female breast            |
| C50.919 | Malignant neoplasm of unspecified site of unspecified female breast     |
| C50.921 | Malignant neoplasm of unspecified site of right male breast             |







| ICD-10  | ICD-10 Description  |
|---------|---|
| C50.922 | Malignant neoplasm of unspecified site of left male breast        |
| C50.929 | Malignant neoplasm of unspecified site of unspecified male breast |
| C51.0   | Malignant neoplasm of labium majus                                |
| C51.1   | Malignant neoplasm of labium minus                                |
| C51.2   | Malignant neoplasm of clitoris                                    |
| C51.8   | Malignant neoplasm of overlapping sites of vulva                  |
| C51.9   | Malignant neoplasm of vulva, unspecified                          |
| C53.0   | Malignant neoplasm of endocervix                                  |
| C53.1   | Malignant neoplasm of exocervix                                   |
| C53.8   | Malignant neoplasm of overlapping sites of cervix uteri           |
| C53.9   | Malignant neoplasm of cervix uteri, unspecified                   |
| C54.0   | Malignant neoplasm of isthmus uteri                               |
| C54.1   | Malignant neoplasm of endometrium                                 |
| C54.2   | Malignant neoplasm of myometrium                                  |
| C54.3   | Malignant neoplasm of fundus uteri                                |
| C54.8   | Malignant neoplasm of overlapping sites of corpus uteri           |
| C54.9   | Malignant neoplasm of corpus uteri, unspecified                   |
| C55     | Malignant neoplasm of uterus, part unspecified                    |
| C56.1   | Malignant neoplasm of right ovary                                 |
| C56.2   | Malignant neoplasm of left ovary                                  |
| C56.3   | Malignant neoplasm of bilateral ovaries                           |
| C56.9   | Malignant neoplasm of unspecified ovary                           |
| C57.00  | Malignant neoplasm of unspecified fallopian tube                  |
| C57.01  | Malignant neoplasm of right fallopian tube                        |
| C57.02  | Malignant neoplasm of left fallopian tube                         |
| C57.10  | Malignant neoplasm of unspecified broad ligament                  |
| C57.11  | Malignant neoplasm of right broad ligament                        |
| C57.12  | Malignant neoplasm of left broad ligament                         |
| C57.20  | Malignant neoplasm of unspecified round ligament                  |
| C57.21  | Malignant neoplasm of right round ligament                        |
| C57.22  | Malignant neoplasm of left round ligament                         |
| C57.3   | Malignant neoplasm of parametrium                                 |
| C57.4   | Malignant neoplasm of uterine adnexa, unspecified                 |
| C57.7   | Malignant neoplasm of other specified female genital organs       |
| C57.8   | Malignant neoplasm of overlapping sites of female genital organs  |
| C57.9   | Malignant neoplasm of female genital organ, unspecified           |







| ICD-10 | ICD-10 Description   |
|--------|--|
| C60.0  | Malignant neoplasm of prepuce  |
| C60.1  | Malignant neoplasm of glans penis  |
| C60.2  | Malignant neoplasm of body of penis  |
| C60.8  | Malignant neoplasm of overlapping sites of penis                                       |
| C60.9  | Malignant neoplasm of penis, unspecified   |
| C61    | Malignant neoplasm of prostate   |
| C62.00 | Malignant neoplasm of unspecified undescended testis                                   |
| C62.01 | Malignant neoplasm of undescended right testis   |
| C62.02 | Malignant neoplasm of undescended left testis  |
| C62.10 | Malignant neoplasm of unspecified descended testis                                     |
| C62.11 | Malignant neoplasm of descended right testis   |
| C62.12 | Malignant neoplasm of descended left testis  |
| C62.90 | Malignant neoplasm of unspecified testis, unspecified whether descended or undescended |
| C62.91 | Malignant neoplasm of right testis, unspecified whether descended or undescended       |
| C62.92 | Malignant neoplasm of left testis, unspecified whether descended or undescended        |
| C63.7  | Malignant neoplasm of other specified male genital organs                              |
| C63.8  | Malignant neoplasm of overlapping sites of male genital organs                         |
| C64.1  | Malignant neoplasm of right kidney, except renal pelvis                                |
| C64.2  | Malignant neoplasm of left kidney, except renal pelvis                                 |
| C64.9  | Malignant neoplasm of unspecified kidney, except renal pelvis                          |
| C65.1  | Malignant neoplasm of right renal pelvis   |
| C65.2  | Malignant neoplasm of left renal pelvis  |
| C65.9  | Malignant neoplasm of unspecified renal pelvis   |
| C66.1  | Malignant neoplasm of right ureter   |
| C66.2  | Malignant neoplasm of left ureter  |
| C66.9  | Malignant neoplasm of unspecified ureter   |
| C67.0  | Malignant neoplasm of trigone of bladder   |
| C67.1  | Malignant neoplasm of dome of bladder  |
| C67.2  | Malignant neoplasm of lateral wall of bladder  |
| C67.3  | Malignant neoplasm of anterior wall of bladder   |
| C67.4  | Malignant neoplasm of posterior wall of bladder  |
| C67.5  | Malignant neoplasm of bladder neck   |
| C67.6  | Malignant neoplasm of ureteric orifice   |
| C67.7  | Malignant neoplasm of urachus  |
| C67.8  | Malignant neoplasm of overlapping sites of bladder                                     |
| C67.9  | Malignant neoplasm of bladder, unspecified   |







| ICD-10 | ICD-10 Description   |
|--------|--|
| C68.0  | Malignant neoplasm of urethra  |
| C72.0  | Malignant neoplasm of spinal cord  |
| C72.1  | Malignant neoplasm of cauda equina   |
| C74.00 | Malignant neoplasm of cortex of unspecified adrenal gland                          |
| C74.01 | Malignant neoplasm of cortex of right adrenal gland                                |
| C74.02 | Malignant neoplasm of cortex of left adrenal gland                                 |
| C74.90 | Malignant neoplasm of unspecified part of unspecified adrenal gland                |
| C74.91 | Malignant neoplasm of unspecified part of right adrenal gland                      |
| C74.92 | Malignant neoplasm of unspecified part of left adrenal gland                       |
| C76.0  | Malignant neoplasm of head, face and neck  |
| C77.0  | Secondary and unspecified malignant neoplasm of lymph nodes of head, face and neck |
| C78.00 | Secondary malignant neoplasm of unspecified lung                                   |
| C78.01 | Secondary malignant neoplasm of right lung   |
| C78.02 | Secondary malignant neoplasm of left lung  |
| C78.6  | Secondary malignant neoplasm of retroperitoneum and peritoneum                     |
| C78.7  | Secondary malignant neoplasm of liver and intrahepatic bile duct                   |
| C79.31 | Secondary malignant neoplasm of brain  |
| C7A.1  | Malignant poorly differentiated neuroendocrine tumors                              |
| C7A.8  | Other malignant neuroendocrine tumors  |
| C7B.00 | Secondary carcinoid tumors unspecified site  |
| C7B.01 | Secondary carcinoid tumors of distant lymph nodes                                  |
| C7B.02 | Secondary carcinoid tumors of liver  |
| C7B.03 | Secondary carcinoid tumors of bone   |
| C7B.04 | Secondary carcinoid tumors of peritoneum   |
| C7B.1  | Secondary Merkel cell carcinoma  |
| C7B.8  | Other secondary neuroendocrine tumors  |
| C80.0  | Disseminated malignant neoplasm, unspecified                                       |
| C80.1  | Malignant (primary) neoplasm, unspecified  |
| C81.10 | Nodular sclerosis Hodgkin lymphoma, unspecified site                               |
| C81.11 | Nodular sclerosis Hodgkin lymphoma, lymph nodes of head, face, and neck            |
| C81.12 | Nodular sclerosis Hodgkin lymphoma, intrathoracic lymph nodes                      |
| C81.13 | Nodular sclerosis Hodgkin lymphoma, intra-abdominal lymph nodes                    |
| C81.14 | Nodular sclerosis Hodgkin lymphoma, lymph nodes of axilla and upper limb           |
| C81.15 | Nodular sclerosis Hodgkin lymphoma, lymph nodes of inguinal region and lower limb  |
| C81.16 | Nodular sclerosis Hodgkin lymphoma, intrapelvic lymph nodes                        |
| C81.17 | Nodular sclerosis Hodgkin lymphoma, spleen   |
|        |  |







| ICD-10 | ICD-10 Description  |  |
|--------|---|--|
| C81.18 | Nodular sclerosis Hodgkin lymphoma, lymph nodes of multiple sites                   |  |
| C81.19 | Nodular sclerosis Hodgkin lymphoma, extranodal and solid organ sites                |  |
| C81.20 | Mixed cellularity Hodgkin lymphoma, unspecified site                                |  |
| C81.21 | Mixed cellularity Hodgkin lymphoma, lymph nodes of head, face, and neck             |  |
| C81.22 | Mixed cellularity Hodgkin lymphoma, intrathoracic lymph nodes                       |  |
| C81.23 | Mixed cellularity Hodgkin lymphoma, intra-abdominal lymph nodes                     |  |
| C81.24 | Mixed cellularity Hodgkin lymphoma, lymph nodes of axilla and upper limb            |  |
| C81.25 | Mixed cellularity Hodgkin lymphoma, lymph nodes of inguinal region and lower limb   |  |
| C81.26 | Mixed cellularity Hodgkin lymphoma, intrapelvic lymph nodes                         |  |
| C81.27 | Mixed cellularity Hodgkin lymphoma, spleen  |  |
| C81.28 | Mixed cellularity Hodgkin lymphoma, lymph nodes of multiple sites                   |  |
| C81.29 | Mixed cellularity Hodgkin lymphoma, extranodal and solid organ sites                |  |
| C81.30 | Lymphocyte depleted Hodgkin lymphoma, unspecified site                              |  |
| C81.31 | Lymphocyte depleted Hodgkin lymphoma, lymph nodes of head, face, and neck           |  |
| C81.32 | Lymphocyte depleted Hodgkin lymphoma, intrathoracic lymph nodes                     |  |
| C81.33 | Lymphocyte depleted Hodgkin lymphoma, intra-abdominal lymph nodes                   |  |
| C81.34 | Lymphocyte depleted Hodgkin lymphoma, lymph nodes of axilla and upper limb          |  |
| C81.35 | Lymphocyte depleted Hodgkin lymphoma, lymph nodes of inguinal region and lower limb |  |
| C81.36 | Lymphocyte depleted Hodgkin lymphoma, intrapelvic lymph nodes                       |  |
| C81.37 | Lymphocyte depleted Hodgkin lymphoma, spleen  |  |
| C81.38 | Lymphocyte depleted Hodgkin lymphoma, lymph nodes of multiple sites                 |  |
| C81.39 | Lymphocyte depleted Hodgkin lymphoma, extranodal and solid organ sites              |  |
| C81.40 | Lymphocyte-rich Hodgkin lymphoma, unspecified site                                  |  |
| C81.41 | Lymphocyte-rich Hodgkin lymphoma, lymph nodes of head, face, and neck               |  |
| C81.42 | Lymphocyte-rich Hodgkin lymphoma, intrathoracic lymph nodes                         |  |
| C81.43 | Lymphocyte-rich Hodgkin lymphoma, intra-abdominal lymph nodes                       |  |
| C81.44 | Lymphocyte-rich Hodgkin lymphoma, lymph nodes of axilla and upper limb              |  |
| C81.45 | Lymphocyte-rich Hodgkin lymphoma, lymph nodes of inguinal region and lower limb     |  |
| C81.46 | Lymphocyte-rich Hodgkin lymphoma, intrapelvic lymph nodes                           |  |
| C81.47 | Lymphocyte-rich Hodgkin lymphoma, spleen  |  |
| C81.48 | Lymphocyte-rich Hodgkin lymphoma, lymph nodes of multiple sites                     |  |
| C81.49 | Lymphocyte-rich Hodgkin lymphoma, extranodal and solid organ sites                  |  |
| C81.70 | Other Hodgkin lymphoma unspecified site   |  |
| C81.71 | Other Hodgkin lymphoma lymph nodes of head, face, and neck                          |  |
| C81.72 | Other Hodgkin lymphoma intrathoracic lymph nodes                                    |  |
| C81.73 | Other Hodgkin lymphoma intra-abdominal lymph nodes                                  |  |







| ICD-10 | ICD-10 Description  |  |  |
|--------|---|--|--|
| C81.74 | Other Hodgkin lymphoma lymph nodes of axilla and upper limb                                   |  |  |
| C81.75 | Other Hodgkin lymphoma lymph nodes of inguinal region and lower limb                          |  |  |
| C81.76 | Other Hodgkin lymphoma intrapelvic lymph nodes  |  |  |
| C81.77 | Other Hodgkin lymphoma spleen   |  |  |
| C81.78 | Other Hodgkin lymphoma lymph nodes of multiple sites  |  |  |
| C81.79 | Other Hodgkin lymphoma extranodal and solid organ sites                                       |  |  |
| C81.90 | Hodgkin lymphoma, unspecified, unspecified site   |  |  |
| C81.91 | Hodgkin lymphoma, unspecified, lymph nodes of head, face, and neck                            |  |  |
| C81.92 | Hodgkin lymphoma, unspecified, intrathoracic lymph nodes                                      |  |  |
| C81.93 | Hodgkin lymphoma, unspecified, intra-abdominal lymph nodes                                    |  |  |
| C81.94 | Hodgkin lymphoma, unspecified, lymph nodes of axilla and upper limb                           |  |  |
| C81.95 | Hodgkin lymphoma, unspecified, lymph nodes of inguinal region and lower limb                  |  |  |
| C81.96 | Hodgkin lymphoma, unspecified, intrapelvic lymph nodes  |  |  |
| C81.97 | Hodgkin lymphoma, unspecified, spleen   |  |  |
| C81.98 | Hodgkin lymphoma, unspecified, lymph nodes of multiple sites                                  |  |  |
| C81.99 | Hodgkin lymphoma, unspecified, extranodal and solid organ sites                               |  |  |
| C83.90 | Non-follicular (diffuse) lymphoma, unspecified, unspecified site                              |  |  |
| C83.91 | Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of head, face, and neck           |  |  |
| C83.92 | Non-follicular (diffuse) lymphoma, unspecified, intrathoracic lymph nodes                     |  |  |
| C83.93 | Non-follicular (diffuse) lymphoma, unspecified, intra-abdominal lymph nodes                   |  |  |
| C83.94 | Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of axilla and upper limb          |  |  |
| C83.95 | Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of inguinal region and lower limb |  |  |
| C83.96 | Non-follicular (diffuse) lymphoma, unspecified, intrapelvic lymph nodes                       |  |  |
| C83.97 | Non-follicular (diffuse) lymphoma, unspecified, spleen  |  |  |
| C83.98 | Non-follicular (diffuse) lymphoma, unspecified, lymph nodes of multiple sites                 |  |  |
| C83.99 | Non-follicular (diffuse) lymphoma, unspecified, extranodal and solid organ sites              |  |  |
| C84.00 | Mycosis fungoides, unspecified site   |  |  |
| C84.01 | Mycosis fungoides, lymph nodes of head, face, and neck  |  |  |
| C84.02 | Mycosis fungoides, intrathoracic lymph nodes  |  |  |
| C84.03 | Mycosis fungoides, intra-abdominal lymph nodes  |  |  |
| C84.04 | Mycosis fungoides, lymph nodes of axilla and upper limb                                       |  |  |
| C84.05 | Mycosis fungoides, lymph nodes of inguinal region and lower limb                              |  |  |
| C84.06 | Mycosis fungoides, intrapelvic lymph nodes  |  |  |
| C84.07 | Mycosis fungoides, spleen   |  |  |
| C84.08 | Mycosis fungoides, lymph nodes of multiple sites  |  |  |
| C84.09 | Mycosis fungoides, extranodal and solid organ sites   |  |  |







| ICD-10  | ICD-10 Description  |  |
|---------|---|--|
| C84.10  | Sézary disease, unspecified site  |  |
| C84.11  | Sézary disease, lymph nodes of head, face, and neck                                       |  |
| C84.12  | Sézary disease, intrathoracic lymph nodes   |  |
| C84.13  | Sézary disease, intra-abdominal lymph nodes   |  |
| C84.14  | Sézary disease, lymph nodes of axilla and upper limb                                      |  |
| C84.15  | Sézary disease, lymph nodes of inguinal region and lower limb                             |  |
| C84.16  | Sézary disease, intrapelvic lymph nodes   |  |
| C84.17  | Sézary disease, spleen  |  |
| C84.18  | Sézary disease, lymph nodes of multiple sites   |  |
| C84.19  | Sézary disease, extranodal and solid organ sites  |  |
| C85.20  | Mediastinal (thymic) large B-cell lymphoma, unspecified site                              |  |
| C85.21  | Mediastinal (thymic) large B-cell lymphoma, lymph nodes of head, face and neck            |  |
| C85.22  | Mediastinal (thymic) large B-cell lymphoma, intrathoracic lymph nodes                     |  |
| C85.23  | Mediastinal (thymic) large B-cell lymphoma, intra-abdominal lymph nodes                   |  |
| C85.24  | Mediastinal (thymic) large B-cell lymphoma, lymph nodes of axilla and upper limb          |  |
| C85.25  | Mediastinal (thymic) large B-cell lymphoma, lymph nodes of inguinal region and lower limb |  |
| C85.26  | Mediastinal (thymic) large B-cell lymphoma, intrapelvic lymph nodes                       |  |
| C85.27  | Mediastinal (thymic) large B-cell lymphoma, spleen  |  |
| C85.28  | Mediastinal (thymic) large B-cell lymphoma, lymph nodes of multiple sites                 |  |
| C85.29  | Mediastinal (thymic) large B-cell lymphoma, extranodal and solid organ sites              |  |
| D09.0   | Carcinoma in situ of bladder  |  |
| D15.0   | Benign neoplasm of other and unspecified intrathoracic organs                             |  |
| D37.01  | Neoplasm of uncertain behavior of lip   |  |
| D37.02  | Neoplasm of uncertain behavior of tongue  |  |
| D37.05  | Neoplasm of uncertain behavior of pharynx   |  |
| D37.09  | Neoplasm of uncertain behavior of other specified sites of the oral cavity                |  |
| D37.1   | Neoplasm of uncertain behavior of stomach   |  |
| D37.8   | Neoplasm of uncertain behavior of other specified digestive organs                        |  |
| D37.9   | Neoplasm of uncertain behavior of digestive organ, unspecified                            |  |
| D38.0   | Neoplasm of uncertain behavior of larynx  |  |
| D38.4   | Neoplasm of uncertain behavior of thymus  |  |
| D38.5   | Neoplasm of uncertain behavior of other respiratory organs                                |  |
| D38.6   | Neoplasm of uncertain behavior of respiratory organ, unspecified                          |  |
| Z85.00  | Personal history of malignant neoplasm of unspecified digestive organ                     |  |
| Z85.01  | Personal history of malignant neoplasm of esophagus                                       |  |
| Z85.028 | Personal history of other malignant neoplasm of stomach                                   |  |







| ICD-10  | ICD-10 Description  |  |
|---------|---|--|
| Z85.068 | Personal history of other malignant neoplasm of small intestine     |  |
| Z85.07  | Personal history of malignant neoplasm of pancreas                  |  |
| Z85.09  | Personal history of malignant neoplasm of other digestive organs    |  |
| Z85.118 | Personal history of other malignant neoplasm of bronchus and lung   |  |
| Z85.238 | Personal history of other malignant neoplasm of thymus              |  |
| Z85.42  | Personal history of malignant neoplasm of other parts of uterus     |  |
| Z85.47  | Personal history of malignant neoplasm of testis                    |  |
| Z85.51  | Personal history of malignant neoplasm of bladder                   |  |
| Z85.528 | Personal history of other malignant neoplasm of kidney              |  |
| Z85.59  | Personal history of malignant neoplasm of other urinary tract organ |  |
| Z85.71  | Personal history of Hodgkin Lymphoma                                |  |
| Z85.72  | Personal history of non-Hodgkin lymphomas                           |  |
| Z85.820 | Personal history of malignant melanoma of skin                      |  |
| Z85.830 | Personal history of malignant neoplasm of bone                      |  |
| Z85.831 | Personal history of malignant neoplasm of soft tissue               |  |
| Z85.858 | Personal history of malignant neoplasm of other endocrine glands    |  |

## **Appendix 2** – Centers for Medicare and Medicaid Services (CMS)

The preceding information is intended for non-Medicare coverage determinations. Medicare coverage for outpatient (Part B) drugs is outlined in the Medicare Benefit Policy Manual (Pub. 100-2), Chapter 15, §50 Drugs and Biologicals. In addition, National Coverage Determinations (NCDs) and/or Local Coverage Determinations (LCDs) may exist and compliance with these policies is required where applicable. Local Coverage Articles (LCAs) may also exist for claims payment purposes or to clarify benefit eligibility under Part B for drugs which may be self-administered. The following link may be used to search for NCD, LCD, or LCA documents: <a href="https://www.cms.gov/medicare-coverage-database/search.aspx">https://www.cms.gov/medicare-coverage-database/search.aspx</a>. Additional indications, including any preceding information, may be applied at the discretion of the health plan.

Medicare Part B Covered Diagnosis Codes (applicable to existing NCD/LCD/LCA): N/A

| Medicare Part B Administrative Contractor (MAC) Jurisdictions |  |   |  |  |
|---|--|---|--|--|
| Jurisdiction  | Applicable State/US Territory          | Contractor  |  |  |
| E (1)   | CA, HI, NV, AS, GU, CNMI               | Noridian Healthcare Solutions, LLC                |  |  |
| F (2 & 3)   | AK, WA, OR, ID, ND, SD, MT, WY, UT, AZ | Noridian Healthcare Solutions, LLC                |  |  |
| 5   | KS, NE, IA, MO                         | Wisconsin Physicians Service Insurance Corp (WPS) |  |  |
| 6   | MN, WI, IL                             | National Government Services, Inc. (NGS)          |  |  |
| H (4 & 7)   | LA, AR, MS, TX, OK, CO, NM             | Novitas Solutions, Inc.                           |  |  |





| Medicare Part B Administrative Contractor (MAC) Jurisdictions |   |   |  |  |
|---|---|---|--|--|
| Jurisdiction  | Applicable State/US Territory   | Contractor  |  |  |
| 8   | MI, IN  | Wisconsin Physicians Service Insurance Corp (WPS) |  |  |
| N (9)   | FL, PR, VI  | First Coast Service Options, Inc.                 |  |  |
| J (10)  | TN, GA, AL  | Palmetto GBA, LLC                                 |  |  |
| M (11)  | NC, SC, WV, VA (excluding below)  | Palmetto GBA, LLC                                 |  |  |
| L (12)  | DE, MD, PA, NJ, DC (includes Arlington &<br>Fairfax counties and the city of Alexandria in<br>VA) | Novitas Solutions, Inc.                           |  |  |
| K (13 & 14)   | NY, CT, MA, RI, VT, ME, NH  | National Government Services, Inc. (NGS)          |  |  |
| 15  | KY, OH  | CGS Administrators, LLC                           |  |  |

