

1. NAME OF THE MEDICINAL PRODUCT

KEYTRUDA® 25 mg/mL concentrate for solution for infusion.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One vial of 4 mL of concentrate contains 100 mg of pembrolizumab.

Each mL of concentrate contains 25 mg of pembrolizumab.

Pembrolizumab is a humanised monoclonal anti-programmed cell death-1 (PD-1) antibody (IgG4/kappa isotype with a stabilising sequence alteration in the Fc region) produced in Chinese hamster ovary cells by recombinant DNA technology.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Concentrate for solution for infusion.

Clear to slightly opalescent, colourless to slightly yellow solution, pH 5.2-5.8.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Melanoma

KEYTRUDA as monotherapy is indicated for the treatment of adults and adolescents aged 12 years and older with advanced (unresectable or metastatic) melanoma.

KEYTRUDA as monotherapy is indicated for the adjuvant treatment of adults and adolescents aged 12 years and older with Stage IIB, IIC or III melanoma and who have undergone complete resection (see section 5.1).

Non-small cell lung carcinoma (NSCLC)

KEYTRUDA as monotherapy is indicated for the first-line treatment of metastatic non-small cell lung carcinoma in adults whose tumours express PD-L1 with a $\geq 50\%$ tumour proportion score (TPS) with no EGFR or ALK positive tumour mutations.

KEYTRUDA, in combination with pemetrexed and platinum chemotherapy, is indicated for the first-line treatment of metastatic non-squamous non-small cell lung carcinoma in adults whose tumours have no EGFR or ALK positive mutations.

KEYTRUDA, in combination with carboplatin and either paclitaxel or nab-paclitaxel, is indicated for the first-line treatment of metastatic squamous non-small cell lung carcinoma in adults.

KEYTRUDA as monotherapy is indicated for the treatment of locally advanced or metastatic non-small cell lung carcinoma in adults whose tumours express PD-L1 with a $\geq 1\%$ TPS and who have received at least one prior chemotherapy regimen. Patients with EGFR or ALK positive tumour mutations should also have received targeted therapy before receiving KEYTRUDA.

Classical Hodgkin lymphoma (cHL)

KEYTRUDA as monotherapy is indicated for the treatment of adult and paediatric patients aged 3 years and older with relapsed or refractory classical Hodgkin lymphoma who have failed autologous

stem cell transplant (ASCT) or following at least two prior therapies when ASCT is not a treatment option.

Urothelial carcinoma

KEYTRUDA as monotherapy is indicated for the treatment of locally advanced or metastatic urothelial carcinoma in adults who have received prior platinum-containing chemotherapy (see section 5.1).

KEYTRUDA as monotherapy is indicated for the treatment of locally advanced or metastatic urothelial carcinoma in adults who are not eligible for cisplatin-containing chemotherapy and whose tumours express PD-L1 with a combined positive score (CPS) ≥ 10 (see section 5.1).

Head and neck squamous cell carcinoma (HNSCC)

KEYTRUDA, as monotherapy or in combination with platinum and 5-fluorouracil (5-FU) chemotherapy, is indicated for the first-line treatment of metastatic or unresectable recurrent head and neck squamous cell carcinoma in adults whose tumours express PD-L1 with a CPS ≥ 1 (see section 5.1).

KEYTRUDA as monotherapy is indicated for the treatment of recurrent or metastatic head and neck squamous cell carcinoma in adults whose tumours express PD-L1 with a $\geq 50\%$ TPS and progressing on or after platinum-containing chemotherapy (see section 5.1).

Renal cell carcinoma (RCC)

KEYTRUDA, in combination with axitinib, is indicated for the first-line treatment of advanced renal cell carcinoma in adults (see section 5.1).

KEYTRUDA, in combination with lenvatinib, is indicated for the first-line treatment of advanced renal cell carcinoma in adults (see section 5.1).

KEYTRUDA as monotherapy is indicated for the adjuvant treatment of adults with renal cell carcinoma at increased risk of recurrence following nephrectomy or following nephrectomy and resection of metastatic lesions (for selection criteria, please see section 5.1).

Microsatellite instability high (MSI-H) or mismatch repair deficient (dMMR) cancers

Colorectal cancer (CRC)

KEYTRUDA as monotherapy is indicated for adults with MSI-H or dMMR colorectal cancer in the following settings:

- first-line treatment of metastatic colorectal cancer;
- treatment of unresectable or metastatic colorectal cancer after previous fluoropyrimidine-based combination therapy.

Non-colorectal cancers

KEYTRUDA as monotherapy is indicated for the treatment of the following MSI-H or dMMR tumours in adults with:

- advanced or recurrent endometrial carcinoma, who have disease progression on or following prior treatment with a platinum-containing therapy in any setting and who are not candidates for curative surgery or radiation;
- unresectable or metastatic gastric, small intestine, or biliary cancer, who have disease progression on or following at least one prior therapy.

Oesophageal carcinoma

KEYTRUDA, in combination with platinum and fluoropyrimidine-based chemotherapy, is indicated for the first-line treatment of locally advanced unresectable or metastatic carcinoma of the oesophagus or HER-2 negative gastroesophageal junction adenocarcinoma, in adults whose tumours express PD-L1 with a CPS \geq 10 (see section 5.1).

Triple-negative breast cancer (TNBC)

KEYTRUDA, in combination with chemotherapy as neoadjuvant treatment, and then continued as monotherapy as adjuvant treatment after surgery, is indicated for the treatment of adults with locally advanced, or early-stage triple-negative breast cancer at high risk of recurrence (see section 5.1).

KEYTRUDA, in combination with chemotherapy, is indicated for the treatment of locally recurrent unresectable or metastatic triple-negative breast cancer in adults whose tumours express PD-L1 with a CPS \geq 10 and who have not received prior chemotherapy for metastatic disease (see section 5.1).

Endometrial carcinoma (EC)

KEYTRUDA, in combination with lenvatinib, is indicated for the treatment of advanced or recurrent endometrial carcinoma in adults who have disease progression on or following prior treatment with a platinum-containing therapy in any setting and who are not candidates for curative surgery or radiation.

Cervical cancer

KEYTRUDA, in combination with chemotherapy with or without bevacizumab, is indicated for the treatment of persistent, recurrent, or metastatic cervical cancer in adults whose tumours express PD-L1 with a CPS \geq 1.

4.2 Posology and method of administration

Therapy must be initiated and supervised by specialist physicians experienced in the treatment of cancer.

PD-L1 testing

If specified in the indication, patient selection for treatment with KEYTRUDA based on the tumour expression of PD-L1 should be confirmed by a validated test (see sections 4.1, 4.4, 4.8 and 5.1).

MSI/MMR testing

If specified in the indication, patient selection for treatment with KEYTRUDA based on MSI-H/dMMR tumour status should be confirmed by a validated test (see sections 4.1 and 5.1).

Posology

The recommended dose of KEYTRUDA in adults is either 200 mg every 3 weeks or 400 mg every 6 weeks administered as an intravenous infusion over 30 minutes.

The recommended dose of KEYTRUDA as monotherapy in paediatric patients aged 3 years and older with cHL or patients aged 12 years and older with melanoma is 2 mg/kg bodyweight (bw) (up to a maximum of 200 mg), every 3 weeks administered as an intravenous infusion over 30 minutes.

For use in combination, see the Summary of Product Characteristics (SmPC) for the concomitant therapies.

Patients should be treated with KEYTRUDA until disease progression or unacceptable toxicity (and up to maximum duration of therapy if specified for an indication). Atypical responses (i.e. an initial transient increase in tumour size or small new lesions within the first few months followed by tumour shrinkage) have been observed. It is recommended to continue treatment for clinically stable patients with initial evidence of disease progression until disease progression is confirmed.

For the adjuvant treatment of melanoma or RCC, KEYTRUDA should be administered until disease recurrence, unacceptable toxicity, or for a duration of up to one year.

For the neoadjuvant and adjuvant treatment of TNBC, patients should be treated with neoadjuvant KEYTRUDA in combination with chemotherapy for 8 doses of 200 mg every 3 weeks or 4 doses of 400 mg every 6 weeks or until disease progression that precludes definitive surgery or unacceptable toxicity, followed by adjuvant treatment with KEYTRUDA as monotherapy for 9 doses of 200 mg every 3 weeks or 5 doses of 400 mg every 6 weeks or until disease recurrence or unacceptable toxicity. Patients who experience disease progression that precludes definitive surgery or unacceptable toxicity related to KEYTRUDA as neoadjuvant treatment in combination with chemotherapy should not receive KEYTRUDA monotherapy as adjuvant treatment.

Dose delay or discontinuation (see also section 4.4)

No dose reductions of KEYTRUDA are recommended. KEYTRUDA should be withheld or discontinued to manage adverse reactions as described in Table 1.

Table 1: Recommended treatment modifications for KEYTRUDA

| Immune-related adverse reactions | Severity | Treatment modification |
|----------------------------------|--|---|
| Pneumonitis | Grade 2 | Withhold until adverse reactions recover to Grades 0-1* |
| | Grades 3 or 4 or recurrent Grade 2 | Permanently discontinue |
| Colitis | Grades 2 or 3 | Withhold until adverse reactions recover to Grades 0-1* |
| | Grade 4 or recurrent Grade 3 | Permanently discontinue |
| Nephritis | Grade 2 with creatinine > 1.5 to ≤ 3 times upper limit of normal (ULN) | Withhold until adverse reactions recover to Grades 0-1* |
| | Grade ≥ 3 with creatinine > 3 times ULN | Permanently discontinue |
| Endocrinopathies | Grade 2 adrenal insufficiency and hypophysitis | Withhold treatment until controlled by hormone replacement |
| | Grades 3 or 4 adrenal insufficiency or symptomatic hypophysitis | Withhold until adverse reactions recover to Grades 0-1* |
| | Type 1 diabetes associated with Grade ≥ 3 hyperglycaemia (glucose > 250 mg/dL or > | For patients with Grade 3 or Grade 4 endocrinopathies that improved to Grade 2 or lower |

| | | |
|---|---|---|
| | 13.9 mmol/L) or associated with ketoacidosis Hyperthyroidism Grade \geq 3 | and are controlled with hormone replacement, if indicated, continuation of pembrolizumab may be considered after corticosteroid taper, if needed. Otherwise treatment should be discontinued. |
| | Hypothyroidism | Hypothyroidism may be managed with replacement therapy without treatment interruption. |
| Hepatitis NOTE: for RCC patients treated with pembrolizumab in combination with axitinib with liver enzyme elevations, see dosing guidelines following this table. | Grade 2 with aspartate aminotransferase (AST) or alanine aminotransferase (ALT) > 3 to 5 times ULN or total bilirubin > 1.5 to 3 times ULN | Withhold until adverse reactions recover to Grades 0-1* |
| | Grade \geq 3 with AST or ALT > 5 times ULN or total bilirubin > 3 times ULN | Permanently discontinue |
| | In case of liver metastasis with baseline Grade 2 elevation of AST or ALT, hepatitis with AST or ALT increases \geq 50% and lasts \geq 1 week | Permanently discontinue |
| Skin reactions | Grade 3 or suspected Stevens-Johnson syndrome (SJS) or toxic epidermal necrolysis (TEN) | Withhold until adverse reactions recover to Grades 0-1* |
| | Grade 4 or confirmed SJS or TEN | Permanently discontinue |
| Other immune-related adverse reactions | Based on severity and type of reaction (Grade 2 or Grade 3) | Withhold until adverse reactions recover to Grades 0-1* |
| | Grades 3 or 4 myocarditis Grades 3 or 4 encephalitis Grades 3 or 4 Guillain-Barré syndrome | Permanently discontinue |
| | Grade 4 or recurrent Grade 3 | Permanently discontinue |
| Infusion-related reactions | Grades 3 or 4 | Permanently discontinue |

Note: toxicity grades are in accordance with National Cancer Institute Common Terminology Criteria for Adverse Events Version 4.0 (NCI-CTCAE v.4).

*If treatment-related toxicity does not resolve to Grades 0-1 within 12 weeks after last dose of KEYTRUDA, or if corticosteroid dosing cannot be reduced to \leq 10 mg prednisone or equivalent per day within 12 weeks, KEYTRUDA should be permanently discontinued.

The safety of re-initiating pembrolizumab therapy in patients previously experiencing immune-related myocarditis is not known.

KEYTRUDA, as monotherapy or as combination therapy, should be permanently discontinued for Grade 4 or recurrent Grade 3 immune-related adverse reactions, unless otherwise specified in Table 1.

For Grade 4 haematological toxicity, only in patients with cHL, KEYTRUDA should be withheld until adverse reactions recover to Grades 0-1.

KEYTRUDA in combination with axitinib in RCC

For RCC patients treated with KEYTRUDA in combination with axitinib, see the SmPC regarding dosing of axitinib. When used in combination with pembrolizumab, dose escalation of axitinib above the initial 5 mg dose may be considered at intervals of six weeks or longer (see section 5.1).

For liver enzyme elevations, in patients with RCC being treated with KEYTRUDA in combination with axitinib:

- If ALT or AST ≥ 3 times ULN but < 10 times ULN without concurrent total bilirubin ≥ 2 times ULN, both KEYTRUDA and axitinib should be withheld until these adverse reactions recover to Grades 0-1. Corticosteroid therapy may be considered. Rechallenge with a single medicine or sequential rechallenge with both medicines after recovery may be considered. If rechallenging with axitinib, dose reduction as per the axitinib SmPC may be considered.
- If ALT or AST ≥ 10 times ULN or > 3 times ULN with concurrent total bilirubin ≥ 2 times ULN, both KEYTRUDA and axitinib should be permanently discontinued and corticosteroid therapy may be considered.

KEYTRUDA in combination with lenvatinib

When used in combination with lenvatinib, one or both medicines should be interrupted as appropriate. Lenvatinib should be withheld, dose reduced, or discontinued in accordance with the instructions in the lenvatinib SmPC for combination with pembrolizumab. No dose reductions are recommended for KEYTRUDA.

For recommendations for management of adverse reactions of lenvatinib, refer to the prescribing information for lenvatinib. Recommended dose reductions for lenvatinib when used to treat endometrial carcinoma are shown in Table 2.

Table 2: Recommended Dose Reductions of Lenvatinib for Adverse Reactions

| Indication | Starting Dose | First Dose Reduction To | Second Dose Reduction To | Third Dose Reduction To |
|-----------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| Endometrial Carcinoma | 20 mg orally once daily | 14 mg once daily | 10 mg once daily | 8 mg once daily |

Lenvatinib Dose Modifications for Severe Renal Impairment

The recommended dosage of lenvatinib for patients with endometrial carcinoma and severe renal impairment (creatinine clearance less than 30 mL/min calculated by Cockcroft-Gault equation using actual body weight) is 10 mg orally once daily. For additional information regarding renal toxicity with lenvatinib, refer to the prescribing information for lenvatinib.

Lenvatinib Dose Modifications for Severe Hepatic Impairment

The recommended dosage of lenvatinib for patients with endometrial carcinoma and severe hepatic impairment (Child-Pugh C) is 10 mg orally once daily. For additional information regarding hepatotoxicity with lenvatinib, refer to the prescribing information for lenvatinib.

Patients treated with KEYTRUDA must be given the patient alert card and be informed about the risks of KEYTRUDA (see also package leaflet).

Special populations

Elderly

No dose adjustment is necessary in patients ≥ 65 years (see sections 4.4 and 5.1).

Renal impairment

No dose adjustment is needed for patients with mild or moderate renal impairment. KEYTRUDA has not been studied in patients with severe renal impairment (see sections 4.4 and 5.2).

Hepatic impairment

No dose adjustment is needed for patients with mild hepatic impairment. KEYTRUDA has not been studied in patients with moderate or severe hepatic impairment (see sections 4.4 and 5.2).

Paediatric population

The safety and efficacy of KEYTRUDA in children below 18 years of age have not been established except in paediatric patients with melanoma or with cHL. Currently available data are described in sections 4.8, 5.1 and 5.2.

Method of administration

KEYTRUDA is for intravenous use. It must be administered by infusion over 30 minutes. KEYTRUDA must not be administered as an intravenous push or bolus injection.

When administering KEYTRUDA as part of a combination with intravenous chemotherapy, KEYTRUDA should be administered first.

For instructions on dilution of the medicinal product before administration, see section 6.6.

4.3 Contraindications

Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

4.4 Special warnings and precautions for use

Traceability

In order to improve the traceability of biological medicinal products, the name and the batch number of the administered product should be clearly recorded.

Assessment of PD-L1 status

When assessing the PD-L1 status of the tumour, it is important that a well-validated and robust methodology is chosen to minimise false negative or false positive determinations.

Immune-related adverse reactions

Immune-related adverse reactions, including severe and fatal cases, have occurred in patients receiving pembrolizumab. Most immune-related adverse reactions occurring during treatment with pembrolizumab were reversible and managed with interruptions of pembrolizumab, administration of corticosteroids and/or supportive care. Immune-related adverse reactions have also occurred after the last dose of pembrolizumab. Immune-related adverse reactions affecting more than one body system can occur simultaneously.

For suspected immune-related adverse reactions, adequate evaluation to confirm aetiology or exclude other causes should be ensured. Based on the severity of the adverse reaction, pembrolizumab should be withheld and corticosteroids administered. Upon improvement to Grade ≤ 1 , corticosteroid taper

should be initiated and continued over at least 1 month. Based on limited data from clinical studies in patients whose immune-related adverse reactions could not be controlled with corticosteroid use, administration of other systemic immunosuppressants can be considered.

Pembrolizumab may be restarted within 12 weeks after last dose of KEYTRUDA if the adverse reaction recovers to Grade \leq 1 and corticosteroid dose has been reduced to \leq 10 mg prednisone or equivalent per day.

Pembrolizumab must be permanently discontinued for any Grade 3 immune-related adverse reaction that recurs and for any Grade 4 immune-related adverse reaction toxicity, except for endocrinopathies that are controlled with replacement hormones (see sections 4.2 and 4.8).

Immune-related pneumonitis

Pneumonitis has been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for signs and symptoms of pneumonitis. Suspected pneumonitis should be confirmed with radiographic imaging and other causes excluded. Corticosteroids should be administered for Grade \geq 2 events (initial dose of 1-2 mg/kg/day prednisone or equivalent followed by a taper); pembrolizumab should be withheld for Grade 2 pneumonitis, and permanently discontinued for Grade 3, Grade 4 or recurrent Grade 2 pneumonitis (see section 4.2).

Immune-related colitis

Colitis has been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for signs and symptoms of colitis, and other causes excluded. Corticosteroids should be administered for Grade \geq 2 events (initial dose of 1-2 mg/kg/day prednisone or equivalent followed by a taper); pembrolizumab should be withheld for Grade 2 or Grade 3 colitis, and permanently discontinued for Grade 4 or recurrent Grade 3 colitis (see section 4.2). The potential risk of gastrointestinal perforation should be taken into consideration.

Immune-related hepatitis

Hepatitis has been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for changes in liver function (at the start of treatment, periodically during treatment and as indicated based on clinical evaluation) and symptoms of hepatitis, and other causes excluded. Corticosteroids should be administered (initial dose of 0.5-1 mg/kg/day (for Grade 2 events) and 1-2 mg/kg/day (for Grade \geq 3 events) prednisone or equivalent followed by a taper) and based on severity of liver enzyme elevations, pembrolizumab should be withheld or discontinued (see section 4.2).

Immune-related nephritis

Nephritis has been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for changes in renal function, and other causes of renal dysfunction excluded. Corticosteroids should be administered for Grade \geq 2 events (initial dose of 1-2 mg/kg/day prednisone or equivalent followed by a taper) and based on severity of creatinine elevations, pembrolizumab should be withheld for Grade 2, and permanently discontinued for Grade 3 or Grade 4 nephritis (see section 4.2).

Immune-related endocrinopathies

Severe endocrinopathies, including adrenal insufficiency, hypophysitis, type 1 diabetes mellitus, diabetic ketoacidosis, hypothyroidism, and hyperthyroidism have been observed with pembrolizumab treatment.

Long-term hormone replacement therapy may be necessary in cases of immune-related endocrinopathies.

Adrenal insufficiency (primary and secondary) has been reported in patients receiving pembrolizumab. Hypophysitis has also been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for signs and symptoms of adrenal insufficiency and hypophysitis (including hypopituitarism) and other causes excluded. Corticosteroids to treat adrenal insufficiency and other hormone replacement should be administered as clinically indicated. Pembrolizumab should be withheld for Grade 2 adrenal insufficiency or hypophysitis until the event is controlled with hormone replacement. Pembrolizumab should be withheld or discontinued for Grades 3 or 4 adrenal insufficiency or symptomatic hypophysitis. Continuation of pembrolizumab may be considered, after corticosteroid taper, if needed (see section 4.2). Pituitary function and hormone levels should be monitored to ensure appropriate hormone replacement.

Type 1 diabetes mellitus, including diabetic ketoacidosis, has been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for hyperglycaemia or other signs and symptoms of diabetes. Insulin should be administered for type 1 diabetes, and pembrolizumab should be withheld in cases of type 1 diabetes associated with Grade ≥ 3 hyperglycaemia or ketoacidosis until metabolic control is achieved (see section 4.2).

Thyroid disorders, including hypothyroidism, hyperthyroidism and thyroiditis, have been reported in patients receiving pembrolizumab and can occur at any time during treatment. Hypothyroidism is more frequently reported in patients with HNSCC with prior radiation therapy. Patients should be monitored for changes in thyroid function (at the start of treatment, periodically during treatment and as indicated based on clinical evaluation) and clinical signs and symptoms of thyroid disorders. Hypothyroidism may be managed with replacement therapy without treatment interruption and without corticosteroids. Hyperthyroidism may be managed symptomatically. Pembrolizumab should be withheld for Grade ≥ 3 until recovery to Grade ≤ 1 hyperthyroidism. Thyroid function and hormone levels should be monitored to ensure appropriate hormone replacement.

For patients with Grade 3 or Grade 4 endocrinopathies that improved to Grade 2 or lower and are controlled with hormone replacement, if indicated, continuation of pembrolizumab may be considered after corticosteroid taper, if needed. Otherwise, treatment should be discontinued (see sections 4.2 and 4.8).

Immune-related skin adverse reactions

Immune-related severe skin reactions have been reported in patients receiving pembrolizumab (see section 4.8). Patients should be monitored for suspected severe skin reactions and other causes should be excluded. Based on the severity of the adverse reaction, pembrolizumab should be withheld for Grade 3 skin reactions until recovery to Grade ≤ 1 or permanently discontinued for Grade 4 skin reactions, and corticosteroids should be administered (see section 4.2).

Cases of Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) have been reported in patients receiving pembrolizumab (see section 4.8). For suspected SJS or TEN, pembrolizumab should be withheld and the patient should be referred to a specialised unit for assessment and treatment. If SJS or TEN is confirmed, pembrolizumab should be permanently discontinued (see section 4.2).

Caution should be used when considering the use of pembrolizumab in a patient who has previously experienced a severe or life-threatening skin adverse reaction on prior treatment with other immune-stimulatory anti-cancer agents.

Other immune-related adverse reactions

The following additional clinically significant, immune-related adverse reactions have been reported in clinical studies or in post-marketing experience: uveitis, arthritis, myositis, myocarditis, pancreatitis, Guillain-Barré syndrome, myasthenic syndrome, haemolytic anaemia, sarcoidosis, encephalitis, myelitis, vasculitis, cholangitis sclerosing, gastritis, cystitis noninfective and hypoparathyroidism (see sections 4.2 and 4.8).

Based on the severity and type of the adverse reaction, pembrolizumab should be withheld for Grade 2 or Grade 3 events and corticosteroids administered.

Pembrolizumab may be restarted within 12 weeks after last dose of KEYTRUDA if the adverse reaction recovers to Grade ≤ 1 and corticosteroid dose has been reduced to ≤ 10 mg prednisone or equivalent per day.

Pembrolizumab must be permanently discontinued for any Grade 3 immune-related adverse reaction that recurs and for any Grade 4 immune-related adverse reaction.

For Grades 3 or 4 myocarditis, encephalitis or Guillain-Barré syndrome, pembrolizumab should be permanently discontinued (see sections 4.2 and 4.8).

Transplant-related adverse reactions

Solid organ transplant rejection

Solid organ transplant rejection has been reported in the post-marketing setting in patients treated with PD-1 inhibitors. Treatment with pembrolizumab may increase the risk of rejection in solid organ transplant recipients. The benefit of treatment with pembrolizumab versus the risk of possible organ rejection should be considered in these patients.

Complications of allogeneic Haematopoietic Stem Cell Transplant (HSCT)

Allogeneic HSCT after treatment with pembrolizumab

Cases of graft-versus-host-disease (GVHD) and hepatic veno-occlusive disease (VOD) have been observed in patients with cHL undergoing allogeneic HSCT after previous exposure to pembrolizumab. Until further data become available, careful consideration to the potential benefits of HSCT and the possible increased risk of transplant-related complications should be made case by case (see section 4.8).

Allogeneic HSCT prior to treatment with pembrolizumab

In patients with a history of allogeneic HSCT, acute GVHD, including fatal GVHD, has been reported after treatment with pembrolizumab. Patients who experienced GVHD after their transplant procedure may be at an increased risk for GVHD after treatment with pembrolizumab. Consider the benefit of treatment with pembrolizumab versus the risk of possible GVHD in patients with a history of allogeneic HSCT.

Infusion-related reactions

Severe infusion-related reactions, including hypersensitivity and anaphylaxis, have been reported in patients receiving pembrolizumab (see section 4.8). For Grades 3 or 4 infusion reactions, infusion should be stopped and pembrolizumab permanently discontinued (see section 4.2). Patients with

Grades 1 or 2 infusion reaction may continue to receive pembrolizumab with close monitoring; premedication with antipyretic and antihistamine may be considered.

Use of pembrolizumab in combination with chemotherapy

Pembrolizumab in combination with chemotherapy should be used with caution in patients ≥ 75 years after careful consideration of the potential benefit/risk on an individual basis (see section 5.1).

Disease-specific precautions

Use of pembrolizumab in urothelial carcinoma patients who have received prior platinum-containing chemotherapy

Physicians should consider the delayed onset of pembrolizumab effect before initiating treatment in patients with poorer prognostic features and/or aggressive disease. In urothelial carcinoma, a higher number of deaths within 2 months was observed in pembrolizumab compared to chemotherapy (see section 5.1). Factors associated with early deaths were fast progressive disease on prior platinum therapy and liver metastases.

Use of pembrolizumab in urothelial carcinoma for patients who are considered ineligible for cisplatin-containing chemotherapy and whose tumours express PD-L1 with CPS ≥ 10

The baseline and prognostic disease characteristics of the study population of KEYNOTE-052 included a proportion of patients eligible for a carboplatin-based combination, for whom the benefit has been assessed in a comparative study (KEYNOTE-361). In KEYNOTE-361, a higher number of deaths within 6 months of treatment initiation followed by a long-term survival benefit was observed with pembrolizumab monotherapy compared to chemotherapy (see section 5.1). No specific factor(s) associated with early deaths could be identified. Physicians should consider the delayed onset of pembrolizumab effect before initiating treatment in patients with urothelial carcinoma who are considered eligible for carboplatin-based combination chemotherapy. KEYNOTE-052 also included patients eligible for mono-chemotherapy, for whom no randomised data are available. In addition, no safety and efficacy data are available in frailer patients (e.g. ECOG performance status 3) considered not eligible for chemotherapy. In the absence of these data, pembrolizumab should be used with caution in this population after careful consideration of the potential risk-benefit on an individual basis.

Use of pembrolizumab for first-line treatment of patients with NSCLC

In general, the frequency of adverse reactions for pembrolizumab combination therapy is observed to be higher than for pembrolizumab monotherapy or chemotherapy alone, reflecting the contributions of each of these components (see sections 4.2 and 4.8). A direct comparison of pembrolizumab when used in combination with chemotherapy to pembrolizumab monotherapy is not available.

Physicians should consider the benefit/risk balance of the available treatment options (pembrolizumab monotherapy or pembrolizumab in combination with chemotherapy) before initiating treatment in previously untreated patients with NSCLC whose tumours express PD-L1.

In KEYNOTE-042, a higher number of deaths within 4 months of treatment initiation followed by a long-term survival benefit was observed with pembrolizumab monotherapy compared to chemotherapy (see section 5.1).

Use of pembrolizumab for first-line treatment of patients with HNSCC

In general, the frequency of adverse reactions for pembrolizumab combination therapy is observed to be higher than for pembrolizumab monotherapy or chemotherapy alone, reflecting the contributions of each of these components (see section 4.8).

Physicians should consider the benefit/risk balance of the available treatment options (pembrolizumab monotherapy or pembrolizumab in combination with chemotherapy) before initiating treatment in patients with HNSCC whose tumours express PD-L1 (see section 5.1).

Use of pembrolizumab for treatment of patients with advanced or recurrent MSI-H or dMMR endometrial carcinoma

A direct comparison of pembrolizumab when used in combination with lenvatinib to pembrolizumab monotherapy is not available. Physicians should consider the benefit/risk balance of the available treatment options (pembrolizumab monotherapy or pembrolizumab in combination with lenvatinib) before initiating treatment in patients with advanced or recurrent MSI-H or dMMR endometrial carcinoma.

Use of pembrolizumab for adjuvant treatment of patients with melanoma

A trend toward increased frequency of severe and serious adverse reactions in patients ≥ 75 years was observed. Safety data of pembrolizumab in the adjuvant melanoma setting in patients ≥ 75 years are limited.

Use of pembrolizumab in combination with axitinib for first-line treatment of patients with RCC

When pembrolizumab is given with axitinib, higher than expected frequencies of Grades 3 and 4 ALT and AST elevations have been reported in patients with advanced RCC (see section 4.8). Liver enzymes should be monitored before initiation of and periodically throughout treatment. More frequent monitoring of liver enzymes as compared to when the medicines are used in monotherapy may be considered. Medical management guidelines for both medicines should be followed (see section 4.2 and refer to the SmPC for axitinib).

Use of pembrolizumab for first-line treatment of patients with MSI-H/dMMR CRC

In KEYNOTE-177, the hazard rates for overall survival events were greater for pembrolizumab compared with chemotherapy for the first 4 months of treatment, followed by a long-term survival benefit for pembrolizumab (see section 5.1).

Patients excluded from clinical studies

Patients with the following conditions were excluded from clinical studies: active CNS metastases; ECOG PS ≥ 2 (except for urothelial carcinoma and RCC); HIV infection, hepatitis B or hepatitis C infection; active systemic autoimmune disease; interstitial lung disease; prior pneumonitis requiring systemic corticosteroid therapy; a history of severe hypersensitivity to another monoclonal antibody; receiving immunosuppressive therapy and a history of severe immune-related adverse reactions from treatment with ipilimumab, defined as any Grade 4 toxicity or Grade 3 toxicity requiring corticosteroid treatment (> 10 mg/day prednisone or equivalent) for greater than 12 weeks. Patients with active infections were excluded from clinical studies and were required to have their infection treated prior to receiving pembrolizumab. Patients with active infections occurring during treatment with pembrolizumab were managed with appropriate medical therapy. Patients with clinically significant renal (creatinine > 1.5 x ULN) or hepatic (bilirubin > 1.5 x ULN, ALT, AST > 2.5 x ULN in the absence of liver metastases) abnormalities at baseline were excluded from clinical studies, therefore information is limited in patients with severe renal and moderate to severe hepatic impairment.

There are limited data on the safety and efficacy of KEYTRUDA in patients with ocular melanoma (see section 5.1).

After careful consideration of the potential increased risk, pembrolizumab may be used with appropriate medical management in these patients.

Patient alert card

All prescribers of KEYTRUDA must be familiar with the Physician Information and Management Guidelines. The prescriber must discuss the risks of KEYTRUDA therapy with the patient. The patient will be provided with the patient alert card with each prescription.

4.5 Interaction with other medicinal products and other forms of interaction

No formal pharmacokinetic drug interaction studies have been conducted with pembrolizumab. Since pembrolizumab is cleared from the circulation through catabolism, no metabolic drug-drug interactions are expected.

The use of systemic corticosteroids or immunosuppressants before starting pembrolizumab should be avoided because of their potential interference with the pharmacodynamic activity and efficacy of pembrolizumab. However, systemic corticosteroids or other immunosuppressants can be used after starting pembrolizumab to treat immune-related adverse reactions (see section 4.4). Corticosteroids can also be used as premedication, when pembrolizumab is used in combination with chemotherapy, as antiemetic prophylaxis and/or to alleviate chemotherapy-related adverse reactions.

4.6 Fertility, pregnancy and lactation

Women of childbearing potential

Women of childbearing potential should use effective contraception during treatment with pembrolizumab and for at least 4 months after the last dose of pembrolizumab.

Pregnancy

There are no data on the use of pembrolizumab in pregnant women. Animal reproduction studies have not been conducted with pembrolizumab; however, in murine models of pregnancy blockade of PD-L1 signalling has been shown to disrupt tolerance to the foetus and to result in an increased foetal loss (see section 5.3). These results indicate a potential risk, based on its mechanism of action, that administration of pembrolizumab during pregnancy could cause foetal harm, including increased rates of abortion or stillbirth. Human immunoglobulins G4 (IgG4) are known to cross the placental barrier; therefore, being an IgG4, pembrolizumab has the potential to be transmitted from the mother to the developing foetus. Pembrolizumab should not be used during pregnancy unless the clinical condition of the woman requires treatment with pembrolizumab.

Breastfeeding

It is unknown whether pembrolizumab is secreted in human milk. Since it is known that antibodies can be secreted in human milk, a risk to the newborns/infants cannot be excluded. A decision should be made whether to discontinue breastfeeding or to discontinue pembrolizumab, taking into account the benefit of breastfeeding for the child and the benefit of pembrolizumab therapy for the woman.

Fertility

No clinical data are available on the possible effects of pembrolizumab on fertility. There were no notable effects in the male and female reproductive organs in monkeys based on 1-month and 6-month repeat-dose toxicity studies (see section 5.3).

4.7 Effects on ability to drive and use machines

Pembrolizumab has a minor influence on the ability to drive and use machines. In some patients, dizziness and fatigue have been reported following administration of pembrolizumab (see section 4.8).

4.8 Undesirable effects

Summary of the safety profile

Pembrolizumab is most commonly associated with immune-related adverse reactions. Most of these, including severe reactions, resolved following initiation of appropriate medical therapy or withdrawal of pembrolizumab (see “Description of selected adverse reactions” below). The frequencies included below and in Table 2 are based on all reported adverse drug reactions, regardless of the investigator assessment of causality.

Pembrolizumab in monotherapy (see section 4.2)

The safety of pembrolizumab as monotherapy has been evaluated in 7,631 patients across tumour types and across four doses (2 mg/kg bw every 3 weeks, 200 mg every 3 weeks, or 10 mg/kg bw every 2 or 3 weeks) in clinical studies. In this patient population, the median observation time was 8.5 months (range: 1 day to 39 months) and the most frequent adverse reactions with pembrolizumab were fatigue (31%), diarrhoea (22%), and nausea (20%). The majority of adverse reactions reported for monotherapy were of Grades 1 or 2 severity. The most serious adverse reactions were immune-related adverse reactions and severe infusion-related reactions (see section 4.4). The incidences of immune-related adverse reactions were 36.1% all Grades and 8.9% for Grades 3-5 for pembrolizumab monotherapy in the adjuvant setting (n=1,480) and 24.2% all Grades and 6.4% for Grades 3-5 in the metastatic setting (n=5,375). No new immune-related adverse reactions were identified in the adjuvant setting.

Pembrolizumab in combination with chemotherapy (see section 4.2)

When pembrolizumab is administered in combination, refer to the SmPC for the respective combination therapy components prior to initiation of treatment.

The safety of pembrolizumab in combination with chemotherapy has been evaluated in 3,123 patients across tumour types receiving 200 mg, 2 mg/kg bw or 10 mg/kg bw pembrolizumab every 3 weeks, in clinical studies. In this patient population, the most frequent adverse reactions were anaemia (55%), nausea (54%), fatigue (38%), neutropenia (36%), constipation (35%), alopecia (35%), diarrhoea (34%), vomiting (28%), and decreased appetite (27%). Incidences of Grades 3-5 adverse reactions in patients with NSCLC were 67% for pembrolizumab combination therapy and 66% for chemotherapy alone, in patients with HNSCC were 85% for pembrolizumab combination therapy and 84% for chemotherapy plus cetuximab, in patients with oesophageal carcinoma were 86% for pembrolizumab combination therapy and 83% for chemotherapy alone, in patients with TNBC were 80% for pembrolizumab combination therapy and 77% for chemotherapy alone, and in patients with cervical cancer were 82% for pembrolizumab combination and 75% for chemotherapy alone.

Pembrolizumab in combination with tyrosine kinase inhibitor (TKI) (see section 4.2)

When pembrolizumab is administered in combination with axitinib or lenvatinib, refer to the SmPC for axitinib or lenvatinib prior to initiation of treatment. For additional lenvatinib safety information related to advanced RCC see the SmPC for Kisplyx and for advanced EC see the SmPC for Lenvima. For additional axitinib safety information for elevated liver enzymes see also section 4.4.

The safety of pembrolizumab in combination with axitinib or lenvatinib in advanced RCC, and in combination with lenvatinib in advanced EC has been evaluated in a total of 1,456 patients with advanced RCC or advanced EC receiving 200 mg pembrolizumab every 3 weeks with either axitinib 5 mg twice daily or lenvatinib 20 mg once daily in clinical studies, as appropriate. In these patient populations, the most frequent adverse reactions were diarrhoea (58%), hypertension (54%), hypothyroidism (46%), fatigue (41%), decreased appetite (40%), nausea (40%), arthralgia (30%),

vomiting (28%), weight decreased (28%), dysphonia (28%), abdominal pain (28%), proteinuria (27%), palmar-plantar erythrodysesthesia syndrome (26%), rash (26%), stomatitis (25%), constipation (25%), musculoskeletal pain (23%), headache (23%) and cough (21%). Grades 3-5 adverse reactions in patients with RCC were 80% for pembrolizumab in combination with either axitinib or lenvatinib and 71% for sunitinib alone. In patients with EC, Grades 3-5 adverse reactions were 89% for pembrolizumab in combination with lenvatinib and 73% for chemotherapy alone.

Tabulated summary of adverse reactions

Adverse reactions observed in clinical studies of pembrolizumab as monotherapy or in combination with chemotherapy or other anti-tumour medicines or reported from post-marketing use of pembrolizumab are listed in Table 3. These reactions are presented by system organ class and by frequency. Frequencies are defined as: very common ($\geq 1/10$); common ($\geq 1/100$ to $< 1/10$); uncommon ($\geq 1/1,000$ to $< 1/100$); rare ($\geq 1/10,000$ to $< 1/1,000$); very rare ($< 1/10,000$); and not known (cannot be estimated from the available data). Within each frequency grouping, adverse reactions are presented in the order of decreasing seriousness. Adverse reactions known to occur with pembrolizumab, or combination therapy components given alone may occur during treatment with these medicinal products in combination, even if these reactions were not reported in clinical studies with combination therapy.

For additional safety information when pembrolizumab is administered in combination, refer to the SmPC for the respective combination therapy components.

Table 3: Adverse reactions in patients treated with pembrolizumab *

| | Monotherapy | In combination with chemotherapy | In combination with axitinib or lenvatinib |
|---|--|--|--|
| Infections and infestations | | | |
| Very common | | | urinary tract infection |
| Common | pneumonia | pneumonia | pneumonia |
| Blood and lymphatic system disorders | | | |
| Very common | anaemia | neutropenia, anaemia, thrombocytopenia, leukopenia | anaemia |
| Common | thrombocytopenia, neutropenia, lymphopenia | febrile neutropenia, lymphopenia | neutropenia, thrombocytopenia, lymphopenia, leukopenia |
| Uncommon | leukopenia, immune thrombocytopenia, eosinophilia | eosinophilia | eosinophilia |
| Rare | haemolytic anaemia, pure red cell aplasia, haemophagocytic lymphohistiocytosis | haemolytic anaemia, immune thrombocytopenia | |
| Immune system disorders | | | |
| Common | infusion-related reaction ^a | infusion-related reaction ^a | infusion-related reaction ^a |
| Uncommon | sarcoidosis | | |
| Rare | | sarcoidosis | |
| Not known | solid organ transplant rejection | | |

| Endocrine disorders | | | |
|---|--|--|--|
| Very common | hypothyroidism ^b | hypothyroidism ^b | hypothyroidism |
| Common | hyperthyroidism | adrenal insufficiency ^c , thyroiditis ^d , hyperthyroidism ^e | adrenal insufficiency ^c , hyperthyroidism, thyroiditis ^d |
| Uncommon | adrenal insufficiency ^c , hypophysitis ^f , thyroiditis ^d | hypophysitis ^f | hypophysitis ^f |
| Rare | hypoparathyroidism | hypoparathyroidism | hypoparathyroidism |
| Metabolism and nutrition disorders | | | |
| Very common | decreased appetite | hypokalaemia, decreased appetite | decreased appetite |
| Common | hyponatraemia, hypokalaemia, hypocalcaemia | hyponatraemia, hypocalcaemia | hyponatraemia, hypokalaemia, hypocalcaemia |
| Uncommon | type 1 diabetes mellitus ^g | type 1 diabetes mellitus ^g | type 1 diabetes mellitus ^g |
| Psychiatric disorders | | | |
| Very common | | insomnia | |
| Common | insomnia | | insomnia |
| Nervous system disorders | | | |
| Very common | headache | neuropathy peripheral, headache, dizziness, dysgeusia | headache, dysgeusia |
| Common | dizziness, neuropathy peripheral, lethargy, dysgeusia | lethargy | dizziness, neuropathy peripheral, lethargy |
| Uncommon | myasthenic syndrome ^h , epilepsy | encephalitis ⁱ , epilepsy | myasthenic syndrome ^h , encephalitis ⁱ |
| Rare | Guillain-Barré syndrome ^j , encephalitis ⁱ , myelitis ^k , meningitis (aseptic) ^l | Guillain-Barré syndrome ^j , myasthenic syndrome | |
| Eye disorders | | | |
| Common | dry eye | dry eye | dry eye |
| Uncommon | uveitis ^m | | uveitis ^m |
| Rare | Vogt-Koyanagi-Harada syndrome | uveitis ^m | Vogt-Koyanagi-Harada syndrome |
| Cardiac disorders | | | |
| Common | cardiac arrhythmia [†] (including atrial fibrillation) | cardiac arrhythmia [†] (including atrial fibrillation) | cardiac arrhythmia [†] (including atrial fibrillation) |
| Uncommon | myocarditis, pericardial effusion, pericarditis | myocarditis ⁿ , pericardial effusion, pericarditis | myocarditis, pericardial effusion |

| Vascular disorders | | | |
|--|---|---|--|
| Very common | | | hypertension |
| Common | hypertension | hypertension | |
| Uncommon | | vasculitis ^o | vasculitis ^o |
| Rare | vasculitis ^o | | |
| Respiratory, thoracic and mediastinal disorders | | | |
| Very common | dyspnoea, cough | dyspnoea, cough | dyspnoea, cough |
| Common | pneumonitis ^p | pneumonitis ^p | pneumonitis ^p |
| Gastrointestinal disorders | | | |
| Very common | diarrhoea, abdominal pain ^q , nausea, vomiting, constipation | nausea, diarrhoea, vomiting, abdominal pain ^q , constipation | diarrhoea, abdominal pain ^q , nausea, vomiting, constipation |
| Common | colitis ^r , dry mouth | colitis ^r , gastritis, dry mouth | colitis ^r , pancreatitis ^s , gastritis, dry mouth |
| Uncommon | pancreatitis ^s , gastritis, gastrointestinal ulceration ^t | pancreatitis ^s , gastrointestinal ulceration ^t | gastrointestinal ulceration ^t |
| Rare | small intestinal perforation | small intestinal perforation | small intestinal perforation |
| Hepatobiliary disorders | | | |
| Common | hepatitis ^u | hepatitis ^u | hepatitis ^u |
| Rare | cholangitis sclerosing | cholangitis sclerosing ^v | |
| Skin and subcutaneous tissue disorders | | | |
| Very common | pruritus ^w , rash ^x | alopecia, rash ^x , pruritus ^w | rash ^x , pruritus ^w |
| Common | severe skin reactions ^y , erythema, dermatitis, dry skin, vitiligo ^z , eczema, alopecia, dermatitis acneiform | severe skin reactions ^y , erythema, dermatitis acneiform, dermatitis, dry skin, eczema | severe skin reactions ^y , dermatitis, dry skin, erythema, dermatitis acneiform, alopecia |
| Uncommon | psoriasis, lichenoid keratosis ^{aa} , papule, hair colour changes | psoriasis, lichenoid keratosis ^{aa} , vitiligo ^z , papule | eczema, lichenoid keratosis ^{aa} , psoriasis, vitiligo ^z , papule, hair colour changes |
| Rare | Stevens-Johnson syndrome, erythema nodosum, toxic epidermal necrolysis | Stevens-Johnson syndrome, erythema nodosum, hair colour changes | toxic epidermal necrolysis, Stevens-Johnson syndrome |
| Musculoskeletal and connective tissue disorders | | | |
| Very common | musculoskeletal pain ^{bb} , arthralgia | arthralgia, musculoskeletal pain ^{bb} , myositis ^{cc} | arthralgia, musculoskeletal pain ^{bb} , |

| | | | |
|---|---|---|--|
| | | | myositis ^{cc} , pain in extremity |
| Common | myositis ^{cc} , pain in extremity, arthritis ^{dd} | pain in extremity, arthritis ^{dd} | arthritis ^{dd} |
| Uncommon | tenosynovitis ^{ee} | tenosynovitis ^{ee} | tenosynovitis ^{ee} |
| Rare | Sjogren's syndrome | Sjogren's syndrome | Sjogren's syndrome |
| Renal and urinary disorders | | | |
| Common | | acute kidney injury | nephritis ^{ff} |
| Uncommon | nephritis ^{ff} | nephritis ^{ff} , cystitis noninfective | |
| Rare | cystitis noninfective | | cystitis noninfective |
| General disorders and administration site conditions | | | |
| Very common | fatigue, asthenia, oedema ^{gg} , pyrexia | fatigue, asthenia, pyrexia, oedema ^{gg} | fatigue, asthenia, oedema ^{gg} , pyrexia |
| Common | influenza-like illness, chills | influenza-like illness, chills | influenza-like illness, chills |
| Investigations | | | |
| Very common | | alanine aminotransferase increased, aspartate aminotransferase increased | lipase increased, alanine aminotransferase increased, aspartate aminotransferase increased, blood creatinine increased |
| Common | alanine aminotransferase increased, aspartate aminotransferase increased, blood alkaline phosphatase increased, hypercalcaemia, blood bilirubin increased, blood creatinine increased | blood creatinine increased, blood alkaline phosphatase increased, hypercalcaemia, blood bilirubin increased | amylase increased, blood bilirubin increased, blood alkaline phosphatase increased, hypercalcaemia |
| Uncommon | amylase increased | amylase increased | |

* Adverse reaction frequencies presented in Table 2 may not be fully attributable to pembrolizumab alone but may contain contributions from the underlying disease or from other medicinal products used in a combination.

† Based upon a standard query including bradyarrhythmias and tachyarrhythmias.

The following terms represent a group of related events that describe a medical condition rather than a single event:

- ^a infusion-related reaction (drug hypersensitivity, anaphylactic reaction, anaphylactoid reaction, hypersensitivity, infusion-related hypersensitivity reaction, cytokine release syndrome and serum sickness)
- ^b hypothyroidism (myxoedema and immune-mediated hypothyroidism)
- ^c adrenal insufficiency (Addison's disease, adrenocortical insufficiency acute, secondary adrenocortical insufficiency)
- ^d thyroiditis (autoimmune thyroiditis, thyroid disorder and thyroiditis acute)
- ^e hyperthyroidism (Basedow's disease)
- ^f hypophysitis (hypopituitarism, lymphocytic hypophysitis)

- g type 1 diabetes mellitus (diabetic ketoacidosis)
- h myasthenic syndrome (myasthenia gravis, including exacerbation)
- i encephalitis (autoimmune encephalitis, noninfective encephalitis)
- j Guillain-Barré syndrome (axonal neuropathy and demyelinating polyneuropathy)
- k myelitis (including transverse myelitis)
- l meningitis aseptic (meningitis, meningitis non-infective)
- m uveitis (chorioretinitis, iritis and iridocyclitis)
- n myocarditis (autoimmune myocarditis)
- o vasculitis (central nervous system vasculitis, aortitis, giant cell arteritis)
- p pneumonitis (interstitial lung disease, organising pneumonia, immune-mediated pneumonitis, and immune-mediated lung disease)
- q abdominal pain (abdominal discomfort, abdominal pain upper and abdominal pain lower)
- r colitis (colitis microscopic, enterocolitis, enterocolitis haemorrhagic, autoimmune colitis and immune-mediated enterocolitis)
- s pancreatitis (autoimmune pancreatitis, pancreatitis acute and immune-mediated pancreatitis)
- t gastrointestinal ulceration (gastric ulcer and duodenal ulcer)
- u hepatitis (autoimmune hepatitis, immune-mediated hepatitis, drug induced liver injury and acute hepatitis)
- v cholangitis sclerosing (immune-mediated cholangitis)
- w pruritus (urticaria, urticaria papular and pruritus genital)
- x rash (rash erythematous, rash follicular, rash macular, rash maculo-papular, rash papular, rash pruritic, rash vesicular and genital rash)
- y severe skin reactions (exfoliative rash, pemphigus and Grade ≥ 3 of the following: dermatitis bullous, dermatitis exfoliative, dermatitis exfoliative generalised, erythema multiforme, lichen planus, oral lichen planus, pemphigoid, pruritus, pruritus genital, rash, rash erythematous, rash maculo-papular, rash pruritic, rash pustular, skin necrosis and toxic skin eruption)
- z vitiligo (skin depigmentation, skin hypopigmentation and hypopigmentation of the eyelid)
- aa lichenoid keratosis (lichen planus and lichen sclerosus)
- bb musculoskeletal pain (musculoskeletal discomfort, back pain, musculoskeletal stiffness, musculoskeletal chest pain and torticollis)
- cc myositis (myalgia, myopathy, necrotising myositis, polymyalgia rheumatica and rhabdomyolysis)
- dd arthritis (joint swelling, polyarthritis and joint effusion)
- ee tenosynovitis (tendonitis, synovitis and tendon pain)
- ff nephritis (autoimmune nephritis, tubulointerstitial nephritis and renal failure, renal failure acute or acute kidney injury with evidence of nephritis, nephrotic syndrome, glomerulonephritis and glomerulonephritis membranous)
- gg oedema (oedema peripheral, generalised oedema, fluid overload, fluid retention, eyelid oedema and lip oedema, face oedema, localised oedema and periorbital oedema)

Description of selected adverse reactions

Data for the following immune-related adverse reactions are based on patients who received pembrolizumab across four doses (2 mg/kg bw every 3 weeks, 10 mg/kg bw every 2 or 3 weeks, or 200 mg every 3 weeks) in clinical studies (see section 5.1). The management guidelines for these adverse reactions are described in section 4.4.

Immune-related adverse reactions (see section 4.4)

Immune-related pneumonitis

Pneumonitis occurred in 324 (4.2%) patients, including Grade 2, 3, 4 or 5 cases in 143 (1.9%), 81 (1.1%), 19 (0.2%) and 9 (0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of pneumonitis was 3.9 months (range 2 days to 27.2 months). The median duration was 2.0

months (range 1 day to 51.0+ months). Pneumonitis occurred more frequently in patients with a history of prior thoracic radiation (8.1%) than in patients who did not receive prior thoracic radiation (3.9%). Pneumonitis led to discontinuation of pembrolizumab in 131 (1.7%) patients. Pneumonitis resolved in 190 patients, 6 with sequelae.

In patients with NSCLC, pneumonitis occurred in 160 (5.7%), including Grade 2, 3, 4 or 5 cases in 62 (2.2%), 47 (1.7%), 14 (0.5%) and 10 (0.4%), respectively. In patients with NSCLC, pneumonitis occurred in 8.9% with a history of prior thoracic radiation. In patients with cHL, the incidence of pneumonitis (all Grades) ranged from 5.2% to 10.8% for cHL patients in KEYNOTE-087 (n=210) and KEYNOTE-204 (n=148), respectively.

Immune-related colitis

Colitis occurred in 158 (2.1%) patients, including Grade 2, 3 or 4 cases in 49 (0.6%), 82 (1.1%) and 6 (0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of colitis was 4.3 months (range 2 days to 24.3 months). The median duration was 1.1 month (range 1 day to 45.2 months). Colitis led to discontinuation of pembrolizumab in 48 (0.6%) patients. Colitis resolved in 130 patients, 2 with sequelae. In patients with CRC treated with pembrolizumab as monotherapy (n=153), the incidence of colitis was 6.5% (all Grades) with 2.0% Grade 3 and 1.3% Grade 4.

Immune-related hepatitis

Hepatitis occurred in 80 (1.0%) patients, including Grade 2, 3 or 4 cases in 12 (0.2%), 55 (0.7%) and 8 (0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of hepatitis was 3.5 months (range 8 days to 26.3 months). The median duration was 1.3 months (range 1 day to 29.0+ months). Hepatitis led to discontinuation of pembrolizumab in 37 (0.5%) patients. Hepatitis resolved in 60 patients.

Immune-related nephritis

Nephritis occurred in 37 (0.5%) patients, including Grade 2, 3 or 4 cases in 11 (0.1%), 19 (0.2%) and 2 (< 0.1%) patients, respectively, receiving pembrolizumab as monotherapy. The median time to onset of nephritis was 4.2 months (range 12 days to 21.4 months). The median duration was 3.3 months (range 6 days to 28.2+ months). Nephritis led to discontinuation of pembrolizumab in 17 (0.2%) patients. Nephritis resolved in 20 patients, 5 with sequelae. In patients with non-squamous NSCLC treated with pembrolizumab in combination with pemetrexed and platinum chemotherapy (n=488), the incidence of nephritis was 1.4% (all Grades) with 0.8% Grade 3 and 0.4% Grade 4.

Immune-related endocrinopathies

Adrenal insufficiency occurred in 74 (1.0%) patients, including Grade 2, 3 or 4 cases in 34 (0.4%), 31 (0.4%) and 4 (0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of adrenal insufficiency was 5.4 months (range 1 day to 23.7 months). The median duration was not reached (range 3 days to 40.1+ months). Adrenal insufficiency led to discontinuation of pembrolizumab in 13 (0.2%) patients. Adrenal insufficiency resolved in 17 patients, 11 with sequelae.

Hypophysitis occurred in 52 (0.7%) patients, including Grade 2, 3 or 4 cases in 23 (0.3%), 24 (0.3%) and 1 (< 0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of hypophysitis was 5.9 months (range 1 day to 17.7 months). The median duration was 3.6 months (range 3 days to 48.1+ months). Hypophysitis led to discontinuation of pembrolizumab in 14 (0.2%) patients. Hypophysitis resolved in 15 patients, 8 with sequelae.

Hyperthyroidism occurred in 394 (5.2%) patients, including Grade 2 or 3 cases in 108 (1.4%) and 9 (0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of hyperthyroidism

was 1.4 months (range 1 day to 23.2 months). The median duration was 1.6 months (range 4 days to 43.1+ months). Hyperthyroidism led to discontinuation of pembrolizumab in 4 (0.1%) patients. Hyperthyroidism resolved in 315 (79.9%) patients, 11 with sequelae. In patients with RCC and melanoma treated with pembrolizumab monotherapy in the adjuvant setting (n=1,480), the incidence of hyperthyroidism was 10.9%, the majority of which were Grade 1 or 2.

Hypothyroidism occurred in 939 (12.3%) patients, including Grade 2 or 3 cases in 687 (9.0%) and 8 (0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of hypothyroidism was 3.4 months (range 1 day to 25.9 months). The median duration was not reached (range 2 days to 63.0+ months). Hypothyroidism led to discontinuation of pembrolizumab in 6 (0.1%) patients. Hypothyroidism resolved in 200 (21.3%) patients, 16 with sequelae. In patients with cHL (n=389) the incidence of hypothyroidism was 17%, all of which were Grade 1 or 2. In patients with HNSCC treated with pembrolizumab as monotherapy (n=909), the incidence of hypothyroidism was 16.1% (all Grades) with 0.3% Grade 3. In patients with HNSCC treated with pembrolizumab in combination with platinum and 5-FU chemotherapy (n=276), the incidence of hypothyroidism was 15.2%, all of which were Grade 1 or 2. In patients treated with pembrolizumab in combination with axitinib or lenvatinib (n=1,456), the incidence of hypothyroidism was 46.2% (all Grades) with 0.8% Grade 3 or 4. In patients with RCC and melanoma treated with pembrolizumab monotherapy in the adjuvant setting (n=1,480), the incidence of hypothyroidism was 17.7%, the majority of which were Grade 1 or 2.

Immune-related skin adverse reactions

Immune-related severe skin reactions occurred in 130 (1.7%) patients, including Grade 2, 3, 4 or 5 cases in 11 (0.1%), 103 (1.3%), 1 (< 0.1%) and 1 (< 0.1%) patients, respectively, receiving pembrolizumab. The median time to onset of severe skin reactions was 3.0 months (range 2 days to 25.5 months). The median duration was 1.9 months (range 1 day to 47.1+ months). Severe skin reactions led to discontinuation of pembrolizumab in 18 (0.2%) patients. Severe skin reactions resolved in 93 patients, 2 with sequelae.

Rare cases of SJS and TEN, some of them with fatal outcome, have been observed (see sections 4.2 and 4.4).

Complications of allogeneic HSCT in cHL

Of 14 patients in KEYNOTE-013 who proceeded to allogeneic HSCT after treatment with pembrolizumab, 6 patients reported acute GVHD and 1 patient reported chronic GVHD, none of which were fatal. Two patients experienced hepatic VOD, one of which was fatal. One patient experienced engraftment syndrome post-transplant.

Of 32 patients in KEYNOTE-087 who proceeded to allogeneic HSCT after treatment with pembrolizumab, 16 patients reported acute GVHD and 7 patients reported chronic GVHD, two of which were fatal. No patients experienced hepatic VOD. No patients experienced engraftment syndrome post-transplant.

Of 14 patients in KEYNOTE-204 who proceeded to allogeneic HSCT after treatment with pembrolizumab, 8 patients reported acute GVHD and 3 patients reported chronic GVHD, none of which were fatal. No patients experienced hepatic VOD. One patient experienced engraftment syndrome post-transplant.

Elevated liver enzymes when pembrolizumab is combined with axitinib in RCC

In a clinical study of previously untreated patients with RCC receiving pembrolizumab in combination with axitinib, a higher than expected incidence of Grades 3 and 4 ALT increased (20%) and AST

increased (13%) were observed. The median time to onset of ALT increased was 2.3 months (range: 7 days to 19.8 months). In patients with ALT \geq 3 times ULN (Grades 2-4, n=116), ALT resolved to Grades 0-1 in 94%. Fifty-nine percent of the patients with increased ALT received systemic corticosteroids. Of the patients who recovered, 92 (84%) were rechallenged with either pembrolizumab (3%) or axitinib (31%) monotherapy or with both (50%). Of these patients, 55% had no recurrence of ALT > 3 times ULN, and of those patients with recurrence of ALT > 3 times ULN, all recovered. There were no Grade 5 hepatic events.

Laboratory abnormalities

In patients treated with pembrolizumab monotherapy, the proportion of patients who experienced a shift from baseline to a Grade 3 or 4 laboratory abnormality was as follows: 9.4% for lymphocytes decreased, 7.4% for sodium decreased, 5.8% for haemoglobin decreased, 5.3% for phosphate decreased, 5.3% for glucose increased, 3.3% for ALT increased, 3.1% for AST increased, 2.6% for alkaline phosphatase increased, 2.3% for potassium decreased, 2.1% for potassium increased, 1.9% for neutrophils decreased, 1.8% for platelets decreased, 1.8% for calcium increased, 1.7% for bilirubin increased, 1.5% for calcium decreased, 1.4% for albumin decreased, 1.3% for creatinine increased, 1.2% for glucose decreased, 0.8% for leucocytes decreased, 0.7% for magnesium increased, 0.5% for sodium increased, 0.4% for haemoglobin increased, and 0.2% for magnesium decreased.

In patients treated with pembrolizumab in combination with chemotherapy, the proportion of patients who experienced a shift from baseline to a Grade 3 or 4 laboratory abnormality was as follows: 44.0% for neutrophils decreased, 29.4% for leucocytes decreased, 26.9% for lymphocytes decreased, 22.1% for haemoglobin decreased, 13.2% for platelets decreased, 11.0% for sodium decreased, 7.7% for phosphate decreased, 6.8% for ALT increased, 6.8% for potassium decreased, 6.1% for glucose increased, 5.6% for AST increased, 3.5% for calcium decreased, 3.2% for potassium increased, 2.9% for creatinine increased, 2.2% for albumin decreased, 2.1% for alkaline phosphatase increased, 2.0% for bilirubin increased, 2.0% for calcium increased, 1.3% for prothrombin INR increased, 1.2% for glucose decreased and 0.5% for sodium increased.

In patients treated with pembrolizumab in combination with axitinib or lenvatinib, the proportion of patients who experienced a shift from baseline to a Grade 3 or 4 laboratory abnormality was as follows: 23.0% for lipase increased (not measured in patients treated with pembrolizumab and axitinib), 12.0% for lymphocyte decreased, 11.4% for sodium decreased, 11.2% for amylase increased, 11.2% for triglycerides increased, 10.4% for ALT increased, 8.9% for AST increased, 7.8% for glucose increased, 6.8% for phosphate decreased, 6.1% for potassium decreased, 5.1% for potassium increased, 4.5% for cholesterol increased, 4.4% for creatinine increased, 4.2% for haemoglobin decreased, 4.0% for magnesium decreased, 3.5% for neutrophils decreased, 3.1% for alkaline phosphatase increased, 3.0% for platelets decreased, 2.8% for bilirubin increased, 2.2% for calcium decreased, 1.7% for white blood cells decreased, 1.6% for magnesium increased, 1.5% for prothrombin INR increased, 1.4% for glucose decreased, 1.2% for albumin decreased, 1.2% for calcium increased, 0.4% for sodium increased, and 0.1% for haemoglobin increased.

Immunogenicity

In clinical studies in patients treated with pembrolizumab 2 mg/kg bw every three weeks, 200 mg every three weeks, or 10 mg/kg bw every two or three weeks as monotherapy, 36 (1.8%) of 2,034 evaluable patients tested positive for treatment-emergent antibodies to pembrolizumab, of which 9 (0.4%) patients had neutralising antibodies against pembrolizumab. There was no evidence of an altered pharmacokinetic or safety profile with anti-pembrolizumab binding or neutralising antibody development.

Paediatric population

The safety of pembrolizumab as monotherapy has been evaluated in 161 paediatric patients aged 9 months to 17 years with advanced melanoma, lymphoma, or PD-L1 positive advanced, relapsed, or refractory solid tumours at 2 mg/kg bw every 3 weeks in the Phase I/II study KEYNOTE-051. The cHL population (n=22) included patients 11 to 17 years of age. The safety profile in paediatric patients was generally similar to that seen in adults treated with pembrolizumab. The most common adverse reactions (reported in at least 20% of paediatric patients) were pyrexia (33%), vomiting (30%), headache (26%), abdominal pain (22%), anaemia (21%), cough (21%) and constipation (20%). The majority of adverse reactions reported for monotherapy were of Grades 1 or 2 severity. Seventy-six (47.2%) patients had 1 or more Grades 3 to 5 adverse reactions of which 5 (3.1%) patients had 1 or more adverse reactions that resulted in death. The frequencies are based on all reported adverse drug reactions, regardless of the investigator assessment of causality. Long-term safety data of pembrolizumab in adolescents with Stage IIB, IIC and III melanoma treated in the adjuvant setting are currently unavailable.

Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system.

4.9 Overdose

There is no information on overdose with pembrolizumab.

In case of overdose, patients must be closely monitored for signs or symptoms of adverse reactions, and appropriate symptomatic treatment instituted.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Antineoplastic agents, PD-1/PDL-1 (Programmed cell death protein 1/death ligand 1) inhibitors. ATC code: L01FF02

Mechanism of action

KEYTRUDA is a humanised monoclonal antibody which binds to the programmed cell death-1 (PD-1) receptor and blocks its interaction with ligands PD-L1 and PD-L2. The PD-1 receptor is a negative regulator of T-cell activity that has been shown to be involved in the control of T-cell immune responses. KEYTRUDA potentiates T-cell responses, including anti-tumour responses, through blockade of PD-1 binding to PD-L1 and PD-L2, which are expressed in antigen presenting cells and may be expressed by tumours or other cells in the tumour microenvironment.

The anti-angiogenic effect of lenvatinib (multi-TKI) in combination with the immune-stimulatory effect of pembrolizumab (anti-PD-1) results in a tumour microenvironment with greater T-cell activation to help overcome primary and acquired resistance to immunotherapy and may improve tumour responses compared to either treatment alone. In preclinical murine models, PD-1 plus TKI inhibitors have demonstrated enhanced anti-tumour activity compared to either agent alone.

Clinical efficacy and safety

Pembrolizumab doses of 2 mg/kg bw every 3 weeks, 10 mg/kg bw every 3 weeks, and 10 mg/kg bw every 2 weeks were evaluated in melanoma or previously treated NSCLC clinical studies. Based on the modelling and simulation of dose/exposure relationships for efficacy and safety for

pembrolizumab, there are no clinically significant differences in efficacy or safety among the doses of 200 mg every 3 weeks, 2 mg/kg bw every 3 weeks, and 400 mg every 6 weeks (see section 4.2).

Melanoma

KEYNOTE-006: Controlled study in melanoma patients naïve to treatment with ipilimumab

The safety and efficacy of pembrolizumab were investigated in KEYNOTE-006, a multicentre, open-label, controlled, Phase III study for the treatment of advanced melanoma in patients who were naïve to ipilimumab. Patients were randomised (1:1:1) to receive pembrolizumab 10 mg/kg bw every 2 (n=279) or 3 weeks (n=277) or ipilimumab 3 mg/kg bw every 3 weeks (n=278). Patients with BRAF V600E mutant melanoma were not required to have received prior BRAF inhibitor therapy.

Patients were treated with pembrolizumab until disease progression or unacceptable toxicity. Clinically stable patients with initial evidence of disease progression were permitted to remain on treatment until disease progression was confirmed. Assessment of tumour status was performed at 12 weeks, then every 6 weeks through Week 48, followed by every 12 weeks thereafter.

Of the 834 patients, 60% were male, 44% were ≥ 65 years (median age was 62 years [range 18-89]) and 98% were white. Sixty-five percent of patients had M1c stage, 9% had a history of brain metastases, 66% had no and 34% had one prior therapy. Thirty-one percent had an ECOG Performance Status of 1, 69% had ECOG Performance Status of 0 and 32% had elevated LDH. BRAF mutations were reported in 302 (36%) patients. Among patients with BRAF mutant tumours, 139 (46%) were previously treated with a BRAF inhibitor.

The primary efficacy outcome measures were progression-free survival (PFS; as assessed by Integrated Radiology and Oncology Assessment [IRO] review using Response Evaluation Criteria in Solid Tumours [RECIST], version 1.1) and overall survival (OS). Secondary efficacy outcome measures were objective response rate (ORR) and response duration. Table 4 summarises key efficacy measures in patients naïve to treatment with ipilimumab at the final analysis performed after a minimum of 21 months of follow-up. Kaplan-Meier curves for OS and PFS based on the final analysis are shown in Figures 1 and 2.

Table 4: Efficacy results in KEYNOTE-006

| Endpoint | Pembrolizumab 10 mg/kg bw every 3 weeks n=277 | Pembrolizumab 10 mg/kg bw every 2 weeks n=279 | Ipilimumab 3 mg/kg bw every 3 weeks n=278 |
|-----------------------------------|--|--|--|
| OS | | | |
| Number (%) of patients with event | 119 (43%) | 122 (44%) | 142 (51%) |
| Hazard ratio* (95% CI) | 0.68 (0.53, 0.86) | 0.68 (0.53, 0.87) | --- |
| p-Value [†] | < 0.001 | < 0.001 | --- |
| Median in months (95% CI) | Not reached (24, NA) | Not reached (22, NA) | 16 (14, 22) |
| PFS | | | |
| Number (%) of patients with event | 183 (66%) | 181 (65%) | 202 (73%) |
| Hazard ratio* (95% CI) | 0.61 (0.50, 0.75) | 0.61 (0.50, 0.75) | --- |

| | | | |
|--------------------------------------|-----------------------------|-----------------------------|------------------------------|
| p-Value [†] | < 0.001 | < 0.001 | --- |
| Median in months (95% CI) | 4.1 (2.9, 7.2) | 5.6 (3.4, 8.2) | 2.8 (2.8, 2.9) |
| Best objective response | | | |
| ORR % (95% CI) | 36% (30, 42) | 37% (31, 43) | 13% (10, 18) |
| Complete response % | 13% | 12% | 5% |
| Partial response % | 23% | 25% | 8% |
| Response duration[‡] | | | |
| Median in months (range) | Not reached (2.0, 22.8+) | Not reached (1.8, 22.8+) | Not reached (1.1+, 23.8+) |
| % ongoing at 18 months | 68% [§] | 71% [§] | 70% [§] |

*Hazard ratio (pembrolizumab compared to ipilimumab) based on the stratified Cox proportional hazard model

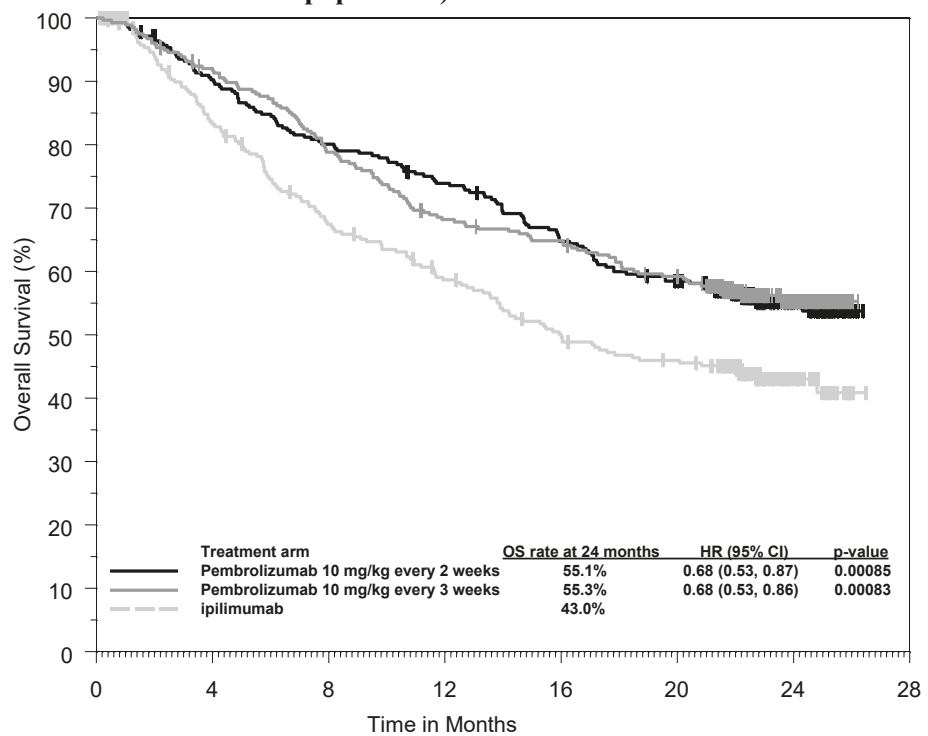
[†]Based on stratified log-rank test

[‡]Based on patients with a best objective response as confirmed complete or partial response

[§]Based on Kaplan-Meier estimation

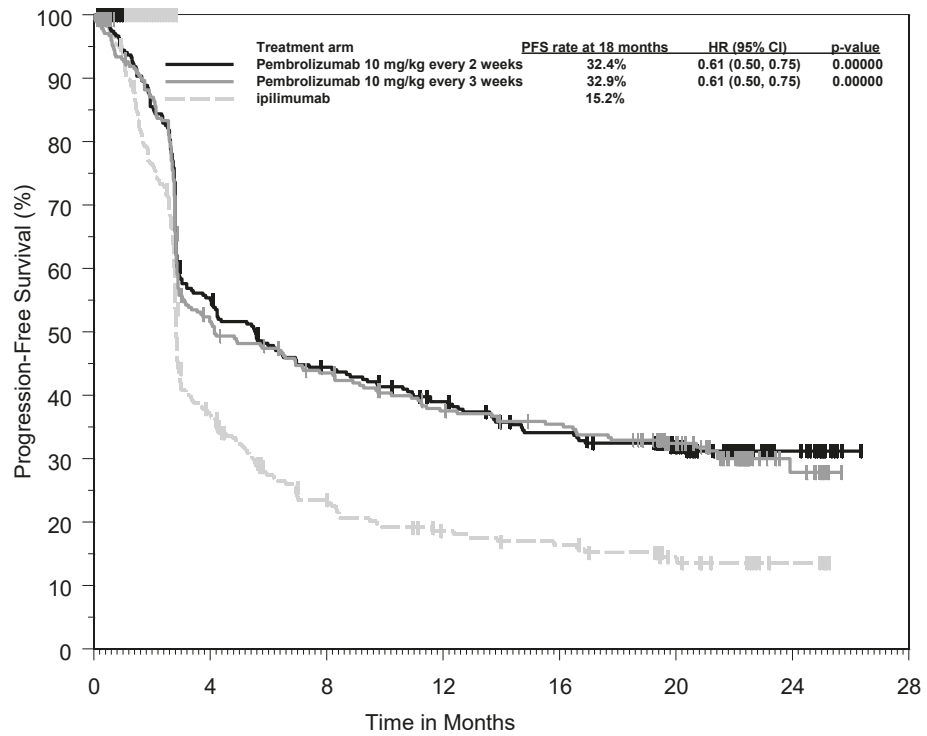
NA = not available

Figure 1: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-006 (intent to treat population)



| Number at Risk | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 |
|---------------------------------------|-----|-----|-----|-----|-----|-----|----|----|
| Pembrolizumab 10 mg/kg every 2 weeks: | 279 | 249 | 221 | 202 | 176 | 156 | 44 | 0 |
| Pembrolizumab 10 mg/kg every 3 weeks: | 277 | 251 | 215 | 184 | 174 | 156 | 43 | 0 |
| ipilimumab: | 278 | 213 | 170 | 145 | 122 | 110 | 28 | 0 |

Figure 2: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-006 (intent to treat population)



| Number at Risk | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 |
|---------------------------------------|-----|-----|-----|----|----|----|----|----|
| Pembrolizumab 10 mg/kg every 2 weeks: | 279 | 148 | 116 | 98 | 82 | 52 | 16 | 0 |
| Pembrolizumab 10 mg/kg every 3 weeks: | 277 | 136 | 111 | 91 | 84 | 60 | 13 | 0 |
| ipilimumab: | 278 | 88 | 48 | 34 | 29 | 16 | 5 | 0 |

KEYNOTE-002: Controlled study in melanoma patients previously treated with ipilimumab

The safety and efficacy of pembrolizumab were investigated in KEYNOTE-002, a multicentre, double-blind, controlled study for the treatment of advanced melanoma in patients previously treated with ipilimumab and if BRAF V600 mutation-positive, with a BRAF or MEK inhibitor. Patients were randomised (1:1:1) to receive pembrolizumab at a dose of 2 (n=180) or 10 mg/kg bw (n=181) every 3 weeks or chemotherapy (n=179; including dacarbazine, temozolomide, carboplatin, paclitaxel, or carboplatin + paclitaxel). The study excluded patients with autoimmune disease or those receiving immunosuppression; further exclusion criteria were a history of severe or life-threatening immune-related adverse reactions from treatment with ipilimumab, defined as any Grade 4 toxicity or Grade 3 toxicity requiring corticosteroid treatment (> 10 mg/day prednisone or equivalent dose) for greater than 12 weeks; ongoing adverse reactions ≥ Grade 2 from previous treatment with ipilimumab; previous severe hypersensitivity to other monoclonal antibodies; a history of pneumonitis or interstitial lung disease; HIV, hepatitis B or hepatitis C infection and ECOG Performance Status ≥ 2.

Patients were treated with pembrolizumab until disease progression or unacceptable toxicity. Clinically stable patients with initial evidence of disease progression were permitted to remain on treatment until disease progression was confirmed. Assessment of tumour status was performed at 12 weeks, then every 6 weeks through Week 48, followed by every 12 weeks thereafter. Patients on chemotherapy who experienced independently-verified progression of disease after the first scheduled disease assessment were able to crossover and receive 2 mg/kg bw or 10 mg/kg bw of pembrolizumab every 3 weeks in a double-blind fashion.

Of the 540 patients, 61% were male, 43% were ≥ 65 years (median age was 62 years [range 15-89]) and 98% were white. Eighty-two percent had M1c stage, 73% had at least two and 32% of patients had three or more prior systemic therapies for advanced melanoma. Forty-five percent had an ECOG Performance Status of 1, 40% had elevated LDH and 23% had a BRAF mutated tumour.

The primary efficacy outcome measures were PFS as assessed by IRO using RECIST version 1.1 and OS. Secondary efficacy outcome measures were ORR and response duration. Table 5 summarises key efficacy measures at the final analysis in patients previously treated with ipilimumab, and the Kaplan-Meier curve for PFS is shown in Figure 3. Both pembrolizumab arms were superior to chemotherapy for PFS, and there was no difference between pembrolizumab doses. There was no statistically significant difference between pembrolizumab and chemotherapy in the final OS analysis that was not adjusted for the potentially confounding effects of crossover. Of the patients randomised to the chemotherapy arm, 55% crossed over and subsequently received treatment with pembrolizumab.

Table 5: Efficacy results in KEYNOTE-002

| Endpoint | Pembrolizumab 2 mg/kg bw every 3 weeks n=180 | Pembrolizumab 10 mg/kg bw every 3 weeks n=181 | Chemotherapy n=179 |
|--------------------------------------|---|--|-----------------------|
| PFS | | | |
| Number (%) of patients with event | 150 (83%) | 144 (80%) | 172 (96%) |
| Hazard ratio* (95% CI) | 0.58 (0.46, 0.73) | 0.47 (0.37, 0.60) | --- |
| p-Value [†] | < 0.001 | < 0.001 | --- |
| Median in months (95% CI) | 2.9 (2.8, 3.8) | 3.0 (2.8, 5.2) | 2.8 (2.6, 2.8) |
| OS | | | |
| Number (%) of patients with event | 123 (68%) | 117 (65%) | 128 (72%) |
| Hazard ratio* (95% CI) | 0.86 (0.67, 1.10) | 0.74 (0.57, 0.96) | --- |
| p-Value [†] | 0.1173 | 0.0106 [‡] | --- |
| Median in months (95% CI) | 13.4 (11.0, 16.4) | 14.7 (11.3, 19.5) | 11.0 (8.9, 13.8) |
| Best objective response | | | |
| ORR % (95% CI) | 22% (16, 29) | 28% (21, 35) | 5% (2, 9) |
| Complete response % | 3% | 7% | 0% |
| Partial response % | 19% | 20% | 5% |
| Response duration[§] | | | |
| Median in months (range) | 22.8 (1.4+, 25.3+) | Not reached (1.1+, 28.3+) | 6.8 (2.8, 11.3) |
| % ongoing at 12 months | 73% ¶ | 79% ¶ | 0% ¶ |

*Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

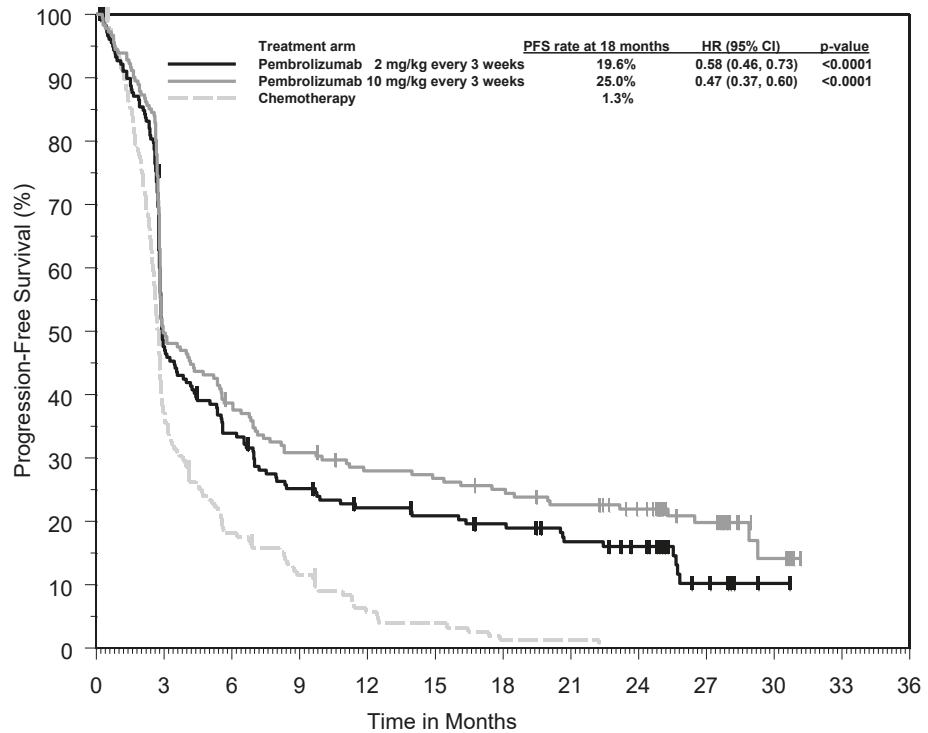
[†]Based on stratified log-rank test

[‡]Not statistically significant after adjustment for multiplicity

[§]Based on patients with a best objective response as confirmed complete or partial response from the final analysis

[¶]Based on Kaplan-Meier estimation

Figure 3: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-002 (intent to treat population)



| Number at Risk | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
|---------------------------------------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| Pembrolizumab 2 mg/kg every 3 weeks: | 180 | 59 | 36 | 29 | 19 | 1 | 0 | | | | | | |
| Pembrolizumab 10 mg/kg every 3 weeks: | 181 | 69 | 48 | 42 | 30 | 5 | 0 | | | | | | |
| Chemotherapy: | 179 | 31 | 9 | 2 | 1 | 0 | 0 | | | | | | |

KEYNOTE-001: Open-label study in melanoma patients naïve and previously treated with ipilimumab

The safety and efficacy of pembrolizumab for patients with advanced melanoma were investigated in an uncontrolled, open-label study, KEYNOTE-001. Efficacy was evaluated for 276 patients from two defined cohorts, one which included patients previously treated with ipilimumab (and if BRAF V600 mutation-positive, with a BRAF or MEK inhibitor) and the other which included patients naïve to treatment with ipilimumab. Patients were randomly assigned to receive pembrolizumab at a dose of 2 mg/kg bw every 3 weeks or 10 mg/kg bw every 3 weeks. Patients were treated with pembrolizumab until disease progression or unacceptable toxicity. Clinically stable patients with initial evidence of disease progression were permitted to remain on treatment until disease progression was confirmed. Exclusion criteria were similar to those of KEYNOTE-002.

Of the 89 patients receiving 2 mg/kg bw of pembrolizumab who were previously treated with ipilimumab, 53% were male, 33% were ≥ 65 years of age and the median age was 59 years (range 18-88). All but two patients were white. Eighty-four percent had M1c stage and 8% of patients had a history of brain metastases. Seventy percent had at least two and 35% of patients had three or more prior systemic therapies for advanced melanoma. BRAF mutations were reported in 13% of the study population. All patients with BRAF mutant tumours were previously treated with a BRAF inhibitor.

Of the 51 patients receiving 2 mg/kg bw of pembrolizumab who were naïve to treatment with ipilimumab, 63% were male, 35% were ≥ 65 years of age and the median age was 60 years (range 35-80). All but one patient was white. Sixty-three percent had M1c stage and 2% of patients had a history of brain metastases. Forty-five percent had no prior therapies for advanced melanoma. BRAF mutations were reported in 20 (39%) patients. Among patients with BRAF mutant tumours, 10 (50%) were previously treated with a BRAF inhibitor.

The primary efficacy outcome measure was ORR as assessed by independent review using RECIST 1.1. Secondary efficacy outcome measures were disease control rate (DCR; including complete response, partial response and stable disease), response duration, PFS and OS. Tumour response was assessed at 12-week intervals. Table 6 summarises key efficacy measures in patients previously treated or naïve to treatment with ipilimumab, receiving pembrolizumab at a dose of 2 mg/kg bw based on a minimum follow-up time of 30 months for all patients.

Table 6: Efficacy results in KEYNOTE-001

| Endpoint | Pembrolizumab 2 mg/kg bw every 3 weeks in patients previously treated with ipilimumab n=89 | Pembrolizumab 2 mg/kg bw every 3 weeks in patients naïve to treatment with ipilimumab n=51 |
|---|---|---|
| Best objective response* by IRO† | | |
| ORR %, (95% CI) | 26% (17, 36) | 35% (22, 50) |
| Complete response | 7% | 12% |
| Partial response | 19% | 24% |
| Disease control rate %‡ | 48% | 49% |
| Response duration§ | | |
| Median in months (range) | 30.5 (2.8+, 30.6+) | 27.4 (1.6+, 31.8+) |
| % ongoing at 24 months¶ | 75% | 71% |
| PFS | | |
| Median in months (95% CI) | 4.9 (2.8, 8.3) | 4.7 (2.8, 13.8) |
| PFS rate at 12 months | 34% | 38% |
| OS | | |
| Median in months (95% CI) | 18.9 (11, not available) | 28.0 (14, not available) |
| OS rate at 24 months | 44% | 56% |

*Includes patients without measurable disease at baseline by independent radiology

†IRO = Integrated radiology and oncologist assessment using RECIST 1.1

‡Based on best response of stable disease or better

§Based on patients with a confirmed response by independent review, starting from the date the response was first recorded; n=23 for patients previously treated with ipilimumab; n=18 for patients naïve to treatment with ipilimumab

¶Based on Kaplan-Meier estimation

Results for patients previously treated with ipilimumab (n=84) and naïve to treatment with ipilimumab (n=52) who received 10 mg/kg bw of pembrolizumab every 3 weeks were similar to those seen in patients who received 2 mg/kg bw of pembrolizumab every 3 weeks.

Sub-population analyses

BRAF mutation status in melanoma

A subgroup analysis was performed as part of the final analysis of KEYNOTE-002 in patients who were BRAF wild type (n=414; 77%) or BRAF mutant with prior BRAF treatment (n=126; 23%) as summarised in Table 7.

Table 7: Efficacy results by BRAF mutation status in KEYNOTE-002

| | BRAF wild type | BRAF mutant with prior BRAF treatment |
|--|-----------------------|--|
| | | |

| Endpoint | Pembrolizumab 2 mg/kg bw every 3 weeks (n=136) | Chemotherapy (n=137) | Pembrolizumab 2 mg/kg bw every 3 weeks (n=44) | Chemotherapy (n=42) |
|----------------------------|---|-------------------------|--|------------------------|
| PFS Hazard ratio* (95% CI) | 0.50 (0.39, 0.66) | --- | 0.79 (0.50, 1.25) | --- |
| OS Hazard ratio* (95% CI) | 0.78 (0.58, 1.04) | --- | 1.07 (0.64, 1.78) | --- |
| ORR % | 26% | 6% | 9% | 0% |

*Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

A subgroup analysis was performed as part of the final analysis of KEYNOTE-006 in patients who were BRAF wild type (n=525; 63%), BRAF mutant without prior BRAF treatment (n=163; 20%) and BRAF mutant with prior BRAF treatment (n=139; 17%) as summarised in Table 7.

Table 8: Efficacy results by BRAF mutation status in KEYNOTE-006

| Endpoint | BRAF wild type | | BRAF mutant without prior BRAF treatment | | BRAF mutant with prior BRAF treatment | |
|----------------------------|--|-----------------------|--|----------------------|--|----------------------|
| | Pembrolizumab 10 mg/kg bw every 2 or 3 weeks (pooled) | Ipilimumab (n=170) | Pembrolizumab 10 mg/kg bw every 2 or 3 weeks (pooled) | Ipilimumab (n=55) | Pembrolizumab 10 mg/kg bw every 2 or 3 weeks (pooled) | Ipilimumab (n=52) |
| PFS Hazard ratio* (95% CI) | 0.61 (0.49, 0.76) | --- | 0.52 (0.35, 0.78) | --- | 0.76 (0.51, 1.14) | --- |
| OS Hazard ratio* (95% CI) | 0.68 (0.52, 0.88) | --- | 0.70 (0.40, 1.22) | --- | 0.66 (0.41, 1.04) | --- |
| ORR % | 38% | 14% | 41% | 15% | 24% | 10% |

*Hazard ratio (pembrolizumab compared to ipilimumab) based on the stratified Cox proportional hazard model

PD-L1 status in melanoma

A subgroup analysis was performed as part of the final analysis of KEYNOTE-002 in patients who were PD-L1 positive (PD-L1 expression in $\geq 1\%$ of tumour and tumour-associated immune cells relative to all viable tumour cells - MEL score) vs. PD-L1 negative. PD-L1 expression was tested retrospectively by immunohistochemistry (IHC) assay with the 22C3 anti-PD-L1 antibody. Among patients who were evaluable for PD-L1 expression (79%), 69% (n=294) were PD-L1 positive and 31% (n=134) were PD-L1 negative. Table 9 summarises efficacy results by PD-L1 expression.

Table 9: Efficacy results by PD-L1 expression in KEYNOTE-002

| Endpoint | Pembrolizumab 2 mg/kg bw every 3 weeks | Chemotherapy | Pembrolizumab 2 mg/kg bw every 3 weeks | Chemotherapy |
|----------------------------|--|--------------|--|--------------|
| | PD-L1 positive | | PD-L1 negative | |
| PFS Hazard ratio* (95% CI) | 0.55 (0.40, 0.76) | --- | 0.81 (0.50, 1.31) | --- |
| OS Hazard ratio* | 0.90 (0.63, 1.28) | --- | 1.18 (0.70, 1.99) | --- |

| | | | | |
|----------|-----|----|-----|----|
| (95% CI) | | | | |
| ORR % | 25% | 4% | 10% | 8% |

*Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

A subgroup analysis was performed as part of the final analysis of KEYNOTE-006 in patients who were PD-L1 positive (n=671; 80%) vs. PD-L1 negative (n=150; 18%). Among patients who were evaluable for PD-L1 expression (98%), 82% were PD-L1 positive and 18% were PD-L1 negative. Table 10 summarises efficacy results by PD-L1 expression.

Table 10: Efficacy results by PD-L1 expression in KEYNOTE-006

| Endpoint | Pembrolizumab 10 mg/kg bw every 2 or 3 weeks (pooled) | Ipilimumab | Pembrolizumab 10 mg/kg bw every 2 or 3 weeks (pooled) | Ipilimumab |
|----------------------------|--|------------|--|------------|
| | PD-L1 positive | | PD-L1 negative | |
| PFS Hazard ratio* (95% CI) | 0.53 (0.44, 0.65) | --- | 0.87 (0.58, 1.30) | --- |
| OS Hazard ratio* (95% CI) | 0.63 (0.50, 0.80) | --- | 0.76 (0.48, 1.19) | --- |
| ORR % | 40% | 14% | 24% | 13% |

*Hazard ratio (pembrolizumab compared to ipilimumab) based on the stratified Cox proportional hazard model

Ocular melanoma

In 20 subjects with ocular melanoma included in KEYNOTE-001, no objective responses were reported; stable disease was reported in 6 patients.

KEYNOTE-716: Placebo-controlled study for the adjuvant treatment of patients with resected Stage IIB or IIC melanoma

The efficacy of pembrolizumab was evaluated in KEYNOTE-716, a multicentre, randomised, double-blind, placebo-controlled study in patients with resected Stage IIB or IIC melanoma. A total of 976 patients were randomised (1:1) to receive pembrolizumab 200 mg every three weeks (or the paediatric [12 to 17 years old] dose of 2 mg/kg intravenously [up to a maximum of 200 mg] every three weeks) (n=487) or placebo (n=489), for up to one year or until disease recurrence or unacceptable toxicity. Randomisation was stratified by American Joint Committee on Cancer (AJCC) 8th edition T stage. Patients with active autoimmune disease or a medical condition that required immunosuppression or mucosal or ocular melanoma were ineligible. Patients who received prior therapy for melanoma other than surgery were ineligible. Patients underwent imaging every six months from randomisation through the 4th year, and then once in year 5 from randomisation or until recurrence, whichever came first.

Among the 976 patients, the baseline characteristics were: median age of 61 years (range 16-87; 39% age 65 or older; 2 adolescent patients [one per treatment arm]); 60% male; and ECOG PS of 0 (93%) and 1 (7%). Sixty-four percent had Stage IIB and 35% had Stage IIC.

The primary efficacy outcome measure was investigator-assessed recurrence-free survival (RFS) in the whole population, where RFS was defined as the time between the date of randomisation and the date of first recurrence (local, regional, or distant metastasis) or death, whichever occurs first. The secondary outcome measures were distant metastasis-free survival (DMFS) and OS in the whole population. OS was not formally assessed at the time of this analysis. The study initially demonstrated

a statistically significant improvement in RFS (HR 0.65; 95% CI 0.46, 0.92; p-Value = 0.00658) for patients randomised to the pembrolizumab arm compared with placebo at its pre-specified interim analysis. Results reported from the pre-specified final analysis for RFS at a median follow-up of 20.5 months are summarised in Table 10 and Figure 4. Updated RFS results at a median follow-up of 26.9 months were consistent with the final analysis for RFS for patients randomised to the pembrolizumab arm compared with placebo (HR 0.64; 95% CI 0.50, 0.84). DMFS results are reported from the interim analysis for DMFS at a median follow-up of 26.9 months in Table 11 and Figure 5.

Table 11: Efficacy results in KEYNOTE-716

| Endpoint | KEYTRUDA 200 mg every 3 weeks n=487 | Placebo n=489 |
|--|---|------------------|
| RFS | | |
| Number (%) of patients with event | 72 (15%) | 115 (24%) |
| Median in months (95% CI) | NR (NR, NR) | NR (29.9, NR) |
| Hazard ratio* (95% CI) | 0.61 (0.45, 0.82) | |
| p-Value (stratified log-rank) [†] | 0.00046 | |
| DMFS | | |
| Number (%) of patients with event | 63 (13%) | 95 (19%) |
| Median in months (95% CI) | NR (NR, NR) | NR (NR, NR) |
| Hazard ratio* (95% CI) | 0.64 (0.47, 0.88) | |
| p-Value (stratified log-rank) | 0.00292 | |

*Based on the stratified Cox proportional hazard model

[†]Nominal p-Value based on log-rank test stratified by American Joint Committee on Cancer (AJCC) 8th edition T stage.

NR = not reached

Figure 4: Kaplan-Meier curve for recurrence-free survival by treatment arm in KEYNOTE-716 (intent to treat population)

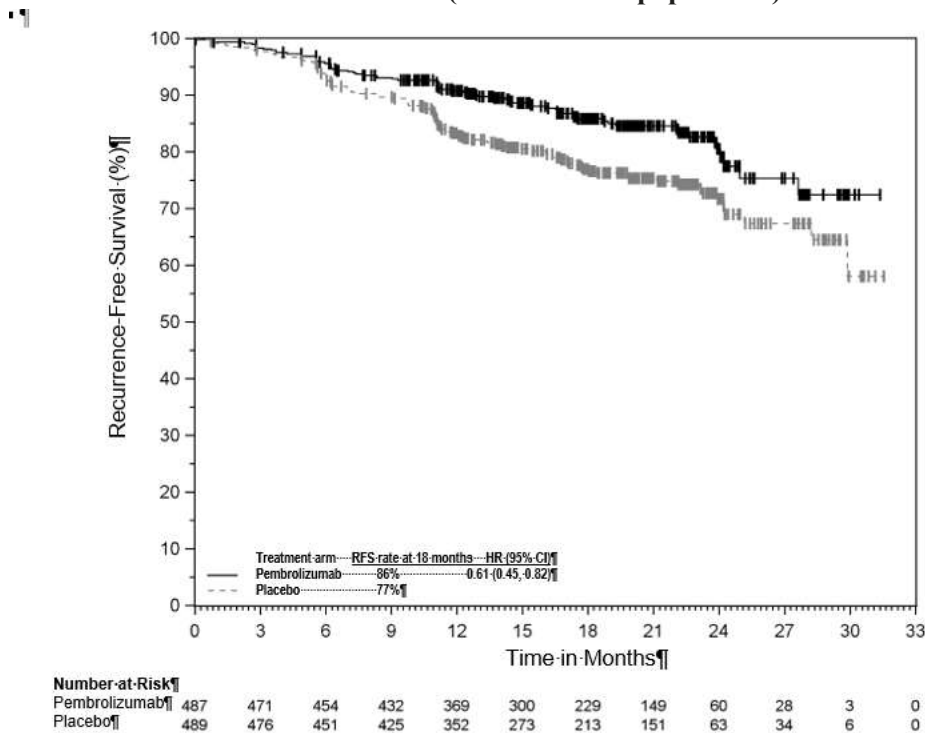
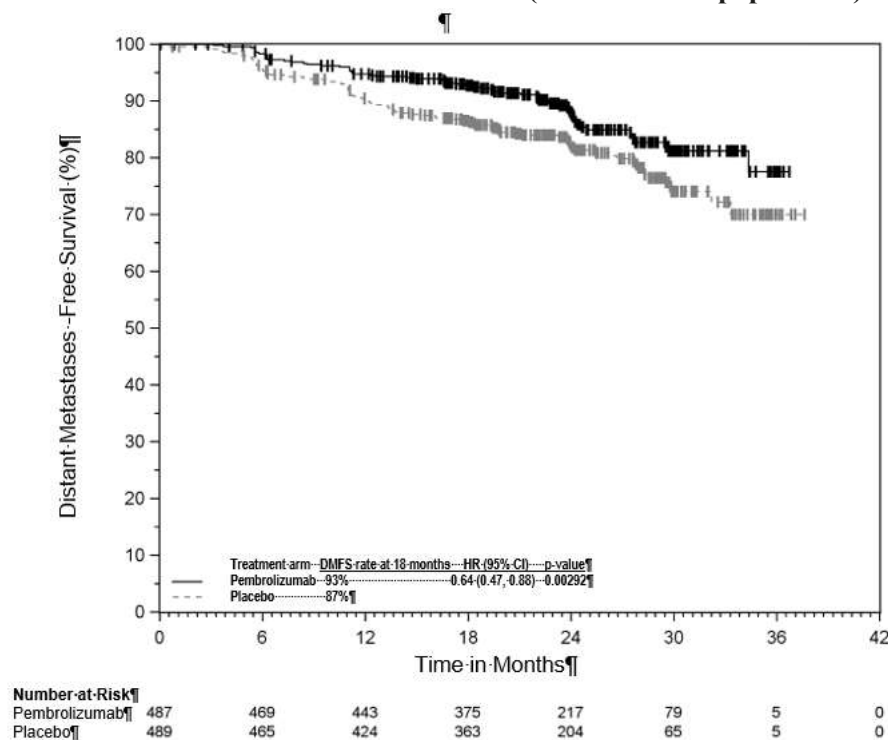


Figure 5: Kaplan-Meier curve for distant metastasis-free survival by treatment arm in KEYNOTE-716 (intent to treat population)



KEYNOTE-054: Placebo-controlled study for the adjuvant treatment of patients with completely resected Stage III melanoma

The efficacy of pembrolizumab was evaluated in KEYNOTE-054, a multicentre, randomised, double-blind, placebo-controlled study in patients with completely resected stage IIIA (> 1 mm lymph node metastasis), IIIB or IIIC melanoma. A total of 1,019 adult patients were randomised (1:1) to receive pembrolizumab 200 mg every three weeks (n=514) or placebo (n=505), for up to one year until disease recurrence or unacceptable toxicity. Randomisation was stratified by AJCC 7th edition stage (IIIA vs. IIIB vs. IIIC 1-3 positive lymph nodes vs. IIIC ≥ 4 positive lymph nodes) and geographic region (North America, European countries, Australia and other countries as designated). Patients must have undergone lymph node dissection, and if indicated, radiotherapy within 13 weeks prior to starting treatment. Patients with active autoimmune disease or a medical condition that required immunosuppression or mucosal or ocular melanoma were ineligible. Patients who received prior therapy for melanoma other than surgery or interferon for thick primary melanomas without evidence of lymph node involvement were ineligible. Patients underwent imaging every 12 weeks after the first dose of pembrolizumab for the first two years, then every 6 months from year 3 to 5, and then annually.

Among the 1,019 patients, the baseline characteristics were: median age of 54 years (25% age 65 or older); 62% male; and ECOG PS of 0 (94%) and 1 (6%). Sixteen percent had stage IIIA; 46% had stage IIIB; 18% had stage IIIC (1-3 positive lymph nodes) and 20% had stage IIIC (≥ 4 positive lymph nodes); 50% were BRAF V600 mutation positive and 44% were BRAF wild-type. PD-L1 expression was tested retrospectively by IHC assay with the 22C3 anti-PD-L1 antibody; 84% of patients had PD-L1-positive melanoma (PD-L1 expression in ≥ 1% of tumour and tumour-associated immune cells

relative to all viable tumour cells). The same scoring system was used for metastatic melanoma (MEL score).

The primary efficacy outcome measures were investigator-assessed RFS in the whole population and in the population with PD-L1 positive tumours, where RFS was defined as the time between the date of randomisation and the date of first recurrence (local, regional or distant metastasis) or death, whichever occurs first. The secondary outcome measures were DMFS and OS in the whole population and in the population with PD-L1 positive tumours. OS was not formally assessed at the time of these analyses. The study initially demonstrated a statistically significant improvement in RFS (HR 0.57; 98.4% CI 0.43, 0.74; p-Value < 0.0001) for patients randomised to the pembrolizumab arm compared with placebo at its pre-specified interim analysis. Updated efficacy results with a median follow-up time of 45.5 months are summarised in Table 12 and Figures 6 and 7.

Table 12: Efficacy results in KEYNOTE-054

| Endpoint | KEYTRUDA 200 mg every 3 weeks n=514 | Placebo n=505 |
|-----------------------------------|--|--------------------------|
| RFS | | |
| Number (%) of patients with event | 203 (40%) | 288 (57%) |
| Median in months (95% CI) | NR | 21.4 (16.3, 27.0) |
| Hazard ratio* (95% CI) | 0.59 (0.49, 0.70) | |
| DMFS | | |
| Number (%) of patients with event | 173 (34%) | 245 (49%) |
| Median in months (95% CI) | NR | 40.0 (27.7, NR) |
| Hazard ratio* (95% CI) | 0.60 (0.49, 0.73) | |
| p-Value (stratified log-rank) | < 0.0001 | |

*Based on the stratified Cox proportional hazard model

NR = not reached

Figure 6: Kaplan-Meier curve for recurrence-free survival by treatment arm in KEYNOTE-054 (intent to treat population)

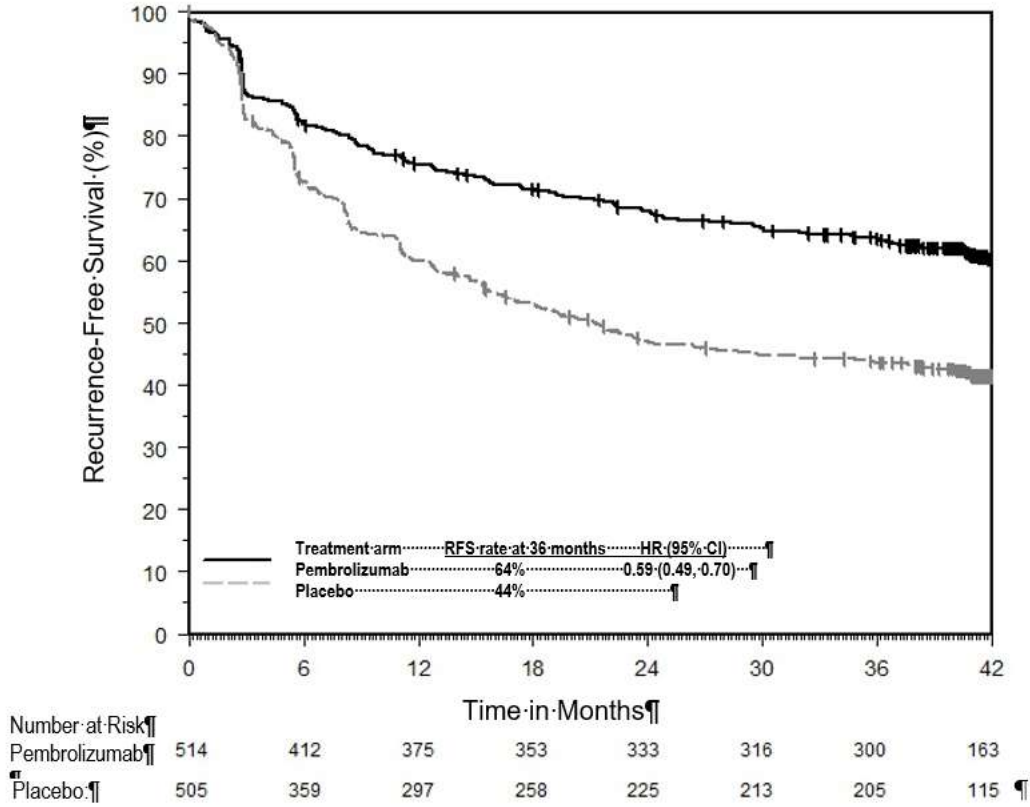
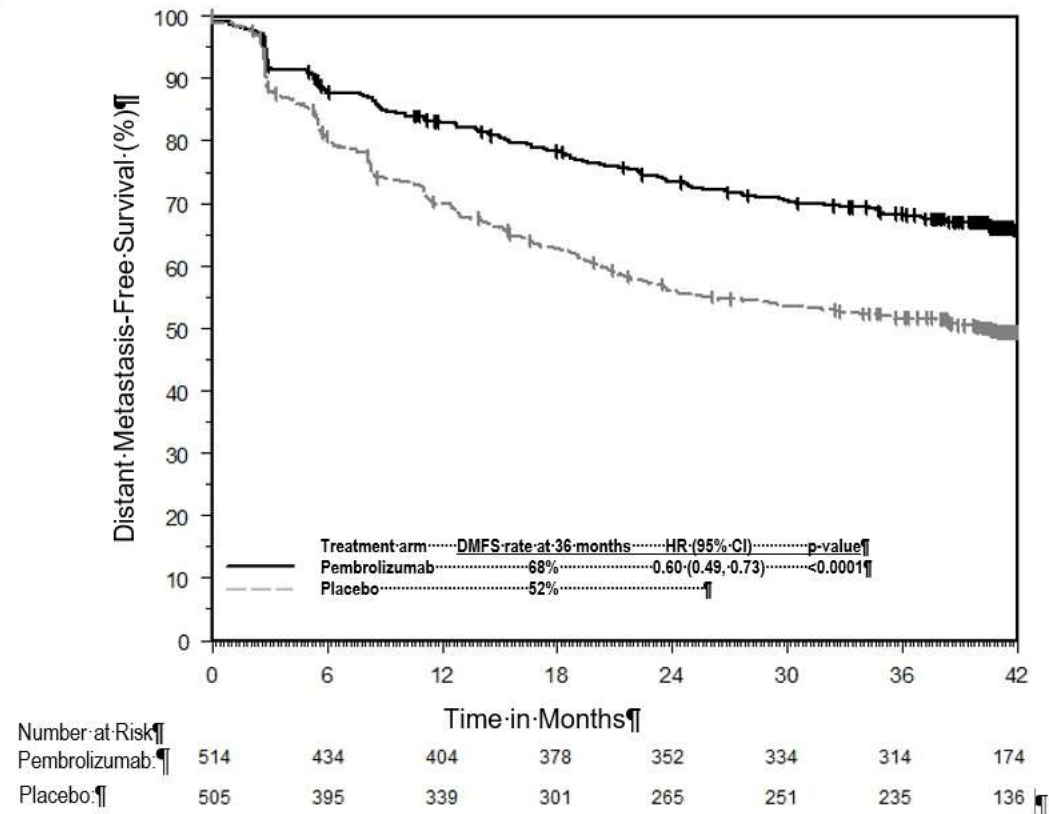


Figure 7: Kaplan-Meier curve for distant metastasis-free survival by treatment arm in KEYNOTE-054 (intent to treat population)



RFS and DMFS benefit was consistently demonstrated across subgroups, including tumour PD-L1 expression, BRAF mutation status, and stage of disease (using AJCC 7th edition). These results were

consistent when reclassified in a post-hoc analysis according to the current AJCC 8th edition staging system.

NSCLC

KEYNOTE-024: Controlled study of NSCLC patients naïve to treatment

The safety and efficacy of pembrolizumab were investigated in KEYNOTE-024, a multicentre, open-label, controlled study for the treatment of previously untreated metastatic NSCLC. Patients had PD-L1 expression with a $\geq 50\%$ TPS based on the PD-L1 IHC 22C3 pharmDx™ Kit. Patients were randomised (1:1) to receive pembrolizumab at a dose of 200 mg every 3 weeks (n=154) or investigator's choice platinum-containing chemotherapy (n=151; including pemetrexed + carboplatin, pemetrexed + cisplatin, gemcitabine + cisplatin, gemcitabine + carboplatin or paclitaxel + carboplatin. Patients with non-squamous NSCLC could receive pemetrexed maintenance.). Patients were treated with pembrolizumab until unacceptable toxicity or disease progression. Treatment could continue beyond disease progression if the patient was clinically stable and was considered to be deriving clinical benefit by the investigator. Patients without disease progression could be treated for up to 24 months. The study excluded patients with EGFR or ALK genomic tumour aberrations; autoimmune disease that required systemic therapy within 2 years of treatment; a medical condition that required immunosuppression; or who had received more than 30 Gy of thoracic radiation within the prior 26 weeks. Assessment of tumour status was performed every 9 weeks. Patients on chemotherapy who experienced independently-verified progression of disease were able to crossover and receive pembrolizumab.

Among the 305 patients in KEYNOTE-024, baseline characteristics were: median age 65 years (54% age 65 or older); 61% male; 82% White, 15% Asian; and ECOG performance status 0 and 1 in 35% and 65%, respectively. Disease characteristics were squamous (18%) and non-squamous (82%); M1 (99%); and brain metastases (9%).

The primary efficacy outcome measure was PFS as assessed by blinded independent central review (BICR) using RECIST 1.1. Secondary efficacy outcome measures were OS and ORR (as assessed by BICR using RECIST 1.1). Table 13 summarises key efficacy measures for the entire intent to treat (ITT) population. PFS and ORR results are reported from an interim analysis at a median follow-up of 11 months. OS results are reported from the final analysis at a median follow-up of 25 months.

Table 13: Efficacy results in KEYNOTE-024

| Endpoint | Pembrolizumab 200 mg every 3 weeks n=154 | Chemotherapy n=151 |
|-----------------------------------|---|-------------------------------|
| PFS | | |
| Number (%) of patients with event | 73 (47%) | 116 (77%) |
| Hazard ratio* (95% CI) | 0.50 (0.37, 0.68) | |
| p-Value [†] | < 0.001 | |
| Median in months (95% CI) | 10.3 (6.7, NA) | 6.0 (4.2, 6.2) |
| OS | | |
| Number (%) of patients with event | 73 (47%) | 96 (64%) |
| Hazard ratio* (95% CI) | 0.63 (0.47, 0.86) | |
| p-Value [†] | 0.002 | |
| Median in months (95% CI) | 30.0 (18.3, NA) | 14.2 (9.8, 19.0) |

| Objective response rate | | |
|--------------------------------------|---------------------------|----------------------|
| ORR % (95% CI) | 45% (37, 53) | 28% (21, 36) |
| Complete response % | 4% | 1% |
| Partial response % | 41% | 27% |
| Response duration[‡] | | |
| Median in months (range) | Not reached (1.9+, 14.5+) | 6.3 (2.1+, 12.6+) |
| % with duration \geq 6 months | 88% [§] | 59% [¶] |

*Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

[†]Based on stratified log-rank test

[‡]Based on patients with a best objective response as confirmed complete or partial response

[§]Based on Kaplan-Meier estimates; includes 43 patients with responses of 6 months or longer

[¶]Based on Kaplan-Meier estimates; includes 16 patients with responses of 6 months or longer

NA = not available

Figure 8: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-024 (intent to treat population)

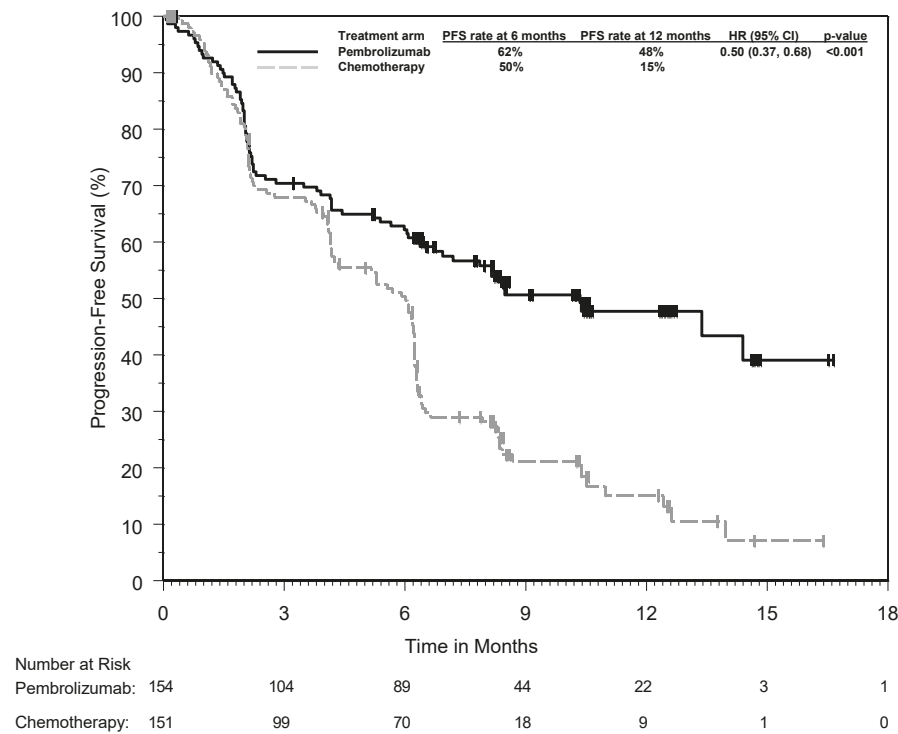
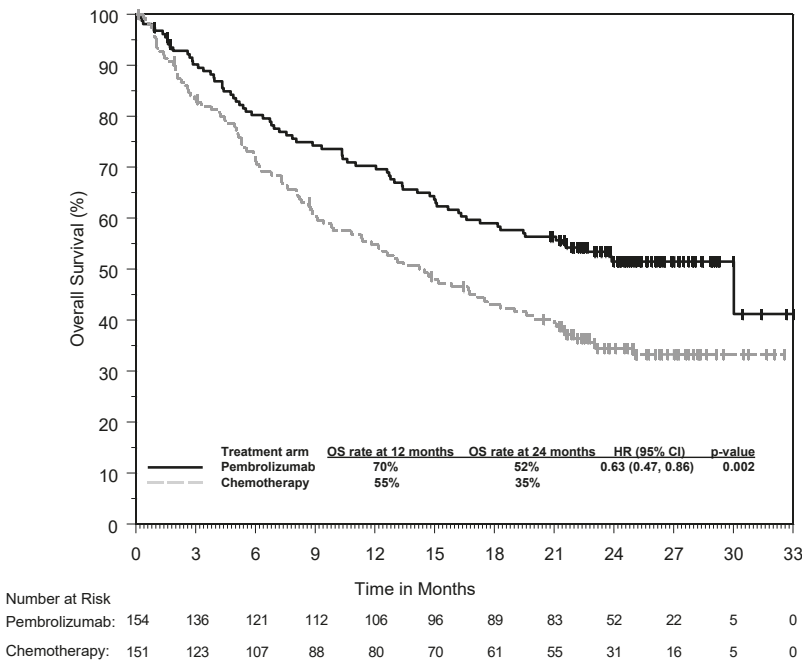


Figure 9: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-024 (intent to treat population)



In a subgroup analysis, a reduced survival benefit of pembrolizumab compared to chemotherapy was observed in the small number of patients who were never-smokers; however, due to the small number of patients, no definitive conclusions can be drawn from these data.

KEYNOTE-042: Controlled study of NSCLC patients naïve to treatment

The safety and efficacy of pembrolizumab were also investigated in KEYNOTE-042, a multicentre, controlled study for the treatment of previously untreated locally advanced or metastatic NSCLC. The study design was similar to that of KEYNOTE-024, except that patients had PD-L1 expression with a $\geq 1\%$ TPS based on the PD-L1 IHC 22C3 pharmDx™ Kit. Patients were randomised (1:1) to receive pembrolizumab at a dose of 200 mg every 3 weeks (n=637) or investigator’s choice platinum-containing chemotherapy (n=637; including pemetrexed + carboplatin or paclitaxel + carboplatin. Patients with non-squamous NSCLC could receive pemetrexed maintenance.). Assessment of tumour status was performed every 9 weeks for the first 45 weeks, and every 12 weeks thereafter.

Among the 1,274 patients in KEYNOTE-042, 599 (47%) had tumours that expressed PD-L1 with TPS $\geq 50\%$ based on the PD-L1 IHC 22C3 pharmDx™ Kit. The baseline characteristics of these 599 patients included: median age 63 years (45% age 65 or older); 69% male; 63% White and 32% Asian; 17% Hispanic or Latino; and ECOG performance status 0 and 1 in 31% and 69%, respectively. Disease characteristics were squamous (37%) and non-squamous (63%); stage IIIA (0.8%); stage IIIB (9%); stage IV (90%); and treated brain metastases (6%).

The primary efficacy outcome measure was OS. Secondary efficacy outcome measures were PFS and ORR (as assessed by BICR using RECIST 1.1). The study demonstrated a statistically significant improvement in OS for patients whose tumours expressed PD-L1 TPS $\geq 1\%$ randomised to pembrolizumab monotherapy compared to chemotherapy (HR 0.82; 95% CI 0.71, 0.93 at the final analysis) and in patients whose tumours expressed PD-L1 TPS $\geq 50\%$ randomised to pembrolizumab monotherapy compared to chemotherapy. Table 14 summarises key efficacy measures for the TPS $\geq 50\%$ population at the final analysis performed at a median follow-up of 15.4 months. The Kaplan-Meier curve for OS for the TPS $\geq 50\%$ population based on the final analysis is shown in Figure 10.

Table 14: Efficacy results (PD-L1 TPS $\geq 50\%$) in KEYNOTE-042

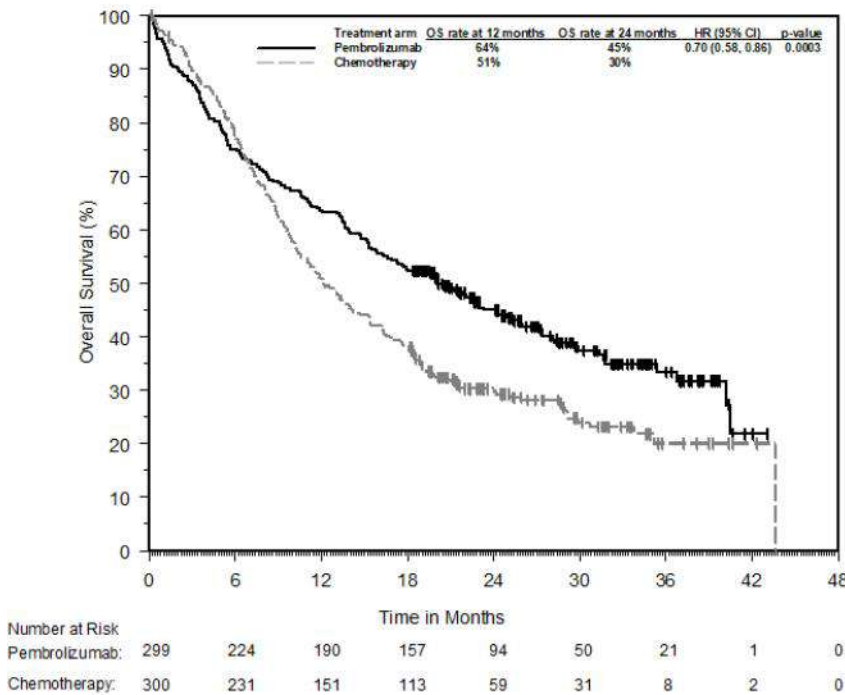
| Endpoint | Pembrolizumab 200 mg every 3 weeks n=299 | Chemotherapy n=300 |
|--------------------------------------|--|-----------------------|
| OS | | |
| Number (%) of patients with event | 180 (60%) | 220 (73%) |
| Hazard ratio* (95% CI) | 0.70 (0.58, 0.86) | |
| p-Value [†] | 0.0003 | |
| Median in months (95% CI) | 20.0 (15.9, 24.2) | 12.2 (10.4, 14.6) |
| PFS | | |
| Number (%) of patients with event | 238 (80%) | 250 (83%) |
| Hazard ratio* (95% CI) | 0.84 (0.70, 1.01) | |
| Median in months (95% CI) | 6.5 (5.9, 8.5) | 6.4 (6.2, 7.2) |
| Objective response rate | | |
| ORR % (95% CI) | 39% (34, 45) | 32% (27, 38) |
| Complete response % | 1% | 0.3% |
| Partial response % | 38% | 32% |
| Response duration[‡] | | |
| Median in months (range) | 22.0 (2.1+, 36.5+) | 10.8 (1.8+, 30.4+) |
| % with duration ≥ 18 months | 57% | 34% |

*Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

[†]Based on stratified log-rank test

[‡]Based on patients with a best objective response as confirmed complete or partial response

Figure 10: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-042 (patients with PD-L1 expression TPS ≥ 50%, intent to treat population)



The results of a post-hoc exploratory subgroup analysis indicated a trend towards reduced survival benefit of pembrolizumab compared to chemotherapy, during both the first 4 months and throughout

the entire duration of treatment, in patients who were never-smokers. However, due to the exploratory nature of this subgroup analysis, no definitive conclusions can be drawn.

KEYNOTE-189: Controlled study of combination therapy in non-squamous NSCLC patients naïve to treatment

The efficacy of pembrolizumab in combination with pemetrexed and platinum chemotherapy was investigated in a multicentre, randomised, active-controlled, double-blind study, KEYNOTE-189. Key eligibility criteria were metastatic non-squamous NSCLC, no prior systemic treatment for metastatic NSCLC, and no EGFR or ALK genomic tumour aberrations. Patients with autoimmune disease that required systemic therapy within 2 years of treatment; a medical condition that required immunosuppression; or who had received more than 30 Gy of thoracic radiation within the prior 26 weeks were ineligible. Patients were randomised (2:1) to receive one of the following regimens:

- Pembrolizumab 200 mg with pemetrexed 500 mg/m² and investigator's choice of cisplatin 75 mg/m² or carboplatin AUC 5 mg/mL/min intravenously every 3 weeks for 4 cycles followed by pembrolizumab 200 mg and pemetrexed 500 mg/m² intravenously every 3 weeks (n=410)
- Placebo with pemetrexed 500 mg/m² and investigator's choice of cisplatin 75 mg/m² or carboplatin AUC 5 mg/mL/min intravenously every 3 weeks for 4 cycles followed by placebo and pemetrexed 500 mg/m² intravenously every 3 weeks (n=206)

Treatment with pembrolizumab continued until RECIST 1.1-defined progression of disease as determined by the investigator, unacceptable toxicity, or a maximum of 24 months. Administration of pembrolizumab was permitted beyond RECIST-defined disease progression by BICR or beyond discontinuation of pemetrexed if the patient was clinically stable and deriving clinical benefit as determined by the investigator. For patients who completed 24 months of therapy or had a complete response, treatment with pembrolizumab could be reinitiated for disease progression and administered for up to 1 additional year. Assessment of tumour status was performed at Week 6 and Week 12, followed by every 9 weeks thereafter. Patients receiving placebo plus chemotherapy who experienced independently-verified progression of disease were offered pembrolizumab as monotherapy.

Among the 616 patients in KEYNOTE-189, baseline characteristics were: median age of 64 years (49% age 65 or older); 59% male; 94% White and 3% Asian; 43% and 56% ECOG performance status of 0 or 1 respectively; 31% PD-L1 negative (TPS < 1%); and 18% with treated or untreated brain metastases at baseline.

The primary efficacy outcome measures were OS and PFS (as assessed by BICR using RECIST 1.1). Secondary efficacy outcome measures were ORR and response duration, as assessed by BICR using RECIST 1.1. Table 15 summarises key efficacy measures and Figures 11 and 12 show the Kaplan-Meier curves for OS and PFS based on the final analysis with a median follow-up of 18.8 months.

Table 15: Efficacy results in KEYNOTE-189

| Endpoint | Pembrolizumab + Pemetrexed + Platinum Chemotherapy n=410 | Placebo + Pemetrexed + Platinum Chemotherapy n=206 |
|------------------------------------|--|--|
| OS* | | |
| Number (%) of patients with event | 258 (63%) | 163 (79%) |
| Hazard ratio [†] (95% CI) | 0.56 (0.46, 0.69) | |
| p-Value [‡] | < 0.00001 | |

| | | |
|--|--------------------|------------------|
| Median in months (95% CI) | 22.0 (19.5, 24.5) | 10.6 (8.7, 13.6) |
| PFS | | |
| Number (%) of patients with event | 337 (82%) | 197 (96%) |
| Hazard ratio [†] (95% CI) | 0.49 (0.41, 0.59) | |
| p-Value [‡] | < 0.00001 | |
| Median in months (95% CI) | 9.0 (8.1, 10.4) | 4.9 (4.7, 5.5) |
| Objective response rate | | |
| ORR [§] % (95% CI) | 48% (43, 53) | 20% (15, 26) |
| Complete response % | 1.2% | 0.5% |
| Partial response % | 47% | 19% |
| p-Value [¶] | < 0.0001 | |
| Response duration | | |
| Median in months (range) | 12.5 (1.1+, 34.9+) | 7.1 (2.4, 27.8+) |
| % with duration ≥ 12 months [#] | 53% | 27% |

*A total of 113 patients (57%) who discontinued study treatment in the placebo plus chemotherapy arm crossed over to receive monotherapy pembrolizumab or received a checkpoint inhibitor as subsequent therapy

[†]Based on the stratified Cox proportional hazard model

[‡]Based on stratified log-rank test

[§]Based on patients with a best objective response as confirmed complete or partial response

[¶]Based on Miettinen and Nurminen method stratified by PD-L1 status, platinum chemotherapy and smoking status

[#]Based on Kaplan-Meier estimation

Figure 11: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-189 (intent to treat population)

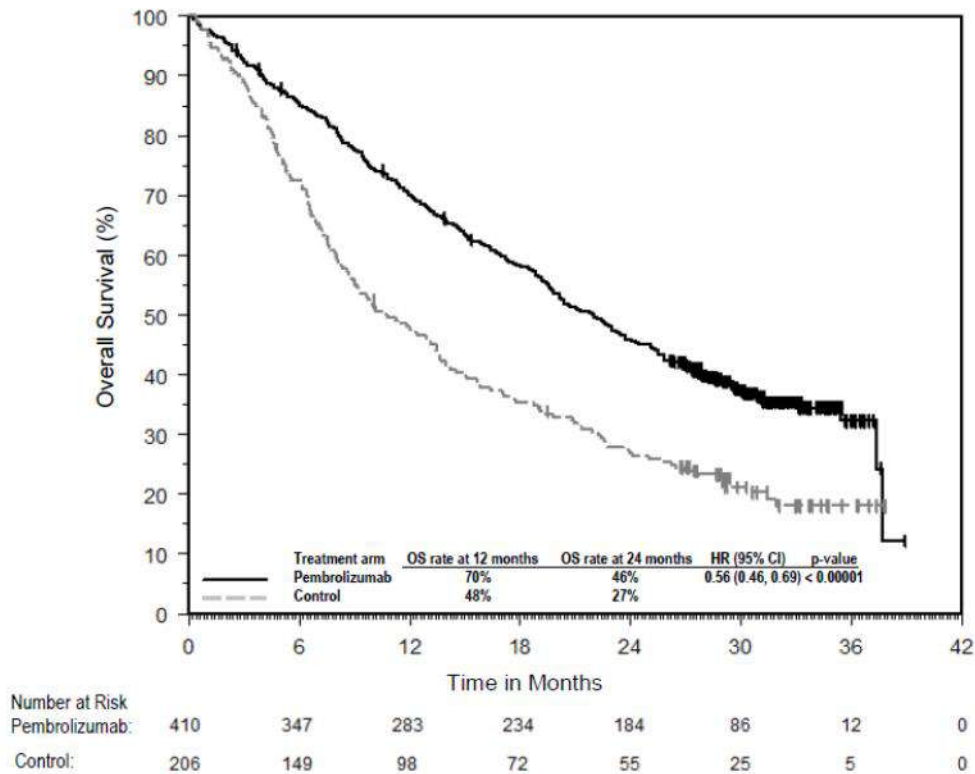
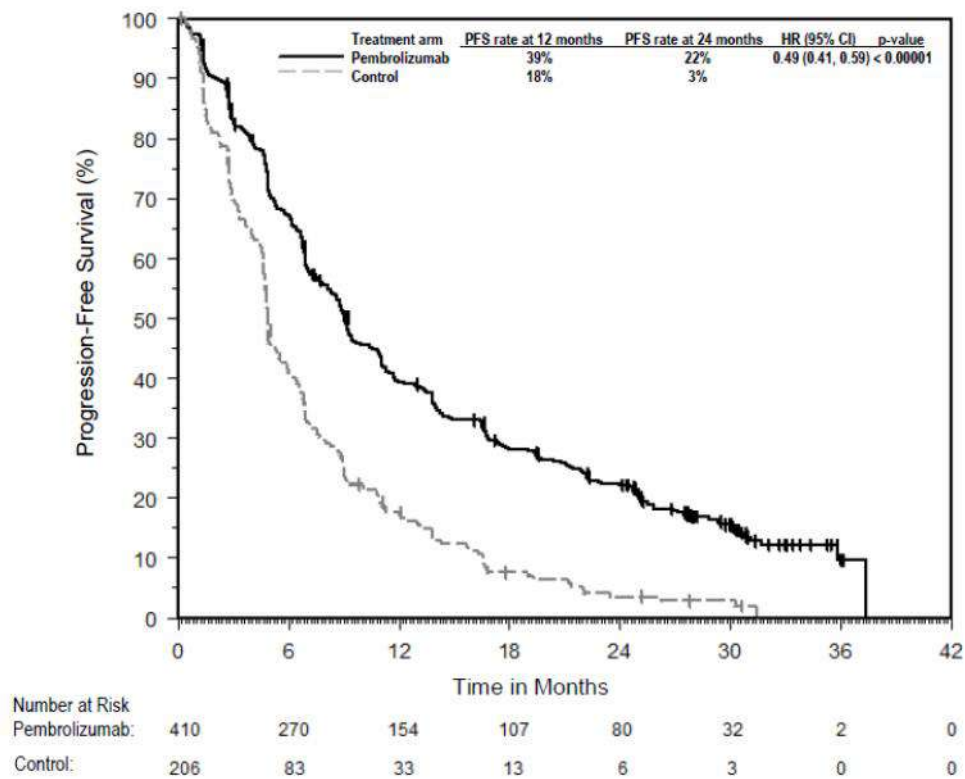


Figure 12: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-189 (intent to treat population)



An analysis was performed in KEYNOTE-189 in patients who had PD-L1 TPS < 1% [pembrolizumab combination: n=127 (31%) vs. chemotherapy: n=63 (31%)], TPS 1-49% [pembrolizumab combination: n=128 (31%) vs. chemotherapy: n=58 (28%)] or ≥ 50% [pembrolizumab combination: n=132 (32%) vs. chemotherapy: n=70 (34%)] (see Table 16).

Table 16: Efficacy results by PD-L1 expression in KEYNOTE-189*

| Endpoint | Pembrolizumab combination therapy | Chemotherapy | Pembrolizumab combination therapy | Chemotherapy | Pembrolizumab combination therapy | Chemotherapy |
|----------------------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|--------------|
| | TPS < 1% | | TPS 1 to 49% | | TPS ≥ 50% | |
| OS Hazard ratio† (95% CI) | 0.51 (0.36, 0.71) | | 0.66 (0.46, 0.96) | | 0.59 (0.40, 0.86) | |
| PFS Hazard ratio† (95% CI) | 0.67 (0.49, 0.93) | | 0.53 (0.38, 0.74) | | 0.35 (0.25, 0.49) | |
| ORR % | 33% | 14% | 50% | 21% | 62% | 26% |

*Based on final analysis

†Hazard ratio (pembrolizumab combination therapy compared to chemotherapy) based on the stratified Cox proportional hazard model

At final analysis, a total of 57 NSCLC patients aged ≥ 75 years were enrolled in study KEYNOTE-189 (35 in the pembrolizumab combination and 22 in the control). A HR=1.54 [95% CI 0.76, 3.14] in OS and HR=1.12 [95% CI 0.56, 2.22] in PFS for pembrolizumab combination vs. chemotherapy was reported within this study subgroup. Data about efficacy of pembrolizumab in combination with platinum chemotherapy are limited in this patient population.

KEYNOTE-407: Controlled study of combination therapy in squamous NSCLC patients naïve to treatment

The efficacy of pembrolizumab in combination with carboplatin and either paclitaxel or nab-paclitaxel was investigated in Study KEYNOTE-407, a randomised, double-blind, multicentre, placebo-controlled study. The key eligibility criteria for this study were metastatic squamous NSCLC, regardless of tumour PD-L1 expression status, and no prior systemic treatment for metastatic disease. Patients with autoimmune disease that required systemic therapy within 2 years of treatment; a medical condition that required immunosuppression; or who had received more than 30 Gy of thoracic radiation within the prior 26 weeks were ineligible. Randomisation was stratified by tumour PD-L1 expression (TPS < 1% [negative] vs. TPS ≥ 1%), investigator's choice of paclitaxel or nab-paclitaxel, and geographic region (East Asia vs. non-East Asia). Patients were randomised (1:1) to one of the following treatment arms via intravenous infusion:

- Pembrolizumab 200 mg and carboplatin AUC 6 mg/mL/min on Day 1 of each 21-day cycle for 4 cycles, and paclitaxel 200 mg/m² on Day 1 of each 21-day cycle for 4 cycles or nab-paclitaxel 100 mg/m² on Days 1, 8 and 15 of each 21-day cycle for 4 cycles, followed by pembrolizumab 200 mg every 3 weeks. Pembrolizumab was administered prior to chemotherapy on Day 1.
- Placebo and carboplatin AUC 6 mg/mL/min on Day 1 of each 21-day cycle for 4 cycles and paclitaxel 200 mg/m² on Day 1 of each 21-day cycle for 4 cycles or nab-paclitaxel 100 mg/m² on Days 1, 8 and 15 of each 21-day cycle for 4 cycles, followed by placebo every 3 weeks.

Treatment with pembrolizumab or placebo continued until RECIST 1.1-defined progression of disease as determined by BICR, unacceptable toxicity, or a maximum of 24 months. Administration of pembrolizumab was permitted beyond RECIST-defined disease progression if the patient was clinically stable and deriving clinical benefit as determined by the investigator.

Patients in the placebo arm were offered pembrolizumab as a single agent at the time of disease progression.

Assessment of tumour status was performed every 6 weeks through Week 18, every 9 weeks through Week 45 and every 12 weeks thereafter.

A total of 559 patients were randomised. The study population characteristics were: median age of 65 years (range: 29 to 88); 55% age 65 or older; 81% male; 77% White; ECOG performance status of 0 (29%) and 1 (71%); and 8% with treated brain metastases at baseline. Thirty-five percent had tumour PD-L1 expression TPS < 1% [negative]; 19% were East Asian; and 60% received paclitaxel.

The primary efficacy outcome measures were OS and PFS (as assessed by BICR using RECIST 1.1). Secondary efficacy outcome measures were ORR and response duration, as assessed by BICR using RECIST 1.1. Table 17 summarises key efficacy measures and Figures 13 and 14 show the Kaplan-Meier curves for OS and PFS based on the final analysis with a median follow-up of 14.3 months.

Table 17: Efficacy results in KEYNOTE-407

| Endpoint | Pembrolizumab Carboplatin Paclitaxel/Nab-paclitaxel n=278 | Placebo Carboplatin Paclitaxel/Nab-paclitaxel n=281 |
|------------------------------------|--|--|
| OS* | | |
| Number of events (%) | 168 (60%) | 197 (70%) |
| Median in months (95% CI) | 17.1 (14.4, 19.9) | 11.6 (10.1, 13.7) |
| Hazard ratio [†] (95% CI) | 0.71 (0.58, 0.88) | |

| | | |
|---|-------------------|-------------------|
| p-Value [‡] | 0.0006 | |
| PFS | | |
| Number of events (%) | 217 (78%) | 252 (90%) |
| Median in months (95% CI) | 8.0 (6.3, 8.4) | 5.1 (4.3, 6.0) |
| Hazard ratio [†] (95% CI) | 0.57 (0.47, 0.69) | |
| p-Value [‡] | < 0.0001 | |
| Objective response rate | | |
| ORR % (95% CI) | 63% (57, 68) | 38% (33, 44) |
| Complete response % | 2.2% | 3.2% |
| Partial response % | 60% | 35% |
| p-Value [§] | < 0.0001 | |
| Response duration | | |
| Median duration of response in months (range) | 8.8 (1.3+, 28.4+) | 4.9 (1.3+, 28.3+) |
| % with duration ≥ 12 months [¶] | 38% | 25% |

*A total of 138 patients (51%) who discontinued study treatment in the placebo plus chemotherapy arm crossed over to receive monotherapy pembrolizumab or received a checkpoint inhibitor as subsequent therapy

[†]Based on the stratified Cox proportional hazard model

[‡]Based on stratified log-rank test

[§]Based on method by Miettinen and Nurminen

[¶]Based on Kaplan-Meier estimation

Figure 13: Kaplan-Meier Curve for Overall Survival in KEYNOTE-407

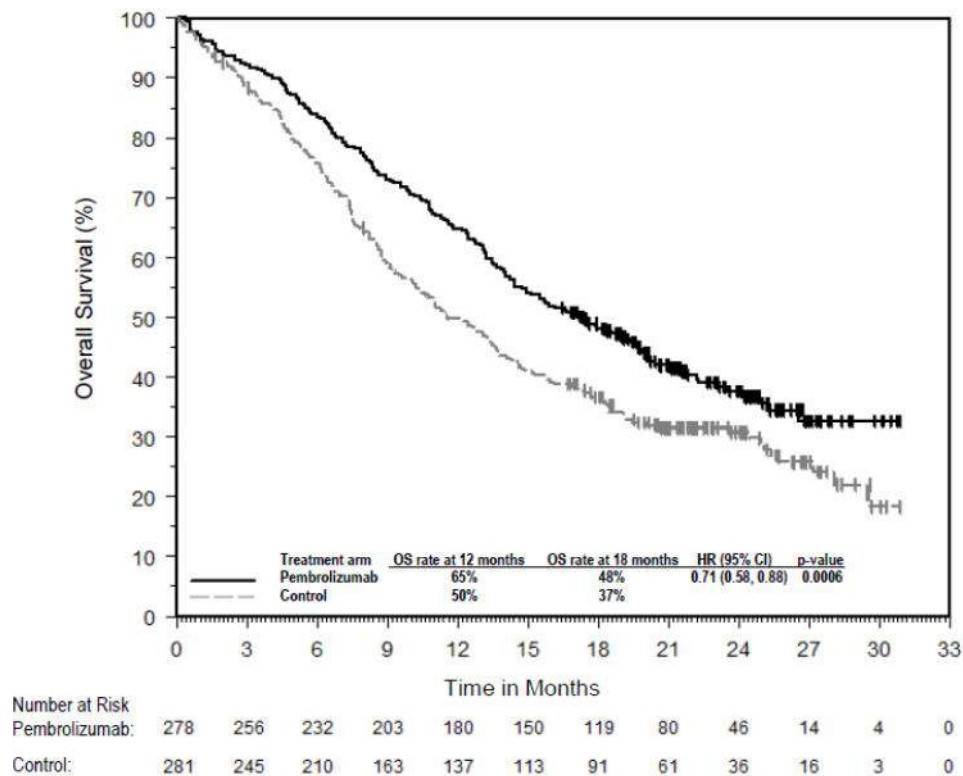
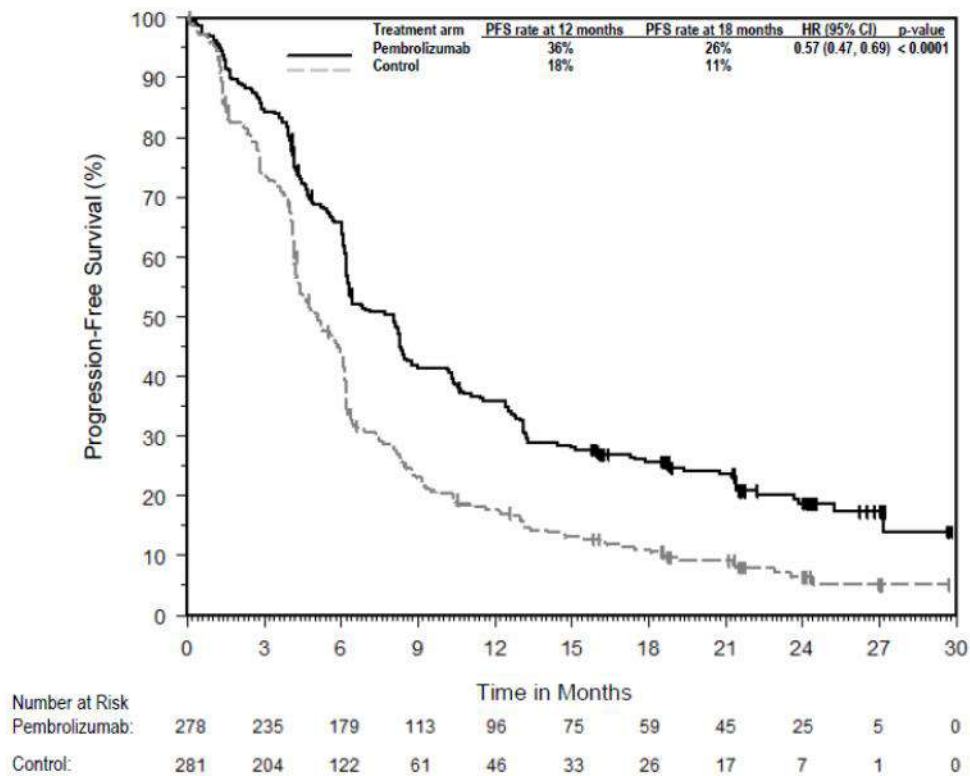


Figure 14: Kaplan-Meier Curve for Progression-Free Survival in KEYNOTE-407



An analysis was performed in KEYNOTE-407 in patients who had PD-L1 TPS < 1% [pembrolizumab plus chemotherapy arm: n=95 (34%) vs. placebo plus chemotherapy arm: n=99 (35%)], TPS 1% to 49% [pembrolizumab plus chemotherapy arm: n=103 (37%) vs. placebo plus chemotherapy arm: n=104 (37%)] or TPS ≥ 50% [pembrolizumab plus chemotherapy arm: n=73 (26%) vs. placebo plus chemotherapy arm: n=73 (26%)] (see Table 18).

Table 18: Efficacy results by PD-L1 expression in KEYNOTE-407*

| Endpoint | Pembrolizumab combination therapy | Chemotherapy | Pembrolizumab combination therapy | Chemotherapy | Pembrolizumab combination therapy | Chemotherapy |
|----------------------------|-----------------------------------|--------------|-----------------------------------|--------------|-----------------------------------|--------------|
| | TPS < 1% | | TPS 1 to 49% | | TPS ≥ 50% | |
| OS Hazard ratio† (95% CI) | 0.79 (0.56, 1.11) | | 0.59 (0.42, 0.84) | | 0.79 (0.52, 1.21) | |
| PFS Hazard ratio† (95% CI) | 0.67 (0.49, 0.91) | | 0.52 (0.38, 0.71) | | 0.43 (0.29, 0.63) | |
| ORR % | 67% | 41% | 55% | 42% | 64% | 30% |

*Based on final analysis

†Hazard ratio (pembrolizumab combination therapy compared to chemotherapy) based on the stratified Cox proportional hazard model

At final analysis, a total of 65 NSCLC patients aged ≥ 75 years were enrolled in study KEYNOTE-407 (34 in the pembrolizumab combination and 31 in the control). An HR=0.81 [95% CI 0.43, 1.55] in OS, an HR=0.61 [95% CI 0.34, 1.09] in PFS, and an ORR of 62% and 45% for pembrolizumab combination vs. chemotherapy was reported within this study subgroup. Data about efficacy of pembrolizumab in combination with platinum chemotherapy are limited in this patient population.

KEYNOTE-010: Controlled study of NSCLC patients previously treated with chemotherapy

The safety and efficacy of pembrolizumab were investigated in KEYNOTE-010, a multicentre, open-label, controlled study for the treatment of advanced NSCLC in patients previously treated with platinum-containing chemotherapy. Patients had PD-L1 expression with a ≥ 1% TPS based on the PD-

L1 IHC 22C3 pharmDx™ Kit. Patients with EGFR activation mutation or ALK translocation also had disease progression on approved therapy for these mutations prior to receiving pembrolizumab. Patients were randomised (1:1:1) to receive pembrolizumab at a dose of 2 (n=344) or 10 mg/kg bw (n=346) every 3 weeks or docetaxel at a dose of 75 mg/m² every 3 weeks (n=343) until disease progression or unacceptable toxicity. The study excluded patients with autoimmune disease; a medical condition that required immunosuppression; or who had received more than 30 Gy of thoracic radiation within the prior 26 weeks. Assessment of tumour status was performed every 9 weeks.

The baseline characteristics for this population included: median age 63 years (42% age 65 or older); 61% male; 72% White and 21% Asian and 34% and 66% with an ECOG performance status 0 and 1, respectively. Disease characteristics were squamous (21%) and non-squamous (70%); stage IIIA (2%); stage IIIB (7%); stage IV (91%); stable brain metastases (15%) and the incidence of mutations was EGFR (8%) or ALK (1%). Prior therapy included platinum-doublet regimen (100%); patients received one (69%) or two or more (29%) treatment lines.

The primary efficacy outcome measures were OS and PFS as assessed by BICR using RECIST 1.1. Secondary efficacy outcome measures were ORR and response duration. Table 19 summarises key efficacy measures for the entire population (TPS ≥ 1%) and for the patients with TPS ≥ 50%, and Figure 15 shows the Kaplan-Meier curve for OS (TPS ≥ 1%), based on a final analysis with median follow-up of 42.6 months.

Table 19: Response to pembrolizumab 2 or 10 mg/kg bw every 3 weeks in previously treated patients with NSCLC in KEYNOTE-010

| Endpoint | Pembrolizumab 2 mg/kg bw every 3 weeks | Pembrolizumab 10 mg/kg bw every 3 weeks | Docetaxel 75 mg/m ² every 3 weeks |
|--|--|---|--|
| TPS ≥ 1% | | | |
| Number of patients | 344 | 346 | 343 |
| OS | | | |
| Number (%) of patients with event | 284 (83%) | 264 (76%) | 295 (86%) |
| Hazard ratio* (95% CI) | 0.77 (0.66, 0.91) | 0.61 (0.52, 0.73) | --- |
| p-Value [†] | 0.00128 | < 0.001 | --- |
| Median in months (95% CI) | 10.4 (9.5, 11.9) | 13.2 (11.2, 16.7) | 8.4 (7.6, 9.5) |
| PFS[‡] | | | |
| Number (%) of patients with event | 305 (89%) | 292 (84%) | 314 (92%) |
| Hazard ratio* (95% CI) | 0.88 (0.75, 1.04) | 0.75 (0.63, 0.89) | --- |
| p-Value [†] | 0.065 | < 0.001 | --- |
| Median in months (95% CI) | 3.9 (3.1, 4.1) | 4.0 (2.7, 4.5) | 4.1 (3.8, 4.5) |
| Objective response rate[‡] | | | |
| ORR % (95% CI) | 20% (16, 25) | 21% (17, 26) | 9% (6, 13) |
| Complete response % | 2% | 3% | 0% |
| Partial response % | 18% | 18% | 9% |
| Response duration^{‡,§} | | | |
| Median in months (range) | Not reached (2.8, 46.2+) | 37.8 (2.0+, 49.3+) | 7.1 (1.4+, 16.8) |
| % ongoing [¶] | 42% | 43% | 6% |
| TPS ≥ 50% | | | |
| Number of patients | 139 | 151 | 152 |
| OS | | | |

| | | | |
|--|-----------------------------|-----------------------|--------------------|
| Number (%) of patients with event | 97 (70%) | 102 (68%) | 127 (84%) |
| Hazard ratio* (95% CI) | 0.56 (0.43, 0.74) | 0.50 (0.38, 0.65) | --- |
| p-Value [†] | < 0.001 | < 0.001 | --- |
| Median in months (95% CI) | 15.8 (10.8, 22.5) | 18.7 (12.1, 25.3) | 8.2 (6.4, 9.8) |
| PFS[‡] | | | |
| Number (%) of patients with event | 107 (77%) | 115 (76%) | 138 (91%) |
| Hazard ratio* (95% CI) | 0.59 (0.45, 0.77) | 0.53 (0.41, 0.70) | --- |
| p-Value [†] | < 0.001 | < 0.001 | --- |
| Median in months (95% CI) | 5.3 (4.1, 7.9) | 5.2 (4.1, 8.1) | 4.2 (3.8, 4.7) |
| Objective response rate[‡] | | | |
| ORR % (95% CI) | 32% (24, 40) | 32% (25, 41) | 9% (5, 14) |
| Complete response % | 4% | 4% | 0% |
| Partial response % | 27% | 28% | 9% |
| Response duration^{‡,§} | | | |
| Median in months (range) | Not reached (2.8, 44.0+) | 37.5 (2.0+, 49.3+) | 8.1 (2.6, 16.8) |
| % ongoing [¶] | 55% | 47% | 8% |

*Hazard ratio (pembrolizumab compared to docetaxel) based on the stratified Cox proportional hazard model

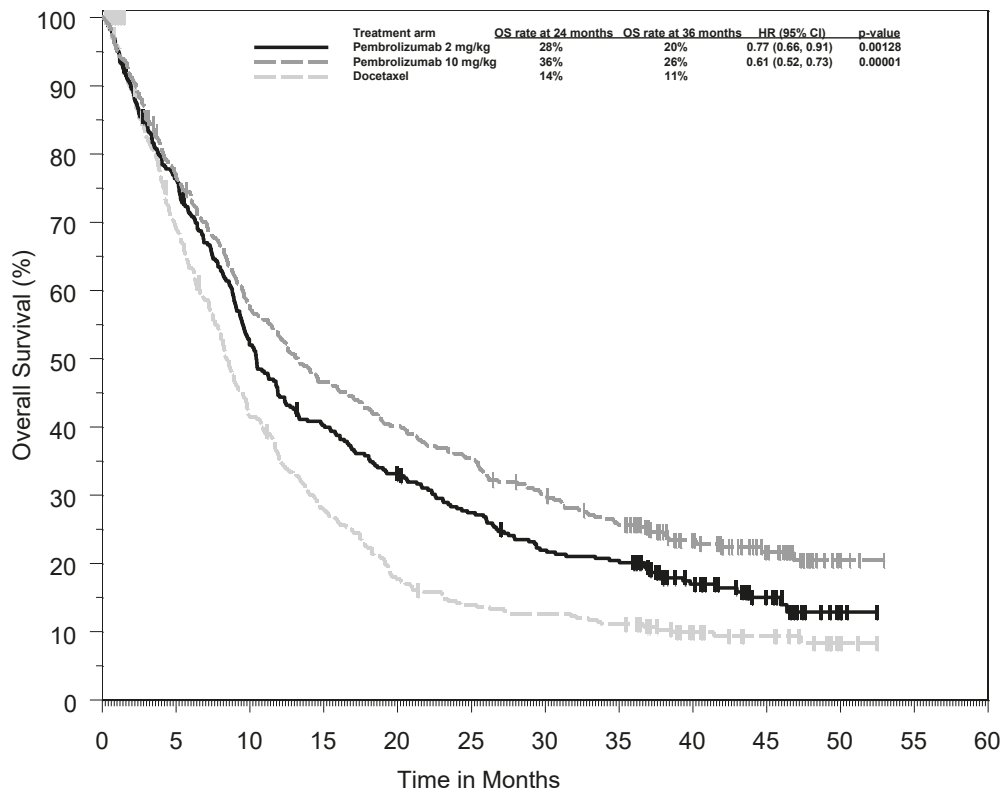
[†]Based on stratified log-rank test

[‡]Assessed by BICR using RECIST 1.1

[§]Based on patients with a best objective response as confirmed complete or partial response

[¶]Ongoing response includes all responders who at the time of analysis were alive, progression-free, did not initiate new anti-cancer therapies and had not been determined to be lost to follow-up

Figure 15: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-010 (patients with PD-L1 expression TPS \geq 1%, intent to treat population)



| Number at Risk | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
|-------------------------|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Pembrolizumab 2 mg/kg: | 344 | 261 | 177 | 136 | 111 | 91 | 72 | 67 | 36 | 17 | 2 | 0 | 0 |
| Pembrolizumab 10 mg/kg: | 346 | 262 | 197 | 159 | 137 | 120 | 99 | 84 | 50 | 28 | 3 | 0 | 0 |
| Docetaxel: | 343 | 226 | 135 | 90 | 57 | 44 | 40 | 35 | 20 | 13 | 2 | 0 | 0 |

Efficacy results were similar for the 2 mg/kg bw and 10 mg/kg bw pembrolizumab arms. Efficacy results for OS were consistent regardless of the age of tumour specimen (new vs. archival) based on an intergroup comparison.

In subgroup analyses, a reduced survival benefit of pembrolizumab compared to docetaxel was observed for patients who were never-smokers or patients with tumours harbouring EGFR activating mutations who received at least platinum-based chemotherapy and a tyrosine kinase inhibitor; however, due to the small numbers of patients, no definitive conclusions can be drawn from these data.

The efficacy and safety of pembrolizumab in patients with tumours that do not express PD-L1 have not been established.

Classical Hodgkin lymphoma

KEYNOTE-204: Controlled study in patients with relapsed or refractory classical Hodgkin lymphoma (cHL)

The efficacy of pembrolizumab was investigated in KEYNOTE-204, a randomised, open-label, active-controlled study conducted in 304 patients with relapsed or refractory cHL. Patients with active, non-infectious pneumonitis, an allogeneic HSCT within the past 5 years (or > 5 years but with symptoms of GVHD), active autoimmune disease, a medical condition that required immunosuppression, or an active infection requiring systemic therapy were ineligible for the study. Randomisation was stratified by prior ASCT (yes vs. no) and disease status after frontline therapy (primary refractory vs. relapse less than 12 months after completion vs. relapse 12 months or more after completion). Patients were randomised (1:1) to one of the following treatment arms:

- Pembrolizumab 200 mg intravenously every 3 weeks

- Brentuximab vedotin (BV) 1.8 mg/kg bw intravenously every 3 weeks.

Patients received pembrolizumab 200 mg intravenously every 3 weeks until unacceptable toxicity or documented disease progression, or a maximum of 35 cycles. Limited data are currently available on response duration following pembrolizumab discontinuation at cycle 35. Response was assessed every 12 weeks, with the first planned post-baseline assessment at Week 12.

Among the 304 patients in KEYNOTE-204, there is a subpopulation consisting of 112 patients who failed a transplant before enrolling and 137 who failed 2 or more prior therapies and were ineligible for ASCT at the time of enrolment. The baseline characteristics of these 249 patients were: median age 34 years (11% age 65 or older); 56% male; 80% White and 7% Asian and 58% and 41% with an ECOG performance status 0 and 1, respectively. Approximately 30% were refractory to frontline chemotherapy and ~ 45% had received prior ASCT. Nodular-sclerosis was the more represented cHL histological subtype (~ 81%) and bulky disease, B symptoms and bone marrow involvement were present in approximately 21%, 28% and 4% of patients, respectively.

The primary efficacy outcome was PFS and the secondary efficacy outcome measure was ORR, both assessed by BICR according to the 2007 revised International Working Group (IWG) criteria. The additional primary efficacy outcome measure, OS, was not formally assessed at the time of the analysis. In the ITT population, the median follow-up time for 151 patients treated with pembrolizumab was 24.9 months (range: 1.8 to 42.0 months). The initial analysis resulted in a HR for PFS of 0.65 (95% CI: 0.48, 0.88) with a one-sided p-Value of 0.0027. The ORR was 66% for pembrolizumab compared to 54% for standard treatment with a p-Value of 0.0225. Table 20 summarises the efficacy results in the subpopulation. Efficacy results in this subpopulation were consistent with the ITT population. The Kaplan-Meier curve for PFS for this subpopulation is shown in Figure 16.

Table 20: Efficacy results in cHL patients who failed a transplant before enrolling or who failed 2 or more prior therapies and were ineligible for ASCT in KEYNOTE-204

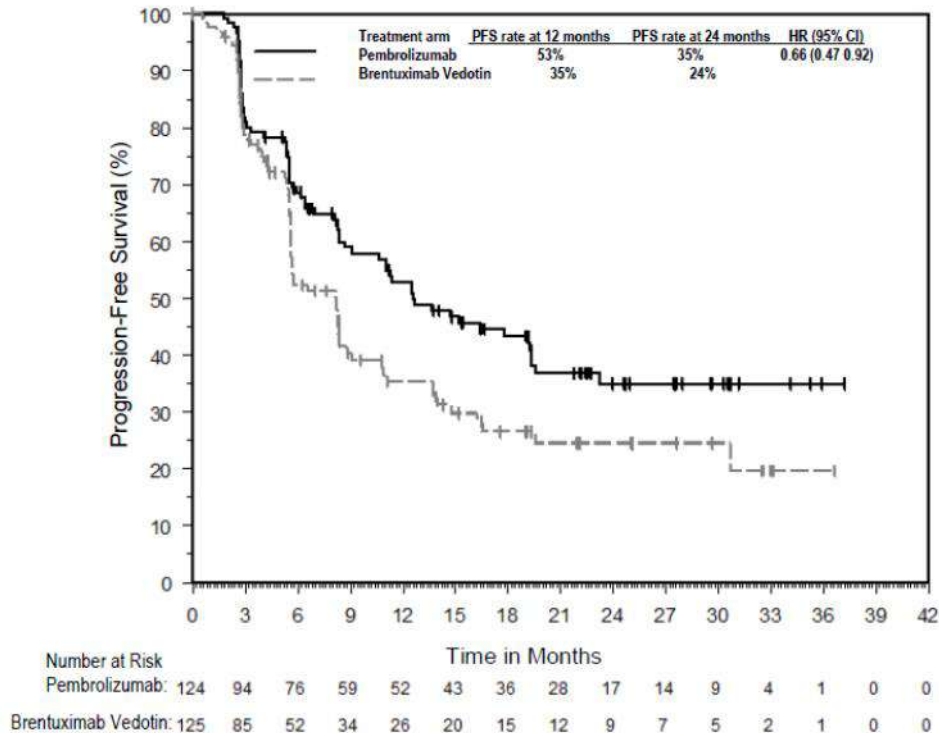
| Endpoint | Pembrolizumab 200 mg every 3 weeks n=124 | Brentuximab vedotin 1.8 mg/kg bw every 3 weeks n=125 |
|--|--|---|
| PFS | | |
| Number (%) of patients with event | 68 (55%) | 75 (60%) |
| Hazard ratio* (95% CI) | 0.66 (0.47, 0.92) | |
| Median in months (95% CI) | 12.6 (8.7, 19.4) | 8.2 (5.6, 8.8) |
| Objective response rate | | |
| ORR [‡] % (95% CI) | 65% (56.3, 73.6) | 54% (45.3, 63.3) |
| Complete response | 27% | 22% |
| Partial response | 39% | 33% |
| Stable disease | 12% | 23% |
| Response duration | | |
| Median in months (range) | 20.5 (0.0+, 33.2+) | 11.2 (0.0+, 33.9+) |
| Number (% [¶]) of patients with duration ≥ 6 months | 53 (80.8%) | 28 (61.2%) |
| Number (% [¶]) of patients with duration ≥ 12 months | 37 (61.7%) | 17 (49.0%) |

*Based on the stratified Cox proportional hazard model

‡Based on patients with a best overall response as complete or partial response

¶Based on Kaplan-Meier estimation

Figure 16: Kaplan-Meier curve for progression-free survival by treatment arm in cHL patients who failed a transplant before enrolling or who failed 2 or more prior therapies and were ineligible for ASCT in KEYNOTE-204



KEYNOTE-087 and KEYNOTE-013: Open-label studies in patients with relapsed or refractory cHL

The efficacy of pembrolizumab was investigated in KEYNOTE-087 and KEYNOTE-013, two multicentre, open-label studies for the treatment of 241 patients with cHL. These studies enrolled patients who failed ASCT and BV, who were ineligible for ASCT because they were unable to achieve a complete or partial remission to salvage chemotherapy and failed BV, or who failed ASCT and did not receive BV. Five study subjects were ineligible to ASCT due to reasons other than failure to salvage chemotherapy. Both studies included patients regardless of PD-L1 expression. Patients with active, non-infectious pneumonitis, an allogeneic transplant within the past 5 years (or > 5 years but with GVHD), active autoimmune disease or a medical condition that required immunosuppression were ineligible for either study. Patients received pembrolizumab 200 mg every 3 weeks (n=210; KEYNOTE-087) or 10 mg/kg bw every 2 weeks (n=31; KEYNOTE-013) until unacceptable toxicity or documented disease progression.

Among KEYNOTE-087 patients, the baseline characteristics were median age 35 years (9% age 65 or older); 54% male; 88% White; and 49% and 51% had an ECOG performance status 0 and 1, respectively. The median number of prior lines of therapy administered for the treatment of cHL was 4 (range 1 to 12). Eighty-one percent were refractory to at least one prior therapy, including 34% who were refractory to first line therapy. Sixty-one percent of patients had received ASCT, 38% were transplant ineligible; 17% had no prior brentuximab vedotin use; and 37% of patients had prior radiation therapy. Disease subtypes were 81% nodular sclerosis, 11% mixed cellularity, 4% lymphocyte-rich and 2% lymphocyte-depleted.

Among KEYNOTE-013 patients, the baseline characteristics were median age 32 years (7% age 65 or older), 58% male, 94% White; and 45% and 55% had an ECOG performance status 0 and 1, respectively. The median number of prior lines of therapy administered for the treatment of cHL was 5 (range 2 to 15). Eighty-four percent were refractory to at least one prior therapy, including 35% who were refractory to first line therapy. Seventy-four percent of patients had received ASCT, 26% were transplant ineligible, and 45% of patients had prior radiation therapy. Disease subtypes were 97% nodular sclerosis and 3% mixed cellularity.

The primary efficacy outcome measures (ORR and CRR) were assessed by BICR according to the IWG 2007 criteria. Secondary efficacy outcome measures were duration of response, PFS and OS. Response was assessed in KEYNOTE-087 and KEYNOTE-013 every 12 and 8 weeks, respectively, with the first planned post-baseline assessment at Week 12. Main efficacy results are summarised in Table 21.

Table 21: Efficacy results in KEYNOTE-087 and KEYNOTE-013

| | KEYNOTE-087* | KEYNOTE-013† |
|-----------------------------------|---|---|
| Endpoint | Pembrolizumab 200 mg every 3 weeks n=210 | Pembrolizumab 10 mg/kg bw every 2 weeks n=31 |
| Objective response rate‡ | | |
| ORR % (95% CI) | 71% (64.8, 77.4) | 58% (39.1, 75.5) |
| Complete remission | 28% | 19% |
| Partial remission | 44% | 39% |
| Response duration‡ | | |
| Median in months (range) | 16.6 (0.0+, 62.1+)§ | Not reached (0.0+, 45.6+)¶ |
| % with duration ≥ 12-months | 59%# | 70% ^b |
| % with duration ≥ 24-months | 45% ^β | --- |
| % with duration ≥ 60-months | 25% ^α | --- |
| Time to response | | |
| Median in months (range) | 2.8 (2.1, 16.5)§ | 2.8 (2.4, 8.6)¶ |
| OS | | |
| Number (%) of patients with event | 59 (16%) | 6 (19%) |
| 12-month OS rate | 96% | 87% |
| 24-month OS rate | 91% | 87% |
| 60-month OS rate | 71% | --- |

*Median follow-up time of 62.9 months

†Median follow-up time of 52.8 months

‡Assessed by BICR according to the IWG 2007 criteria by PET CT scans

§Based on patients (n=150) with a response by independent review

¶Based on patients (n=18) with a response by independent review

#Based on Kaplan-Meier estimation; includes 62 patients with responses of 12 months or longer

^bBased on Kaplan-Meier estimation; includes 7 patients with responses of 12 months or longer

^βBased on Kaplan-Meier estimation; includes 37 patients with responses of 24 months or longer

^αBased on Kaplan-Meier estimation; includes 4 patients with responses of 60 months or longer

Efficacy in elderly patients

Overall, 46 cHL patients \geq 65 years were treated with pembrolizumab in studies KEYNOTE-087, KEYNOTE-013 and KEYNOTE-204. Data from these patients are too limited to draw any conclusion on efficacy in this population.

Urothelial carcinoma

KEYNOTE-045: Controlled study in urothelial carcinoma patients who have received prior platinum-containing chemotherapy

The safety and efficacy of pembrolizumab were evaluated in KEYNOTE-045, a multicentre, open-label, randomised (1:1), controlled study for the treatment of locally advanced or metastatic urothelial carcinoma in patients with disease progression on or after platinum-containing chemotherapy. Patients must have received first-line platinum-containing regimen for locally advanced/metastatic disease or as neoadjuvant/adjuvant treatment, with recurrence/progression \leq 12 months following completion of therapy. Patients were randomised (1:1) to receive either pembrolizumab 200 mg every 3 weeks (n=270) or investigator's choice of any of the following chemotherapy regimens all given intravenously every 3 weeks (n=272): paclitaxel 175 mg/m² (n=84), docetaxel 75 mg/m² (n=84), or vinflunine 320 mg/m² (n=87). Patients were treated with pembrolizumab until unacceptable toxicity or disease progression. Treatment could continue beyond progression if the patient was clinically stable and was considered to be deriving clinical benefit by the investigator. Patients without disease progression could be treated for up to 24 months. The study excluded patients with autoimmune disease, a medical condition that required immunosuppression and patients with more than 2 prior lines of systemic chemotherapy for metastatic urothelial carcinoma. Patients with an ECOG performance status of 2 had to have a haemoglobin \geq 10 g/dL, could not have liver metastases, and must have received the last dose of their last prior chemotherapy regimen \geq 3 months prior to enrolment. Assessment of tumour status was performed at 9 weeks after the first dose, then every 6 weeks through the first year, followed by every 12 weeks thereafter.

Among the 542 randomised patients in KEYNOTE-045, baseline characteristics were: median age 66 years (range: 26 to 88), 58% age 65 or older; 74% male; 72% White and 23% Asian; 56% ECOG performance status of 1 and 1% ECOG performance status of 2; and 96% M1 disease and 4% M0 disease. Eighty-seven percent of patients had visceral metastases, including 34% with liver metastases. Eighty-six percent had a primary tumour in the lower tract and 14% had a primary tumour in the upper tract. Fifteen percent of patients had disease progression following prior platinum-containing neoadjuvant or adjuvant chemotherapy. Twenty-one percent had received 2 prior systemic regimens in the metastatic setting. Seventy-six percent of patients received prior cisplatin, 23% had prior carboplatin, and 1% was treated with other platinum-based regimens.

The primary efficacy outcomes were OS and PFS as assessed by BICR using RECIST v1.1. Secondary outcome measures were ORR (as assessed by BICR using RECIST v1.1) and duration of response. Table 22 summarises the key efficacy measures for the ITT population at the final analysis. The Kaplan-Meier curve based on the final analysis for OS is shown in Figure 17. The study demonstrated statistically significant improvements in OS and ORR for patients randomised to pembrolizumab as compared to chemotherapy. There was no statistically significant difference between pembrolizumab and chemotherapy with respect to PFS.

Table 22: Response to pembrolizumab 200 mg every 3 weeks in patients with urothelial carcinoma previously treated with chemotherapy in KEYNOTE-045

| Endpoint | Pembrolizumab 200 mg every 3 weeks n=270 | Chemotherapy n=272 |
|----------|--|-----------------------|
| | | |

| OS | | |
|--|------------------------------|----------------------|
| Number (%) of patients with event | 200 (74%) | 219 (81%) |
| Hazard ratio* (95% CI) | 0.70 (0.57, 0.85) | |
| p-Value [†] | < 0.001 | |
| Median in months (95% CI) | 10.1 (8.0, 12.3) | 7.3 (6.1, 8.1) |
| PFS[‡] | | |
| Number (%) of patients with event | 233 (86%) | 237 (87%) |
| Hazard ratio* (95% CI) | 0.96 (0.79, 1.16) | |
| p-Value [†] | 0.313 | |
| Median in months (95% CI) | 2.1 (2.0, 2.2) | 3.3 (2.4, 3.6) |
| Objective response rate[‡] | | |
| ORR % (95% CI) | 21% (16, 27) | 11% (8, 15) |
| p-Value [§] | < 0.001 | |
| Complete response | 9% | 3% |
| Partial response | 12% | 8% |
| Stable disease | 17% | 34% |
| Response duration^{‡,¶} | | |
| Median in months (range) | Not reached (1.6+, 30.0+) | 4.4 (1.4+, 29.9+) |
| Number (% [#]) of patients with duration ≥ 6 months | 46 (84%) | 8 (47%) |
| Number (% [#]) of patients with duration ≥ 12 months | 35 (68%) | 5 (35%) |

*Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

[†]Based on stratified log-rank test

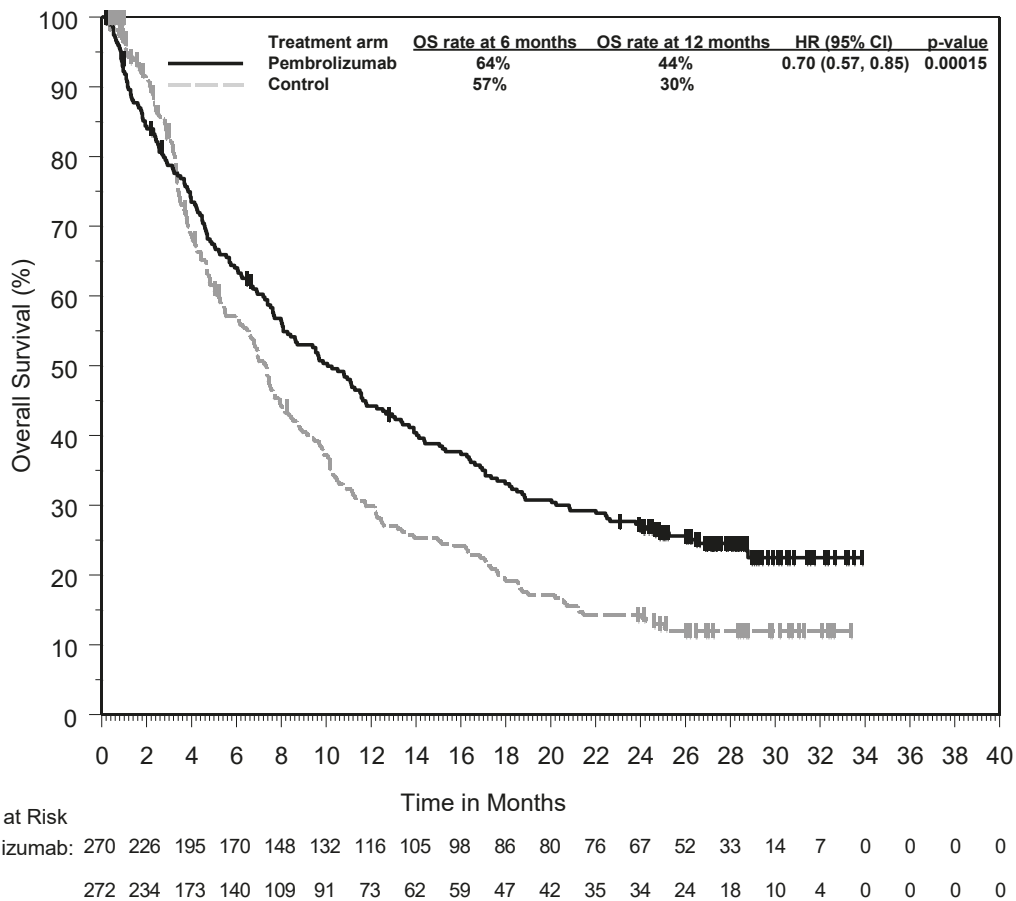
[‡]Assessed by BICR using RECIST 1.1

[§]Based on method by Miettinen and Nurminen

[¶]Based on patients with a best objective response as confirmed complete or partial response

[#]Based on Kaplan-Meier estimation

Figure 17: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-045 (intent to treat population)



An analysis was performed in KEYNOTE-045 in patients who had PD-L1 CPS < 10 [pembrolizumab: n=186 (69%) vs. chemotherapy: n=176 (65%)] or ≥ 10 [pembrolizumab: n=74 (27%) vs. chemotherapy: n=90 (33%)] in both pembrolizumab- and chemotherapy-treated arms (see Table 23).

Table 23: OS by PD-L1 expression

| PD-L1 Expression | Pembrolizumab | Chemotherapy | Hazard Ratio [†] (95% CI) |
|------------------|---|--------------|------------------------------------|
| | OS by PD-L1 Expression | | |
| | Number (%) of patients with event* | | |
| CPS < 10 | 140 (75%) | 144 (82%) | 0.75 (0.59, 0.95) |
| CPS ≥ 10 | 53 (72%) | 72 (80%) | 0.55 (0.37, 0.81) |

*Based on final analysis

[†]Hazard ratio (pembrolizumab compared to chemotherapy) based on the stratified Cox proportional hazard model

Patient-reported outcomes (PROs) were assessed using EORTC QLQ-C30. A prolonged time to deterioration in EORTC QLQ-C30 global health status/QoL was observed for patients treated with pembrolizumab compared to investigator’s choice chemotherapy (HR 0.70; 95% CI 0.55-0.90). Over 15 weeks of follow-up, patients treated with pembrolizumab had stable global health status/QoL, while those treated with investigator’s choice chemotherapy had a decline in global health status/QoL. These results should be interpreted in the context of the open-label study design and therefore taken cautiously.

KEYNOTE-052: Open-label study in urothelial carcinoma patients ineligible for cisplatin-containing chemotherapy

The safety and efficacy of pembrolizumab were investigated in KEYNOTE-052, a multicentre, open-label study for the treatment of locally advanced or metastatic urothelial carcinoma in patients who were not eligible for cisplatin-containing chemotherapy. Patients received pembrolizumab at a dose of 200 mg every 3 weeks until unacceptable toxicity or disease progression. Treatment could continue beyond progression if the patient was clinically stable and was considered to be deriving clinical benefit by the investigator. Patients without disease progression could be treated for up to 24 months. The study excluded patients with autoimmune disease or a medical condition that required immunosuppression. Assessment of tumour status was performed at 9 weeks after the first dose, then every 6 weeks through the first year, followed by every 12 weeks thereafter.

Among 370 patients with urothelial carcinoma who were not eligible for cisplatin-containing chemotherapy baseline characteristics were: median age 74 years (82% age 65 or older); 77% male; and 89% White and 7% Asian. Eighty-eight percent had M1 disease and 12% had M0 disease. Eighty-five percent of patients had visceral metastases, including 21% with liver metastases. Reasons for cisplatin ineligibility included: baseline creatinine clearance of < 60 mL/min (50%), ECOG performance status of 2 (32%), ECOG performance status of 2 and baseline creatinine clearance of < 60 mL/min (9%), and other (Class III heart failure, Grade 2 or greater peripheral neuropathy, and Grade 2 or greater hearing loss; 9%). Ninety percent of patients were treatment naïve, and 10% received prior adjuvant or neoadjuvant platinum-based chemotherapy. Eighty-one percent had a primary tumour in the lower tract, and 19% of patients had a primary tumour in the upper tract.

The primary efficacy outcome measure was ORR as assessed by BICR using RECIST 1.1. Secondary efficacy outcome measures were duration of response, PFS, and OS. Table 24 summarises the key efficacy measures for the study population at the final analysis based on a median follow-up time of 11.4 months (range: 0.1, 41.2 months) for all patients.

Table 24: Response to pembrolizumab 200 mg every 3 weeks in patients with urothelial carcinoma ineligible for cisplatin-containing chemotherapy in KEYNOTE-052

| Endpoint | n=370 |
|-----------------------------------|--------------------|
| Objective response rate* | |
| ORR %, (95% CI) | 29% (24, 34) |
| Disease control rate [†] | 47% |
| Complete response | 9% |
| Partial response | 20% |
| Stable disease | 18% |
| Response duration | |
| Median in months (range) | 30.1 (1.4+, 35.9+) |
| % with duration ≥ 6-months | 81% [‡] |
| Time to response | |
| Median in months (range) | 2.1 (1.3, 9.0) |
| PFS* | |
| Median in months (95% CI) | 2.2 (2.1, 3.4) |
| 6-month PFS rate | 33% |
| 12-month PFS rate | 22% |
| OS | |
| Median in months (95% CI) | 11.3 (9.7, 13.1) |
| 6-month OS rate | 67% |
| 12-month OS rate | 47% |

*Assessed by BICR using RECIST 1.1

†Based on best response of stable disease or better

‡Based on Kaplan-Meier estimates; includes 84 patients with response of 6 months or longer

An analysis was performed in KEYNOTE-052 in patients who had tumours that expressed PD-L1 with a CPS < 10 (n=251; 68%) or ≥ 10 (n=110; 30%) based on the PD-L1 IHC 22C3 pharmDx™ Kit (see Table 25).

Table 25: ORR and OS by PD-L1 expression

| Endpoint | CPS < 10 n=251 | CPS ≥ 10 n=110 |
|---------------------------------|-------------------|-------------------|
| Objective response rate* | | |
| ORR %, (95% CI) | 20% (16, 26) | 47% (38, 57) |
| OS | | |
| Median in months (95% CI) | 10 (8, 12) | 19 (12, 29) |
| 12-month OS rate | 41% | 61% |

*BICR using RECIST 1.1

KEYNOTE-361 is a Phase III, randomised, controlled, open-label clinical study of pembrolizumab with or without platinum-based combination chemotherapy (i.e. either cisplatin or carboplatin with gemcitabine) versus chemotherapy as first-line treatment in subjects with advanced or metastatic urothelial carcinoma. Results of KEYNOTE-361 for pembrolizumab in combination with chemotherapy did not show statistically significant improvement in PFS as assessed by BICR using RECIST 1.1 (HR 0.78; 95% CI: 0.65, 0.93; p=0.0033), and OS (HR 0.86; 95% CI: 0.72, 1.02; p=0.0407) versus chemotherapy alone. Per the pre-specified hierarchical testing order no formal tests for statistical significance of pembrolizumab versus chemotherapy could be performed. The key efficacy results of pembrolizumab monotherapy in patients for whom carboplatin rather than cisplatin was selected by the investigator as the better choice of chemotherapy were consistent with KEYNOTE-052 results. Efficacy results in patients whose tumours express PD-L1 with CPS ≥ 10 were similar to the overall population for whom carboplatin was selected as the choice of chemotherapy. See Table 26 and Figures 18 and 19.

Table 26: Response to pembrolizumab 200 mg every 3 weeks or chemotherapy in patients with previously untreated urothelial carcinoma for whom carboplatin rather than cisplatin was selected by the investigator as the better choice of chemotherapy in KEYNOTE-361

| Endpoint | Pembrolizumab n=170 | Chemotherapy n=196 | Pembrolizumab CPS ≥ 10 n=84 | Chemotherapy CPS ≥ 10 n=89 |
|---------------------------------|------------------------|-----------------------|-----------------------------------|----------------------------------|
| Objective response rate* | | | | |
| ORR %, (95% CI) | 28% (21.1, 35.0) | 42% (34.8, 49.1) | 30% (20.3, 40.7) | 46% (35.4, 57.0) |
| Complete response | 10% | 11% | 12% | 18% |
| Partial response | 18% | 31% | 18% | 28% |
| Response duration* | | | | |
| Median in months (range) | NR (3.2+, 36.1+) | 6.3 (1.8+, 33.8+) | NR (4.2, 36.1+) | 8.3 (2.1+, 33.8+) |
| % with duration ≥ 12 months† | 57% | 30% | 63% | 38% |
| PFS* | | | | |

| | | | | |
|---------------------------|-------------------|-------------------|------------------|------------------|
| Median in months (95% CI) | 3.2 (2.2, 5.5) | 6.7 (6.2, 8.1) | 3.9 (2.2, 6.8) | 7.9 (6.1, 9.3) |
| 12-month PFS rate | 25% | 24% | 26% | 31% |
| OS | | | | |
| Median in months (95% CI) | 14.6 (10.2, 17.9) | 12.3 (10.0, 15.5) | 15.6 (8.6, 19.7) | 13.5 (9.5, 21.0) |
| 12-month OS rate | 54% | 51% | 57% | 54% |

*Assessed by BICR using RECIST 1.1

†Based on Kaplan-Meier estimation

Figure 18: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-361 (intent to treat population, choice of carboplatin)

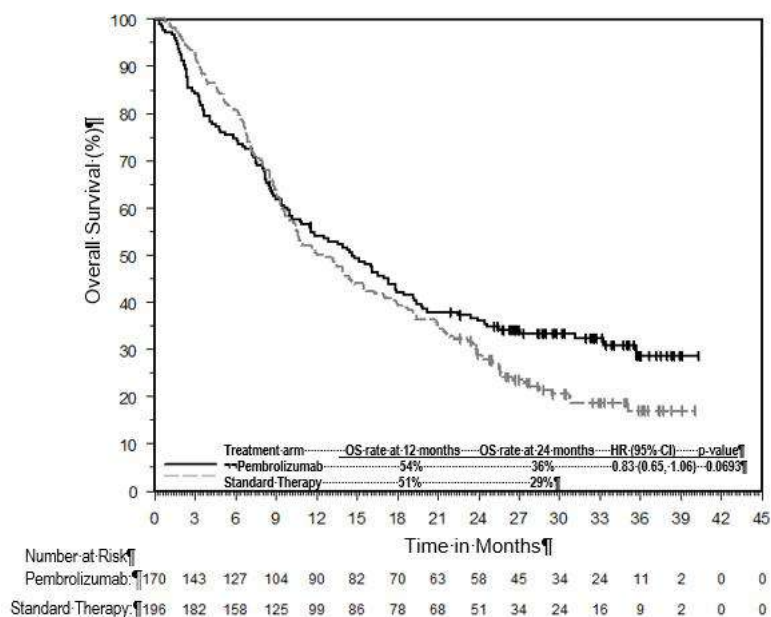
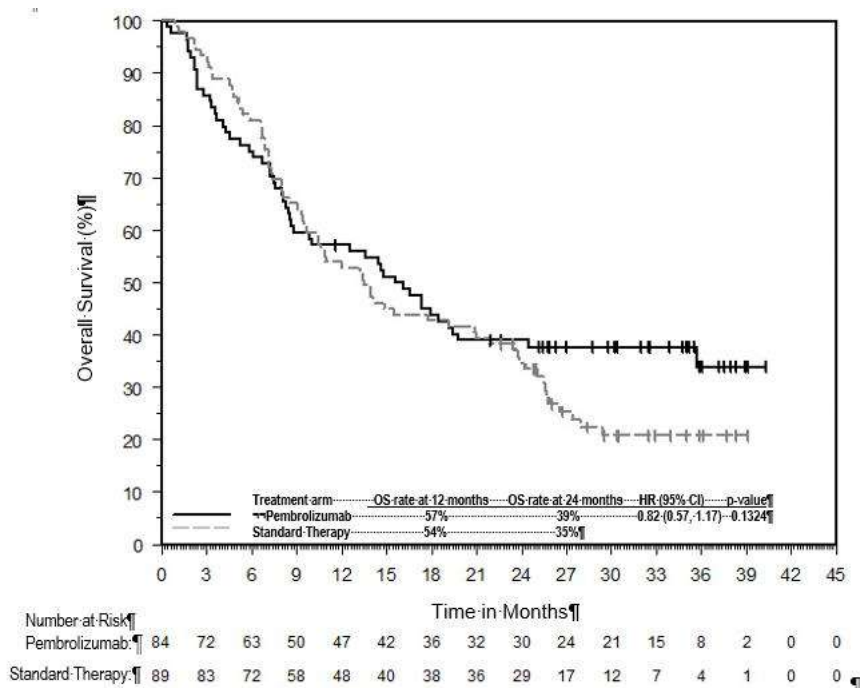


Figure 19: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-361 (patients with PD-L1 expression CPS ≥ 10, intent to treat population, choice of carboplatin)



Head and Neck Squamous Cell Carcinoma

KEYNOTE-048: Controlled study of monotherapy and combination therapy in HNSCC patients naïve to treatment in the recurrent or metastatic setting

The efficacy of pembrolizumab was investigated in KEYNOTE-048, a multicentre, randomised, open-label, active-controlled study in patients with histologically confirmed metastatic or recurrent HNSCC of the oral cavity, pharynx or larynx, who had not previously received systemic therapy for recurrent or metastatic disease and who were considered incurable by local therapies. Patients with nasopharyngeal carcinoma, active autoimmune disease that required systemic therapy within two years of treatment or a medical condition that required immunosuppression were ineligible for the study. Randomisation was stratified by tumour PD-L1 expression (TPS ≥ 50% or < 50%), HPV status (positive or negative), and ECOG PS (0 vs. 1). Patients were randomised 1:1:1 to one of the following treatment arms:

- Pembrolizumab 200 mg every 3 weeks
- Pembrolizumab 200 mg every 3 weeks, carboplatin AUC 5 mg/mL/min every 3 weeks or cisplatin 100 mg/m² every 3 weeks, and 5-FU 1,000 mg/m²/d 4 days continuous every 3 weeks (maximum of 6 cycles of platinum and 5-FU)
- Cetuximab 400 mg/m² load then 250 mg/m² once weekly, carboplatin AUC 5 mg/mL/min every 3 weeks or cisplatin 100 mg/m² every 3 weeks, and 5-FU 1,000 mg/m²/d 4 days continuous every 3 weeks (maximum of 6 cycles of platinum and 5-FU)

Treatment with pembrolizumab continued until RECIST 1.1-defined progression of disease as determined by the investigator, unacceptable toxicity, or a maximum of 24 months. Administration of pembrolizumab was permitted beyond RECIST-defined disease progression if the patient was clinically stable and considered to be deriving clinical benefit by the investigator. Assessment of tumour status was performed at Week 9 and then every 6 weeks for the first year, followed by every 9 weeks through 24 months.

Among the 882 patients in KEYNOTE-048, 754 (85%) had tumours that expressed PD-L1 with a CPS ≥ 1 based on the PD-L1 IHC 22C3 pharmDx™ Kit. The baseline characteristics of these 754 patients included: median age of 61 years (range: 20 to 94); 36% age 65 or older; 82% male; 74% White and 19% Asian; 61% ECOG performance status of 1; and 77% former/current smokers. Disease

characteristics were: 21% HPV positive and 95% had stage IV disease (stage IVa 21%, stage IVb 6%, and stage IVc 69%).

The primary efficacy outcome measures were OS and PFS (assessed by BICR according to RECIST 1.1). The study demonstrated a statistically significant improvement in OS for all patients randomised to pembrolizumab in combination with chemotherapy compared to standard treatment (HR 0.72; 95% CI 0.60-0.87) and in patients whose tumours expressed PD-L1 CPS \geq 1 randomised to pembrolizumab monotherapy compared to standard treatment. Tables 27 and 278 summarise key efficacy results for pembrolizumab in patients whose tumours expressed PD-L1 with a CPS \geq 1 in KEYNOTE-048 at the final analysis performed at a median follow-up of 13 months for pembrolizumab in combination with chemotherapy and at a median follow-up of 11.5 months for pembrolizumab monotherapy. Kaplan-Meier curves for OS based on the final analysis are shown in Figures 20 and 21.

Table 27: Efficacy results for pembrolizumab plus chemotherapy in KEYNOTE-048 with PD-L1 expression (CPS \geq 1)

| Endpoint | Pembrolizumab + Platinum Chemotherapy + 5-FU n=242 | Standard Treatment* n=235 |
|------------------------------------|---|---------------------------------|
| OS | | |
| Number (%) of patients with event | 177 (73%) | 213 (91%) |
| Median in months (95% CI) | 13.6 (10.7, 15.5) | 10.4 (9.1, 11.7) |
| Hazard ratio [†] (95% CI) | 0.65 (0.53, 0.80) | |
| p-Value [‡] | 0.00002 | |
| PFS | | |
| Number (%) of patients with event | 212 (88%) | 221 (94%) |
| Median in months (95% CI) | 5.1 (4.7, 6.2) | 5.0 (4.8, 6.0) |
| Hazard ratio [†] (95% CI) | 0.84 (0.69, 1.02) | |
| p-Value [‡] | 0.03697 | |
| Objective response rate | | |
| ORR [§] % (95% CI) | 36% (30.3, 42.8) | 36% (29.6, 42.2) |
| Complete response | 7% | 3% |
| Partial response | 30% | 33% |
| p-Value [¶] | 0.4586 | |
| Response duration | | |
| Median in months (range) | 6.7 (1.6+, 39.0+) | 4.3 (1.2+, 31.5+) |
| % with duration \geq 6 months | 54% | 34% |

*Cetuximab, platinum, and 5-FU

[†]Based on the stratified Cox proportional hazard model

[‡]Based on stratified log-rank test

[§]Response: Best objective response as confirmed complete response or partial response

[¶]Based on Miettinen and Nurminen method stratified by ECOG (0 vs. 1), HPV status (positive vs. negative) and PD-L1 status (strongly positive vs. not strongly positive)

Figure 20: Kaplan-Meier curve for overall survival for pembrolizumab plus chemotherapy in KEYNOTE-048 with PD-L1 expression (CPS \geq 1)

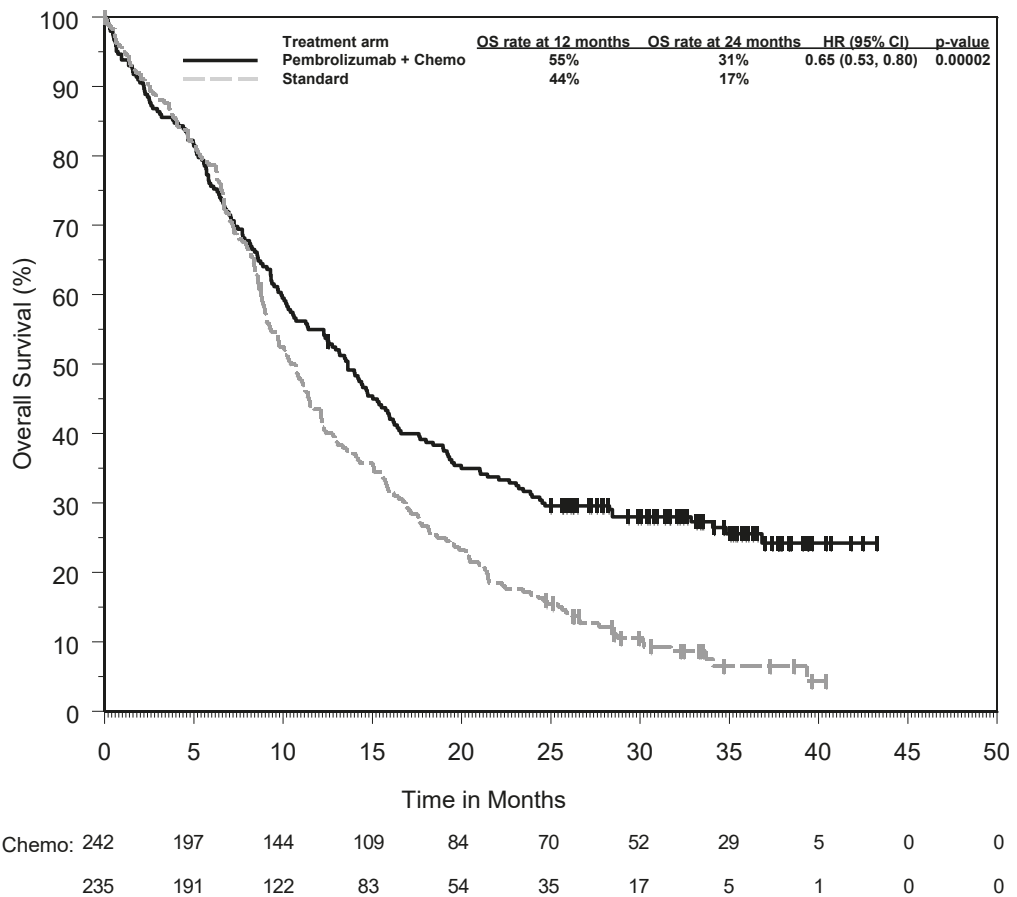


Table 28: Efficacy results for pembrolizumab as monotherapy in KEYNOTE-048 with PD-L1 expression (CPS ≥ 1)

| Endpoint | Pembrolizumab n=257 | Standard Treatment* n=255 |
|------------------------------------|------------------------|---------------------------------|
| OS | | |
| Number (%) of patients with event | 197 (77%) | 229 (90%) |
| Median in months (95% CI) | 12.3 (10.8, 14.3) | 10.3 (9.0, 11.5) |
| Hazard ratio [†] (95% CI) | 0.74 (0.61, 0.90) | |
| p-Value [‡] | 0.00133 | |
| PFS | | |
| Number (%) of patients with event | 228 (89%) | 237 (93%) |
| Median in months (95% CI) | 3.2 (2.2, 3.4) | 5.0 (4.8, 6.0) |
| Hazard ratio [†] (95% CI) | 1.13 (0.94, 1.36) | |
| p-Value [‡] | 0.89580 | |
| Objective response rate | | |
| ORR [§] % (95% CI) | 19.1% (14.5, 24.4) | 35% (29.1, 41.1) |
| Complete response | 5% | 3% |
| Partial response | 14% | 32% |
| p-Value [¶] | 1.0000 | |
| Response duration | | |
| Median in months (range) | 23.4 (1.5+, 43.0+) | 4.5 (1.2+, 38.7+) |
| % with duration ≥ 6 months | 81% | 36% |

*Cetuximab, platinum, and 5-FU

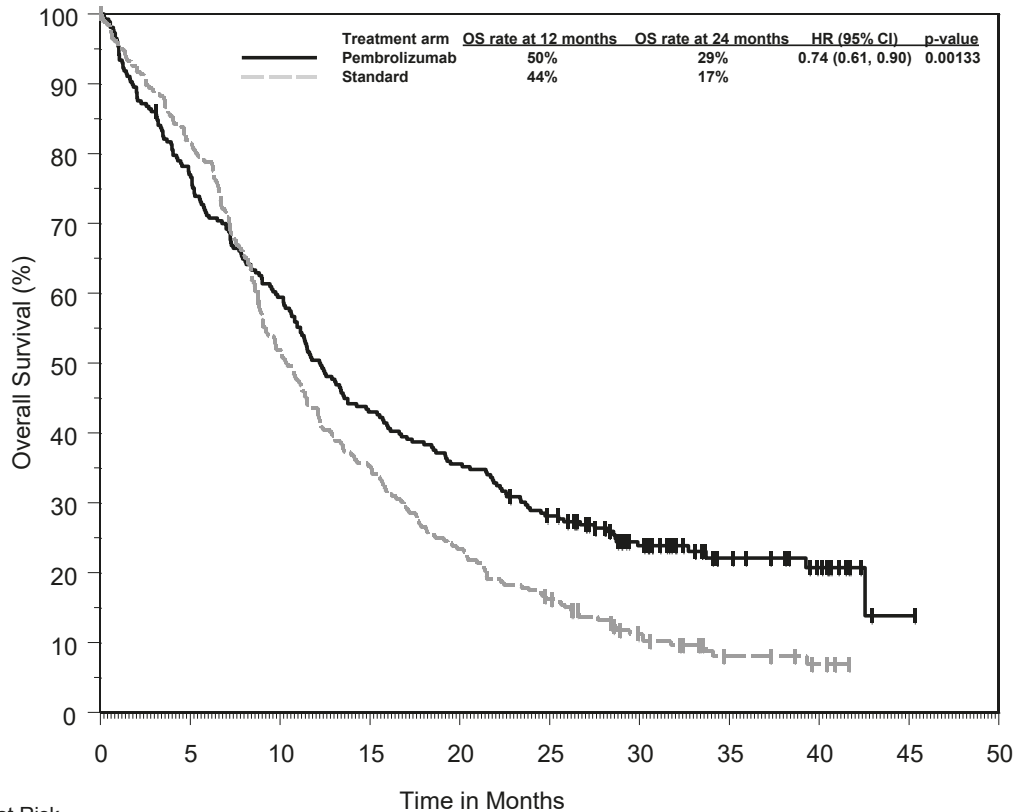
†Based on the stratified Cox proportional hazard model

‡Based on stratified log-rank test

§Response: Best objective response as confirmed complete response or partial response

¶Based on Miettinen and Nurminen method stratified by ECOG (0 vs. 1), HPV status (positive vs. negative) and PD-L1 status (strongly positive vs. not strongly positive)

Figure 21: Kaplan-Meier curve for overall survival for pembrolizumab as monotherapy in KEYNOTE-048 with PD-L1 expression (CPS ≥ 1)



| Number at Risk | | Time in Months | | | | | | | | | | |
|----------------|-----|----------------|-----|-----|----|----|----|----|----|----|----|----|
| | | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| Pembrolizumab: | 257 | 197 | 152 | 110 | 91 | 70 | 43 | 21 | 13 | 1 | 0 | |
| Standard: | 255 | 207 | 131 | 89 | 59 | 40 | 21 | 9 | 5 | 0 | 0 | |

An analysis was performed in KEYNOTE-048 in patients whose tumours expressed PD-L1 CPS ≥ 20 [pembrolizumab plus chemotherapy: n=126 (49%) vs. standard treatment: n=110 (43%) and pembrolizumab monotherapy: n=133 (52%) vs. standard treatment: n=122 (48%)] (see Table 29).

Table 29: Efficacy results for pembrolizumab plus chemotherapy and pembrolizumab as monotherapy by PD-L1 expression in KEYNOTE-048 (CPS ≥ 20)

| Endpoint | Pembrolizumab + Platinum Chemotherapy + 5-FU n=126 | Standard Treatment* n=110 | Pembrolizumab Monotherapy n=133 | Standard Treatment* n=122 |
|-----------------------------------|--|---------------------------|---------------------------------|---------------------------|
| OS | | | | |
| Number (%) of patients with event | 84 (66.7) | 98 (89.1) | 94 (70.7) | 108 (88.5) |
| Median in months (95% CI) | 14.7 (10.3, 19.3) | 11.0 (9.2, 13.0) | 14.8 (11.5, 20.6) | 10.7 (8.8, 12.8) |

| | | | | |
|---|-------------------|----------------------|--------------------|----------------------|
| Hazard ratio [†] (95% CI) | 0.60 (0.45, 0.82) | | 0.58 (0.44, 0.78) | |
| p-Value [‡] | 0.00044 | | 0.00010 | |
| OS rate at 6 months (95% CI) | 74.6 (66.0, 81.3) | 80.0 (71.2, 86.3) | 74.4 (66.1, 81.0) | 79.5 (71.2, 85.7) |
| OS rate at 12 months (95% CI) | 57.1 (48.0, 65.2) | 46.1 (36.6, 55.1) | 56.4 (47.5, 64.3) | 44.9 (35.9, 53.4) |
| OS rate at 24 months (95% CI) | 35.4 (27.2, 43.8) | 19.4 (12.6, 27.3) | 35.3 (27.3, 43.4) | 19.1 (12.7, 26.6) |
| PFS | | | | |
| Number (%) of patients with event | 106 (84.1) | 104 (94.5) | 115 (86.5) | 114 (93.4) |
| Median in months (95% CI) | 5.8 (4.7, 7.6) | 5.3 (4.9, 6.3) | 3.4 (3.2, 3.8) | 5.3 (4.8, 6.3) |
| Hazard ratio [†] (95% CI) | 0.76 (0.58, 1.01) | | 0.99 (0.76, 1.29) | |
| p-Value [‡] | 0.02951 | | 0.46791 | |
| PFS rate at 6 months (95% CI) | 49.4 (40.3, 57.9) | 47.2 (37.5, 56.2) | 33.0 (25.2, 41.0) | 46.6 (37.5, 55.2) |
| PFS rate at 12 months (95% CI) | 23.9 (16.7, 31.7) | 14.0 (8.2, 21.3) | 23.5 (16.6, 31.1) | 15.1 (9.3, 22.2) |
| PFS rate at 24 months (95% CI) | 14.6 (8.9, 21.5) | 5.0 (1.9, 10.5) | 16.8 (10.9, 23.8) | 6.1 (2.7, 11.6) |
| Objective response rate | | | | |
| ORR [§] % (95% CI) | 42.9 (34.1, 52.0) | 38.2 (29.1, 47.9) | 23.3 (16.4, 31.4) | 36.1 (27.6, 45.3) |
| Response duration | | | | |
| Number of responders | 54 | 42 | 31 | 44 |
| Median in months (range) | 7.1 (2.1+, 39.0+) | 4.2 (1.2+, 31.5+) | 22.6 (2.7+, 43.0+) | 4.2 (1.2+, 31.5+) |

*Cetuximab, platinum, and 5-FU

[†]Based on the stratified Cox proportional hazard model

[‡]Based on stratified log-rank test

[§]Response: Best objective response as confirmed complete response or partial response

An exploratory subgroup analysis was performed in KEYNOTE-048 in patients whose tumours expressed PD-L1 CPS ≥ 1 to < 20 [pembrolizumab plus chemotherapy: n=116 (45%) vs. standard treatment: n=125 (49%) and pembrolizumab monotherapy: n=124 (48%) vs. standard treatment: n=133 (52%)] (see Table 30).

Table 30: Efficacy results for pembrolizumab plus chemotherapy and pembrolizumab as monotherapy by PD-L1 expression in KEYNOTE-048 (CPS ≥ 1 to < 20)

| Endpoint | Pembrolizumab + Platinum Chemotherapy + 5-FU n=116 | Standard Treatment* n=125 | Pembrolizumab Monotherapy n=124 | Standard Treatment* n=133 |
|----------|--|---------------------------------|---------------------------------------|---------------------------------|
| | | | | |

| OS | | | | |
|------------------------------------|-------------------|-------------------|-------------------|-------------------|
| Number (%) of patients with event | 93 (80.2) | 115 (92.0) | 103 (83.1) | 121 (91.0) |
| Median in months (95% CI) | 12.7 (9.4, 15.3) | 9.9 (8.6, 11.5) | 10.8 (9.0, 12.6) | 10.1 (8.7, 12.1) |
| Hazard ratio [†] (95% CI) | 0.71 (0.54, 0.94) | | 0.86 (0.66, 1.12) | |
| OS rate at 6 months (95% CI) | 76.7 (67.9, 83.4) | 77.4 (69.0, 83.8) | 67.6 (58.6, 75.1) | 78.0 (70.0, 84.2) |
| OS rate at 12 months (95% CI) | 52.6 (43.1, 61.2) | 41.1 (32.4, 49.6) | 44.0 (35.1, 52.5) | 42.4 (33.9, 50.7) |
| OS rate at 24 months (95% CI) | 25.9 (18.3, 34.1) | 14.5 (9.0, 21.3) | 22.0 (15.1, 29.6) | 15.9 (10.3, 22.6) |
| PFS | | | | |
| Number (%) of patients with event | 106 (91.4) | 117 (93.6) | 113 (91.1) | 123 (92.5) |
| Median in months (95% CI) | 4.9 (4.2, 5.3) | 4.9 (3.7, 6.0) | 2.2 (2.1, 2.9) | 4.9 (3.8, 6.0) |
| Hazard ratio [†] (95% CI) | 0.93 (0.71, 1.21) | | 1.25 (0.96, 1.61) | |
| PFS rate at 6 months (95% CI) | 40.1 (31.0, 49.0) | 40.0 (31.2, 48.5) | 24.2 (17.1, 32.0) | 41.4 (32.8, 49.7) |
| PFS rate at 12 months (95% CI) | 15.1 (9.1, 22.4) | 11.3 (6.4, 17.7) | 17.5 (11.4, 24.7) | 12.1 (7.2, 18.5) |
| PFS rate at 24 months (95% CI) | 8.5 (4.2, 14.7) | 5.0 (1.9, 10.1) | 8.3 (4.3, 14.1) | 6.3 (2.9, 11.5) |
| Objective response rate | | | | |
| ORR [‡] % (95% CI) | 29.3 (21.2, 38.5) | 33.6 (25.4, 42.6) | 14.5 (8.8, 22.0) | 33.8 (25.9, 42.5) |
| Response duration | | | | |
| Number of responders | 34 | 42 | 18 | 45 |
| Median in months (range) | 5.6 (1.6+, 25.6+) | 4.6 (1.4+, 31.4+) | NR (1.5+, 38.9+) | 5.0 (1.4+, 38.7+) |

*Cetuximab, platinum, and 5-FU

[†]Based on the stratified Cox proportional hazard model

[‡]Response: Best objective response as confirmed complete response or partial response

KEYNOTE-040: Controlled study in HNSCC patients previously treated with platinum-containing chemotherapy

The safety and efficacy of pembrolizumab were investigated in KEYNOTE-040, a multicentre, open-label, randomised, controlled study for the treatment of histologically confirmed recurrent or metastatic HNSCC of the oral cavity, pharynx or larynx in patients who had disease progression on or after platinum-containing chemotherapy administered for recurrent or metastatic HNSCC or following platinum-containing chemotherapy administered as part of induction, concurrent, or adjuvant therapy, and were not amenable to local therapy with curative intent. Patients were stratified by PD-L1 expression (TPS \geq 50%), HPV status and ECOG performance status and then randomised (1:1) to receive either pembrolizumab 200 mg every 3 weeks (n=247) or one of three standard treatments (n=248): methotrexate 40 mg/m² once weekly (n=64), docetaxel 75 mg/m² once every 3 weeks (n=99), or cetuximab 400 mg/m² loading dose and then 250 mg/m² once weekly (n=71). Treatment could continue beyond progression if the patient was clinically stable and was considered to be deriving clinical benefit by the investigator. The study excluded patients with nasopharyngeal carcinoma, active

autoimmune disease that required systemic therapy within 2 years of treatment, a medical condition that required immunosuppression, or who were previously treated with 3 or more systemic regimens for recurrent and/or metastatic HNSCC. Assessment of tumour status was performed at 9 weeks, then every 6 weeks through Week 52, followed by every 9 weeks through 24 months.

Among the 495 patients in KEYNOTE-040, 129 (26%) had tumours that expressed PD-L1 with a TPS \geq 50% based on the PD-L1 IHC 22C3 pharmDx™ Kit. The baseline characteristics of these 129 patients included: median age 62 years (40% age 65 or older); 81% male; 78% White, 11% Asian, and 2% Black; 23% and 77% with an ECOG performance status 0 or 1, respectively; and 19% with HPV positive tumours. Sixty-seven percent (67%) of patients had M1 disease and the majority had stage IV disease (stage IV 32%, stage IVa 14%, stage IVb 4%, and stage IVc 44%). Sixteen percent (16%) had disease progression following platinum-containing neoadjuvant or adjuvant chemotherapy, and 84% had received 1-2 prior systemic regimens for metastatic disease.

The primary efficacy outcome was OS in the ITT population. The initial analysis resulted in a HR for OS of 0.82 (95% CI: 0.67, 1.01) with a one-sided p-Value of 0.0316. The median OS was 8.4 months for pembrolizumab compared to 7.1 months for standard treatment. Table 31 summarises the key efficacy measures for the TPS \geq 50% population. The Kaplan-Meier curve for OS for the TPS \geq 50% population is shown in Figure 22.

Table 31: Efficacy of pembrolizumab 200 mg every 3 weeks in HNSCC patients with TPS \geq 50 % who were previously treated with platinum chemotherapy in KEYNOTE-040

| Endpoint | Pembrolizumab 200 mg every 3 weeks n=64 | Standard Treatment* n=65 |
|--|---|-----------------------------|
| OS | | |
| Number (%) of patients with event | 41 (64) | 56 (86) |
| Hazard ratio [†] (95% CI) | 0.53 (0.35, 0.81) | |
| p-Value [‡] | 0.001 | |
| Median in months (95% CI) | 11.6 (8.3, 19.5) | 6.6 (4.8, 9.2) |
| PFS[§] | | |
| Number (%) of patients with event | 52 (81) | 58 (89) |
| Hazard ratio [†] (95% CI) | 0.58 (0.39, 0.86) | |
| p-Value [‡] | 0.003 | |
| Median in months (95% CI) | 3.5 (2.1, 6.3) | 2.1 (2.0, 2.4) |
| Rate (%) at 6 months (95% CI) | 40.1 (28.1, 51.9) | 17.1 (8.8, 27.7) |
| Objective response rate[§] | | |
| ORR % (95% CI) | 26.6 (16.3, 39.1) | 9.2 (3.5, 19.0) |
| p-Value [¶] | 0.0009 | |
| Complete response | 5% | 2% |
| Partial response | 22% | 8% |
| Stable disease | 23% | 23% |
| Response duration^{§,#} | | |
| Median in months (range) | Not reached (2.7, 13.8+) | 6.9 (4.2, 18.8) |
| Number (% ^b) of patients with duration \geq 6 months | 9 (66) | 2 (50) |

*Methotrexate, docetaxel, or cetuximab

[†]Hazard ratio (pembrolizumab compared to standard treatment) based on the stratified Cox proportional hazard model

‡One-sided p-Value based on log-rank test

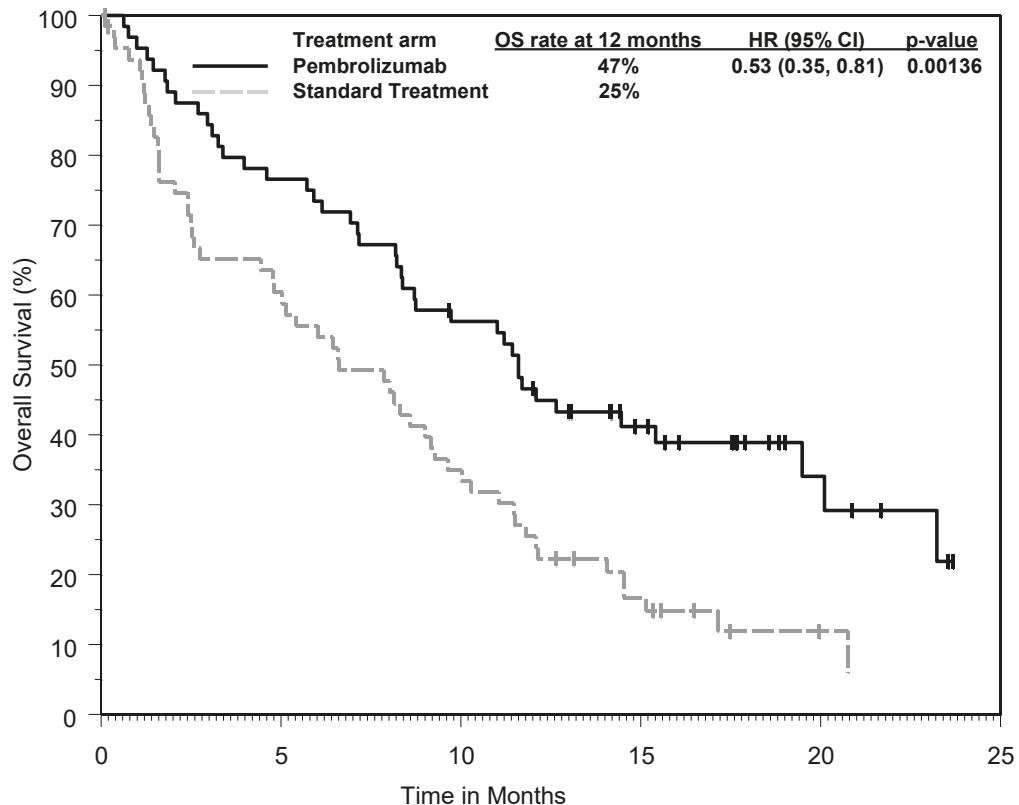
§Assessed by BICR using RECIST 1.1

¶Based on method by Miettinen and Nurminen

#Based on patients with a best objective response as confirmed complete or partial response

ᵖBased on Kaplan-Meier estimation

Figure 22: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-040 patients with PD-L1 expression (TPS ≥ 50%)



| Number at Risk | 0 | 5 | 10 | 15 | 20 | 25 |
|---------------------|----|----|----|----|----|----|
| Pembrolizumab: | 64 | 49 | 35 | 19 | 7 | 1 |
| Standard Treatment: | 65 | 38 | 22 | 9 | 2 | 0 |

Renal cell carcinoma

KEYNOTE-426: Controlled study of combination therapy with axitinib in RCC patients naïve to treatment

The efficacy of pembrolizumab in combination with axitinib was investigated in KEYNOTE-426, a randomised, multicentre, open-label, active-controlled study conducted in patients with advanced RCC with clear cell component, regardless of PD-L1 tumour expression status and International Metastatic RCC Database Consortium (IMDC) risk group categories. The study excluded patients with autoimmune disease or a medical condition that required immunosuppression. Randomisation was stratified by risk categories (favourable versus intermediate versus poor) and geographic region (North America versus Western Europe versus “Rest of the World”). Patients were randomised (1:1) to one of the following treatment arms:

- pembrolizumab 200 mg intravenously every 3 weeks in combination with axitinib 5 mg orally, twice daily. Patients who tolerated axitinib 5 mg twice daily for 2 consecutive treatment cycles (i.e. 6 weeks) with no > Grade 2 treatment-related adverse events to axitinib and with blood pressure well controlled to ≤ 150/90 mm Hg were permitted dose escalation of axitinib to 7 mg twice daily. Dose escalation of axitinib to 10 mg twice daily was permitted using the

same criteria. Axitinib could be interrupted or reduced to 3 mg twice daily and subsequently to 2 mg twice daily to manage toxicity.

- sunitinib 50 mg orally, once daily for 4 weeks and then off treatment for 2 weeks.

Treatment with pembrolizumab and axitinib continued until RECIST v1.1-defined progression of disease as verified by BICR or confirmed by the investigator, unacceptable toxicity, or for pembrolizumab, a maximum of 24 months. Administration of pembrolizumab and axitinib was permitted beyond RECIST-defined disease progression if the patient was clinically stable and considered to be deriving clinical benefit by the investigator. Assessment of tumour status was performed at baseline, after randomisation at Week 12, then every 6 weeks thereafter until Week 54, and then every 12 weeks thereafter.

A total of 861 patients were randomised. The study population characteristics were: median age of 62 years (range: 26 to 90); 38% age 65 or older; 73% male; 79% White and 16% Asian; 80% had a Karnofsky Performance Score (KPS) 90-100 and 20% had KPS 70-80; patient distribution by IMDC risk categories was 31% favourable, 56% intermediate and 13% poor.

The primary efficacy outcome measures were OS and PFS (as assessed by BICR using RECIST 1.1). Secondary efficacy outcome measures were ORR and response duration, as assessed by BICR using RECIST 1.1. The study demonstrated a statistically significant improvement in OS (HR 0.53; 95% CI 0.38, 0.74; p-Value=0.00005) and PFS (HR 0.69; 95% CI 0.56, 0.84; p-Value=0.00012) for patients randomised to the pembrolizumab combination arm compared with sunitinib at its pre-specified interim analysis. Table 32 summarises key efficacy measures and Figures 23 and 24 show the Kaplan-Meier curves for OS and PFS based on the final analysis with a median follow-up time of 37.7 months.

Table 32: Efficacy results in KEYNOTE-426

| Endpoint | Pembrolizumab Axitinib n=432 | Sunitinib n=429 |
|--|---|----------------------------|
| OS | | |
| Number of events (%) | 193 (45%) | 225 (52%) |
| Median in months (95% CI) | 45.7 (43.6, NA) | 40.1 (34.3, 44.2) |
| Hazard ratio* (95% CI) | 0.73 (0.60, 0.88) | |
| p-Value [†] | 0.00062 | |
| PFS[‡] | | |
| Number of events (%) | 286 (66%) | 301 (70%) |
| Median in months (95% CI) | 15.7 (13.6, 20.2) | 11.1 (8.9, 12.5) |
| Hazard ratio* (95% CI) | 0.68 (0.58, 0.80) | |
| p-Value [†] | < 0.00001 | |
| Objective response rate | | |
| ORR [§] % (95% CI) | 60 (56, 65) | 40 (35, 44) |
| Complete response | 10% | 3% |
| Partial response | 50% | 36% |
| p-Value [¶] | < 0.0001 | |
| Response duration | | |
| Median in months (range) | 23.6 (1.4+, 43.4+) | 15.3 (2.3, 42.8+) |
| Number (% [#]) of patients with duration ≥ 30 months | 87 (45%) | 29 (32%) |

*Based on the stratified Cox proportional hazard model

†Nominal p-Value based on stratified log-rank test

‡Assessed by BICR using RECIST 1.1

§Based on patients with a best objective response as confirmed complete or partial response

¶ Nominal p-Value based on Miettinen and Nurminen method stratified by IMDC risk group and geographic region. At the pre-specified interim analysis of ORR (median follow-up time of 12.8 months), statistically significant superiority was achieved for ORR comparing pembrolizumab plus axitinib with sunitinib p-Value < 0.0001.

#Based on Kaplan-Meier estimation

NA = not available

Figure 23: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-426 (intent to treat population)

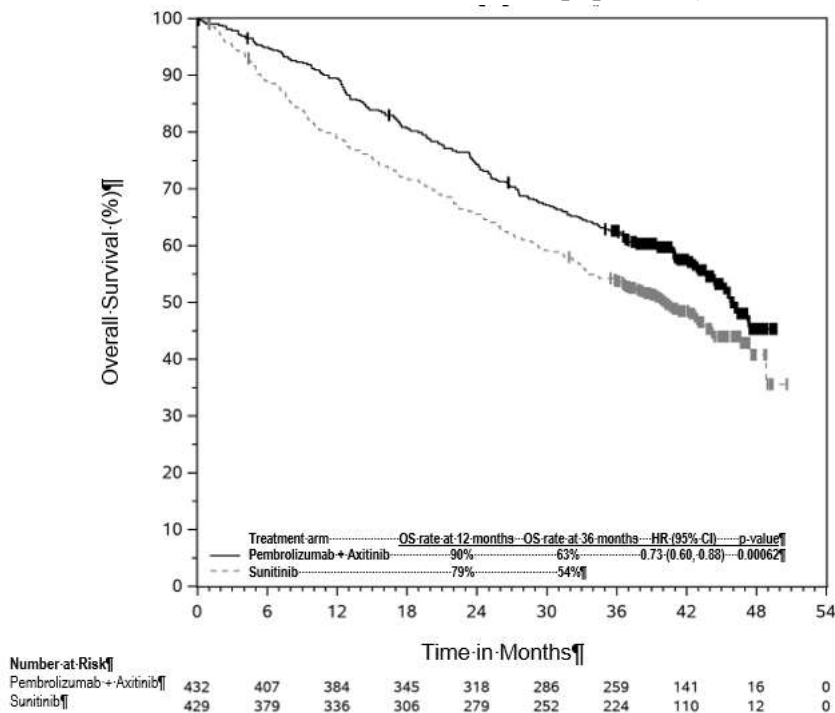
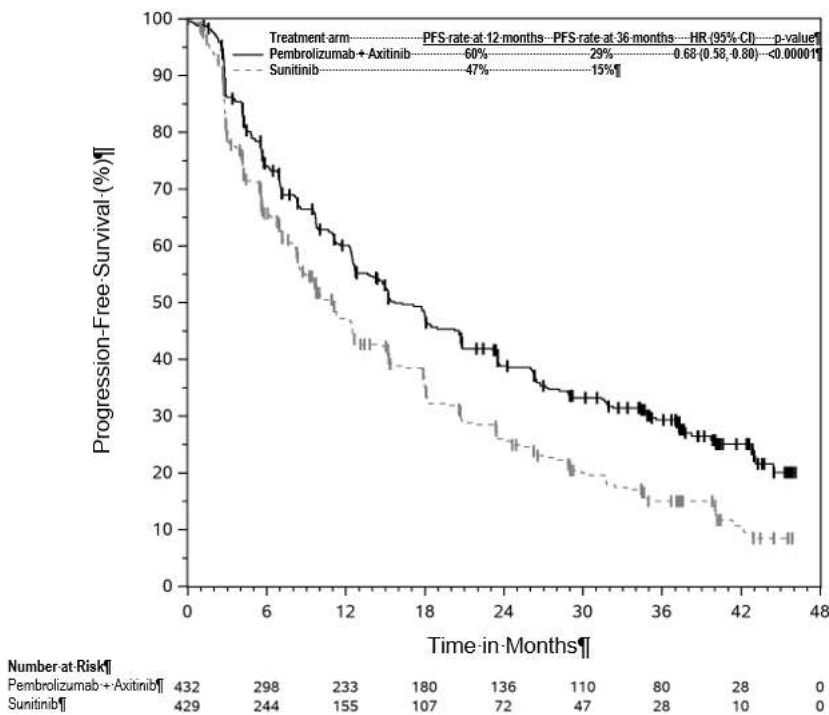


Figure 24: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-426 (intent to treat population)



Subgroup analyses were performed in KEYNOTE-426 in patients with PD-L1 CPS ≥ 1 [pembrolizumab/axitinib combination: n=243 (56%) vs. sunitinib: n=254 (59%)] and CPS < 1 [pembrolizumab/axitinib combination: n=167 (39%) vs. sunitinib: n=158 (37%)]. OS and PFS benefits were observed regardless of PD-L1 expression level.

The KEYNOTE-426 study was not powered to evaluate efficacy of individual subgroups.

At the pre-specified interim analysis, for the IMDC risk category, the OS hazard ratio (HR) for patients randomised to the pembrolizumab combination arm compared with sunitinib in the favourable risk group was 0.64 (95% CI 0.24, 1.68), for the intermediate risk group the OS HR was 0.53 (95% CI 0.35, 0.82), and for the poor risk group the OS HR was 0.43 (95% CI 0.23, 0.81). The PFS HR (95% CI) for the favourable, intermediate and poor risk groups were 0.81 (0.53, 1.24), 0.69 (0.53, 0.90) and 0.58 (0.35, 0.94), respectively. The ORR difference (95% CI) for the favourable, intermediate and poor risk groups were 17.0% (5.3, 28.4), 25.5% (16.7, 33.9), and 31.5% (15.7, 46.2), respectively.

Table 33 summarises the efficacy measures by IMDC risk category based on the final OS analysis at a median follow-up of 37.7 months.

Table 33: Efficacy results in KEYNOTE-426 by IMDC risk category

| Endpoint* | Pembrolizumab + Axitinib n=432 | Sunitinib n=429 | Pembrolizumab + Axitinib vs. Sunitinib |
|--------------|-------------------------------------|-------------------|--|
| OS | 12-month OS rate, % (95% CI) | | OS HR (95% CI) |
| Favourable | 95.6 (90.5, 98.0) | 94.6 (89.0, 97.4) | 1.17 (0.76, 1.80) |
| Intermediate | 90.7 (86.2, 93.8) | 77.6 (71.8, 82.3) | 0.67 (0.52, 0.86) |
| Poor | 69.6 (55.8, 79.9) | 45.1 (31.2, 58.0) | 0.51 (0.32, 0.81) |
| PFS | Median (95% CI), months | | PFS HR (95% CI) |
| Favourable | 20.7 (15.2, 28.9) | 17.8 (12.5, 20.7) | 0.76 (0.56, 1.03) |
| Intermediate | 15.3 (12.5, 20.8) | 9.7 (8.0, 12.4) | 0.69 (0.55, 0.86) |

| | | | |
|----------------------|-------------------|-------------------|---------------------------------------|
| Poor | 4.9 (2.8, 12.4) | 2.9 (2.7, 4.2) | 0.53 (0.33, 0.84) |
| Confirmed ORR | % (95% CI) | | ORR difference, % (95% CI) |
| Favourable | 68.8 (60.4, 76.4) | 50.4 (41.5, 59.2) | 18.5 (6.7, 29.7) |
| Intermediate | 60.5 (54.0, 66.8) | 39.8 (33.7, 46.3) | 20.7 (11.8, 29.2) |
| Poor | 39.3 (26.5, 53.2) | 11.5 (4.4, 23.4) | 27.7 (11.7, 42.8) |

*n (%) for favourable, intermediate and poor risk categories for pembrolizumab/axitinib vs. sunitinib were: 138 (32%) vs. 131 (31%); 238 (55%) vs. 246 (57%); 56 (13%) vs. 52 (12%), respectively

KEYNOTE-581: Controlled study of combination therapy with lenvatinib in RCC patients naïve to treatment

The efficacy of pembrolizumab in combination with lenvatinib was investigated in KEYNOTE-581, a multicentre, open-label, randomised study conducted in 1,069 patients with advanced RCC with clear cell component including other histological features such as sarcomatoid and papillary in the first-line setting. Patients were enrolled regardless of PD-L1 tumour expression status. The study excluded patients with active autoimmune disease or a medical condition that required immunosuppression. Randomisation was stratified by geographic region (North America versus Western Europe versus “Rest of the World”) and Memorial Sloan Kettering Cancer Center (MSKCC) prognostic groups (favourable versus intermediate versus poor).

Patients were randomised (1:1:1) to one of the following treatment arms:

- pembrolizumab 200 mg intravenously every 3 weeks up to 24 months in combination with lenvatinib 20 mg orally once daily.
- lenvatinib 18 mg orally once daily in combination with everolimus 5 mg orally once daily.
- sunitinib 50 mg orally once daily for 4 weeks then off treatment for 2 weeks.

Treatment continued until unacceptable toxicity or disease progression as determined by the investigator and confirmed by BICR using RECIST 1.1. Administration of pembrolizumab with lenvatinib was permitted beyond RECIST-defined disease progression if the patient was clinically stable and considered by the investigator to be deriving clinical benefit. Pembrolizumab was continued for a maximum of 24 months; however, treatment with lenvatinib could be continued beyond 24 months. Assessment of tumour status was performed at baseline and then every 8 weeks.

Among the study population (355 patients in the pembrolizumab with lenvatinib arm and 357 in the sunitinib arm), the baseline characteristics were: median age of 62 years (range: 29 to 88 years), 41% age 65 or older; 74% male; 75% White, 21% Asian, 1% Black, and 2% other races; 17% and 83% of patients had a baseline KPS of 70 to 80 and 90 to 100, respectively; patient distribution by IMDC risk categories was 33% favourable, 56% intermediate and 10% poor, and by MSKCC prognostic groups was 27% favourable, 64% intermediate and 9% poor. Metastatic disease was present in 99% of the patients and locally advanced disease was present in 1%. Common sites of metastases in patients were lung (69%), lymph node (46%) and bone (26%).

The primary efficacy outcome measure was PFS based on BICR using RECIST 1.1. Key secondary efficacy outcome measures included OS and ORR. The study demonstrated statistically significant improvements in PFS, OS, and ORR in patients randomised to pembrolizumab in combination with lenvatinib compared with sunitinib. The median survival follow-up time was 26.5 months. The median duration of treatment for pembrolizumab plus lenvatinib was 17.0 months. Efficacy results for KEYNOTE-581 are summarised in Table 34 and Figures 25 and 26. PFS results were consistent across pre-specified subgroups, MSKCC prognostic groups and PD-L1 tumour expression status. Efficacy results by MSKCC prognostic group are summarised in Table 35.

Table 34: Efficacy results in KEYNOTE-581

| Endpoint | Pembrolizumab 200 mg every 3 weeks and Lenvatinib n=355 | Sunitinib n=357 |
|--------------------------------------|--|------------------------|
| PFS* | | |
| Number of patients with event (%) | 160 (45%) | 205 (57%) |
| Median in months (95% CI) | 23.9 (20.8, 27.7) | 9.2 (6.0, 11.0) |
| Hazard ratio [†] (95% CI) | 0.39 (0.32, 0.49) | |
| p-Value [‡] | < 0.0001 | |
| OS | | |
| Number of patients with event (%) | 80 (23%) | 101 (28%) |
| Median in months (95% CI) | NR (33.6, NR) | NR (NR, NR) |
| Hazard ratio [†] (95% CI) | 0.66 (0.49, 0.88) | |
| p-Value [‡] | 0.0049 | |
| Objective response rate | | |
| ORR [§] (95% CI) | 71% (66, 76) | 36% (31, 41) |
| Complete response | 16% | 4% |
| Partial response | 55% | 32% |
| p-Value [¶] | < 0.0001 | |
| Response duration[#] | | |
| Median in months (range) | 26 (1.6+, 36.8+) | 15 (1.6+, 33.2+) |

*The primary analysis of PFS included censoring for new anti-cancer treatment. Results for PFS with and without censoring for new anti-cancer treatment were consistent.

[†]Based on the stratified Cox proportional hazard model

[‡]Two-sided based on stratified log-rank test

[§]Response: Best objective response as confirmed complete response or partial response

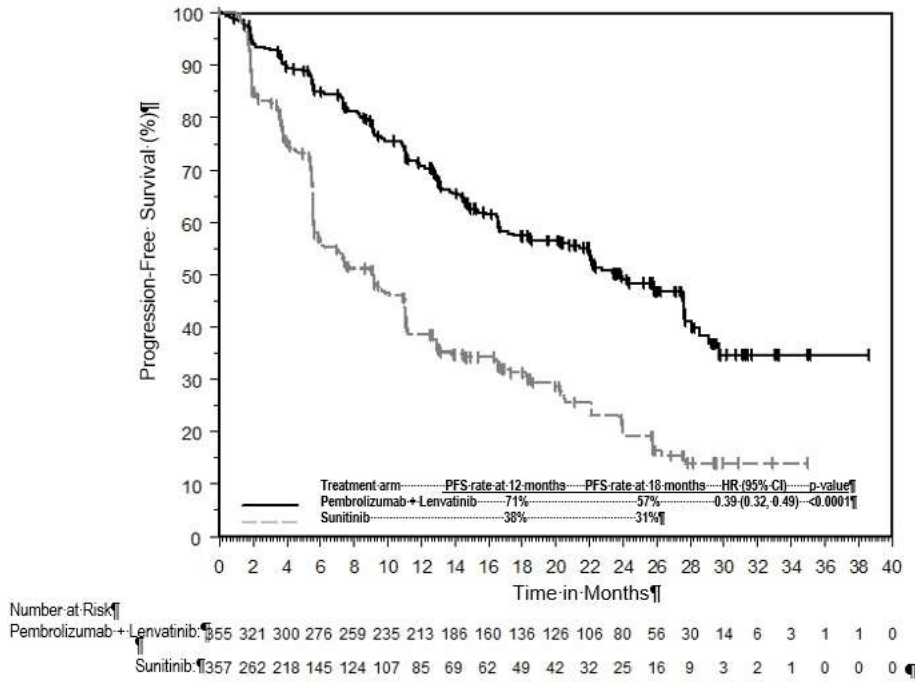
[¶]Nominal two-sided p-Value based on the stratified Cochran-Mantel-Haenszel (CMH) test. At the earlier pre-specified final analysis of ORR (median follow-up time of 17.3 months), statistically significant superiority was achieved for ORR comparing pembrolizumab plus lenvatinib with sunitinib, (odds ratio: 3.84 [95% CI: 2.81, 5.26], p-Value < 0.0001).

[#]Based on Kaplan-Meier estimates

NR = not reached

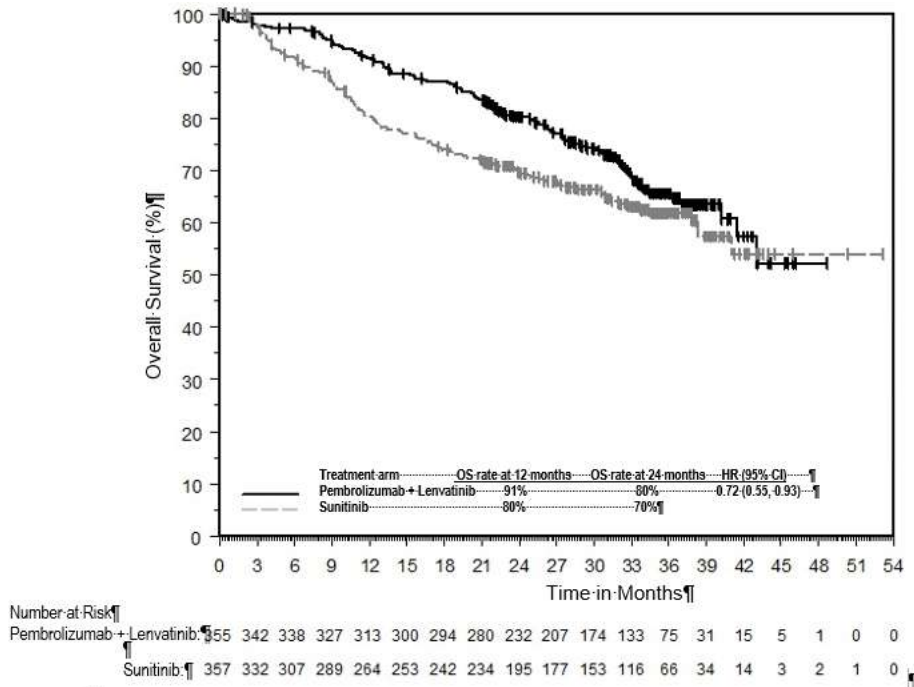
The primary OS analysis was not adjusted to account for subsequent therapies.

Figure 25: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-581



An updated OS analysis was performed when patients receiving pembrolizumab and lenvatinib or sunitinib had a median survival follow-up of 33.4 months. The hazard ratio was 0.72 (95% CI 0.55, 0.93) with 105/355 (30%) deaths in the combination arm and 122/357 (34%) deaths in the sunitinib arm. This updated OS analysis was not adjusted to account for subsequent therapies.

Figure 26: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-581



The KEYNOTE-581 study was not powered to evaluate efficacy of individual subgroups. Table 35 summarises the efficacy measures by MSKCC prognostic group from the pre-specified primary analysis and the updated OS analysis.

Table 35: Efficacy results in KEYNOTE-581 by MSKCC prognostic group

| | Pembrolizumab + Lenvatinib (n=355) | | Sunitinib (n=357) | | Pembrolizumab + Lenvatinib vs. Sunitinib |
|---|------------------------------------|------------------|--------------------|------------------|--|
| | Number of Patients | Number of Events | Number of Patients | Number of Events | |
| Progression-Free Survival (PFS) by BICR* | | | | | PFS HR (95% CI) |
| Favourable | 96 | 39 | 97 | 60 | 0.36 (0.23, 0.54) |
| Intermediate | 227 | 101 | 228 | 126 | 0.44 (0.34, 0.58) |
| Poor | 32 | 20 | 32 | 19 | 0.18 (0.08, 0.42) |
| Overall Survival (OS)* | | | | | OS HR (95% CI) |
| Favourable [†] | 96 | 11 | 97 | 13 | 0.86 (0.38, 1.92) |
| Intermediate | 227 | 57 | 228 | 73 | 0.66 (0.47, 0.94) |
| Poor | 32 | 12 | 32 | 15 | 0.50 (0.23, 1.08) |
| Updated OS[‡] | | | | | OS HR (95% CI) |
| Favourable [†] | 96 | 17 | 97 | 17 | 1.00 (0.51, 1.96) |
| Intermediate | 227 | 74 | 228 | 87 | 0.71 (0.52, 0.97) |
| Poor | 32 | 14 | 32 | 18 | 0.50 (0.25, 1.02) |

*Median follow-up: 26.5 months (data cutoff – 28 August 2020)

[†]Interpretation of HR is limited by the low number of events (24/193 and 34/193)

[‡]Median follow-up: 33.4 months (data cutoff – 31 March 2021)

KEYNOTE-564: Placebo-controlled study for the adjuvant treatment of patients with resected RCC

The efficacy of pembrolizumab was investigated as adjuvant therapy for RCC in KEYNOTE-564, a multicentre, randomised, double-blind, placebo-controlled study in 994 patients with increased risk of recurrence defined as intermediate-high or high risk, or M1 with no evidence of disease (NED). The intermediate-high risk category included: pT2 with Grade 4 or sarcomatoid features; pT3, any Grade without nodal involvement (N0) or distant metastases (M0). The high risk category included: pT4, any Grade N0 and M0; any pT, any Grade with nodal involvement and M0. The M1 NED category included patients with metastatic disease who had undergone complete resection of primary and metastatic lesions. Patients must have undergone a partial nephroprotective or radical complete nephrectomy (and complete resection of solid, isolated, soft tissue metastatic lesion(s) in M1 NED participants) with negative surgical margins ≥ 4 weeks prior to the time of screening. The study excluded patients with active autoimmune disease or a medical condition that required immunosuppression. Patients with RCC with clear cell component were randomised (1:1) to receive pembrolizumab 200 mg every 3 weeks (n=496) or placebo (n=498) for up to 1 year until disease recurrence or unacceptable toxicity. Randomisation was stratified by metastasis status (M0, M1 NED), and within M0 group, further stratified by ECOG PS (0,1), and geographic region (US, non-US). Starting from randomisation, patients underwent imaging every 12 weeks for the first 2 years, then every 16 weeks from year 3 to 5, and then every 24 weeks annually.

Among the 994 patients, the baseline characteristics were: median age of 60 years (range: 25 to 84), 33% age 65 or older; 71% male; and 85% ECOG PS of 0 and 15% ECOG PS of 1. Ninety-four percent were N0; 83% had no sarcomatoid features; 86% were pT2 with Grade 4 or sarcomatoid features or pT3; 8% were pT4 or with nodal involvement; and 6% were M1 NED. Baseline characteristics and demographics were generally comparable between the pembrolizumab and placebo arms.

The primary efficacy outcome measure was investigator-assessed disease-free survival (DFS). The key secondary outcome measure was OS. At the pre-specified interim analysis with a median follow-up time of 23.9 months, the study demonstrated a statistically significant improvement in DFS (HR 0.68; 95% CI 0.53, 0.87; p-Value = 0.0010) for patients randomised to the pembrolizumab arm compared with placebo. Updated efficacy results with a median follow-up time of 29.7 months are summarised in Table 36 and Figure 27.

Table 36: Efficacy results in KEYNOTE-564

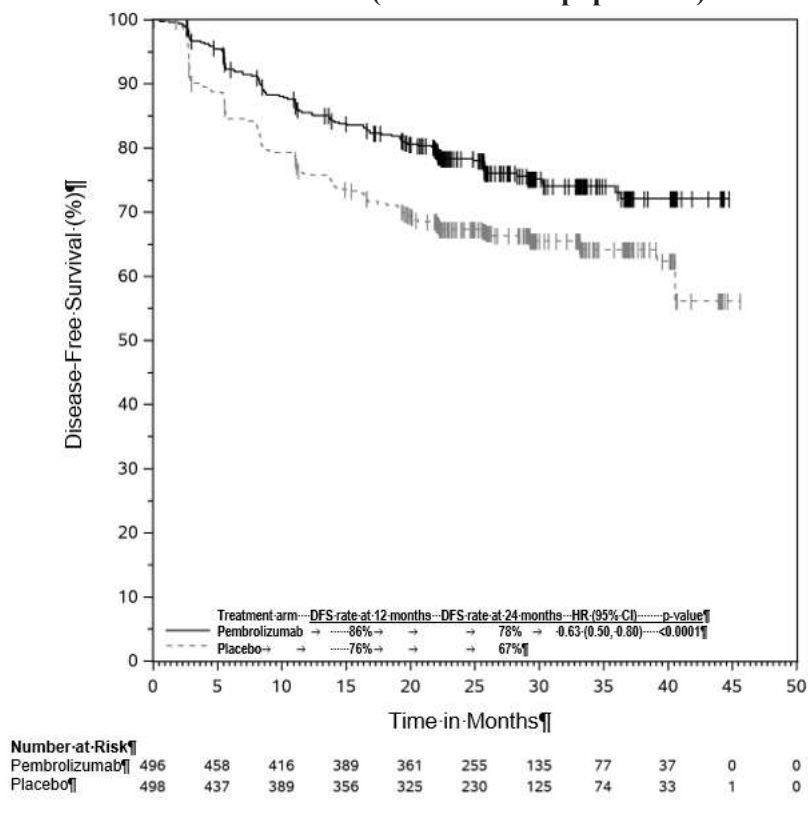
| Endpoint | Pembrolizumab 200 mg every 3 weeks n=496 | Placebo n=498 |
|-----------------------------------|--|------------------|
| DFS | | |
| Number (%) of patients with event | 114 (23%) | 169 (34%) |
| Median in months (95% CI) | NR | NR |
| Hazard ratio* (95% CI) | 0.63 (0.50, 0.80) | |
| p-Value† | < 0.0001 | |

*Based on the stratified Cox proportional hazard model

†Nominal p-Value based on stratified log-rank test

NR = not reached

Figure 27: Kaplan-Meier curve for disease-free survival by treatment arm in KEYNOTE-564 (intent to treat population)



At the time of the updated analysis, the DFS hazard ratio (95% CI) was 0.68 (0.52, 0.89) in the subgroup of patients with M0-intermediate-high risk of recurrence, 0.60 (0.33, 1.10) in the subgroup of patients with M0-high risk of recurrence, and 0.28 (0.12, 0.66) in the subgroup of patients with M1

NED. OS results were not yet mature with 23 deaths out of 496 patients in the pembrolizumab arm and 43 deaths out of 498 patients in the placebo arm.

MSI-H or dMMR cancers

Colorectal cancer

KEYNOTE-177: Controlled study in MSI-H or dMMR CRC patients naïve to treatment in the metastatic setting

The efficacy of pembrolizumab was investigated in KEYNOTE-177, a multicentre, randomised, open-label, active-controlled study that enrolled patients with previously untreated metastatic MSI-H or dMMR CRC. MSI or MMR (mismatch repair) tumour status was determined locally using polymerase chain reaction (PCR) or IHC, respectively. Patients with autoimmune disease or a medical condition that required immunosuppression were ineligible.

Patients were randomised (1:1) to receive pembrolizumab 200 mg intravenously every 3 weeks or investigator's choice of the following chemotherapy regimens given intravenously every 2 weeks:

- mFOLFOX6 (oxaliplatin, leucovorin, and FU) or mFOLFOX6 in combination with either bevacizumab or cetuximab: Oxaliplatin 85 mg/m², leucovorin 400 mg/m² (or levoleucovorin 200 mg/m²), and FU 400 mg/m² bolus on Day 1, then FU 2,400 mg/m² over 46-48 hours. Bevacizumab 5 mg/kg bw on Day 1 or cetuximab 400 mg/m² on first infusion, then 250 mg/m² weekly.
- FOLFIRI (irinotecan, leucovorin and FU) or FOLFIRI in combination with either bevacizumab or cetuximab: Irinotecan 180 mg/m², leucovorin 400 mg/m² (or levoleucovorin 200 mg/m²), and FU 400 mg/m² bolus on Day 1, then FU 2,400 mg/m² over 46-48 hours. Bevacizumab 5 mg/kg bw on Day 1 or cetuximab 400 mg/m² on first infusion, then 250 mg/m² weekly.

Treatment with pembrolizumab continued until RECIST v1.1-defined progression of disease as determined by the investigator or unacceptable toxicity. Patients treated with pembrolizumab without disease progression could be treated for up to 24 months. Assessment of tumour status was performed every 9 weeks. Patients randomised to chemotherapy were offered pembrolizumab at the time of disease progression.

A total of 307 patients were enrolled and randomised to pembrolizumab (n=153) or chemotherapy (n=154). The baseline characteristics of these patients were: median age of 63 years (range: 24 to 93), 47% age 65 or older; 50% male; 75% White and 16% Asian; 52% and 48% had an ECOG performance status of 0 or 1, respectively. Mutation status: 25% BRAF V600E, 24% KRAS/NRAS. For 143 patients treated with chemotherapy, 56% received mFOLFOX6 with or without bevacizumab or cetuximab and 44% received FOLFIRI with or without bevacizumab or cetuximab.

The primary efficacy outcome measures were PFS assessed by BICR according to RECIST v1.1 and OS. Secondary outcome measures were ORR and response duration. The study demonstrated a statistically significant improvement in PFS (HR 0.60; 95% CI 0.45, 0.80; p-Value 0.0002) for patients randomised to the pembrolizumab arm compared with chemotherapy at the pre-specified final analysis for PFS. There was no statistically significant difference between pembrolizumab and chemotherapy in the final OS analysis in which 60% of the patients who had been randomised to receive chemotherapy had crossed over to receive subsequent anti-PD-1/PD-L1 therapies including pembrolizumab. Table 37 summarises the key efficacy measures and Figures 28 and 29 show the Kaplan Meier curves for updated PFS and OS based on the final analysis with a median follow-up time of 38.1 months (range: 0.2 to 58.7 months).

Table 37: Efficacy results in KEYNOTE-177

| Endpoint | Pembrolizumab 200 mg every 3 weeks n=153 | Chemotherapy n=154 |
|-----------------------------------|--|-----------------------|
| PFS* | | |
| Number (%) of patients with event | 86 (56%) | 117 (76%) |
| Median in months (95% CI) | 16.5 (5.4, 38.1) | 8.2 (6.1, 10.2) |
| Hazard ratio† (95% CI) | 0.59 (0.45, 0.79) | |
| p-Value‡ | 0.0001 | |
| OS§ | | |
| Number (%) of patients with event | 62 (41%) | 78 (51%) |
| Median in months (95% CI) | NR (49.2, NR) | 36.7 (27.6, NR) |
| Hazard ratio† (95% CI) | 0.74 (0.53, 1.03) | |
| p-Value§ | 0.0359 | |
| Objective response rate | | |
| ORR (95% CI) | 45% (37.1, 53.3) | 33% (25.8, 41.1) |
| Complete response rate | 13% | 4% |
| Partial response | 32% | 29% |
| Response duration | | |
| Median in months (range) | NR (2.3+, 53.5+) | 10.6 (2.8, 48.3+) |
| % with duration ≥ 24 months¶ | 84% | 34% |

*With additional 12 months of follow-up after the pre-specified final analysis for PFS.

†Based on Cox regression model

‡p-Value is nominal.

§Not statistically significant after adjustment for multiplicity

¶Based on Kaplan-Meier estimation

NR = not reached

Figure 28: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-177 (intent to treat population)

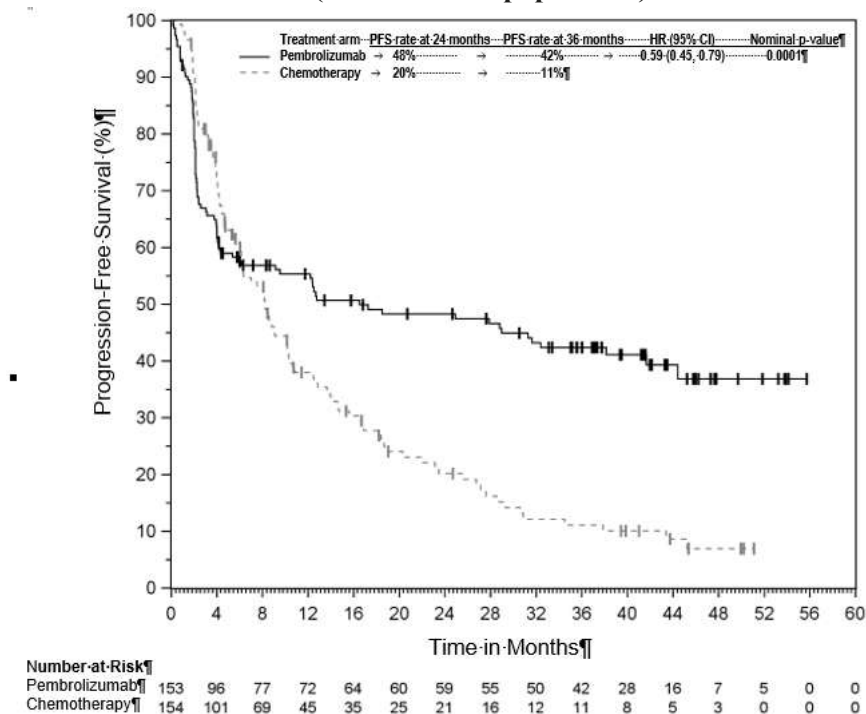
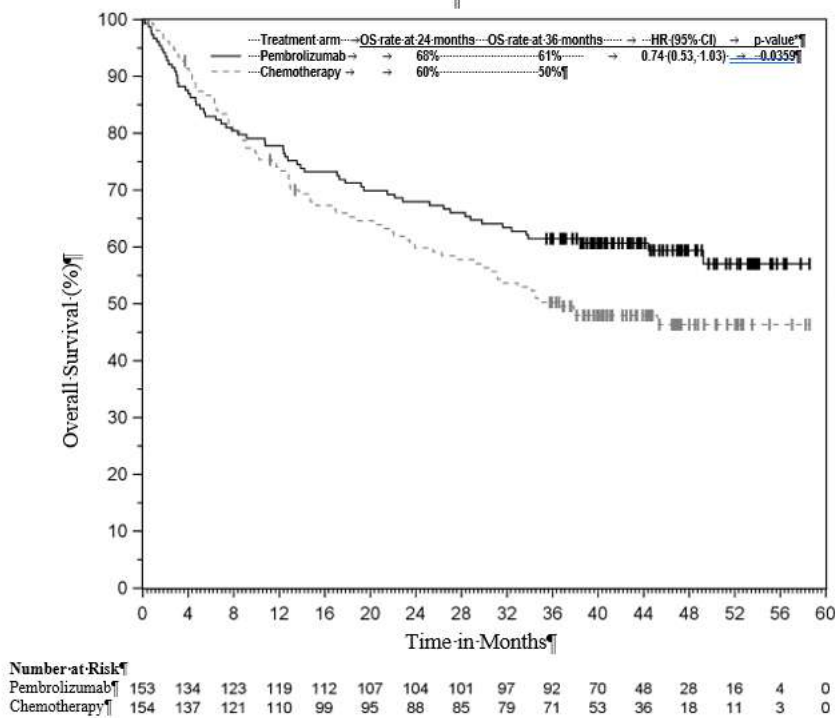


Figure 29: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-177 (intent to treat population)



*Not statistically significant after adjustment for multiplicity

KEYNOTE-164: Open-label study in patients with unresectable or metastatic MSI-H or dMMR CRC who have received prior therapy

The efficacy of pembrolizumab was investigated in KEYNOTE-164, a multicentre, non-randomised, open-label, multi-cohort Phase II study that enrolled patients with unresectable or metastatic MSI-H or dMMR CRC that progressed following prior fluoropyrimidine-based therapy in combination with irinotecan and/or oxaliplatin.

Patients received pembrolizumab 200 mg every 3 weeks until unacceptable toxicity or disease progression. Clinically stable patients with initial evidence of disease progression were permitted to remain on treatment until disease progression was confirmed. Patients without disease progression were treated for up to 24 months (up to 35 cycles). Assessment of tumour status was performed every 9 weeks.

Among the 124 patients enrolled in KEYNOTE-164, the baseline characteristics were: median age 56 years (35% age 65 or older); 56% male; 68% White, 27% Asian; 41% and 59% had an ECOG performance status of 0 and 1, respectively. Twelve percent of patients had BRAF mutations and 36% had RAS mutations; 39% and 34% were undetermined for BRAF and RAS mutations, respectively. Ninety-seven percent of the patients had M1 disease and 3% had M0 disease (locally advanced unresectable). Seventy-six percent of patients received 2 or more prior lines of therapy.

The primary efficacy outcome measure was ORR as assessed by BICR using RECIST 1.1. Secondary efficacy outcome measures included response duration, PFS, and OS. The median follow-up time in months was 37.3 (range: 0.1 to 65.2). Efficacy results are summarised in Table 38.

Table 38: Efficacy results in KEYNOTE-164

| | |
|-----------------|--------------|
| Endpoint | n=124 |
|-----------------|--------------|

| | |
|---|------------------|
| Objective response* rate | |
| ORR (95% CI) | 34% (25.6, 42.9) |
| Complete response | 10% |
| Partial response | 24% |
| Response duration* | |
| Median in months (range) | NR (4.4, 58.5+) |
| % with duration \geq 36 months [#] | 92% |

*Based on patients with a best objective response as confirmed complete or partial response

[#]Based on Kaplan-Meier estimation

+Denotes there is no progressive disease by the time of last disease assessment

NR = not reached

Objective responses were observed regardless of BRAF or RAS mutation status.

Non-colorectal cancers

KEYNOTE-158: Open-label study in patients with unresectable or metastatic MSI-H or dMMR endometrial, gastric, small intestine, or biliary cancer who have received prior therapy

The efficacy of pembrolizumab was investigated in 355 patients with unresectable or metastatic MSI-H or dMMR non-CRC solid tumours enrolled in a multicentre, non-randomised, open-label Phase II study (KEYNOTE-158), including patients with endometrial, gastric, small intestine, or biliary cancer. MSI or MMR tumour status was determined prospectively using PCR or IHC, respectively.

Patients received pembrolizumab 200 mg every 3 weeks until unacceptable toxicity or disease progression. Clinically stable patients with initial evidence of disease progression were permitted to remain on treatment until disease progression was confirmed. Patients without disease progression were treated for up to 24 months (up to 35 cycles). Assessment of tumour status was performed every 9 weeks through the first year, then every 12 weeks thereafter.

Among the 83 patients with endometrial cancer, the baseline characteristics were: median age of 64 years (range: 42 to 86), 46% age 65 or older; 84% White, 6% Asian, and 4% Black; and ECOG PS 0 (46%) and 1 (54%). Ninety-eight percent of the patients had M1 disease and 2% had M0 disease. Forty-seven percent of patients received 2 or more prior lines of therapy.

Among the 51 patients with gastric cancer, the baseline characteristics were: median age 67 years (range: 41 to 89); 57% age 65 or older; 65% male, 63% White, 28% Asian; and ECOG PS 0 (45%) and 1 (55%). All patients had M1 disease. Forty-five percent of patients received 2 or more prior lines of therapy.

Among the 27 patients with small intestinal cancer, the baseline characteristics were: median age 58 years (range: 21 to 77); 33% age 65 or older; 63% male, 81% White, 11% Asian; and ECOG PS 0 (56%) and 1 (44%). Ninety-six percent of patients had M1 disease and 4% M0 disease. Thirty-seven percent of patients received 2 or more prior lines of therapy. All patients had a tumour histology of adenocarcinoma.

Among the 22 patients with biliary cancer, the baseline characteristics were: median age 61 years (range: 40 to 77); 41% age 65 or older; 73% male, 91% White, 9% Asian; ECOG PS 0 (45%) and 1 (55%); and 82% M1 disease and 18% M0 disease. Forty-one percent of patients received 2 or more prior lines of therapy.

The primary efficacy outcome measure was ORR as assessed by BICR using RECIST 1.1. Secondary efficacy outcome measures included response duration, PFS, and OS. The median follow-up time in months was 21.9 (range: 1.5 to 64.0) for endometrial, 13.9 (range: 1.1 to 66.9) for gastric, 29.1 (4.2 to 67.7) for small intestine, and 19.4 (range: 1.1 to 60.8) for biliary cancer. Efficacy results are summarised in Table 39.

Table 39: Efficacy results in KEYNOTE-158

| Endpoint | Endometrial n=83 | Gastric n=51 | Small Intestine n=27 | Biliary n=22 |
|--|---------------------|---------------------|-------------------------|----------------------|
| Objective response* rate | | | | |
| ORR (95% CI) | 51% (39.4, 61.8) | 37% (24.1, 51.9) | 56% (35.3, 74.5) | 41% (20.7, 63.6) |
| Complete response | 16% | 14% | 15% | 14% |
| Partial response | 35% | 24% | 41% | 27% |
| Response duration* | | | | |
| Median in months (range) | NR (2.9, 60.4+) | NR (6.2, 63.0+) | NR (3.7+, 57.3+) | 30.6 (6.2, 46.0+) |
| % with duration ≥ 12 months [#] | 85% | 90% | 93% | 89% |
| % with duration ≥ 36 months [#] | 60% | 81% | 73% | 42% |

*Based on patients with a best objective response as confirmed complete or partial response

[#]Based on Kaplan-Meier estimation

+Denotes there is no progressive disease by the time of last disease assessment

NR = not reached

Oesophageal carcinoma

KEYNOTE-590: Controlled study of combination therapy in oesophageal carcinoma patients naïve to treatment

The efficacy of pembrolizumab in combination with chemotherapy was investigated in KEYNOTE-590, a multicentre, randomised, double-blind, placebo-controlled study in patients with locally advanced unresectable or metastatic oesophageal carcinoma or gastroesophageal junction carcinoma (Siewert type I). Patients with active autoimmune disease, a medical condition that required immunosuppression, or known HER-2 positive GEJ adenocarcinoma patients were ineligible for the study. Randomisation was stratified by tumour histology (squamous cell carcinoma vs. adenocarcinoma), geographic region (Asia vs. ex-Asia), and ECOG performance status (0 vs. 1).

Patients were randomised (1:1) to one of the following treatment arms:

- Pembrolizumab 200 mg on Day 1 of each three-week cycle in combination with cisplatin 80 mg/m² IV on Day 1 of each three-week cycle for up to six cycles and 5-FU 800 mg/m² IV per day on Day 1 to Day 5 of each three-week cycle, or per local standard for 5-FU administration.
- Placebo on Day 1 of each three-week cycle in combination with cisplatin 80 mg/m² IV on Day 1 of each three-week cycle for up to six cycles and 5-FU 800 mg/m² IV per day on Day 1 to Day 5 of each three-week cycle, or per local standard for 5-FU administration.

Treatment with pembrolizumab or chemotherapy continued until unacceptable toxicity or disease progression or a maximum of 24 months. Patients randomised to pembrolizumab were permitted to continue beyond the first RECIST v1.1-defined disease progression if clinically stable until the first

radiographic evidence of disease progression was confirmed at least 4 weeks later with repeat imaging. Assessment of tumour status was performed every 9 weeks.

Among the 749 patients in KEYNOTE-590, 383 (51%) had tumours that expressed PD-L1 with a CPS ≥ 10 based on the PD-L1 IHC 22C3 pharmDx™ Kit. The baseline characteristics of these 383 patients were: median age of 63 years (range: 28 to 89), 41% age 65 or older; 82% male; 34% White and 56% Asian; 43% and 57% had an ECOG performance status of 0 and 1, respectively. Ninety-three percent had M1 disease. Seventy-five percent had a tumour histology of squamous cell carcinoma, and 25% had adenocarcinoma.

The primary efficacy outcome measures were OS and PFS as assessed by the investigator according to RECIST 1.1 in squamous cell histology, CPS ≥ 10 , and in all patients. The study demonstrated a statistically significant improvement in OS and PFS for all pre-specified study populations. In all patients randomised to pembrolizumab in combination with chemotherapy, compared to chemotherapy the OS HR was 0.73 (95% CI 0.62-0.86) and the PFS HR was 0.65 (95% CI 0.55-0.76). Secondary efficacy outcome measures were ORR and duration of response, according to RECIST 1.1 as assessed by the investigator. Table 40 summarises key efficacy measures from the pre-specified analysis in patients whose tumours expressed PD-L1 with a CPS ≥ 10 in KEYNOTE-590 performed at a median follow-up time of 13.5 months (range: 0.5 to 32.7 months). The Kaplan-Meier curve for OS and PFS are shown in Figures 30 and 31.

Table 40: Efficacy results for pembrolizumab plus chemotherapy in KEYNOTE-590 with PD-L1 expression (CPS ≥ 10)

| Endpoint | Pembrolizumab Cisplatin Chemotherapy 5-FU n=186 | Standard Treatment* n=197 |
|---|--|---------------------------------|
| OS | | |
| Number (%) of patients with event | 124 (66.7%) | 165 (83.8%) |
| Median in months [†] (95% CI) | 13.5 (11.1, 15.6) | 9.4 (8.0, 10.7) |
| Hazard ratio [‡] (95% CI) | 0.62 (0.49, 0.78) | |
| p-Value [§] | < 0.0001 | |
| PFS[¶] | | |
| Number (%) of patients with event | 140 (75.3) | 174 (88.3) |
| Median in months [†] (95% CI) | 7.5 (6.2, 8.2) | 5.5 (4.3, 6.0) |
| Hazard ratio [‡] (95% CI) | 0.51 (0.41, 0.65) | |
| p-Value [§] | < 0.0001 | |
| Objective response rate[¶] | | |
| Objective response rate [§] (95% CI) | 51.1 (43.7, 58.5) | 26.9 (20.8, 33.7) |
| Complete response | 5.9% | 2.5% |
| Partial response | 45.2% | 24.4% |
| p-Value [#] | < 0.0001 | |
| Response duration^{¶, p} | | |
| Median in months (range) | 10.4 (1.9, 28.9+) | 5.6 (1.5+, 25.0+) |
| % with duration ≥ 6 months [†] | 80.2% | 47.7% |
| % with duration ≥ 12 months [†] | 43.7% | 23.2% |

| | | |
|---|-------|-------|
| % with duration \geq 18 months [†] | 33.4% | 10.4% |
|---|-------|-------|

*Cisplatin and 5-FU

[†]Based on Kaplan-Meier estimation

[‡]Based on the stratified Cox proportional hazard model

[§]One-sided p-Value based on log-rank test stratified by geographic region (Asia versus Rest of the World) and tumour histology (Adenocarcinoma versus Squamous Cell Carcinoma) and ECOG performance status (0 versus 1)

[¶]Assessed by investigator using RECIST 1.1

[#]One-sided p-Value for testing. H0: difference in % = 0 versus H1: difference in % > 0

[‡]Best objective response as confirmed complete response or partial response.

A total of 32 patients aged \geq 75 years for PD-L1 CPS \geq 10 were enrolled in KEYNOTE-590 (18 in the pembrolizumab combination and 14 in the control). Data about efficacy of pembrolizumab in combination with chemotherapy are too limited in this patient population.

Figure 30: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-590 with PD-L1 expression (CPS \geq 10)

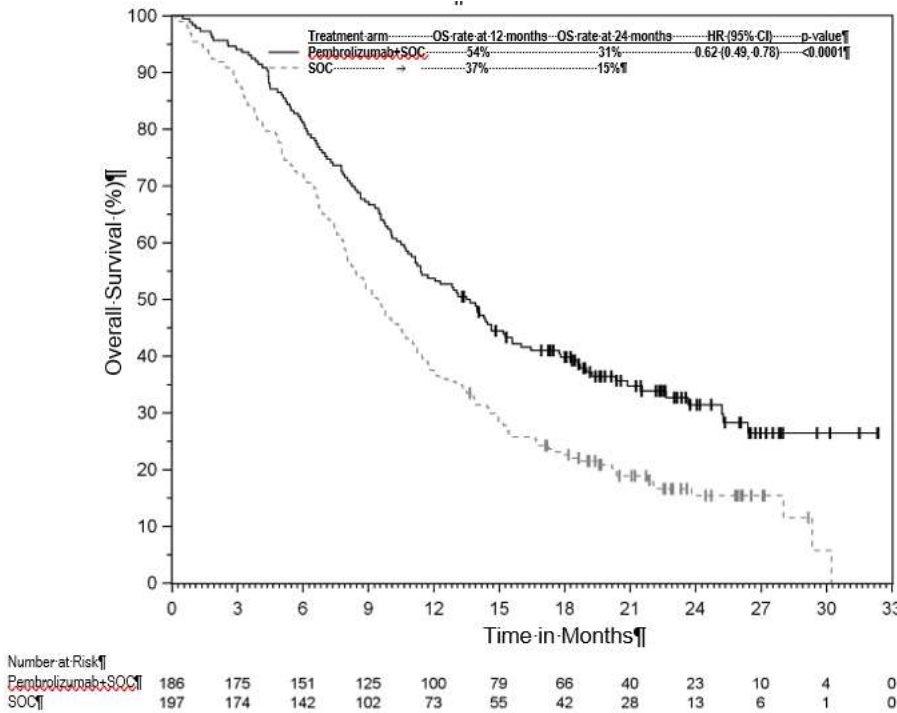
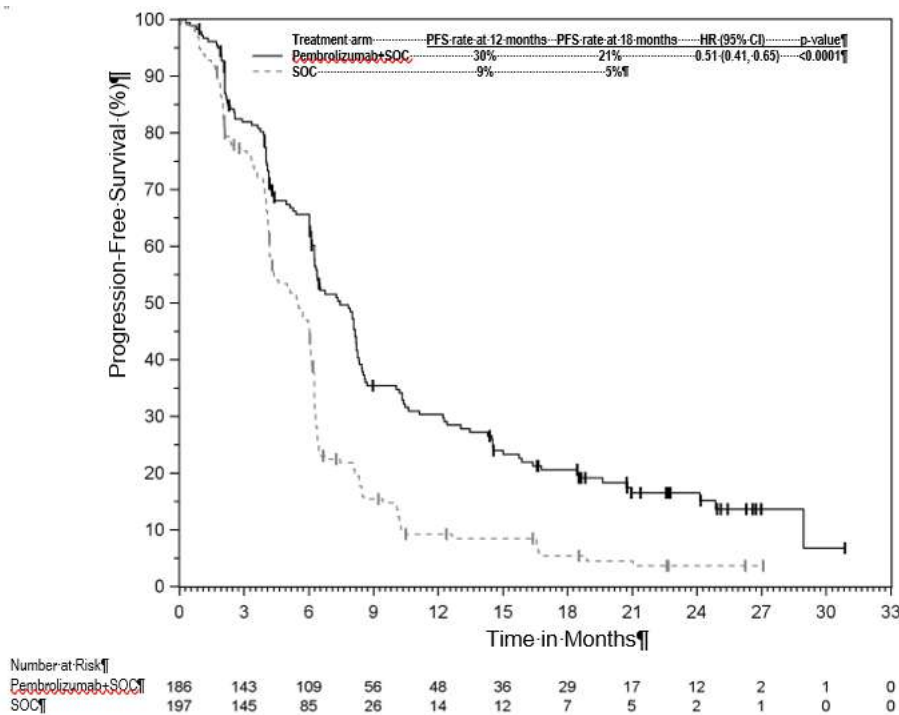


Figure 31: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-590 with PD-L1 expression (CPS \geq 10)



Triple-negative breast cancer

KEYNOTE-522: Controlled study of neoadjuvant and adjuvant therapy in patients with locally advanced, inflammatory, or early-stage triple-negative breast cancer at high risk of recurrence

The efficacy of pembrolizumab in combination with chemotherapy as neoadjuvant treatment and then continued as monotherapy as adjuvant treatment after surgery was investigated in the randomised, double-blind, multicentre, placebo-controlled study KEYNOTE-522. If indicated, patients received adjuvant radiation therapy prior to or concurrent with adjuvant pembrolizumab or placebo. The key eligibility criteria for this study were locally advanced, inflammatory, or early-stage TNBC at high risk of recurrence (tumour size > 1 cm but ≤ 2 cm in diameter with nodal involvement or tumour size > 2 cm in diameter regardless of nodal involvement), regardless of tumour PD-L1 expression. Patients with active autoimmune disease that required systemic therapy within 2 years of treatment or a medical condition that required immunosuppression were ineligible for the study. Randomisation was stratified by nodal status (positive vs. negative), tumour size (T1/T2 vs. T3/T4), and choice of carboplatin (dosed every 3 weeks vs. weekly). Patients were randomised (2:1) to receive either pembrolizumab or placebo via intravenous infusion:

- Four cycles of neoadjuvant pembrolizumab 200 mg every 3 weeks or placebo on Day 1 of cycles 1-4 of treatment regimen in combination with:
 - Carboplatin
 - AUC 5 mg/mL/min every 3 weeks on Day 1 of cycles 1-4 of treatment regimen **or** AUC 1.5 mg/mL/min every week on Day 1, 8, and 15 of cycles 1-4 of treatment regimen **and**
 - Paclitaxel 80 mg/m² every week on Day 1, 8, and 15 of cycles 1-4 of treatment regimen
- Followed by four additional cycles of neoadjuvant pembrolizumab 200 mg every 3 weeks or placebo on Day 1 of cycles 5-8 of treatment regimen in combination with:
 - Doxorubicin 60 mg/m² **or** epirubicin 90 mg/m² every 3 weeks on Day 1 of cycles 5-8 of treatment regimen **and**
 - Cyclophosphamide 600 mg/m² every 3 weeks on Day 1 of cycles 5-8 of treatment regimen

- Following surgery, 9 cycles of adjuvant pembrolizumab 200 mg every 3 weeks or placebo were administered.

Treatment with pembrolizumab or placebo continued until completion of the treatment (17 cycles), disease progression that precludes definitive surgery, disease recurrence in the adjuvant phase, or unacceptable toxicity.

A total of 1,174 patients were randomised. The study population characteristics were: median age of 49 years (range: 22 to 80); 11% age 65 or older; 99.9% female; 64% White; 20% Asian, 5% Black, and 2% American Indian or Alaska Native; ECOG performance status of 0 (87%) and 1 (13%); 56% were pre-menopausal status and 44% were post-menopausal status; 7% were primary Tumour 1 (T1), 68% T2, 19% T3, and 7% T4; 49% were nodal involvement 0 (N0), 40% N1, 11% N2, and 0.2% N3; 1.4% of patients had inflammatory breast cancer; 75% of patients were overall Stage II and 25% were Stage III.

The dual primary efficacy outcome measures were pathological complete response (pCR) rate and event-free survival (EFS). pCR was defined as absence of invasive cancer in the breast and lymph nodes (ypT0/Tis ypN0) and was assessed by the blinded local pathologist at the time of definitive surgery. EFS was defined as the time from randomisation to the first occurrence of any of the following events: progression of disease that precludes definitive surgery, local or distant recurrence, second primary malignancy, or death due to any cause. The study demonstrated a statistically significant improvement in pCR rate difference at its pre-specified primary analysis (n=602), the pCR rates were 64.8% (95% CI: 59.9%, 69.5%) in the pembrolizumab arm and 51.2% (95% CI: 44.1%, 58.3%) in the placebo arm, with a treatment difference of 13.6% (95% CI: 5.4%, 21.8%; p-Value 0.00055). The study also demonstrated a statistically significant improvement in EFS at its pre-specified analysis. A secondary efficacy outcome measure was OS. At the time of EFS analysis, OS results were not yet mature (45% of the required events for final analysis). At a pre-specified interim analysis, the median follow-up time for all patients was 37.8 months (range: 2.7-48 months). Table 41 summarises key efficacy measures from the pre-specified analyses. The Kaplan-Meier curve for EFS and OS are shown in Figures 32 and 33.

Table 41: Efficacy results in KEYNOTE-522

| Endpoint | Pembrolizumab with Chemotherapy/Pembrolizumab | Placebo with Chemotherapy/Placebo |
|--|--|--------------------------------------|
| pCR (ypT0/Tis ypN0)* | n=669 | n=333 |
| Number of patients with pCR | 428 | 182 |
| pCR Rate (%),(95% CI) | 64.0 (60.2, 67.6) | 54.7 (49.1, 60.1) |
| Treatment difference (%) estimate (95% CI)† | 9.2 (2.8, 15.6) | |
| p-Value‡ | 0.00221 | |
| EFS§ | n=784 | n=390 |
| Number of patients with event (%) | 123 (15.7) | 93 (23.8) |
| 24 month EFS rate (95% CI) | 87.8 (85.3, 89.9) | 81.0 (76.8, 84.6) |
| Hazard ratio (95% CI)¶ | 0.63 (0.48, 0.82) | |
| p-Value# | 0.00031 | |
| OS^p | | |
| Number (%) of patients with event | 80 (10.2) | 55 (14.1) |
| 24-month OS rate (95% CI) | 92.3 (90.2, 94.0) | 91.0 (87.7, 93.5) |
| Hazard ratio (95% CI)¶ | 0.72 (0.51, 1.02) | |

- *Based on a pre-specified pCR final analysis (compared to a significance level of 0.0028)
- †Based on Miettinen and Nurminen method stratified by nodal status, tumour size, and choice of carboplatin
- ‡One-sided p-Value for testing. H0: difference in % = 0 versus H1: difference in % > 0
- §Based on a pre-specified EFS interim analysis (compared to a significance level of 0.0052)
- ¶Based on Cox regression model with Efron’s method of tie handling with treatment as a covariate stratified by nodal status, tumour size, and choice of carboplatin
- #One-sided p-Value based on log-rank test stratified by nodal status, tumour size, and choice of carboplatin
- ‡OS results at interim analysis did not meet the pre-specified efficacy boundary of 0.00085861 for statistical significance.

Figure 32: Kaplan-Meier curve for event-free survival by treatment arm in KEYNOTE-522 (intent to treat population)

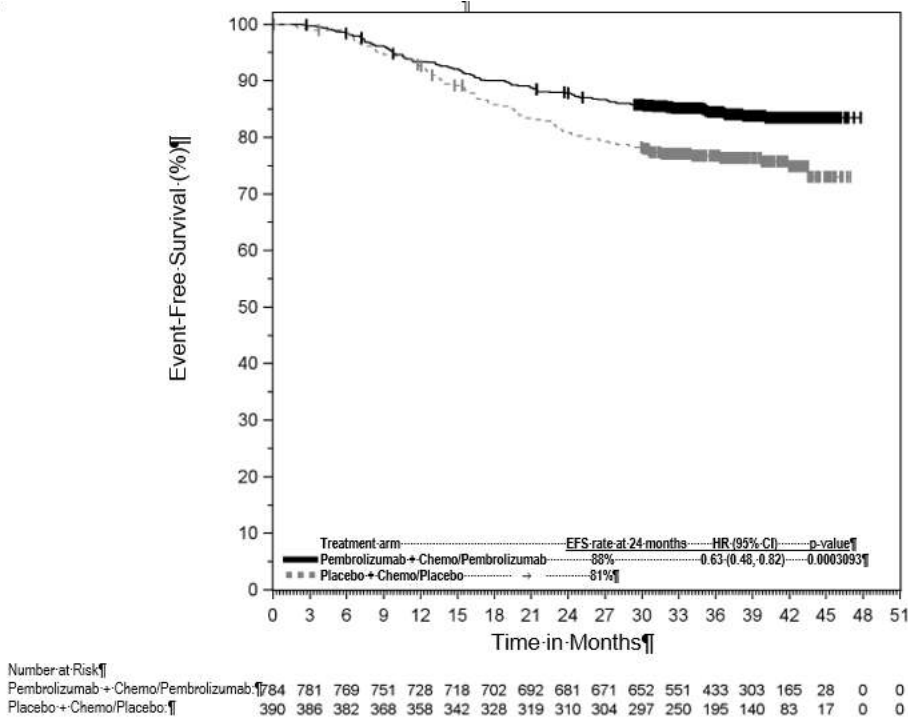
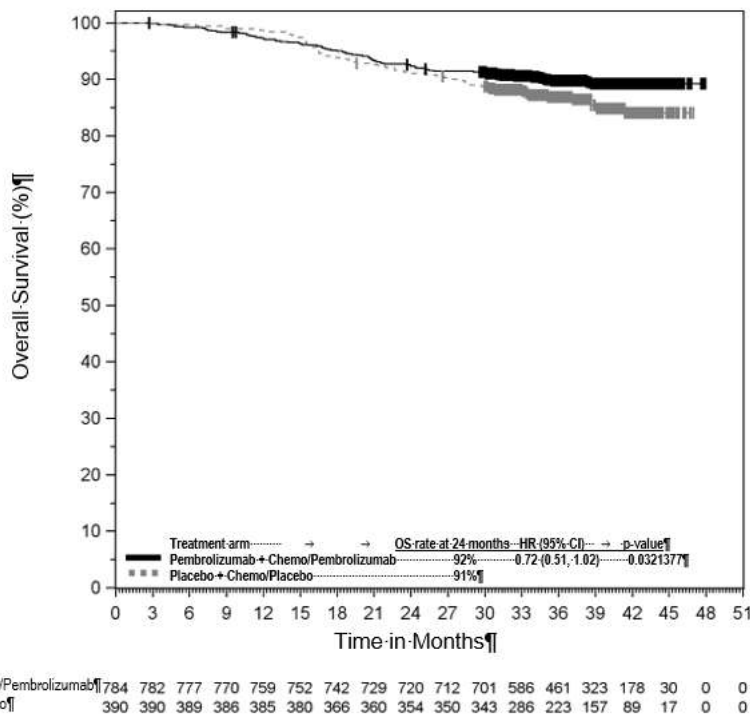


Figure 33: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-522 (intent to treat population)

- 71



KEYNOTE-355: Controlled study of combination therapy in TNBC patients previously untreated for metastatic disease

The efficacy of pembrolizumab in combination with paclitaxel, nab-paclitaxel, or gemcitabine and carboplatin was investigated in KEYNOTE-355, a randomised, double-blind, multicentre, placebo-controlled study. Key eligibility criteria were locally recurrent unresectable or metastatic TNBC, regardless of tumour PD-L1 expression, not previously treated with chemotherapy in the advanced setting. Patients with active autoimmune disease that required systemic therapy within 2 years of treatment or a medical condition that required immunosuppression were ineligible. Randomisation was stratified by chemotherapy treatment (paclitaxel or nab-paclitaxel vs. gemcitabine and carboplatin), tumour PD-L1 expression (CPS ≥ 1 vs. CPS < 1), and prior treatment with the same class of chemotherapy in the neoadjuvant setting (yes vs. no). Patients were randomised (2:1) to one of the following treatment arms via intravenous infusion:

- Pembrolizumab 200 mg on Day 1 every 3 weeks in combination with nab-paclitaxel 100 mg/m² on Days 1, 8 and 15 every 28 days, or paclitaxel 90 mg/m² on Days 1, 8, and 15 every 28 days, or gemcitabine 1,000 mg/m² and carboplatin AUC 2 mg/mL/min on Days 1 and 8 every 21 days.
- Placebo on Day 1 every 3 weeks in combination with nab-paclitaxel 100 mg/m² on Days 1, 8 and 15 every 28 days, or paclitaxel 90 mg/m² on Days 1, 8, and 15 every 28 days, or gemcitabine 1,000 mg/m² and carboplatin AUC 2 mg/mL/min on Days 1 and 8 every 21 days.

Treatment with pembrolizumab or placebo, both in combination with chemotherapy, continued until RECIST 1.1-defined progression of disease as determined by the investigator, unacceptable toxicity, or a maximum of 24 months. Chemotherapy could continue per standard of care. Administration of pembrolizumab was permitted beyond RECIST-defined disease progression if the patient was clinically stable and deriving clinical benefit as determined by the investigator. Assessment of tumour status was performed at Weeks 8, 16, and 24, then every 9 weeks for the first year, and every 12 weeks thereafter.

Among the 847 patients randomised in KEYNOTE-355, 636 (75%) had tumours that expressed PD-L1 with a CPS ≥ 1 and 323 (38%) had tumour PD-L1 expression CPS ≥ 10 based on the PD-L1 IHC

22C3 pharmDx™ Kit. The baseline characteristics of the 323 patients with tumour PD-L1 expression CPS ≥ 10 included: median age of 53 years (range: 22 to 83); 20% age 65 or older; 100% female; 69% White, 20% Asian, and 5% Black; ECOG performance status of 0 (61%) and 1 (39%); 67% were post-menopausal status; 3% had a history of brain metastases; and 20% had disease-free interval of < 12 months.

The dual primary efficacy outcome measures were PFS as assessed by BICR using RECIST 1.1 and OS. Secondary efficacy outcome measures were ORR and response duration as assessed by BICR using RECIST 1.1. The study demonstrated a statistically significant improvement in PFS at its pre-specified interim analysis (HR 0.65; 95% CI 0.49, 0.86; p-Value 0.0012) and OS at final analysis for patients with tumour PD-L1 expression CPS ≥ 10 randomised to the pembrolizumab in combination with chemotherapy arm compared with placebo in combination with chemotherapy. Table 42 summarises key efficacy measures and Figures 34 and 35 show the Kaplan-Meier curves for PFS and OS based on the final analysis with a median follow-up time of 20.2 months (range: 0.3 to 53.1 months) for patients with tumour PD-L1 expression CPS ≥ 10 .

Table 42: Efficacy results in KEYNOTE-355 patients with CPS ≥ 10

| Endpoint | Pembrolizumab with chemotherapy* n=220 | Placebo with chemotherapy* n=103 |
|---|--|--|
| PFS[†] | | |
| Number (%) of patients with event | 144 (65%) | 81 (79%) |
| Hazard ratio [‡] (95% CI) | 0.66 (0.50, 0.88) | |
| p-Value [§] | 0.0018 | |
| Median in months (95% CI) | 9.7 (7.6, 11.3) | 5.6 (5.3, 7.5) |
| OS | | |
| Number (%) of patients with event | 155 (70%) | 84 (82%) |
| Hazard ratio [‡] (95% CI) | 0.73 (0.55, 0.95) | |
| p-Value [¶] | 0.0093 | |
| Median in months (95% CI) | 23.0 (19.0, 26.3) | 16.1 (12.6, 18.8) |
| Objective response rate[†] | | |
| ORR % (95% CI) | 53% (46, 60) | 41% (31, 51) |
| Complete response | 17% | 14% |
| Partial response | 36% | 27% |
| Response duration[†] | | |
| Median in months (range) | 12.8 (1.6+, 45.9+) | 7.3 (1.5, 46.6+) |
| % with duration ≥ 6 months [#] | 82% | 60% |
| % with duration ≥ 12 months [#] | 56% | 38% |

*Chemotherapy: paclitaxel, nab-paclitaxel, or gemcitabine and carboplatin

[†]Assessed by BICR using RECIST 1.1

[‡]Based on Cox regression model with Efron's method of tie handling with treatment as a covariate stratified by chemotherapy on study (taxane vs. gemcitabine and carboplatin) and prior treatment with same class of chemotherapy in the neoadjuvant setting (yes vs. no)

[§]Nominal p-Value based on log-rank test stratified by chemotherapy on study (taxane vs. gemcitabine and carboplatin) and prior treatment with same class of chemotherapy in the neoadjuvant setting (yes vs. no). At the pre-specified interim analysis of PFS (median follow-up time of 19.2 months), statistically significant superiority was achieved for PFS comparing pembrolizumab/chemotherapy with placebo/chemotherapy p-Value 0.0012.

[¶]One-sided p-Value based on log-rank test stratified by chemotherapy on study (taxane vs. gemcitabine and carboplatin) and prior treatment with same class of chemotherapy in the neoadjuvant setting (yes vs. no). OS results met the pre-specified efficacy boundary of 0.0113 for statistical significance.

[#]From product-limit (Kaplan-Meier) method for censored data

+Denotes there is no progressive disease by the time of last disease assessment

Figure 34: Kaplan-Meier curve for progression-free survival by treatment arm in KEYNOTE-355 patients with PD-L1 expression (CPS ≥ 10)

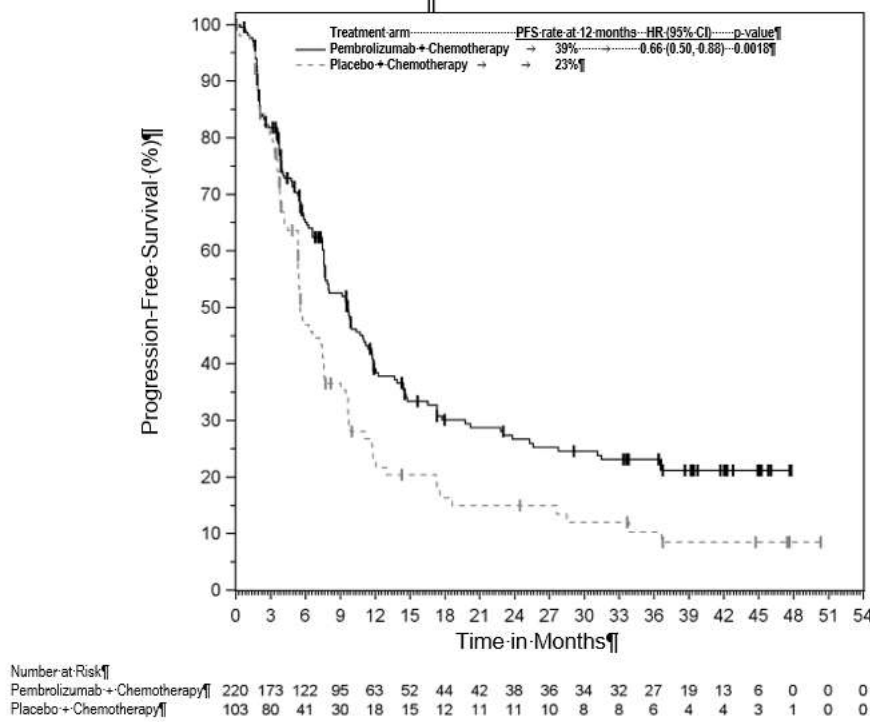
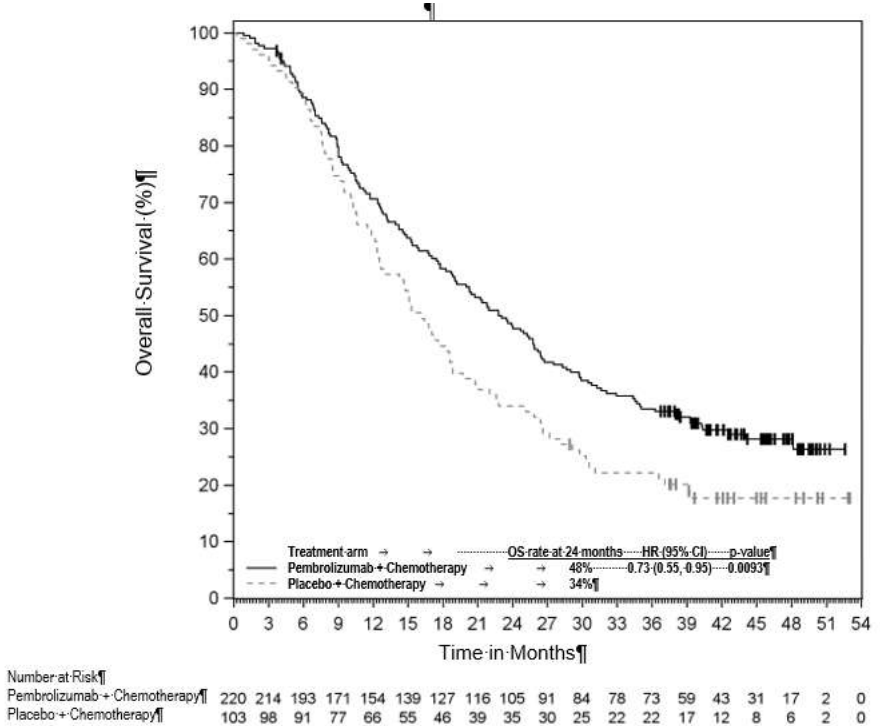


Figure 35: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-355 patients with PD-L1 expression (CPS ≥ 10)



Endometrial carcinomaKEYNOTE-775: Controlled study of combination therapy in advanced EC patients previously treated with systemic chemotherapy

The efficacy of pembrolizumab in combination with lenvatinib was investigated in KEYNOTE-775, a randomised, multicentre, open-label, active-controlled study conducted in patients with advanced EC who had been previously treated with at least one prior platinum-based chemotherapy regimen in any setting, including in the neoadjuvant and adjuvant settings. Participants may have received up to 2 platinum-containing therapies in total, as long as one was given in the neoadjuvant or adjuvant treatment setting. The study excluded patients with endometrial sarcoma, carcinosarcoma, pre-existing Grade ≥ 3 fistula, uncontrolled BP ($> 150/90$ mmHg), significant cardiovascular impairment or event within previous 12 months, or patients who had active autoimmune disease or a medical condition that required immunosuppression. Randomisation was stratified by MMR status (dMMR or pMMR [mismatch repair proficient]) using a validated IHC test. The pMMR stratum was further stratified by ECOG performance status, geographic region, and history of pelvic radiation. Patients were randomised (1:1) to one of the following treatment arms:

- pembrolizumab 200 mg intravenously every 3 weeks in combination with lenvatinib 20 mg orally once daily.
- investigator's choice consisting of either doxorubicin 60 mg/m² every 3 weeks, or paclitaxel 80 mg/m² weekly, 3 weeks on/1 week off.

Treatment with pembrolizumab and lenvatinib continued until RECIST v1.1-defined progression of disease as verified by BICR, unacceptable toxicity, or for pembrolizumab, a maximum of 24 months. Administration of study treatment was permitted beyond RECIST-defined disease progression if the treating investigator considered the patient to be deriving clinical benefit and the treatment was tolerated. A total of 121/411 (29%) of the pembrolizumab and lenvatinib-treated patients received continued study therapy beyond RECIST-defined disease progression. The median duration of the post-progression therapy was 2.8 months. Assessment of tumour status was performed every 8 weeks.

A total of 827 patients were enrolled and randomised to pembrolizumab in combination with lenvatinib (n=411) or investigator's choice of doxorubicin (n=306) or paclitaxel (n=110). The baseline characteristics of these patients were: median age of 65 years (range: 30 to 86), 50% age 65 or older; 61% White, 21% Asian, and 4% Black; ECOG PS of 0 (59%) or 1 (41%), and 84% with pMMR tumour status and 16% with dMMR tumour status. The histologic subtypes were endometrioid carcinoma (60%), serous (26%), clear cell carcinoma (6%), mixed (5%), and other (3%). All 827 of these patients received prior systemic therapy for EC: 69% had one, 28% had two, and 3% had three or more prior systemic therapies. 37% of patients received only prior neoadjuvant or adjuvant therapy.

The primary efficacy outcome measures were OS and PFS (as assessed by BICR using RECIST 1.1). Secondary efficacy outcome measures included ORR, as assessed by BICR using RECIST 1.1. The median follow-up time was 11.4 months (range: 0.3 to 26.9 months). Efficacy results by MMR subgroups were consistent with overall study results. Efficacy measures are summarised in Table 43 and Kaplan-Meier curves for OS and PFS are shown in Figures 36 and 37, respectively.

Table 43: Efficacy results in KEYNOTE-775

| Endpoint | Pembrolizumab 200 mg every 3 weeks Lenvatinib n=411 | Chemotherapy* n=416 |
|-----------------------------------|--|----------------------------|
| OS | | |
| Number (%) of patients with event | 188 (46%) | 245 (59%) |

| | | |
|---------------------------------------|--------------------|-------------------|
| Median in months (95% CI) | 18.3 (15.2, 20.5) | 11.4 (10.5, 12.9) |
| Hazard ratio [†] (95% CI) | 0.62 (0.51, 0.75) | |
| p-Value [‡] | < 0.0001 | |
| PFS | | |
| Number (%) of patients with event | 281 (68%) | 286 (69%) |
| Median in months (95% CI) | 7.2 (5.7, 7.6) | 3.8 (3.6, 4.2) |
| Hazard ratio [†] (95% CI) | 0.56 (0.47, 0.66) | |
| p-Value [‡] | < 0.0001 | |
| Objective response rate | | |
| ORR [§] (95% CI) | 32% (27, 37) | 15% (11, 18) |
| Complete response % | 7% | 3% |
| Partial response % | 25% | 12% |
| p-Value [¶] | < 0.0001 | |
| Response duration | | |
| Median in months [#] (range) | 14.4 (1.6+, 23.7+) | 5.7 (0.0+, 24.2+) |

*Doxorubicin or Paclitaxel

[†]Based on the stratified Cox regression model

[‡]One-sided p-Value based on stratified log-rank test

[§]Response: Best objective response as confirmed complete response or partial response

[¶]Based on Miettinen and Nurminen method stratified by MMR Status, ECOG performance status, geographic region, and history of pelvic radiation

[#]Based on Kaplan-Meier estimation

Figure 36: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-775 (intent to treat population)

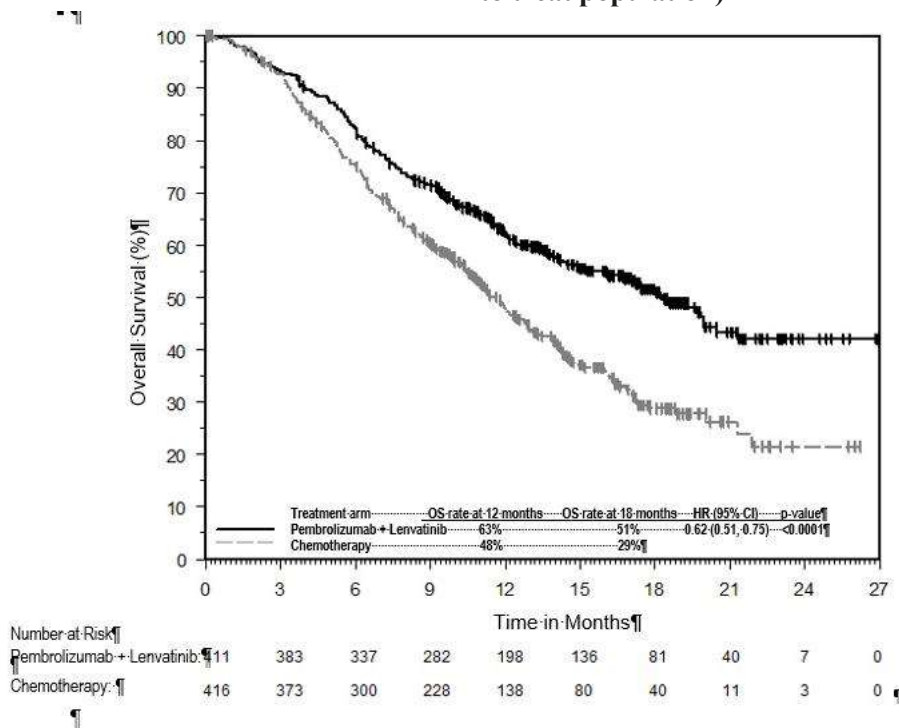
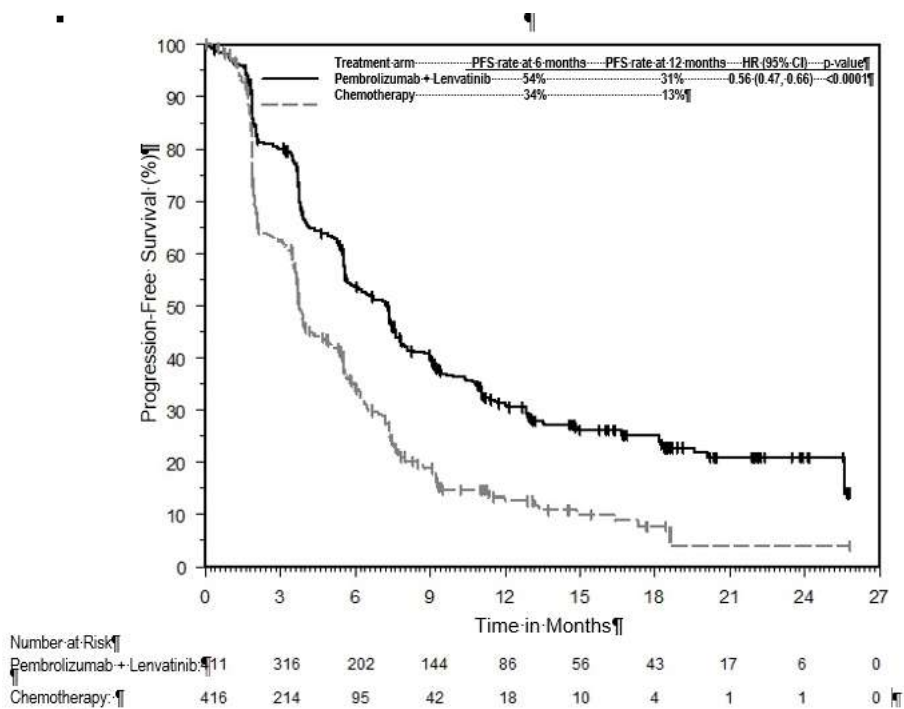


Figure 37: Kaplan-Meier curve for progression free-survival by treatment arm in KEYNOTE-775 (intent to treat population)



For pMMR patients (n=697), the OS HR was 0.68 (95% CI: 0.56, 0.84), p=0.0001, one-sided; with median OS of 17.4 months for pembrolizumab and lenvatinib versus 12.0 months for chemotherapy. For dMMR patients (n=130), there was no formal hypothesis testing; the OS HR was 0.37 (95% CI: 0.22, 0.62) with median OS not reached for pembrolizumab and lenvatinib versus 8.6 months for chemotherapy.

Cervical cancer

KEYNOTE-826: Controlled study of combination therapy in patients with persistent, recurrent, or metastatic cervical cancer

The efficacy of pembrolizumab in combination with paclitaxel and cisplatin or paclitaxel and carboplatin, with or without bevacizumab, was investigated in KEYNOTE-826, a multicentre, randomised, double-blind, placebo-controlled study that enrolled 617 patients with persistent, recurrent, or first-line metastatic cervical cancer who had not been treated with chemotherapy except when used concurrently as a radio-sensitising agent. Patients were enrolled regardless of tumour PD-L1 expression status. Patients with autoimmune disease that required systemic therapy within 2 years of treatment or a medical condition that required immunosuppression were ineligible. Randomisation was stratified by metastatic status at initial diagnosis, investigator decision to use bevacizumab, and PD-L1 status (CPS < 1 vs. CPS 1 to < 10 vs. CPS ≥ 10). Patients were randomised (1:1) to one of the two treatment groups:

- Treatment Group 1: Pembrolizumab 200 mg plus chemotherapy with or without bevacizumab
- Treatment Group 2: Placebo plus chemotherapy with or without bevacizumab

The investigator selected one of the following four treatment regimens prior to randomisation:

1. Paclitaxel 175 mg/m² + cisplatin 50 mg/m²
2. Paclitaxel 175 mg/m² + cisplatin 50 mg/m² + bevacizumab 15 mg/kg
3. Paclitaxel 175 mg/m² + carboplatin AUC 5 mg/mL/min
4. Paclitaxel 175 mg/m² + carboplatin AUC 5 mg/mL/min + bevacizumab 15 mg/kg

All study medications were administered as an intravenous infusion. All study treatments were administered on Day 1 of each 3-week treatment cycle. Cisplatin could be administered on Day 2 of each 3-week treatment cycle. The option to use bevacizumab was by investigator choice prior to

randomisation. Treatment with pembrolizumab continued until RECIST v1.1-defined progression of disease, unacceptable toxicity, or a maximum of 24 months. Administration of pembrolizumab was permitted beyond RECIST-defined disease progression if the patient was clinically stable and considered to be deriving clinical benefit by the investigator. Assessment of tumour status was performed at Week 9 and then every 9 weeks for the first year, followed by every 12 weeks thereafter.

Of the 617 enrolled patients, 548 patients (89%) had tumours expressing PD-L1 with a CPS ≥ 1 based on the PD-L1 IHC 22C3 pharmDx™ Kit. Among these 548 enrolled patients with tumours expressing PD-L1, 273 patients were randomised to pembrolizumab in combination with chemotherapy with or without bevacizumab, and 275 patients were randomised to placebo in combination with chemotherapy with or without bevacizumab. The baseline characteristics of these 548 patients were: median age of 51 years (range: 22 to 82), 16% age 65 or older; 59% White, 18% Asian, and 1% Black; 37% Hispanic or Latino; 56% and 43% ECOG performance status of 0 or 1, respectively; 63% received bevacizumab as study treatment; 21% with adenocarcinoma and 5% with adenosquamous histology; for patients with persistent or recurrent disease with or without distant metastases, 39% had received prior chemoradiation only and 17% had received prior chemoradiation plus surgery.

The primary efficacy outcome measures were OS and PFS as assessed by investigator according to RECIST v1.1. Secondary efficacy outcome measures were ORR and duration of response, according to RECIST v1.1, as assessed by investigator. The study demonstrated statistically significant improvements in OS and PFS for patients randomised to pembrolizumab in combination with chemotherapy with or without bevacizumab compared to placebo in combination with chemotherapy with or without bevacizumab at a pre-specified interim analysis in the overall population. The median follow-up time was 17.2 months (range: 0.3 to 29.4 months). Table 44 summarises key efficacy measures for patients whose tumours expressed PD-L1 with a CPS ≥ 1 in KEYNOTE-826 from the pre-specified interim analysis. The Kaplan-Meier curves for OS and PFS are shown in Figures 38 and 39.

Table 44: Efficacy results in KEYNOTE-826 for patients with PD-L1 expression (CPS ≥ 1)

| Endpoint | Pembrolizumab 200 mg every 3 weeks plus Chemotherapy* with or without bevacizumab n=273 | Placebo plus Chemotherapy* with or without bevacizumab n=275 |
|------------------------------------|--|---|
| OS | | |
| Number of patients with event (%) | 118 (43) | 154 (56) |
| Median in months (95% CI) | NR (19.8, NR) | 16.3 (14.5, 19.4) |
| Hazard ratio [†] (95% CI) | 0.64 (0.50, 0.81) | |
| p-Value [‡] | 0.0001 | |
| PFS | | |
| Number of patients with event (%) | 157 (58) | 198 (72) |
| Median in months (95% CI) | 10.4 (9.7, 12.3) | 8.2 (6.3, 8.5) |
| Hazard ratio [†] (95% CI) | 0.62 (0.50, 0.77) | |
| p-Value [§] | < 0.0001 | |
| Objective response rate | | |
| ORR [¶] (95% CI) | 68% (62, 74) | 50% (44, 56) |
| Complete response | 23% | 13% |
| Partial response | 45% | 37% |

| Duration of response | | |
|---|--------------------|--------------------|
| Median in months (range) | 18.0 (1.3+, 24.2+) | 10.4 (1.5+, 22.0+) |
| % with duration \geq 12 months [#] | 56 | 46 |

*Chemotherapy (paclitaxel and cisplatin or paclitaxel and carboplatin)

[†]Based on the stratified Cox proportional hazard model

[‡]Based on stratified log-rank test (compared to an alpha boundary of 0.00549)

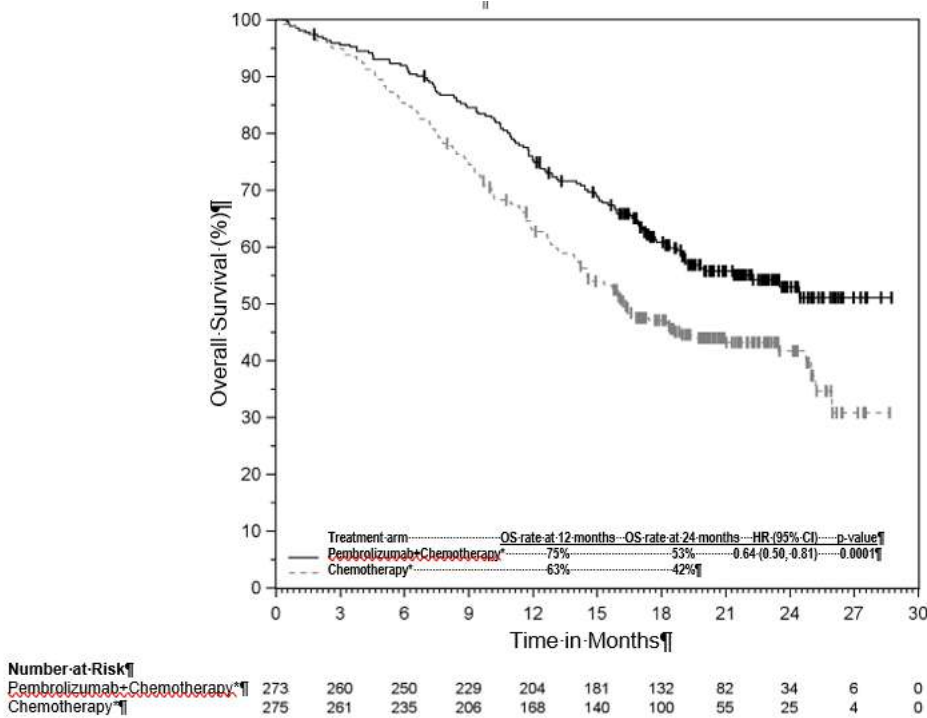
[§]Based on stratified log-rank test (compared to an alpha boundary of 0.00144)

[¶]Response: Best objective response as confirmed complete response or partial response

[#]Based on Kaplan-Meier estimation

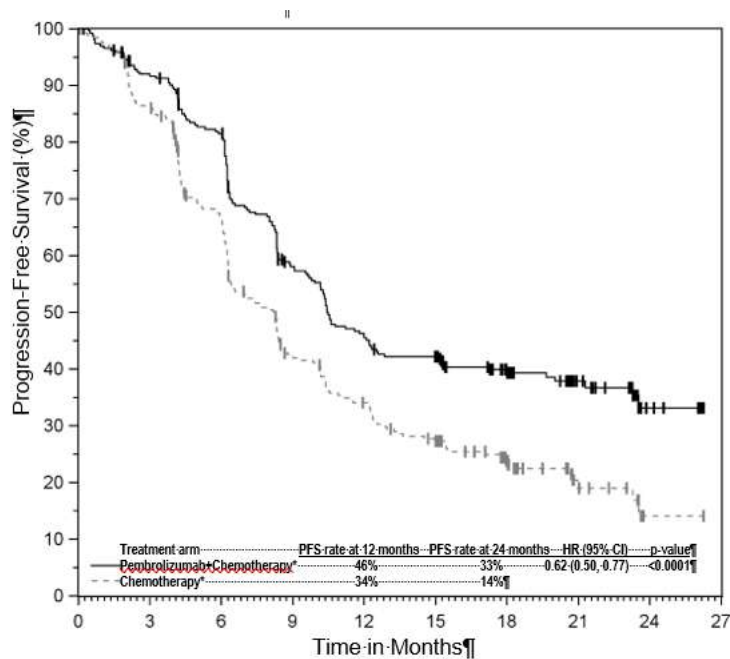
NR = not reached

Figure 38: Kaplan-Meier curve for overall survival by treatment arm in KEYNOTE-826 patients with PD-L1 expression (CPS \geq 1)



*Chemotherapy (paclitaxel and cisplatin or paclitaxel and carboplatin) with or without bevacizumab

Figure 39: Kaplan-Meier curve for progression free survival by treatment arm in KEYNOTE-826 patients with PD-L1 expression (CPS \geq 1)



| Number-at-Risk | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 |
|----------------------------|-----|-----|-----|-----|-----|-----|----|----|----|----|
| Pembrolizumab+Chemotherapy | 173 | 238 | 208 | 143 | 112 | 101 | 66 | 34 | 10 | 0 |
| Chemotherapy | 275 | 229 | 170 | 103 | 81 | 63 | 38 | 13 | 1 | 0 |

*Chemotherapy (paclitaxel and cisplatin or paclitaxel and carboplatin) with or without bevacizumab

Elderly population

No overall differences in safety were observed in patients ≥ 75 years of age compared to younger patients receiving pembrolizumab monotherapy. Based on limited safety data from patients ≥ 75 years of age, when administered in combination with chemotherapy, pembrolizumab showed less tolerability in patients ≥ 75 years of age compared to younger patients. For efficacy data in patients ≥ 75 years of age please refer to the relevant section of each indication.

Paediatric population

In KEYNOTE-051, 161 paediatric patients (62 children aged 9 months to less than 12 years and 99 adolescents aged 12 years to 17 years) with advanced melanoma or PD-L1 positive advanced, relapsed, or refractory solid tumours or lymphoma were administered pembrolizumab 2 mg/kg bw every 3 weeks. All patients received pembrolizumab for a median of 4 doses (range 1-35 doses), with 138 patients (85.7%) receiving pembrolizumab for 2 doses or more. Participants were enrolled across 28 tumour types by primary diagnosis. The most common tumour types by histology were Hodgkin lymphoma (13.7%), glioblastoma multiforme (9.3%), neuroblastoma (6.2%), osteosarcoma (6.2%) and melanoma (5.6%). Of the 161 patients, 137 were enrolled with solid tumours, 22 with Hodgkin lymphoma, and 2 with other lymphomas. In patients with solid tumours and other lymphomas, the ORR was 5.8%, no patient had a complete response and 8 patients (5.8%) had a partial response. In the Hodgkin lymphoma population (n=22), in patients aged 11 years to 17 years, the baseline characteristics were median age 15 years; 64% male; 68% White; 77% had a Lansky/Karnofsky scale 90-100 and 23% had scale 70-80. Eighty-six percent had two or more prior lines of therapy and 64% had Stage 3 or higher. In these paediatric patients with cHL, the ORR assessed by BICR according to the IWG 2007 criteria was 54.5%, 1 patient (4.5%) had a complete response and 11 patients (50.0%) had a partial response, and the ORR assessed by the Lugano 2014 criteria was 63.6%, 4 patients (18.2%) had a complete response and 10 patients (45.5%) had a partial response. Data from clinical trials in adolescent melanoma patients is very limited and extrapolation from adult data has been used to establish efficacy. Among the 5 adolescent participants with advanced melanoma treated on KEYNOTE-051, no patient had a complete or a partial response, and 1 patient had stable disease.

The European Medicines Agency has deferred the obligation to submit the results of studies with pembrolizumab in one or more subsets of the paediatric population in treatment of Hodgkin lymphoma (see section 4.2 for information on paediatric use).

5.2 Pharmacokinetic properties

The pharmacokinetics of pembrolizumab was studied in 2,993 patients with metastatic or unresectable melanoma, NSCLC, or carcinoma who received doses in the range of 1 to 10 mg/kg bw every 2 weeks, 2 to 10 mg/kg bw every 3 weeks, or 200 mg every 3 weeks.

Absorption

Pembrolizumab is administered via the intravenous route and therefore is immediately and completely bioavailable.

Distribution

Consistent with a limited extravascular distribution, the volume of distribution of pembrolizumab at steady-state is small (~6.0 L; CV: 20%). As expected for an antibody, pembrolizumab does not bind to plasma proteins in a specific manner.

Biotransformation

Pembrolizumab is catabolised through non-specific pathways; metabolism does not contribute to its clearance.

Elimination

Pembrolizumab CL is approximately 23% lower (geometric mean, 195 mL/day [CV%: 40%]) after achieving maximal change at steady-state compared with the first dose (252 mL/day [CV%: 37%]); this decrease in CL with time is not considered clinically meaningful. The geometric mean value (CV%) for the terminal half-life is 22 days (32%) at steady-state.

Linearity/non-linearity

Exposure to pembrolizumab as expressed by peak concentration (C_{max}) or area under the plasma concentration time curve (AUC) increased dose proportionally within the dose range for efficacy. Steady-state concentrations of pembrolizumab were reached by 16 weeks of repeated dosing with an every 3 week regimen and the systemic accumulation was 2.1-fold. The median trough concentrations (C_{min}) at steady-state were approximately 22 mcg/mL at a dose of 2 mg/kg bw every 3 weeks and 29 mcg/mL at a dose of 200 mg every 3 weeks. The median area under the concentration time curve at steady-state over 3 weeks ($AUC_{0-3weeks}$) was 794 mcg·day/mL at a dose of 2 mg/kg bw every 3 weeks and 1,053 mcg·day/mL at a dose of 200 mg every 3 weeks.

Following administration of pembrolizumab 200 mg every 3 weeks in patients with cHL, the observed median C_{min} at steady-state was up to 40% higher than that in other tumour types treated with the same dosage; however, the range of trough concentrations is similar. There are no notable differences in median C_{max} between cHL and other tumour types. Based on available safety data in cHL and other tumour types, these differences are not clinically meaningful.

Special populations

The effects of various covariates on the pharmacokinetics of pembrolizumab were assessed in population pharmacokinetic analyses. The following factors had no clinically important effect on the clearance of pembrolizumab: age (range 15-94 years), gender, race, mild or moderate renal impairment, mild hepatic impairment and tumour burden. The relationship between body weight and

clearance supports the use of either fixed dose or body weight-based dosing to provide adequate and similar control of exposure. Pembrolizumab exposure with weight-based dosing at 2 mg/kg bw every 3 weeks in paediatric patients (≥ 3 to 17 years) are comparable to those of adults at the same dose.

Renal impairment

The effect of renal impairment on the clearance of pembrolizumab was evaluated by population pharmacokinetic analyses in patients with mild or moderate renal impairment compared to patients with normal renal function. No clinically important differences in the clearance of pembrolizumab were found between patients with mild or moderate renal impairment and patients with normal renal function. Pembrolizumab has not been studied in patients with severe renal impairment.

Hepatic impairment

The effect of hepatic impairment on the clearance of pembrolizumab was evaluated by population pharmacokinetic analyses in patients with mild hepatic impairment (as defined using the US National Cancer Institute criteria of hepatic dysfunction) compared to patients with normal hepatic function. No clinically important differences in the clearance of pembrolizumab were found between patients with mild hepatic impairment and normal hepatic function. Pembrolizumab has not been studied in patients with moderate or severe hepatic impairment (see section 4.2).

5.3 Preclinical safety data

The safety of pembrolizumab was evaluated in a 1-month and a 6-month repeat-dose toxicity study in Cynomolgus monkeys administered intravenous doses of 6, 40 or 200 mg/kg bw once a week in the 1-month study and once every two weeks in the 6-month study, followed by a 4-month treatment-free period. No findings of toxicological significance were observed and the no observed adverse effect level (NOAEL) in both studies was ≥ 200 mg/kg bw, which produced exposure multiples of 19 and 94 times the exposure in humans at doses of 10 and 2 mg/kg bw, respectively. The exposure multiple between the NOAEL and a human dose of 200 mg was 74.

Animal reproduction studies have not been conducted with pembrolizumab. The PD-1/PD-L1 pathway is thought to be involved in maintaining tolerance to the foetus throughout pregnancy. Blockade of PD-L1 signalling has been shown in murine models of pregnancy to disrupt tolerance to the foetus and to result in an increase in foetal loss.

Animal fertility studies have not been conducted with pembrolizumab. In 1 month and 6 month repeat-dose toxicology studies in monkeys, there were no notable effects in the male and female reproductive organs; however, many animals in these studies were not sexually mature.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

L-histidine
L-histidine hydrochloride monohydrate
Sucrose
Polysorbate 80 (E433)
Water for injections

6.2 Incompatibilities

In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products except those mentioned in section 6.6.

6.3 Shelf life

Unopened vial

2 years.

After preparation of infusion

From a microbiological point of view, the product, once diluted, should be used immediately. The diluted solution must not be frozen. If not used immediately, chemical and physical in-use stability of KEYTRUDA has been demonstrated for 96 hours at 2 °C to 8 °C. This 96-hour hold may include up to 6 hours at room temperature (at or below 25 °C). If refrigerated, the vials and/or intravenous bags must be allowed to come to room temperature prior to use.

6.4 Special precautions for storage

Store in a refrigerator (2 °C – 8 °C).

Do not freeze.

Store in the original carton in order to protect from light.

For storage conditions after dilution of the medicinal product, see section 6.3.

6.5 Nature and contents of container

4 mL of concentrate in a 10 mL Type I clear glass vial, with a coated grey chlorobutyl or bromobutyl stopper and an aluminium seal with a dark blue coloured flip-off cap, containing 100 mg pembrolizumab.

Each carton contains one vial.

6.6 Special precautions for disposal and other handling

Preparation and administration of the infusion

- Do not shake the vial.
- Equilibrate the vial to room temperature (at or below 25 °C).
- Prior to dilution, the vial of liquid can be out of refrigeration (temperatures at or below 25 °C) for up to 24 hours.
- Parenteral medicinal products should be inspected visually for particulate matter and discolouration prior to administration. The concentrate is a clear to slightly opalescent, colourless to slightly yellow solution. Discard the vial if visible particles are observed.
- Withdraw the required volume up to 4 mL (100 mg) of concentrate and transfer into an intravenous bag containing sodium chloride 9 mg/mL (0.9%) or glucose 50 mg/mL (5%) to prepare a diluted solution with a final concentration ranging from 1 to 10 mg/mL. Each vial contains an excess fill of 0.25 mL (total content per vial 4.25 mL) to ensure the recovery of 4 mL of concentrate. Mix diluted solution by gentle inversion.
- From a microbiological point of view, the product, once diluted, should be used immediately. The diluted solution must not be frozen. If not used immediately, chemical and physical in-use stability of KEYTRUDA has been demonstrated for 96 hours at 2 °C to 8 °C. This 96-hour hold may include up to 6 hours at room temperature (at or below 25 °C). If refrigerated, the vials and/or intravenous bags must be allowed to come to room temperature prior to use. Translucent to white proteinaceous particles may be seen in diluted solution. Administer the infusion solution intravenously over 30 minutes using a sterile, non-pyrogenic, low-protein binding 0.2 to 5 µm in-line or add-on filter.
- Do not co-administer other medicinal products through the same infusion line.
- KEYTRUDA is for single use only. Discard any unused portion left in the vial.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

MSD (Pty) Ltd, 117 16th Road, Halfway House 1685, South Africa

8. NAME AND ADDRESS OF THE MANUFACTURER

MSD International GmbH T/A MSD Ireland (Carlow), Dublin Road, Carlow, Co. Carlow, Ireland

9. MARKETING AUTHORISATION NUMBER(S)

| | |
|----------------------------------|----------------------|
| COUNTRY | |
| ETHIOPIA | 07328/08996/NMR/2021 |
| KENYA | |
| NIGERIA (NAFDAC Reg. No.) | |
| TANZANIA | |
| UGANDA | |
| ZAMBIA | |
| ZIMBABWE | |

10. SCHEDULING STATUS
 POM

 R_x ONLY

11. DATE OF FIRST AUTHORISATION

| | |
|-----------------|------------|
| COUNTRY | |
| ETHIOPIA | 19/04/2022 |
| KENYA | |
| NIGERIA | |
| TANZANIA | |
| UGANDA | |
| ZAMBIA | |
| ZIMBABWE | |

12. DATE OF REVISION OF THE TEXT

06 June 2022