6.13 PEMBROLIZUMAB
Powder for injection 50 mg, solution concentrate for I.V. infusion 100 mg in 4 mL,
Keytruda®, Merck Sharp & Dohme (Australia) Pty Ltd

1. Purpose of Application
	1. The minor submission requested amending the dosing regimen of pembrolizumab from a weight-based dosing regimen of 2 mg/kg to a fixed 200 mg per dose regardless of weight, relevant to the existing PBS restrictions for unresectable Stage III or Stage IV malignant melanoma. The minor submission also requested that the maximum amount of pembrolizumab be adjusted from 240 mg to 200 mg to reflect the change in dosing regimen.
2. Requested listing
	1. The minor submission requested a change to the current listing as shown below. Suggestions and additions proposed by the Secretariat to the requested listing are added in italics and suggested deletions are crossed out with strikethrough.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name, Restriction,****Manner of administration and form** | **Max.****Amount** | **№.of****Rpts** | **Dispensed Price for Max. Amount** | **Proprietary Name and Manufacturer** |
| PEMBROLIZUMAB50 mg injection: powder for, 1 vial a100 mg/4 mL injection, 1 vial a | 200 mg | 5 (initial)7 (continuing) | $9,186.18 (private)$9,023.22 (public) | Keytruda® | Merck Sharp & Dohme (AU) Pty Ltd |

**Treatment phase: Initial treatment 1**

|  |  |
| --- | --- |
| **Category / Program** | Section 100 – Efficient funding of Chemotherapy |
| **Prescriber type:** | [ ] Dental [x] Medical Practitioners [ ] Nurse practitioners [ ] Optometrists [ ] Midwives |
| **Severity:** | Unresectable Stage III or Stage IV |
| **Condition:** | *Malignant* *~~M~~melanoma*  |
| **PBS Indication:** | Unresectable Stage III or Stage IV malignant melanoma |
| **Treatment phase:** | Initial treatment 1 |
| **Restriction Level / Method:** | [ ] Restricted benefit[ ] Authority Required - In Writing[ ] Authority Required - Telephone[ ] Authority Required – Emergency[ ] Authority Required - Electronic[x] Streamlined |
| **Clinical criteria:** | The condition must be positive for a BRAF V600 mutation,ANDThe condition must have progressed following treatment with a BRAF inhibitor (with or without a MEK inhibitor) unless contraindicated or not tolerated according to the TGA approved Product Information,ANDPatient must not have received prior treatment with ipilimumab or a PD-1 (programmed cell death-1) inhibitor for this condition,ANDThe treatment must be the sole PBS-subsidised therapy for this condition,ANDThe treatment must not exceed a total of 6 doses at a dose of 200 mg every 3 weeks. |
| **Administrative Advice** | No increase in the maximum number of repeats will be authorised.In the first few months after start of immunotherapy, some patients can have a transient tumour flare with subsequent disease response. When progression is suspected, this should be confirmed through a confirmatory scan, taken at least 4 weeks later. |

**Treatment phase: Initial treatment 2**

|  |  |
| --- | --- |
| **Category / Program** | Section 100 – Efficient funding of Chemotherapy |
| **Prescriber type:** | [ ] Dental [x] Medical Practitioners [ ] Nurse practitioners [ ] Optometrists [ ] Midwives |
| **Severity:** | Unresectable Stage III or Stage IV |
| **Condition:** | *Malignant* *~~M~~melanoma*  |
| **PBS Indication:** | Unresectable Stage III or Stage IV malignant melanoma |
| **Treatment phase:** | Initial treatment 2 |
| **Restriction Level / Method:** | [ ] Restricted benefit[ ] Authority Required - In Writing[ ] Authority Required - Telephone[ ] Authority Required – Emergency[ ] Authority Required - Electronic[x] Streamlined |
| **Clinical criteria:** | The condition must be negative for a BRAF V600 mutation,ANDPatient must not have received prior treatment with ipilimumab or a PD-1 (programmed cell death-1) inhibitor for this condition,ANDThe treatment must be the sole PBS-subsidised therapy for this condition,ANDThe treatment must not exceed a total of 6 doses at a dose of 200 mg every 3 weeks. |
| **Administrative Advice** | No increase in the maximum number of repeats will be authorised.In the first few months after start of immunotherapy, some patients can have a transient tumour flare with subsequent disease response. When progression is suspected, this should be confirmed through a confirmatory scan, taken at least 4 weeks later. |

**Treatment phase: Continuing treatment**

|  |  |
| --- | --- |
| **Category / Program** | Section 100 – Efficient funding of Chemotherapy |
| **Prescriber type:** | [ ] Dental [x] Medical Practitioners [ ] Nurse practitioners [ ] Optometrists [ ] Midwives |
| **Severity:** | Unresectable Stage III or Stage IV |
| **Condition:** | *Malignant* *~~M~~melanoma*  |
| **PBS Indication:** | Unresectable Stage III or Stage IV malignant melanoma |
| **Treatment phase:** | Continuing |
| **Restriction Level / Method:** | [ ] Restricted benefit[ ] Authority Required - In Writing[ ] Authority Required - Telephone[ ] Authority Required – Emergency[ ] Authority Required - Electronic[x] Streamlined |
| **Clinical criteria:** | The treatment must be the sole PBS-subsidised therapy for this condition,ANDPatient must have previously been issued with an authority prescription for this drug for this condition,ANDPatient must have stable or responding disease,ANDThe treatment must be at a dose of 200 mg every 3 weeks. |
| **Administrative Advice** | No increase in the maximum number of repeats will be authorised.In the first few months after start of immunotherapy, some patients can have a transient tumour flare with subsequent disease response. When progression is suspected, this should be confirmed through a confirmatory scan, taken at least 4 weeks later. |

*For more detail on PBAC’s view, see section 5 PBAC outcome.*

1. Background
	1. Pembrolizumab 50 mg was registered by the TGA on 16 April 2015 as monotherapy for the treatment of unresectable or metastatic melanoma in adults, at a dose of 2 mg/kg every three weeks. An additional strength of pembrolizumab, 100 mg/4 mL concentrated injection vial, was TGA registered on 8 March 2016. The fixed, 200 mg dosing regimen was approved by the TGA on 14 November 2017.
	2. Pembrolizumab was first considered by the PBAC in March 2015 and received a positive recommendation for the monotherapy treatment of patients with unresectable stage III or metastatic (stage IV) malignant melanoma, with an initial risk sharing arrangement (in the context of a Managed Entry Scheme [MES]), to achieve the same cost per patient to the PBS as was the case for ipilimumab, and to give a reduced effective price of pembrolizumab. Pembrolizumab was listed on the PBS for this population on 1 September 2015.
	3. A second submission was lodged to fulfil the requirements of the MES and to seek PBAC reconsideration of the cost-effectiveness of pembrolizumab in March 2016. It presented a cost-utility evaluation based on the second interim analysis of the KN-006 trial. The PBAC rejected this submission as the model results were considered implausible, and the model also did not comply with key requirements of the Deed of Agreement relating to the estimation of survival (paragraph 7.7, March 2016 Public Summary Document [PSD]). The PBAC also rejected the submission’s request for an increase in patient numbers contributing to the risk sharing arrangements in the Deed of Agreement (paragraph 7.8, March 2016 PSD).
	4. A third submission was submitted in November 2016 as an “Additional submission” under clause 6.4 of the Deed of Agreement and provided a cost-utility evaluation with two scenarios referred to as a ‘Deed compliant scenario’ and a ‘Realistic scenario’ based on the final analysis of KN-006. This submission was rejected by the PBAC as the Committee decided not to recommend that the circumstances of the PBS listing of pembrolizumab for the treatment of unresectable Stage III or Stage IV metastatic melanoma be changed following the MES. However, the PBAC noted that the Department was separately negotiating with the sponsor in relation to increasing the annual risk sharing arrangement caps for pembrolizumab. The Committee considered that, while the increases proposed in the sponsor’s submission were not justified, there remained some uncertainty about the appropriate annual numbers of PBS-eligible patients for PD-L1 inhibitors in melanoma, thus the annual levels of PBS expenditure. The PBAC therefore advised that smaller increases in the annual risk sharing arrangement caps than those requested may be reasonable. The Committee further suggested that such changes should only be implemented if it could be ensured that any further financial implications for the Commonwealth could be appropriately controlled (paragraphs 7.1 & 7.9, November 2016 PSD).
	5. On 1 April 2017, the variation to the first agreed deed took effect. The previous and current expenditure cap values are presented below in Table 2.
2. Consideration of the evidence

## Sponsor hearing

* 1. There was no hearing for this item as it was a minor submission.

## Consumer comments

* 1. The PBAC noted that there was no consumer comment for this submission.

## Clinical trials

* 1. The minor submission did not present any new clinical evidence, however, it included a “Fixed Dose Clinical Overview”. The minor submission claimed that, “There is an essentially flat relationship between pembrolizumab exposure and efficacy or safety within the dose range of 2 to 10 mg/kg”. The PBAC therefore concluded that, for patients who are currently on a dose of less than 200 mg, there is no requirement for patients to increase their dose, as there would be no additional benefit and potentially more toxicity.

## Estimated PBS usage & financial implications

* 1. The minor submission claimed that, “No impact on the commonwealth budget is expected as a result of this listing as the subsidy for pembrolizumab in melanoma is on the basis of a budget cap with a '''''''% rebate for use exceeding this cap; this submission is not proposing any changes to the existing arrangement, so the current cap on melanoma expenditure will account for any potential increased use.” The PBAC noted that this assumption relies on the annual expenditure caps for pembrolizumab to be exceeded into the future. The PBAC considered that regardless of whether the cap is reached, given that the sponsor has not reduced the price per mg of pembrolizumab to counteract the increased dose per patient, the average cost per patient per course is increased by changing the 2 mg/kg dosing regimen to a 200 mg fixed dose. This therefore changes the cost-effectiveness of pembrolizumab such that treatment with pembrolizumab would no longer be cost-effective in the instance that an annual cap is not exceeded.
	2. The pre-PBAC response argued that the sponsor “believes there is no risk that the annual PD-1 monotherapy cap for unresectable/metastatic melanoma will not be exceeded in Year 4 and 5 of the deed (year 3 ending Sept 2018) for the following reasons:
* There are no new monotherapies which are likely to be listed and significantly reduce the PD-1 market size in 2019 and 2020;
* The incidence of unresectable melanoma is stable, and patients are treated immediately due to their poor prognosis. Therefore, use in excess of the cap in the first two years of listing cannot be due to pent up demand, and would likely continue in future years.”

The pre-PBAC response stated however, that the sponsor was willing to provide the commitment that, in the case where the caps are not exceeded, the sponsor would renegotiate the terms of the deed, such that the PBAC’s determination of a cost-effective price continued to be reflected in the arrangement.

* 1. The PBAC considered that changing from the weight-based to the fixed dose regimen would result in a per-patient treatment cost that was not cost-effective. The PBAC noted however, that while the current risk sharing arrangement is in place and the annual expenditure caps continue to be exceeded, a change to the fixed dose regimen would remain cost-effective for government overall. The PBAC therefore advised that subsequent annual expenditure caps for this melanoma-based Deed of Agreement should be negotiated with the sponsor for pembrolizumab based on the weight-based dosing regimen, to ensure that the PBS listing remains acceptably cost-effective.
	2. In considering the resubmission for pembrolizumab in NSCLC at its November 2017 meeting, the PBAC noted that increasing the average per patient cost of pembrolizumab by moving the recommended dose from a 2 mg/kg basis to a fixed 200 mg basis is likely associated with a 25% wastage of pembrolizumab because corroborating evidence indicates that this is not also associated with an improvement in patient health outcomes. This conclusion is consistent with that of the “Fixed Dose Clinical Overview” in the minor submission. The PBAC considered that this justified its expectation of a price reduction (paragraph 7.15, [Item 7.07] pembrolizumab November 2017 PBAC PSD). At the same meeting in consideration of the major submission for pembrolizumab for urothelial cancer, the PBAC considered that the request for fixed dosing “results in a considerable proportion of patients with urothelial cancer being given a greater dose, at a greater cost, with no evidence of additional benefit. The PBAC therefore considered that it may be reasonable for the price paid for pembrolizumab in urothelial cancer to reflect the cost if weight-based 2 mg/kg dosing was used rather than fixed 200 mg dosing” (paragraph 7.12, pembrolizumab [Item 6.11] November 2017 PBAC PSD). The PBAC considered that a similar issue of wastage applies to the current minor submission.
	3. Departmental analysis of the 2017 PBS utilisation of pembrolizumab indicated that the mean and median doses were 166 mg and 162 mg respectively. At a dose of 2 mg/kg, this equates to an average and median patient weight of 83 kg and 81 kg respectively. In addition, the majority of patients required a dose of less than 200 mg. These results confirm that, in the event that an RSA cap is not exceeded, the requested change to the fixed 200 mg dose would represent a dose increase and thus a higher cost per patient on average, to the government. The 2017 distribution of the pembrolizumab dispensed doses is shown below.

Figure 1: Distribution of pembrolizumab PBS quantity (mg) dispensed in 2017 for melanoma



Source: generated by the SAS System ('SASApp', Linux) on 20 February 2018 at 9:21:15 AM

* 1. Results of departmental analysis to quantify the estimated financial difference between the average benefit paid for pembrolizumab in 2016-17 and the proposed DPMA in the minor submission are shown below.

Table 1: Comparison of the average benefit paid for pembrolizumab between 2016 – 2017 and the price requested by the minor submission

|  |  |  |  |
| --- | --- | --- | --- |
| **Setting** | **Average benefit paid 2016-17** | **Minor submission requested DPMA** | **Difference** |
| Private hospital | $8,468.96 | $9,186.18 | $698.59 |
| Public hospital | $8,418.39 | $9,023.22 | $587.17 |

Source: PBS Item Reports for items 10424P, 10475H, and 10436G, sourced 20 February 2018 from http://medicarestatistics.humanservices.gov.au/statistics/pbs\_item.jsp

* 1. The departmental analysis[[1]](#footnote-1) used the PBS Item Report (publically available from the DHS website and based on date of prescription processing) and included all pembrolizumab PBS services for the calendar years 2016 and 2017. The average benefit paid was approximately $700 and $590 less for private and public hospitals respectively, compared to the proposed price for the 200 mg fixed dose.
	2. ''''''' ''''''''''' '''''''''''''''''''' ''''''''''''' '''''''' ''''''' '''''''''''''' ''''''''''''' ''''' ''''''''''' ''''''''''' '''''''''''''''''''''''''''''' '''' '''''' '''''''''''' ''''''' '''''' ''''''''' ''' '''''' '''''''''''' ''''' '''''' '''''''''' '''''''' '''''''''''''' '''' '''''''''''''' ''''''''''''''' '''''''' '''''''''' ''''''''''''''''''' ''''' ''''''''''''' '''' '''''' '''''''''''' ''''''' '''''''' ''''' ''''' '''''''' '''''''''''' ''''''''''' '''''''''''''''''' '''''''''''' ''''''''''''''' '''''''''''''''' '''''' '''''' '''''''''''''''''''''''' '''''''''''''' ''''''''''''''''''' ''''''' ''''''''''' ''''''''''''''''' ''''''''''' ''''''''' ''''''''' '''''' ''''''''''''''''' '''''''''''''''''''''' '''' ''''''' '''''''''''''' ''''''''' ''''''''''''' '''''' '''''''''''' '''''' ''''''''''' '''''' ''''''''''''''''' '''''' '''''' '''' ''''''''''' '''' '''''''''''''''' ''''''''' '''''''''''''' '''''' '''''' '''''''''''''''''''''''' '''''''''''''' '''' ''''''''' '''''''''''' ''''''' '''''' ''''''' '''' ''''''''''''''' '''''' ''''''''''''''' ''''''''''' ''''''''''''''''' ''''''' '''''''''''''''''''''''' ''''''''''' ''''' ''''' ''''''''''''''''' '''''''' ''''''' '''' ''''''''''''''''' ''''''''''''''''' '''''''' ''''''' '''''''''''''' ''''''''' ''''''''' '''' '''''''''''''''' '''''' ''''''''''''''''''''''' ''''' ''''''' '''''''''''''' ''''''''''''''' '''' ''''''''''''''''''''''''''''' ''''''''''' ''''''''''' '''''''''''''''''' '''' ''''''' ''''''' ''''''''' '''' '''''' ''''''''''''' '''''' '''''' '''''''''''' ''''' ''''' '''''''''''''''' '''''''' ''''' '''''''''''''''' ''''' '''' '''''''''''' The reduction in the maximum amount requested by the submission, from 240 mg to 200 mg, therefore may not be a true reduction at the PBS population level, as the maximum amount would only be reduced for patients greater than 100 kg. For patients less than 100 kg, the change to fixed dosing represents an increase of the maximum amount per patient per dose.

''''''''''''''' '''''''''''''''''''' ''''''''''''''''''' ''''''''''''' '''''''' '''''' '''''''''''''''''''''''''' '''' '''''' '''''''''''''''''''''''''''''''' ''''''''''' ''''''' '''''' '''''''''''''''''' '''''''' ''''''''' '''''''''''''' ''''''' ''''''''' '''''' '''''''''''''''' '''''''''''''''''' ''''' ''''''''''' ''''''' '''''''''''' ''''''' '''''''' '''''' '''''''' '''' '''''' '''''''' ''''' '''''''''''''' ''' '''''''''''' ''''''' ''''''''''''''''''' ''''''''''''''''''' ''''''''''''' ''''''''' '''''''''''' ''''''' ''''''''''' ''''''' ''' ''''''''''''''''' '''''' ''''''' ''''''''''''''''''' ''''''''''' ''''''''' '''''' ''''''''' ''''' '''''' '''''' ''''''''' '''' '''''' ''''''''''''' '''''''

## Risk Sharing Arrangement

* 1. There is a risk sharing arrangement (in the form of annual expenditure caps) in place for the treatment of unresectable Stage III or Stage IV malignant melanoma, which is shared by the sponsors for pembrolizumab and nivolumab. The current cap values (and previous values) are summarised below.

Table 2: Annual expenditure caps under the risk sharing arrangement for the treatment of unresectable Stage III or Stage IV malignant melanoma.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **1** | **2** | **3** | **4** | **5** |
| **Previous cap** | $'''''''''''''''''''''''''''' | $''''''''''''''''''''''''''''' | $'''''''''''''''''''''''''' | $''''''''''''''''''''''''''''' | $'''''''''''''''''''''''''' |
| **Current capa** | $''''''''''''''''''''''''' | $''''''''''''''''''''''''''''' | $''''''''''''''''''''''''' | $''''''''''''''''''''''''''''' | $'''''''''''''''''''''''''' |
| **% reached** | ''''''''''''''''% | '''''''''''''''''% | – | – | – |

a The current risk sharing arrangement commenced on 1 April 2017 and affected the caps for Years 2 – 5.

* 1. The sponsors are required to rebate '''''''% to the Commonwealth for costs exceeding the agreed annual expenditure caps. '''''' ''''''''''''''''''''' '''''''''''''' ''''''''' '''''' '''''''''''''''''' ''''' '''''''''''''''''''''''''''''' ''''''' '''''''''''''''''' ''' '''''''''''''''''''' '''''''' ''''''' '''''''''''''''''''''' '''''''''''''' '''''''''''' ''''' '''''''' '''''''''''''''''''' ''''' ''''''' ''''''''' '''' ''''''' '''''''''''''''''''''''' ''''''''''' '''''''''' ''''' '''''''''''''' '''' ''''''''''''''''''''' ''''''''''''''''' ''''''''''''''''''''' ''''' ''''''''''''''''''' '''''''' '''''' ''''''''''''' '''''' '''''''''''''' '''''' ''''''''''''''''''''''''''' '''''' '''''''''''' ''''''' '''''''''''''''''''''' '''''''''''''' '''''''''' '''''''''''''''' ''''''''''''''''''''''''''''''' ''''''' ''''''''''''''''''''' ''''''''''' '''''''' '''''''''''''' '''''''''''''''' ''''''''''''''''''''''' '''' '''''' ''''''''''''''' ''''' ''''''''''''''''''.
	2. The department’s scenario analyses of the impact of increased pembrolizumab expenditure on the rebate required from the sponsor of nivolumab are shown below.

Table 3: Current (Year 2) market share between pembrolizumab and nivolumab and analyses of the flow-on financial implications to the sponsor of nivolumab if the total expenditure for pembrolizumab increases

| **Circumstance** | **Expenditure** | **% Market share** | **Rebate (% increasea)** |
| --- | --- | --- | --- |
| **Year 2 (cap)** | **''''''''''''''''''''''''** | – | – |
| **Year 2****(actual data)** | Pembrolizumab | '''''''''''''''''''''''''''''''''''''''''' | '''''''''''''''' | '''''''''''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''''' | ''''''''''''''' | ''''''''''''''''''''''''''' |
| Total | '''''''''''''''''''''''''''''''''''''''''' | ''''''''''''''''''' | ''''''''''''''''''''''''''''' |
| **Scenario analyses with percentage increases of current pembrolizumab expenditure due to price increaseb** |
| **110%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''''' | '''''''''''''''''' | ''''''''''''''''''''''''''''''' ''''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''''''' | '''''''''''''''' | '''''''''''''''''''''''''''' ''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''' | ''''''''''''''''''''''' | '''''''''''''''''''''''''''' |
| **115%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''' | ''''''''''''''''' | ''''''''''''''''''''''''''''' '''''''''''''''''''''''''' |
| Nivolumab | '''''''''''''''''''''''''''''''''''' | '''''''''''''''' | ''''''''''''''''''''''''''' '''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''''''''''' | ''''''''''''''''''''''' | ''''''''''''''''''''''''''' |
| **120%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''' | '''''''''''''''''''' | ''''''''''''''''''''''''''''' ''''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''''' | '''''''''''''' | ''''''''''''''''''''''' '''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''''' | ''''''''''''''''''' | ''''''''''''''''''''''''''''' |
| **125%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''''''' | ''''''''''''''''' | '''''''''''''''''''''''''''''' '''''''''''''''''''''' |
| Nivolumab | '''''''''''''''''''''''''''''''''''' | '''''''''''''''' | ''''''''''''''''''''''' ''''''''''''''''''' |
| Total | '''''''''''''''''''''''''''''''''''''''''' | '''''''''''''''''''' | '''''''''''''''''''''''''''''' |
| **130%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''' | ''''''''''''''''' | ''''''''''''''''''''''''''''''''' ''''''''''''''''''''''''''' |
| Nivolumab | '''''''''''''''''''''''''''''''''''' | '''''''''''''''' | ''''''''''''''''''''''''''' '''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''''''''' | ''''''''''''''''''''''' | ''''''''''''''''''''''''''''''''''' |
| **135%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''''''''' | '''''''''''''''''' | ''''''''''''''''''''''''''''''''''' '''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''''' | '''''''''''''' | '''''''''''''''''''''''''' ''''''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''''''''' | '''''''''''''''''''' | ''''''''''''''''''''''''''''''''' |
| **140%** | Pembrolizumab | ''''''''''''''''''''''''''''''''''' | ''''''''''''''''''' | '''''''''''''''''''''''''''''' ''''''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''' | ''''''''''''''' | ''''''''''''''''''''''''' ''''''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''''''' | '''''''''''''''''''''' | ''''''''''''''''''''''''''''''''' |
| **145%** | Pembrolizumab | '''''''''''''''''''''''''''''''''''''''''' | ''''''''''''''''''' | '''''''''''''''''''''''''''''''''' '''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''' | ''''''''''''''' | '''''''''''''''''''''''' '''''''''''''''''''' |
| Total | ''''''''''''''''''''''''''''''''''''''' | '''''''''''''''''''''' | '''''''''''''''''''''''''''''''' |
| **150%** | Pembrolizumab | '''''''''''''''''''''''''''''''''''''''''' | ''''''''''''''''''' | '''''''''''''''''''''''''''''''''' ''''''''''''''''''''''' |
| Nivolumab | ''''''''''''''''''''''''''''''''''' | '''''''''''''' | ''''''''''''''''''''''''' '''''''''''''''''''' |
| Total | '''''''''''''''''''''''''''''''''''''''' | '''''''''''''''''''''' | '''''''''''''''''''''''''''''' |

a Percentage increase in rebate as the expenditure for pembrolizumab increases.

b Impact on the rebate required from the sponsor of nivolumab as the expenditure for pembrolizumab increases by 10%, 15%, 20% etc.

* 1. Although the market share of nivolumab ''''''''''''''''''''' ''''' '''''' ''''''''''''''''''''' '''''' '''''''''''''''''''''''''''''' '''''''''''''''''' ''''''' ''''''''' ''''''''''' ''''''''' '''''' '''''''''''''' '''''' ''''''''''''''''''' ''' '''''''''''''''' '''' '''''''''''''''''' ''''''' ''''''''''''''''''''''''''''''''' '''''''''''''''''''' ''''' '''''' '''''''''''''' '''''''''''' ''''''''''' ''' '''''''''''''''''''' '''''' ''' ''''''''''' '''''''''' ''''''''''''''''''''''''' '''''''''''''' ''''''' ''''''''''' ''''''''''' '''''''' ''' '''''''''''''''''''''''''''''''' '''' '''''' '''''' ''''''''' ''''''''' '''''''' ''''''''''''''''' '''''''''''''' ''''''' '''''''''''''''' '''' '''''''''''''''''' '''' '''''''' '' '''''''''''''' '''' '''''' '''''''''''''' '''''''''''' ''''''''''' '''' ''''''''''' ''''''''''''' ''' '''''''''''''' '''''''''''' '''''''''''''' '''''''''''''''''' '''''''' ''''''''''''' ''''''''''''''''
	2. The pre-PBAC response clarified the sponsor’s intent that implementation to change to the fixed dose regimen should not have unintended consequences to other sponsors sharing the existing deed for melanoma. It stated that the sponsor proposes to work with the government after a positive PBAC recommendation, '''' '''''''''''''' '''''''' '''''' '''''''''''' '''''''' ''''' '''''' '''''''''''''' ''''' ''''''''''''''''''' ''''''''' '''''''''''''' ''''''' ''''''''''''''' '''''''' ''''' '' ''''''''''''''''''' ''''''''''''' '''''''' ''''''' '''''''''''''''''''''''''''' ''''''''''' '''''''''''' ''' '''''''''''' The pre-PBAC response stated that the sponsor’s preferred approach would be '''' ''''''''''' '''''' '''''''''''''''''''''''''''''' '''''''''''' '''''''''''' '''''''''''' '''''''' ''''''''''''''''' '''''' ''''''''''''''' ''''''''''''''''''''''''''''' '''''' ''''''''' '''''''''''''''' ''''''''''''''''' '''' ''''''' '''''''''''''''''' '''''''''.
	3. The PBAC noted that an increased cost per patient per course for pembrolizumab will ''''''' '''''''''' ''' ''''''''''''' '''''''''''' ''''' '''''' '''''''''''''''' ''''' '''''''''''''''''''''' ''''' ''''''' ''''''' '''''''''''' ''''''''''' '''''' '''''''''''''' ''''''''''''''''''''''' '''''''' '''''' ''''''''''''''''''. Furthermore, although there is a ''''''''''' rebate for pembrolizumab use exceeding the agreed caps, the Commonwealth would nonetheless incur increased expenditure in the period between each dispensing of the medicine and the payment of the associated rebate by the sponsor.

*For more detail on PBAC’s view, see section 5 PBAC outcome.*

1. PBAC outcome
	1. The PBAC recommended an amendment to the existing PBS restrictions for pembrolizumab, for the treatment of unresectable Stage III or Stage IV malignant melanoma, to allow either a weight-based dose of 2 mg/kg or a fixed dose of 200 mg, every three weeks. The PBAC recommended that the maximum amount be adjusted to 200 mg.
	2. The PBAC noted the minor submission’s claim that there is a flat relationship between pembrolizumab exposure and efficacy or safety within the dose range of 2 to 10 mg/kg. The PBAC therefore concluded that, for patients who are currently on a weight-based dose of less than 200 mg, there is no extra clinical benefit achieved by increasing to the fixed 200 mg dose, but there could potentially be more toxicity.
	3. The PBAC noted that the sponsor’s request to change dosing from weight based to fixed dosing '''''''' ''''''''''''''''''''' ''''' ''''''' ''''''''''''''''' ''''' ''''''''''' '''''''''''''''''''''''' ''''' '''''' '''''''''''' ''''''' '''' ''''''''''''''''''''''''''''''. The change in dosing has the effect of wasting on average 25% of the drug because the fixed dosing results in a higher administered dose without any additional patient benefit. For this reason, the PBAC concluded that a change from the weight-based to fixed dose regimen would not be cost-effective on a per-patient basis, as currently the mean dose of pembrolizumab is significantly less than 200 mg. However, the PBAC noted that there is currently a relevant risk sharing arrangement in place, with a ''''''''''' rebate over the annual expenditure caps. These caps have been exceeded in previous years. If the caps continue to be exceeded, the overall net cost to Government with the restriction amendment would remain the same as it would be contained by the risk sharing arrangement. The PBAC therefore advised that subsequent annual expenditure caps for this melanoma-based Deed of Agreement should be negotiated with the sponsor for pembrolizumab based on the weight-based dosing regimen, to ensure that the PBS listing remains acceptably cost-effective.
	4. The PBAC agreed with the Secretariat’s suggested changes to the pembrolizumab restriction.
	5. The PBAC noted that this submission is not eligible for an Independent Review it has received a positive recommendation.

**Outcome:**

Recommended

1. Recommended listing
	1. Amend existing listing as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name, Restriction,****Manner of administration and form** | **Max.****Amount** | **№.of****Rpts** |  | **Proprietary Name and Manufacturer** |
| PEMBROLIZUMAB50 mg injection: powder for, 1 vial a100 mg/4 mL injection, 1 vial a | 200 mg | 5 (initial)7 (continuing) |  | Keytruda® | Merck Sharp & Dohme (AU) Pty Ltd |

**Treatment phase: Initial treatment 1**

|  |  |
| --- | --- |
| **Category / Program** | Section 100 – Efficient funding of Chemotherapy |
| **Prescriber type:** | [ ] Dental [x] Medical Practitioners [ ] Nurse practitioners [ ] Optometrists [ ] Midwives |
| **Severity:** | Unresectable Stage III or Stage IV |
| **Condition:** | Malignant melanoma |
| **PBS Indication:** | Unresectable Stage III or Stage IV malignant melanoma |
| **Treatment phase:** | Initial treatment 1 |
| **Restriction Level / Method:** | [ ] Restricted benefit[ ] Authority Required - In Writing[ ] Authority Required - Telephone[ ] Authority Required – Emergency[ ] Authority Required - Electronic[x] Streamlined |
| **Clinical criteria:** | The condition must be positive for a BRAF V600 mutation,ANDThe condition must have progressed following treatment with a BRAF inhibitor (with or without a MEK inhibitor) unless contraindicated or not tolerated according to the TGA approved Product Information,ANDPatient must not have received prior treatment with ipilimumab or a PD-1 (programmed cell death-1) inhibitor for this condition,ANDThe treatment must be the sole PBS-subsidised therapy for this condition,ANDThe treatment must not exceed a total of 6 doses administered every 3 weeks, with each maximum dose either at 2 mg per kg for patients <100 kg or fixed at 200 mg.  |
| **Prescriber Instructions** | The patient's body weight must be documented in the patient's medical records at the time treatment is initiated. |
| **Administrative Advice** | No increase in the maximum number of repeats will be authorised.In the first few months after start of immunotherapy, some patients can have a transient tumour flare with subsequent disease response. When progression is suspected, this should be confirmed through a confirmatory scan, taken at least 4 weeks later. |

**Treatment phase: Initial treatment 2**

|  |  |
| --- | --- |
| **Category / Program** | Section 100 – Efficient funding of Chemotherapy |
| **Prescriber type:** | [ ] Dental [x] Medical Practitioners [ ] Nurse practitioners [ ] Optometrists [ ] Midwives |
| **Severity:** | Unresectable Stage III or Stage IV |
| **Condition:** | Malignant melanoma |
| **PBS Indication:** | Unresectable Stage III or Stage IV malignant melanoma |
| **Treatment phase:** | Initial treatment 2 |
| **Restriction Level / Method:** | [ ] Restricted benefit[ ] Authority Required - In Writing[ ] Authority Required - Telephone[ ] Authority Required – Emergency[ ] Authority Required - Electronic[x] Streamlined |
| **Clinical criteria:** | The condition must be negative for a BRAF V600 mutation,ANDPatient must not have received prior treatment with ipilimumab or a PD-1 (programmed cell death-1) inhibitor for this condition,ANDThe treatment must be the sole PBS-subsidised therapy for this condition,ANDThe treatment must not exceed a total of 6 doses administered every 3 weeks, with each maximum dose either at 2 mg per kg for patients <100 kg or fixed at 200 mg. |
| **Prescriber Instructions** | The patient's body weight must be documented in the patient's medical records at the time treatment is initiated. |
| **Administrative Advice** | No increase in the maximum number of repeats will be authorised.In the first few months after start of immunotherapy, some patients can have a transient tumour flare with subsequent disease response. When progression is suspected, this should be confirmed through a confirmatory scan, taken at least 4 weeks later. |

**Treatment phase: Continuing treatment**

|  |  |
| --- | --- |
| **Category / Program** | Section 100 – Efficient funding of Chemotherapy |
| **Prescriber type:** | [ ] Dental [x] Medical Practitioners [ ] Nurse practitioners [ ] Optometrists [ ] Midwives |
| **Severity:** | Unresectable Stage III or Stage IV |
| **Condition:** | Malignant melanoma |
| **PBS Indication:** | Unresectable Stage III or Stage IV malignant melanoma |
| **Treatment phase:** | Continuing |
| **Restriction Level / Method:** | [ ] Restricted benefit[ ] Authority Required - In Writing[ ] Authority Required - Telephone[ ] Authority Required – Emergency[ ] Authority Required - Electronic[x] Streamlined |
| **Clinical criteria:** | The treatment must be the sole PBS-subsidised therapy for this condition,ANDPatient must have previously been issued with an authority prescription for this drug for this condition,ANDPatient must have stable or responding disease,ANDThe treatment must not exceed a maximum dose administered every 3 weeks either at 2 mg per kg for patients <100 kg or fixed at 200 mg. |
| **Administrative Advice** | No increase in the maximum number of repeats will be authorised.In the first few months after start of immunotherapy, some patients can have a transient tumour flare with subsequent disease response. When progression is suspected, this should be confirmed through a confirmatory scan, taken at least 4 weeks later. |

1. Context for Decision

The PBAC helps decide whether and, if so, how medicines should be subsidised in Australia. It considers submissions in this context. A PBAC decision not to recommend listing or not to recommend changing a listing does not represent a final PBAC view about the merits of the medicine. A company can resubmit to the PBAC or seek independent review of the PBAC decision.

1. Sponsor’s Comment

The sponsor had no comment.

1. Calculations applied weighted co-payments across patient categories using the 2016 fees of $38.30 and $6.20 for general and concessional patients respectively. These co-payments were increased in 2017 to $38.80 and $6.30 respectively. The impact of changes to the co-payments across time has minimal impact on the estimates presented. [↑](#footnote-ref-1)