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Budget impact of nivolumab plus ipilimumab plus chemotherapy as 1L treatment for patients with metastatic non-small cell lung cancer in Switzerland

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Introduction

- Lung cancer is the leading cause of cancer mortality worldwide, accounting for 18.7% of all cancer-related deaths in 2022.[1]
- Lung cancer also represents a significant health burden in Switzerland (CH)[2], with the Global Cancer Observatory estimating approximately 5,000 new cases (2,800 in men and 2,200 in women) and nearly 3,500 related deaths annually.[3]
- Non-small cell lung cancer (NSCLC) accounts for 85% of all lung cancer cases[4] and has a 5-year survival rate of 28.1% in men and 32.0% among women in CH (data for 2014-2018)[5].
- Approximately 73% of NSCLC patients in CH have been diagnosed or have progressed to stage IV disease[6], which is associated with a particularly poor prognosis.
- **Table 1** presents first-line (1L) treatment options for patients with metastatic or advanced NSCLC that are approved by Swissmedic and reimbursed by the compulsory health insurance.
- In the randomized, phase 3 CheckMate 9LA trial[7], 1L therapy with nivolumab plus ipilimumab in combination with two cycles of platinum-doublet chemotherapy (PDC) (NIVO+IPI+PDC) has demonstrated long-term, durable overall survival benefit when compared with standard PDC in patients with advanced NSCLC without targetable gene alterations, regardless of tumor programmed death ligand 1 (PD-L1) expression level and tumor histology.
- NIVO+IPI+PDC has recently been included on the List of Specialties by the Federal Office of Public Health (FOPH) for this indication.

Table 1. Treatment regimens reimbursed for 1L NSCLC patients in CH[a]

Treatment regimen	Abbreviation	Pivotal trial	Licensed and reimbursed population
Nivolumab + Ipilimumab + Paclitaxel + Carboplatin (SQ) or Pemetrexed + Cis/Carboplatin (NSQ)	NIVO+IPI+PDC	CheckMate 9LA[7]	1L NSCLC patients with PD-L1<50%
Paclitaxel + Carboplatin (SQ) or Pemetrexed + Cis/Carboplatin (NSQ)	PDC	CheckMate 9LA[7]	All 1L NSCLC patients regardless of PD-L1 levels or histology
Pembrolizumab	PEMBRO mono	KEYNOTE-024[8]	1L NSCLC patients with PD-L1≥50%
Pembrolizumab + Pemetrexed + Cis/Carboplatin	PEMBRO+PLAT+ PEMX	KEYNOTE-189[9]	Non-squamous 1L NSCLC patients
Pembrolizumab + Paclitaxel + Carboplatin[b]	PEMBRO+PLAT+ TAX	KEYNOTE-407[10]	Squamous 1L NSCLC patients
Atezolizumab + Nab-Paclitaxel + Carboplatin	ATEZO+PLAT+ Nab-TAX	IMpower130[11]	Non-squamous 1L NSCLC patients
Atezolizumab + Paclitaxel + Carboplatin	ATEZO+PLAT+ TAX	IMpower150[12]	Non-squamous 1L NSCLC patients
Cemiplimab	CEMI mono	EMPOWER-Lung 1[13]	1L NSCLC patients with PD-L1>50%

[a] Cemiplimab + PDC has a Marketing Authorization, but is not reimbursed as a treatment option for 1L NSCLC at the CH national level
[b] Paclitaxel, nab-paclitaxel, cisplatin and carboplatin could be used in the clinical trial, but only the paclitaxel + carboplatin combination is reimbursed in CH
1L, first line, ATEZO, atezolizumab; CEMI, cemiplimab; IPI, ipilimumab; mono, monotherapy; Nab-TAX, nab-paclitaxel; NIVO, nivolumab; NSCLC, non-small cell lung cancer; NSQ: non-squamous; PDC, platinum doublet chemotherapy; PD-L1, programmed death ligand 1; PEMBRO, pembrolizumab; PEMX, pemetrexed; PLAT, platinum; SQ, squamous; TAX, paclitaxel

Objective

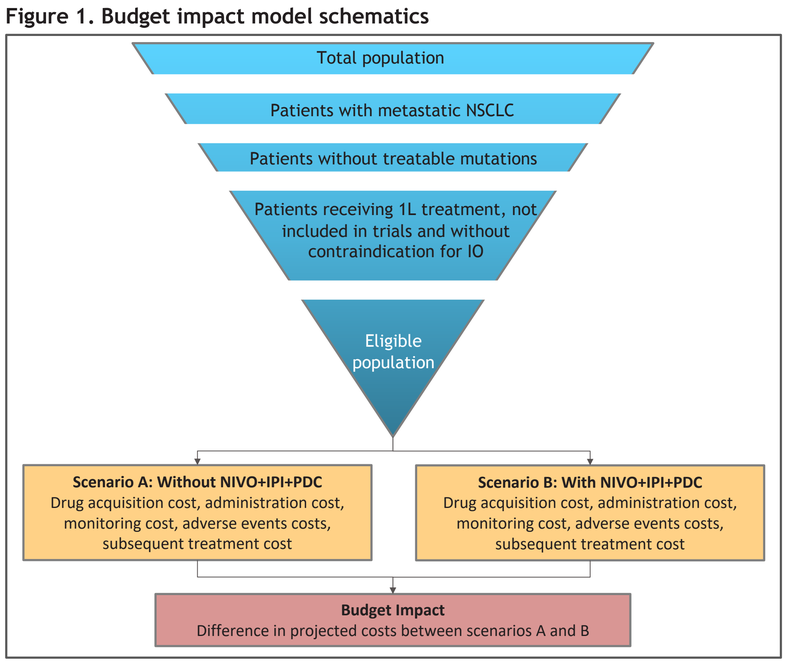
- The objective of this study was to estimate the budget impact of introducing NIVO+IPI+PDC as 1L treatment for patients with advanced or metastatic NSCLC, regardless of histology and with no EGFR or ALK genomic tumor aberrations in the CH setting.
- Analyses were conducted for patients with PD-L1 levels <50% (base case analysis) and for an all-comer population regardless of PD-L1 levels (scenario analysis).

Methods

Framework

- A budget impact model (BIM) was developed in Microsoft Excel (Office 365) in accordance with ISPOR's principles of good practices for budget impact analysis[14].
- The analysis was conducted from a Swiss compulsory health insurance system perspective over a time horizon of 5 years.
- As common, a reference scenario without NIVO+IPI+PDC is being compared to a scenario in which NIVO+IPI+PDC is available to patients and their treating physicians.
- The total cost for both scenarios and incremental budget impact was calculated by combining epidemiological data, current market shares and forecasted market uptakes for NIVO+IPI+PDC, with costs for drug acquisition, administration, monitoring, management of adverse events (AEs) and subsequent treatments (**Figure 1**).

Figure 1. Budget impact model schematics



IO, immuno-oncology; IPI, ipilimumab; NIVO, nivolumab; PDC, platinum doublet chemotherapy; 1L, first line

Model Inputs

Epidemiology parameters

- The eligible population was estimated using Swiss epidemiological data, published literature, and expert opinion. In the Swiss 2025 population of 8,949,369[15], nearly 4,900 new lung cancer cases were identified according to the Nationale Krebsregistrierungsstelle[16].
- Amongst 3,039 patients with metastatic NSCLC, an estimated 2,430 patients had disease without targetable mutations. Based on local expert opinion, 25% and 75% of patients were considered to have squamous and non-squamous histology, respectively.
- The final population eligible for 1L therapy, not taking part in clinical trials, and without immuno-oncology contraindications was distributed across three PD-L1 expression levels (36% PD-L1<1%, 34% PD-L1 1-49%, 30% PD-L1≥50%) and comprised of 1,134 and 1,620 patients in the base case (PD-L1<50%) and scenario (all-comers) populations analysis, respectively.

Market shares

- Market share forecasts were developed based on market research and expert opinion, with NIVO+IPI+PDC uptake estimated to be 14.0%, 10.9% and 10.9% across PD-L1<1%, PD-L1 1-49%, and PD-L1≥50% subgroups, respectively, in Year 1, with slight growth to 15.0%, 10.9% and 10.9% in Year 5. It was assumed that NIVO+IPI+PDC would primarily displace market shares from pembrolizumab regimens.
- Market shares for the target populations were calculated as a weighted average of market shares in the three PD-L1 subgroups, resulting in an assumed NIVO+IPI+PDC market share of 13.0% in the PD-L1<50% and 12.3% for the all-comer population in Year 5.

1L comparators and treatment duration

- Comparators included all drugs on the List of Specialties for this indication (**Table 1**).
- Mean number of NIVO+IPI+PDC and PDC doses administered were derived from mature CheckMate 9LA trial data[18] (**Table 2**).
- For other regimens, mean duration of treatment (DoT) was estimated based on publicly available information from the respective pivotal trials (**Table 2**):
  - For PEMBRO combination regimens, mature DoT Kaplan-Meier (KM) curves were obtained from the literature[17]. These KM curves were digitized, and 2-year restricted means were calculated from the area under the curves.
  - For PEMBRO monotherapy, the mean number of doses administered was back-calculated from published cost-effectiveness studies[19].
  - For the ATEZO+PLAT+Nab-TAX regimen, mean treatment duration was reported in the literature[11].
  - For ATEZO+PLAT+TAX, mean treatment duration was estimated based on reported DoT ranges[12].
  - For CEMI monotherapy, in absence of published mean DoT data, progression-free survival was used as a proxy to inform DoT, reflecting the common clinical practice of treating until disease progression[13].
- A 2-year treatment stopping rule was applied to immunotherapy regimens (except ATEZO), consistent with clinical trial protocols and Swiss clinical practice. PDC components were capped at the protocol-specified maximum treatment cycles (i.e., 2 cycles for NIVO+IPI+PDC; 4 cycles for PDC and other combination regimens).

Adverse events

- The BIM incorporates grade 3 to 5 treatment-related adverse events that occurred in ≥5% of patients in the relevant treatment arm of the respective clinical trials.

Cost Inputs

- Drug acquisition costs were calculated based on official drug prices, doses and schedules of administration as per the label, and treatment duration. Official drug prices were obtained from the FOPH List of Specialties issued by the CH government as of September 1st, 2025[20] **(Table 2).**
- It was assumed that vial sharing was not allowed.
- Costs for drug administration (**Table 2**), patient monitoring and management of AEs were sourced from the inpatient (Swiss DRG)[21] and outpatient (TARMED)[22] tariff systems.
- Monitoring costs reflect treatment-specific healthcare resource use such as doctor visits, laboratory tests, and scans aligned with CH clinical practice[23].
- In line with the relevant clinical trials, patients with non-squamous disease could receive PEMX maintenance therapy after 1L treatment with either PDC or PEMBRO+PLAT+PEMX.

Table 2. Model inputs related to 1L drug acquisition and administration costs

Treatment regimen	Drug components	Duration of treatment (mos)	Acquisition cost / dose, CHF	Administration cost / dose, CHF
NIVO+IPI+PDC	NIVO (Q3W)	9.18	4,568.85	219.26
	IPI (Q6W)	9.25	8,007.60	73.24
	PDC (Q3W)	1.31	902.24	269.80
PDC	PDC (Q3W)	2.35	900.41	377.49
PEMBRO mono	PEMBRO (Q3W)	11.77	4,294.10	240.77
PEMBRO+PLAT +PEMX	PEMBRO (Q3W)	9.96	4,294.10	224.95
	Cis/Carboplatin (Q3W)	2.76	1,060.52	209.98
	PEMX (Q3W)			
REMBRO+PLAT +TAX	PEMBRO (Q3W)	10.41	4,294.10	224.95
	TAX (Q3W)	2.76	482.75	386.16
	Carboplatin (Q3W)			
ATEZO+PLAT+ Nab-TAX	ATEZO (Q3W)	8.90	4,769.45	206.49
	Carboplatin (Q3W)	2.40	420.40	76.30
	Nab-TAX (Q1W)	2.80	164.45	76.30
ATEZO+PLAT+ TAX	ATEZO (Q3W)	8.10	4,769.45	220.22
	TAX (Q3W)	2.30	482.75	475.81
	Carboplatin (Q3W)			
CEMI mono	CEMI (Q3W)	11.12	3,811.00	240.77

1L, first line; ATEZO, atezolizumab; CEMI, cemiplimab; CHF, Swiss Franc; IPI, ipilimumab; mono, monotherapy; mos; months; Nab-TAX, nab-paclitaxel; NIVO, nivolumab; PDC, platinum doublet chemotherapy; PD-L1,programmed death ligand 1; PEMBRO, pembrolizumab; PEMX, pemetrexed; PLAT, platinum; TAX, paclitaxel; QxW, every x weeks

Subsequent treatments

- On failure of 1L treatment of NIVO+IPI+PDC or a comparator therapy, a proportion of the initial cohort moves on to receive a subsequent treatment:
  - The proportion of patients receiving any subsequent treatment was 43.2% for NIVO+IPI+PDC and 54.2% for PDC based on CheckMate 9LA data.
  - For other immuno-oncology regimens, this proportion was derived from relevant clinical trial publications and ranged from 32.2% for CEMI mono to 55.3% for PEMBRO+PLAT+PEMX.
- These patients were assumed to receive one additional line of systemic therapy. The distribution of subsequent therapies was informed by relevant clinical trial publications.
- The average time on subsequent treatment depends on the specific treatment received.
  - Second-line IO therapy duration was estimated at 6.77 months using 2-year restricted mean from nivolumab data (derived from pooled mature CheckMate 057/017 trial data), validated by clinical experts in October 2020.
  - Second-line chemotherapy durations were set at 4.14 months (six 3-weekly cycles) for most agents, with pemetrexed specifically modeled at 5.5 months based on expert recommendation.

Results

Base case results (PD-L1<50% population)

- The introduction of NIVO+IPI+PDC as 1L treatment option for patients with advanced NSCLC and PD-L1 levels <50% was estimated to increase total costs by CHF 5.78 million to CHF 6.20 million in years 1 to 5, respectively. This corresponds to a 5-year budget impact of 6.5% (**Table 3**).
- The increase in total cost was primarily driven by the change in the drug acquisition costs due to the introduction of NIVO+IPI+PDC. This was partially offset by savings in drug administration costs, drug monitoring costs, subsequent treatment costs, PEMX maintenance costs, and costs for the management of adverse events.
- Results for individual PD-L1 subgroups are presented in **Figure 2**. Total costs for the PD-L1<50% population presented in **Table 3** correspond to the total costs for the PD-L1<1% and PD-L1 1-49 subgroups shown in **Figure 2**.

Scenario analyses (PD-L1<50% population, altered product uptake)

- Scenario analyses were conducted to assess economic implications of more rapid adoption of NIVO+IPI+PDC (12.0% uptake in Year 1, 18.2% in Year 2, and 24.5% in Years 3 to 5) and more conservative adoption rates (uptake of 6.0% in Year 1 and 7.0% in Years 2 to 5).
- Results suggest that the total budget impact over 5 years may range between -0.96% and 7.75%, depending on the market uptake of NIVO+IPI+PDC.

Figure 2. Total cost per year for scenarios with and without NIVO+IPI+PDC

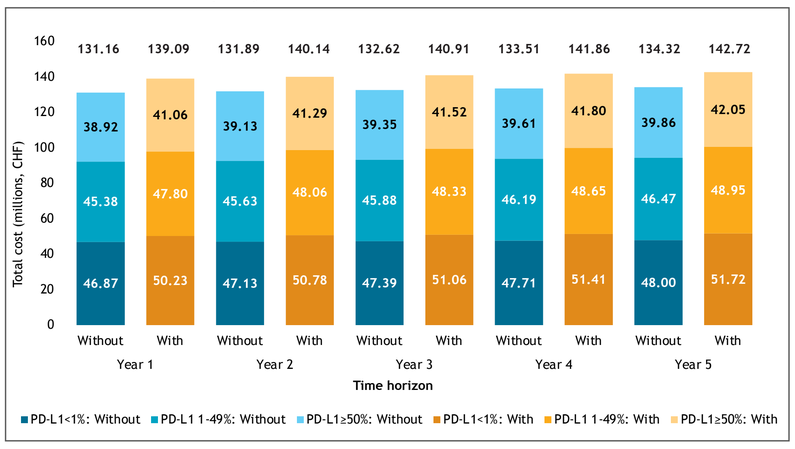


Table 3. Base case results (PD-L1<50% population)

Result	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Patient count						
No. of new patients treated	1,134	1,140	1,147	1,154	1,161	5,736
Without NIVO+IPI+PDC (CHF, millions)						
Drug acquisition cost	67.86	68.23	68.61	69.07	69.49	343.27
Administration cost	4.49	4.51	4.54	4.57	4.59	22.70
Monitoring cost	3.16	3.18	3.19	3.21	3.23	15.98
Adverse event cost	1.59	1.60	1.61	1.62	1.63	8.06
Subsequent treatment cost	9.95	10.01	10.06	10.13	10.19	50.34
PEMX maintenance cost	5.20	5.23	5.26	5.29	5.32	26.30
Total costs	92.25	92.76	93.27	93.90	94.47	466.63
With NIVO+IPI+PDC (CHF, millions)						
Drug acquisition cost	74.98	75.68	76.10	76.61	77.08	380.45
Administration cost	4.44	4.46	4.49	4.52	4.54	22.45
Monitoring cost	3.13	3.15	3.17	3.19	3.21	15.84
Adverse event cost	1.49	1.50	1.51	1.52	1.53	7.54
Subsequent treatment cost	9.36	9.41	9.47	9.53	9.59	47.36
PEMX maintenance cost	4.62	4.64	4.67	4.70	4.73	23.35
Total costs	98.03	98.85	99.39	100.06	100.67	496.99
Incremental cost	**5.78**	**6.09**	**6.12**	**6.16**	**6.20**	**30.36**
Percentage budget Impact	**6.27%**	**6.56%**	**6.56%**	**6.56%**	**6.56%**	**6.51%**

Scenario analysis (all-comer population)

- A scenario analysis was conducted for the all-comer population including all three PD-L1 subgroups.
- Overall, an estimated 8,195 patients would be treated over 5 years in this scenario analysis.
- The total incremental cost of adding NIVO+IPI+PDC for 1L treatment of metastatic NSCLC is estimated to amount to CHF 41,215,093 in the first five years after introduction, which would represent a budget increase of 6.2%. (**Table 4** and **Figure 2**)

Table 4. Scenario analysis results (all-comer population)

Result	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Patient count						
No. of new patients treated	1,620	1,629	1,638	1,649	1,659	8,195
Without NIVO+IPI+PDC (CHF, millions)						
Drug acquisition cost	98.78	99.33	99.88	100.55	101.16	499.71
Administration cost	6.40	6.43	6.47	6.51	6.55	32.37
Monitoring cost	4.67	4.70	4.72	4.75	4.78	23.62
Adverse event cost	1.96	1.98	1.99	2.00	2.01	9.94
Subsequent treatment cost	13.15	13.22	13.29	13.38	13.46	66.50
PEMX maintenance cost	6.20	6.24	6.27	6.31	6.35	31.37
Total costs	131.16	131.89	132.62	133.51	134.32	663.51
With NIVO+IPI+PDC (CHF, millions)						
Drug acquisition cost	108.52	109.41	110.02	110.76	111.43	550.14
Administration cost	6.34	6.37	6.40	6.44	6.48	32.03
Monitoring cost	4.63	4.65	4.68	4.71	4.74	23.41
Adverse event cost	1.84	1.84	1.85	1.86	1.88	9.27
Subsequent treatment cost	12.35	12.42	12.49	12.57	12.65	62.49
PEMX maintenance cost	5.41	5.44	5.47	5.51	5.54	27.38
Total costs	139.09	140.14	140.91	141.86	142.72	704.72
Incremental cost	**7.93**	**8.25**	**8.29**	**8.35**	**8.40**	**41.22**
Percentage budget Impact	**6.04%**	**6.25%**	**6.25%**	**6.25%**	**6.25%**	**6.21%**

Note: Results for the all-comer population have been updated subsequent to abstract submission due to revised drug pricing in the List of Specialties issued by the FOPH, effective September 1, 2025.

Conclusion

- From the perspective of the national healthcare payer in Switzerland, the introduction of NIVO+IPI+PDC as a 1L treatment option for stage IV NSCLC with PD-L1<50% is estimated to be associated with incremental costs ranging from approximately CHF 5.78 million in year 1 to CHF 6.20 millions in year 5. This represents a budget impact of 6.5% over this 5-year period.
- The introduction of NIVO+IPI+PDC as a 1L treatment option for NSCLC is expected to increase drug acquisition costs, which will be partially offset by a reduction in costs for drug administration, patient monitoring, PEMX maintenance therapy, subsequent treatments, and management of adverse events.
- The availability of NIVO+IPI+PDC provides Swiss NSCLC patients and their treating physicians with a new treatment option that can improve patient survival and quality of life. The budget impact for local approval and reimbursement of this regimen is modest and well within limits of what is generally deemed acceptable for an innovative therapy.

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