

Serplulimab with carboplatin and etoposide for untreated extensive-stage small-cell lung cancer [ID6346]

Technology appraisal committee D [15 October 2025]

Chair: Raju Reddy

External assessment group: Newcastle University

Technical team: Cara Gibbons, Rachel Williams, Ross Dent

Company: Accord Healthcare

For public – contains no confidential information

Serplulimab with carboplatin and etoposide for untreated extensive-stage small-cell lung cancer [ID6346]

- ✓ **Background, consultation responses and key issues**
- Clinical effectiveness
- Modelling and cost effectiveness
- Other considerations
- Summary

Preliminary recommendation and conclusions

Serplulimab with carboplatin and etoposide should **not** be used for untreated extensive-stage small-cell lung cancer in **adults**

Indirect comparisons with atezolizumab or durvalumab combinations are uncertain because of methods used.

There are also uncertainties in the economic model, including:

- whether the model reflects what would happen in the NHS
- the differences in how long people are expected to stay on the different treatments
- the effects of treatment on quality of life, which are higher than would be expected for people with extensive-stage small-cell lung cancer.

Because of uncertainties in the clinical evidence and economic model, it is not possible to determine most likely cost-effectiveness estimates for serplulimab with carboplatin and etoposide.

Key issues at ACM1

Issues	ACM1 conclusions	Resolved
Generalisability of trials	<ul style="list-style-type: none"> Generalisability of ASTRUM-005, IMpower133 and CASPIAN populations and results to NHS is uncertain ITCs highly uncertain, want NMA with time-varying hazards 	No
PFS and OS extrapolation	<ul style="list-style-type: none"> <u>Serplulimab and chemotherapy only arms</u>: log-logistic models could be acceptable 	Yes
	<ul style="list-style-type: none"> <u>Atezolizumab and durvalumab arms</u>: comparison and justification of serplulimab, durvalumab and atezolizumab extrapolation approach 	No
Constant OS HRs	Want analyses modelling serplulimab, atezolizumab and durvalumab using updated ITCs	No
Time to off treatment extrapolation	<u>Serplulimab and chemotherapy only arms</u> : log-logistic models could be acceptable	Yes
	<u>Atezolizumab and durvalumab arms</u> : concerns with MAICs used to estimate TTOT → requested analyses using updated ITCs	No
Utilities	<ul style="list-style-type: none"> Utilities higher than expected and estimated by least-squares mean Want analyses using whole-population data and mixed-effect approach 	No
Weight/height	Model weight and height based on expected NHSE population	Yes

Draft guidance consultation responses

Comments received from:

- **Company – Accord**
 - Draft guidance response, including:
 - Additional literature on distinct mechanism of action of serplulimab compared with PD-L1 inhibitors, and unique affinity compared with PD-1 inhibitors in ES-SCLC.
 - Summary of independently published network meta-analyses, showing consistency with company NMA results.
 - Revised base-case for economic model including updated baseline weight and quality of life estimates using a linear mixed effects model.
 - Scenarios included fractional polynomial NMAs
- **No other consultation comments received.**

Key issues for ACM2

Issues	ACM2 questions	ICER impact
ITC and OS and PFS extrapolation (atezolizumab and durvalumab)	<ul style="list-style-type: none"> Does committee still consider Bucher ITC to be the best available evidence for comparing serplulimab with atezolizumab or durvalumab? Which PFS and OS extrapolation is more appropriate for serplulimab, atezolizumab and durvalumab? Is it appropriate to assume constant HRs? 	Large 
TTOT extrapolation (atezolizumab and durvalumab)	Which TTOT extrapolation approach is most appropriate for serplulimab, atezolizumab and durvalumab?	Moderate 
Utilities	Are the utility values in revised company and EAG base case appropriate for decision making?	Small (vs. ACM1 base case) 

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Key issue: Indirect treatment comparisons (1)

ACM1 conclusions

Generalisability

- Generalisability of trial outcomes to NHS unclear due to differences in patient characteristics between ASTRUM-005, IMpower133 and CASPIAN and NHS population

Serplulimab as a clinically relevant alternative

- Company ITCs showed PFS and OS improvement compared with atezolizumab and durvalumab
 - Clinical expert: expect similar effectiveness across immunotherapy treatments
- Company: improvement because serplulimab inhibits PD-L1 and PD-L2 (not only PD-L1)
 - Committee: should provide evidence of stronger efficacy than other PD-1 and PD-L1 inhibitors

ITC methods

- Bucher ITCs highly uncertain, but best available evidence for comparing serplulimab with atezolizumab or durvalumab (MAIC preferred by company not robust enough for decision-making)
- Want to see NMA with time-varying hazards to compare relative effectiveness of serplulimab to both atezolizumab and durvalumab (accept this will not address all between-study difference uncertainty)



Company DG response

Generalisability

- ASTRUM-005: large phase 3 RCT with planned subgroups showing no signal for race, sex or weight
- Differences in subsequent treatment likely to have a negligible effect on outcomes given very few patients fit enough for subsequent treatments in clinical practice

Serplulimab as a clinically relevant alternative

- Strong biological rationale to justify serplulimab showing largest difference from placebo of any immunotherapy used 1st line in ES-SCLC. 2 key differentiating features:
 1. Unique mechanism of action → dual PD-L1 and PD-L2 blockade (see [slide](#) for details)
 2. Higher affinity for PD-1 receptor (see [slide](#) for details)

ITC methods

- Conducted fractional polynomial NMA with time-varying HRs (see FP NMA models: [OS](#) and [PFS](#))
 - Flexible, time-varying method aims to address potential PHA violations
 - PHA could not be formally rejected, but concerns for IMPower133 and CASPIAN data (see [slide](#))
 - Limitations with the models mean that the results should be interpreted with caution
 - 1st order models: limited fit to observed survival seen in KM curves
 - 2nd order models: high uncertainty in relative effect estimates and convergence issues
- MAIC remains most appropriate approach as it adjusts for between trial differences
 - 6 independently [published NMAs](#) ranked serplulimab 1st for OS – consistent with MAIC



Key issues: Indirect treatment comparison (3)

EAG comments

Generalisability

- ASTRUM-005 enrolled mostly Asian people and not powered to detect differences between races
- █ (serplulimab) and █ (placebo) had subsequent treatment after 1st disease progression
 - Impact on OS not accounted for in trial analysis or ITC – uncertain if confounded trial outcomes

Serplulimab as a clinically relevant alternative

- Acknowledge molecular evidence for serplulimab disrupting both PD-L1 and PD-L2 through binding to PD1 may lead to greater suppression of T-cell inhibition = greater anti-tumour response
 - No direct evidence from ASTRUM-005 showing PD-L1 or PD-L2 expression was associated with an improvement in outcome
 - Interpret indications of superiority with caution due to differences in trials and NHS populations

ITC method

- FP NMA conducted appropriately, and fixed effect models appropriate given few trials in network
- FP NMA may address some concerns over PHA violations, but does not address uncertainties surrounding generalisability of trial population to NHS population
 - Limited overlap in patient populations would still be recurring issue in alternative methods e.g., ML-NMR, but such alternatives may have offered further insight for decision making



Key issues: Indirect treatment comparison (4)

EAG comments

Base case:

- Bucher ITC (atezolizumab PFS/OS, durvalumab OS)
- 2nd order FP-NMA (durvalumab PFS)

Additional plausible scenario: 2nd order FP-NMA for PFS and OS, for atezolizumab and durvalumab

Considered 4 factors:

1. **Population:** if assumed comparable across trials when considering effect modifiers, then all ITCs should produce similar results (MAIC and Bucher results are similar)
2. **Multiple comparators:** Bucher ITC, simulated ITCs and ML-NMAs preferred to MAICs when evaluating multiple comparators because a) assume similar population (Bucher, NMA) or b) adjust to common population (simulated ITCs, ML-NMAs) → agree Bucher ITC suitable for base case
3. **Proportional hazards (see [PHA assessment](#)):** concerns, but only CASPIAN PFS PHA not met
4. **Best fitting FP-NMA models:** 2nd order models better statistical fit than 1st order models, but many had convergence issues and autocorrelation.



Does committee still consider Bucher ITC to be the best available evidence for comparing serplulimab with atezolizumab or durvalumab?

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Key issues: OS and PFS extrapolation (atezolizumab and durvalumab) (1)

ACM1 conclusion

Company: applied MAIC HRs to serplulimab extrapolation to get extrapolations for comparator arms

- Constant OS and PFS HRs applied in model (20 years) – assumes treatment effect does not wane
- EAG: prefer to apply treatment waning to OS MAIC HR from 3.5 to 6.5 years

Committee:

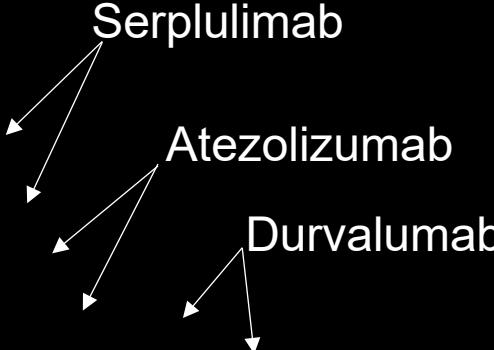
- Requested comparison of serplulimab, atezolizumab and durvalumab extrapolation and justification of approach, considering expected relative treatment effects
- Had concerns about validity of PHA between serplulimab and atezolizumab/durvalumab and requested analyses using NMA with time-varying HRs

Company DG response

- Base case: using MAIC HRs still most appropriate - adjusts for between trial differences, best fitting 1st order FP NMA model had minimal impact on overall results and given [PHA considerations](#)
 - Applies constant HRs and assumes no loss of relative treatment effect (scenarios provided)
 - Unlike IMpower133, ASTRUM-005 indicates no loss of treatment effect (see [KM curves](#))
- Scenarios: using FP NMA time-varying HRs (subject to limitations e.g., model fit and convergence)
 - PHA could not be formally rejected, but some concerns with IMPower133 and CASPIAN data
 - OS and PFS models suggest after initial time period, serplulimab had lower risk of death and progression than all comparators – aligns with MAIC findings

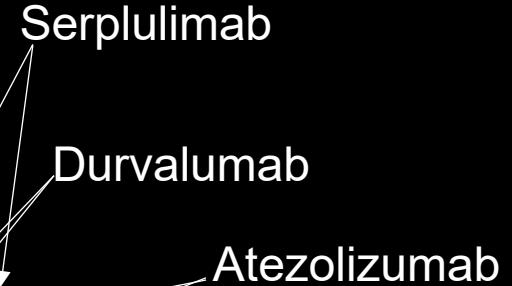
Key issues: OS and PFS extrapolation (atezolizumab and durvalumab) (2)

Company preferred:
MAIC OS HR



Median OS (months)	Trial	Model
Serplulimab	15.77	16.90
Atezolizumab	12.30	13.45
Durvalumab	12.90	14.14

Company preferred:
MAIC PFS HR



Median PFS (months)	Trial	Model
Serplulimab	5.82	7.70
Atezolizumab	5.20	5.86
Durvalumab	5.10	5.63

Company DG response continued

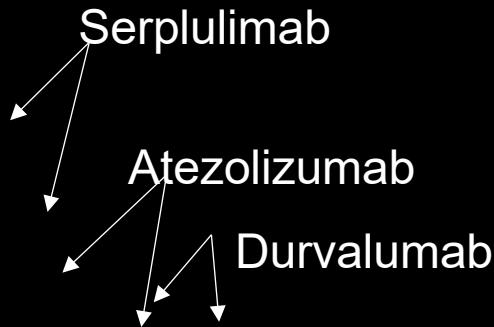
- Atezolizumab and durvalumab extrapolations slightly overestimate OS and PFS compared to KM curves = conservative assessment of relative efficacy
- Relative differences between arms in predicted and observed median OS and PFS well aligned

EAG comments

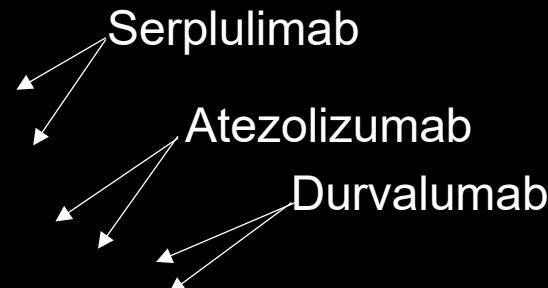
- Durvalumab: extrapolation curve crosses below trial KM curve in latter stages - possible model underestimates long-term PFS and OS, but small number at risk at end of KM curve
- Atezolizumab: extrapolation curve is marginally higher than KM curve

Key issues: OS and PFS extrapolation (atezolizumab and durvalumab) (3)

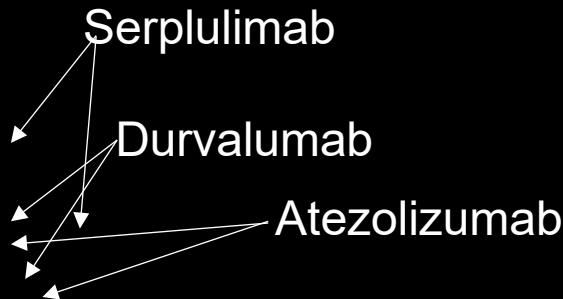
OS

1st order FP NMA ($p_1 = -2$)

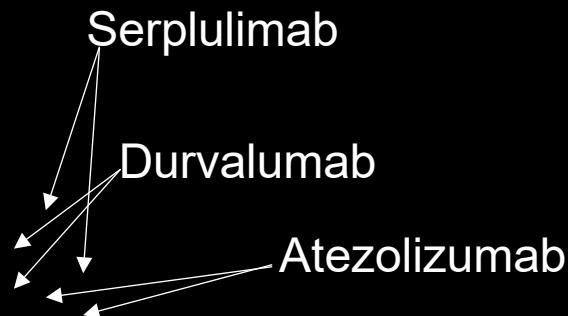
OS

2nd order FP NMA ($p_1 = -2, p_2 = 0.5$)

PFS

1st order FP NMA ($p_1 = -2$)

PFS

2nd order FP NMA ($p_1 = -2, p_2 = 0.5$)

Median OS (months)	Trial	Model prediction		
		MAIC	1 st order model	2 nd order model

Serplulimab	15.77	16.90 ^a	16.90 ^b	16.90 ^b
Atezolizumab	12.30	13.45 ^a	12.30 ^b	14.14 ^b
Durvalumab	12.90	14.14 ^a	14.14 ^b	14.37 ^b

^a provided by company; ^b estimated by NICE from model

Median PFS (months)	Trial	Model prediction		
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Serplulimab	5.82	7.70 ^a	7.70 ^b	7.70 ^b
Atezolizumab	5.20	5.86 ^a	4.25 ^b	4.94 ^b
Durvalumab	5.10	5.63 ^a	4.48 ^b	4.48 ^b

^a provided by company; ^b estimated by NICE from model

Key issues: OS and PFS extrapolation (atezolizumab and durvalumab) (4)

EAG comments continued

Base case: Bucher ITC (atezolizumab PFS/OS, durvalumab OS); 2nd order FP-NMA (durvalumab PFS)

Constant hazard ratios

1st order FP NMA models

- Poor fit to trials for PFS and OS, and DIC values much higher than 2nd order models
- Log-logistic distribution in company base case may be better fit than best fitting 1st order model
 - HR roughly constant over time - estimated HRs not dissimilar to MAIC HRs

2nd order FP NMA models

- Some suffered from autocorrelation and poor convergence, likely due to overfitting sparse data
- Best-fitting 2nd order model without autocorrelation issues in convergence plots, had better visual and statistical fit to KM data – but significant uncertainty in long-term HR predictions
- Clinical expert advice to company said 3 knot survival models predicted unreasonably high survival in long-term - not unreasonable to suppose same comment may be made for these OS predictions



Considering committee's preferred ITC approach, which PFS and OS extrapolation is more appropriate for serplulimab, atezolizumab and durvalumab?

Is it appropriate to assume constant HRs?

Key issues: TTOT extrapolation (atezolizumab and durvalumab) (1)

ACM1 conclusions

- Company: applied reciprocal of MAIC OS HR to serplulimab TTOT hazard rates for comparators
- Committee concerned with MAIC and wanted comparison of trial TTOTs and additional scenarios:
 1. TTOT assumed equivalent to PFS
 2. Model gap between trial TTOT and PFS for serplulimab to capture treatment after progression (same gap assumed for atezolizumab and durvalumab from their PFS extrapolations)
 3. Apply trial ratios of median PFS to median TTOT, to PFS curves to generate TTOT curves
- ASTRUM-005 allowed serplulimab post progression. In model, % people on treatment assumed independent of disease progression status (EAG: limited ICER impact)

Company DG comments

- Serplulimab had greater TTOT - may be due to improved efficacy and/or tolerability (see next slide)

Committee requested TTOT scenarios provided

- MAIC HR approach remains most appropriate to balance costs and efficacy in each treatment arm

1. Likely overestimates TTOT as assumes people only discontinue due to disease progression - likely other reasons to stop before they progress e.g., tolerability
2. Applying same gap leads to imbalance in costs and efficacy for comparator arms, particularly durvalumab (trial had longer TTOT) → underestimates durvalumab TTOT
3. Overly simplistic approach → e.g. durvalumab arm, trial median TTOT greater than median PFS

Key issues: TTOT extrapolation (atezolizumab and durvalumab) (2)

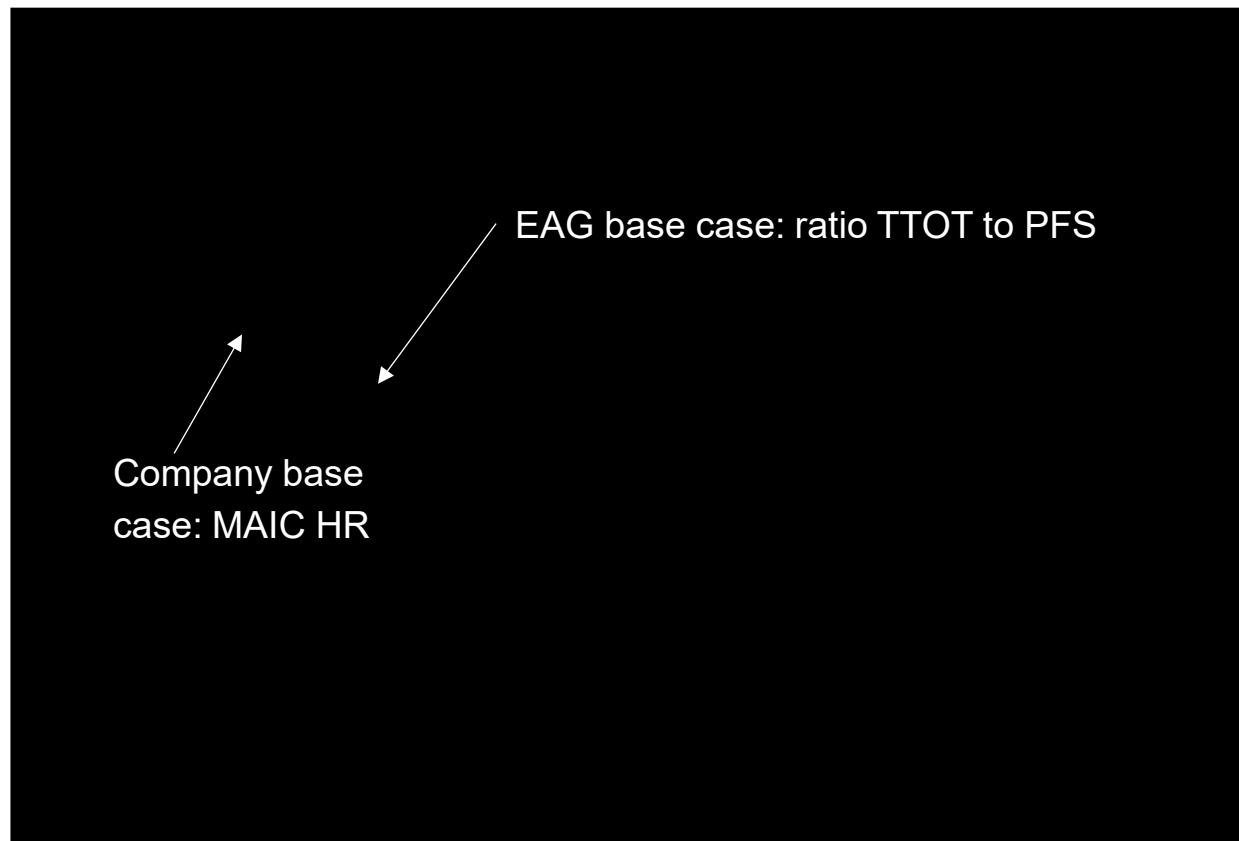
Treatment (trial)	Median duration of treatment exposure	Number of treatment doses	Median ToT:PFS ratio
Serpluliumab (ASTRUM-005)	22 weeks	8	0.87
Atezolizumab (IMpower133)	20.4 weeks	7	0.90
Durvalumab (CASPIAN)	28 weeks	7	1.26

EAG comments

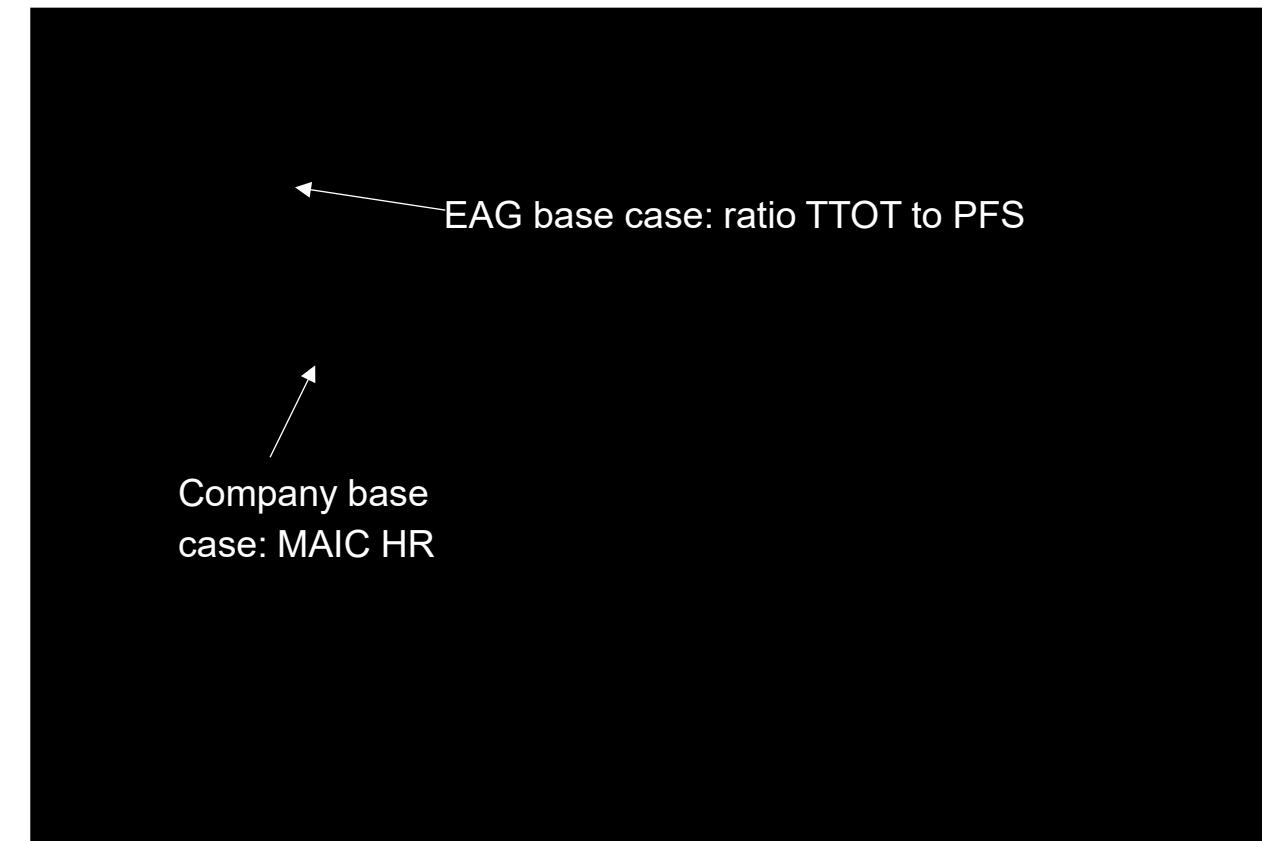
- Company explored all scenarios around TTOT assumptions requested by committee:
 - (1) some people continue treatment beyond progression not captured assuming PFS=TTOT
 - (2) agrees with company that gap method may imbalance costs and efficacy across arms
 - (3) disagrees with company that durvalumab TTOT>PFS is issue for ratio method
- EAG considered an additional scenario:
 - Multiplying comparator PFS hazard rates* by ratio of median TTOT (comparator) to median PFS (comparator) – **revised EAG base case**
 - *Differs to company ratio scenario as company multiplied PFS probability by the ratio

Key issues: TTOT extrapolation (atezolizumab and durvalumab) (3)

Atezolizumab TTOT curves



Durvalumab TTOT curves



At ACM2, EAG revised base case uses [log-logistic model for serplulimab TTOT](#) and assumes the same % of people are on treatment across progression-free and progressed health states (as in company base case)



Which TTOT extrapolation approach is most appropriate for serplulimab, atezolizumab and durvalumab?

Key issue: Health state utilities (1)



ACM1 conclusions

Company: EQ-5D-3L progression-based utilities mapped from ASTRUM-005 EQ-5D-5L

- **Scenarios:** utilities based on treatment status and TTD approach

Committee:

- Utilities higher than expected and least-squares mean method is subject to attrition bias
- Non-Asian subgroup results more clinically plausible, but small sample adds uncertainty
- Prefer health-state utility values for whole population in ASTRUM-005, and requested using a linear mixed effects approach

Company DG response

- Fitted mixed linear effect models using data from 7th May 2024 data cut (see [next slide](#))
- Updated base case utilities: 'progression-free' 0.830 and 'progressed disease' 0.796

EAG comments

- Updated and original PFS and PD utility estimates are similar
- Lack of face validity regarding on-off treatment PFS and PD estimates no longer an issue
 - Utility values are higher than some published values for SCLC patients
- Updated base case utilities same as company



Are the utility values in the company base case appropriate for decision making?

Key issue: Health state utilities (2)



Progression-based utilities

Source	PFS	PD
ASTRUM-005 (LSME, ACM1)	0.838	0.805
Nafees et al. 2008 (NSCLC)	0.673	0.473
Chouaid et al. 2013 (NSCLC)	0.71	0.67
MLEM (ACM2 base case)	0.830	0.796

Progression utilities based on treatment status

Health state	LSME	MLEM
PFS on-treatment	0.855	0.835
PFS off-treatment	0.757	0.786
PD on-treatment	0.836	0.828
PD off-treatment	0.786	0.779

Time to death utilities

Health state	ASTRUM-005 (LSME)	TA638	ASTRUM-005 (MLEM)
On-treatment			
0-≤5 weeks	0.680	0.65	0.636
>5-≤15 weeks	0.778	0.73	0.798
>15-≤30 weeks	0.809	0.72	0.827
>30 weeks	0.859	0.73	0.843
Off-treatment			
0-≤5 weeks	0.432	0.33	0.598
>5-≤15 weeks	0.673	0.53	0.759
>15-≤30 weeks	0.770	0.70	0.788
>30 weeks	0.828	0.75	0.805

Abbreviations: MLEM, mixed linear effects model; PD, progressed disease, PFS, progression free disease; LSME; least square mean estimates

QALY weightings for severity

EAG comments

- Company approach to calculate QALYs in general population follows NICE guidance
- But there's inconsistency in mapping value sets for people with condition (ASTRUM-005 EQ-5D-5L mapped to EQ-5D-3L)

QALY weight	Absolute shortfall	Proportional shortfall
x1	Less than 12	Less than 0.85
x1.2	12 to 18	0.85 to 0.95
x1.7	At least 18	At least 0.95

QALYs of people without condition	Current treatment	QALYs with the condition on current treatment	Absolute QALY shortfall		Proportional QALY shortfall	
			Company base case	EAG base case	Company base case	EAG base case
11.92	Atezolizumab	1.24 – 1.31	10.67	10.60	0.90	0.89
	Durvalumab	1.35 – 1.43	10.56	10.48	0.89	0.88
	Carboplatin + etoposide	1.00	10.91	10.91	0.92	0.92



Does the committee agree it is appropriate to apply a QALY weighting for severity? If so, what QALY weighting should be used?

Summary of company and EAG base case assumptions (1)

Assumptions in company and EAG base case

Assumption	Committee ACM1	Company ACM2	EAG ACM2
ITCs and extrapolations			
OS	Serplulimab and C-E	Log-logistic could be acceptable	Log-logistic
	Atezolizumab and durvalumab	<ul style="list-style-type: none"> Unadjusted Bucher best available evidence (ACM1) Requested further analysis using NMA with time-varying HRs 	<ul style="list-style-type: none"> MAIC HR applied to serplulimab extrapolation Constant HRs
PFS	Serplulimab and C-E	Log-logistic could be acceptable	Log-logistic
	Atezolizumab and durvalumab	<ul style="list-style-type: none"> Unadjusted Bucher best available evidence (ACM1) Requested further analysis using NMA with time-varying HRs 	<ul style="list-style-type: none"> MAIC HR applied to serplulimab extrapolation Constant HRs

Summary of company and EAG base case assumptions (2)

Assumptions in company and EAG base case

Assumption	Committee ACM1	Company ACM2	EAG ACM2
TTOT	Serplulimab and C-E – see appendix	Requested further analysis	Log-logistic
	Atezolizumab and durvalumab	Requested further analysis	MAIC HR applied to serplulimab extrapolation
% on treatment across PFS/PD states – see appendix	-	Ratio of median TTOT:PFS (comparator) multiplied by comparator PFS hazard rate	
Utilities	Requested further analysis	Assumed same in PFS and PD states	
Height and weight	UK averages: 168.4 cm / 79.3 kg	Reweighted ASTRUM-005 non-Asian population data: 166.9cm / 76.4kg	
Severity weighting	Requested further analysis	1.2	

Cost-effectiveness results

All ICERs are reported in PART 2 slides because they include confidential PAS discounts for comparators

When using confidential prices, both the company and EAG base cases are around or over £30,000 per QALY gained for all pairwise comparisons, with and without a 1.2 QALY weighting

Scenarios explored	ICER impact (on company base case)
Bucher ITC for OS and PFS	Moderate 
1st-order FP NMA	Moderate 
2nd-order FP NMA	Large ↑ 
Alternative TTOT approaches	Moderate 

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Managed access

Company has not submitted a managed access proposal

The committee can make a recommendation with managed access if:

- the technology cannot be recommended for use because the evidence is too uncertain
- the technology has the plausible potential to be cost effective at the currently agreed price
- new evidence that could sufficiently support the case for recommendation is expected from ongoing or planned clinical trials, or could be collected from people having the technology in clinical practice
- data could feasibly be collected within a reasonable timeframe (up to a maximum of 5 years) without undue burden.



What are the uncertainties, and can they be resolved with further data collection?

Key issues for ACM2

Issues	ACM2 questions	ICER impact
ITC, and OS and PFS extrapolation (atezolizumab and durvalumab)	<ul style="list-style-type: none"> Does committee still consider Bucher ITC to be the best available evidence for comparing serplulimab with atezolizumab or durvalumab? Which PFS and OS extrapolation is more appropriate for serplulimab, atezolizumab and durvalumab? Is it appropriate to assume constant HRs? 	Large 
TTOT extrapolation (atezolizumab and durvalumab)	Which TTOT extrapolation approach is most appropriate for serplulimab, atezolizumab and durvalumab?	Moderate 
Utilities	Are the utility values in revised company base case appropriate for decision making?	Small (vs. ACM1 base case) 