

Economic Evidence Associated With Treatments for Patients With Non-Small Cell Lung Cancer That Progressed on Prior Therapies: A Systematic Literature Review

Scan for more information



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Conclusions

Overall economic burden of treating NSCLC is high, particularly for patients who progress onto 2L and above regimens, due to the high cost of healthcare resources and therapeutic options. There is a need for novel therapies that extend survival, reducing progression-related hospitalisations and additional treatment regimens. In addition, there is a clear unmet need to identify cancer earlier in order to be targeted by curative treatment options, thereby preventing the necessity of these treatments.

Background

Non-small cell lung cancer (NSCLC), the most dominant form of lung cancer, accounts for 80–85% of all cases.¹ Although often diagnosed at advanced stage, treatment options for those who progress on first-line (1L) or subsequent treatment lines are limited to docetaxel or best-supportive care. US national estimates suggest that NSCLC is the fifth-costliest tumour, with the cost of treatment increasing significantly over time, irrespective of stage.^{2–4}

Objective

To identify and report economic evidence, including economic evaluations, health state utility values (HSUVs), and cost and resource use (CRU) data, for patients with advanced, metastatic, or recurrent NSCLC who progressed on any prior NSCLC treatment.

Methods

MEDLINE, Embase, The International Health Technology Assessment (HTA) Database and National Health Service Economic Evaluation Database were searched for relevant publications in June 2023. Grey literature searches of five congresses (occurring from 2021 to 2023), 18 HTA websites and three economic databases were undertaken, in addition to bibliography hand-searches.

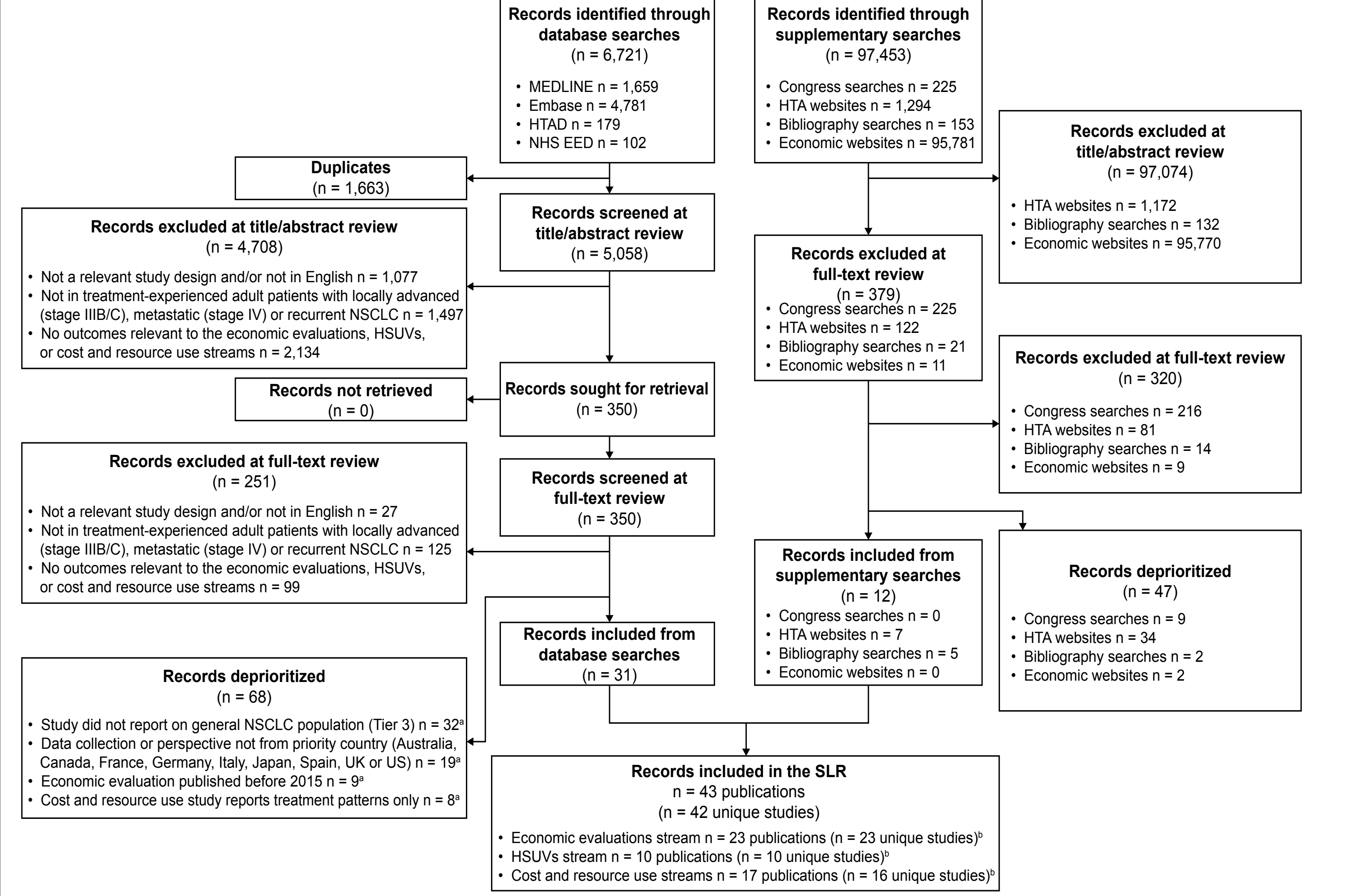
Inclusion criteria denoted adult patients with locally advanced (stage IIIB/C), metastatic (stage IV) or recurrent NSCLC who were treatment experienced. Any publication presenting primary data or any HTA submission was included. Economic evaluations had to assess a pharmacologically active intervention. The quality of extracted economic evaluations was assessed using the Drummond checklist. Evidence prioritisation occurred by extracting data from studies reporting on a general NSCLC population and then by collecting data from or conducted from the perspective of specified countries (Australia, Canada, France, Germany, Italy, Japan, Spain, the United Kingdom or the United States). For economic evaluations, those published from 2015 onwards were prioritised for extraction, whilst studies only reporting treatment patterns were deprioritised. Extracted data included study methodology, patient characteristics, incremental cost-effective ratios (ICERs), treatment resource use, total costs and HSUVs.

Results

Study and Patient Characteristics

Of the 104,174 records retrieved, 42 unique studies were prioritised for data extraction, reporting on economic evaluations (n = 23), HSUVs (n = 10) and CRU data (n = 16; **Figure 1**). All economic evaluations were cost-effectiveness or cost-utility analyses. Most economic evaluations utilised data from the UK (**Table 1**).

Figure 1. PRISMA



^aWhilst studies may fit the criteria for multiple exclusion reasons, a consecutive approach to deprioritisation was taken.
^bStudies may be included in multiple streams.
HSUV, health state utility value; HTA, Health Technology Assessment; HTAD, HTA Database; NHS EED, National Health Service Economic Evaluation Database; NSCLC, non-small cell lung cancer; PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses; SLR, systematic literature review.

References: 1 Osmani L, Askin F, Gabrielson E, et al. Current WHO guidelines and the critical role of immunohistochemical markers in the subclassification of non-small cell lung carcinoma (NSCLC): Moving from targeted therapy to immunotherapy. *Semin Cancer Biol.* 2018;52(Pt 1):103–9. 2 Su Z, Espirito J, Aguilar KM, et al. Real-world outpatient cost of care among patients with non-small cell lung cancer (NSCLC) treated in the US community. Presented at: 2023 International Society for Pharmacoeconomics and Outcomes Research; May 7–10, 2023. Boston, MA. Abstract EE499. 3 Korytowsky B, Radchenko J, Nwokeji ED, et al. Understanding total cost of care in advanced non-small cell lung cancer pre- and postapproval of immuno-oncology therapies. *Am J Manag Care.* 2018;24:S439–47. 4 Cancer Trends Progress Report. Financial Burden of Cancer Care. National Cancer Institute. https://progressreport.cancer.gov/after/economic_burden. Accessed September 25, 2024.

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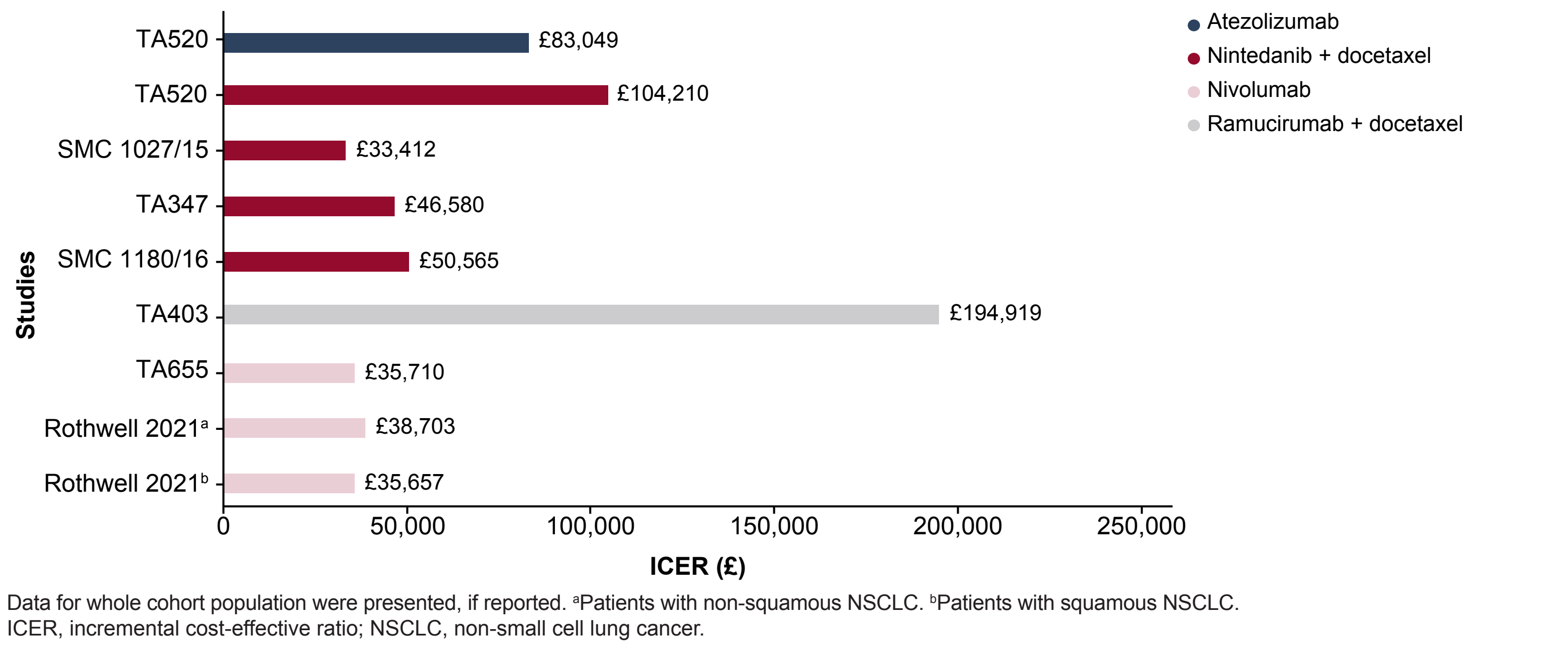
Table 1. Study Characteristics of Included and Extracted Economic Evaluations

Study Characteristic	Total Economic Evaluations ^a (n = 23)
Country, number of studies	
Spain	2
France	2
UK	7
US	5
International ^b	1
Other ^c	6
Intervention assessed, number of studies	
Afinib	1
Atezolizumab	7
Nab-paclitaxel	1
Nintedanib + docetaxel	2
Nivolumab	13
Pembrolizumab	5
Ramucirumab	1

Countries individually named refer to those studies that occurred in that country only. ^aEconomic evaluations have multiple study designs. ^bThe 'International' category includes Canada and Sweden. ^cThe 'Other' category includes Australia (n = 1), Canada (n = 4) and Japan (n = 1).

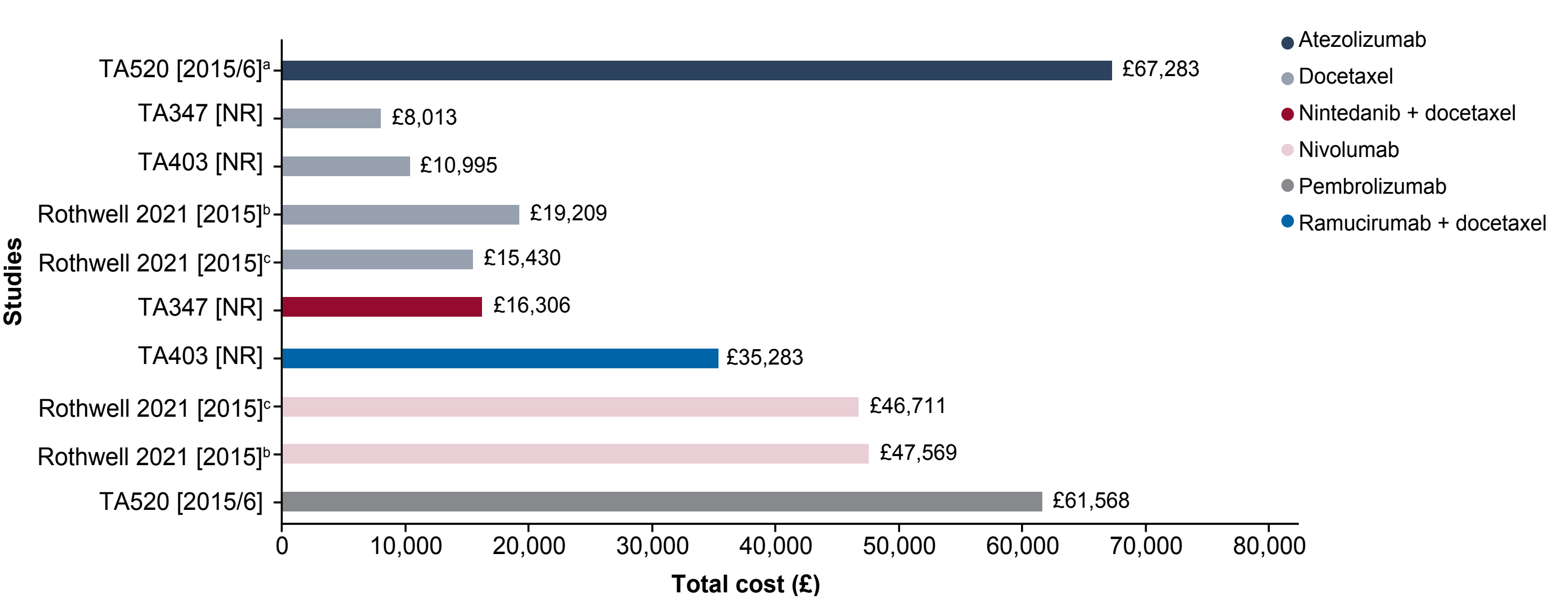
Multiple studies (n = 18) reported varying ICERs comparative to docetaxel. A Japanese study found that the incremental cost/quality-adjusted life years (QALYs) of nab-paclitaxel compared with docetaxel was JPY 19,694,424/QALY, whilst a UK study reported £35,657/QALY comparing nivolumab with docetaxel. Compared with docetaxel, the highest ICER reported by an economic evaluation with a UK perspective was £194,919, for ramucirumab + docetaxel (**Figure 2**).

Figure 2. ICER Values for Economic Evaluations in the UK, by Treatment Comparative to Docetaxel



Improved quality of life compared with docetaxel was reported for pembrolizumab (n = 1; HSUV: 0.687–0.761 across health states) and nivolumab (n = 2; difference in mean change in utility index scores: 0.034 and 0.027) but were not statistically significant. Reported overall treatment cost varied across studies, from €2,671 (annual cost per patient, second-line (2L) treatment for squamous NSCLC without immunotherapy) to £67,283 (total mean costs during on-treatment/progression free survival with atezolizumab; **Figure 3**). Mean length of overall hospital stay (n = 5) ranged from 0.7–26.0 days. The highest mean number of emergency visits (n = 1) was reported for pemetrexed due to dyspnea (1.3), with the highest mean number of outpatient visits (n = 4) reported for patients treated with immunotherapy only (14).

Figure 3. Total Costs for Treatments in the UK



Author contributions: Substantial contributions to study conception/design, or acquisition/analysis/interpretation of data: NK, AP, EK, CM and MR; Drafting of the publication, or revising it critically for important intellectual content: NK, AP, EK, CM and MR; Final approval of the publication: NK, AP, EK, CM and MR.

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Abbreviations: 1L, first line; 2L, second line; CRU, cost and resource use; HSUV, health state utility value; HTA, Health Technology Assessment; HTAD, HTA Database; ICER, incremental cost-effective ratio; INAHTA, International Network of Agencies for Health Technology Assessment; NHS EED, National Health Service Economic Evaluation Database; NR, not reported; NSCLC, non-small cell lung cancer; PD-L1, programmed death-ligand 1; PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses; PRO, patient-reported outcomes; QALY, quality-adjusted life year; RCT, randomised controlled trial; SLR, systematic literature review.

Disclosures: NK and MR: Employees and shareholders of Gilead Sciences, Inc; AP, EK and CM: Employees of Costello Medical.