Supplementary Online Content 1

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This supplementary material has been provided by the authors to give readers additional information about their work.

Declarations

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Conflict of interest: The authors declare no conflict of interest.

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Country	Agency	Website
England	NICE	https://www.nice.org.uk/
Scotland	SMC	https://www.scottishmedicines.org.uk/
France	HAS	https://www.has-sante.fr/
Germany	G-BA	https://www.g-ba.de/
Canada	CADTH	https://www.cadth.ca/
Australia	PBAC	http://www.pbs.gov.au/info/industry/listing/elements/pbac-meetings/psd/public-summary-documents-by-product
USA	FDA	https://www.accessdata.fda.gov/scripts/cder/daf/

Table e1 Data sources

CADTH: Canadian Agency for Drugs and Technologies in Health; FDA: US Food & Drug Administration; G-BA: Federal joint Committee ("*Gemeinsamer Bundesausschuss*"); HAS: Haute Autorité de Santé; NICE: National Institute for Health and Care Excellence; PBAC: Pharmaceutical Benefits Advisory Committee; SMC: Scottish Medicines Consortium.

Variable	Definition	Source [a]
HTA outcome	Reimbursement decision by the respective HTA agency	HTA Report
HTA approval date	Date of the HTA outcome	HTA Report
HTA economic restriction	Financial or outcome-based restriction associated with the HTA outcome	HTA Report
HTA clinical restriction	Dosing or population-based restriction associated with the HTA outcome	HTA Report
Incremental QALYs gained	Incremental quality-adjusted life year improvement the indication offers relative to the standard of care	HTA Report
Incremental LYs gained	Incremental life year improvement the indication offers relative to the standard of care	HTA Report
ICER	Main (base case) incremental cost-effectiveness ratio calculated for each indication relative to the standard of care	HTA Report
Disease prevalence	Country specific disease prevalence rate per 100,000 inhabitants	Global Burden of Disease, 2017
Drug list price	List price of the respective drug in each country extracted after each indication launch	IQVIA Sales

Table e2 Definition and source for all collected variables

ICER: incremental cost-effectiveness ratio; HTA: health technology assessment; LY: life year; QALY: quality-adjusted life year.

[a]: Given the lack of a formal HTA process in the US, data on QALYs, LYs, and ICERs were retrieved from a peer-reviewed literature search of economic evaluations for all included indications.

Agency	Positive		Negative	Not launched
	List	List with condition	Do not list	
NICE	Positive decision without clinical and economic restrictions	Positive decision with any clinical and economic restrictions	Negative decision	No outcome / withdrawn
HAS	SMR important with ASMR I, II	SMR important with ASMR III, IV, V	SMR insufficient	No outcome / withdrawn
SMC	Positive decision without clinical and economic restrictions	Positive decision with any clinical and economic restrictions	Negative decision	No outcome / withdrawn
G-BA	Major or significant added benefit	minor or unquantifiable added benefit	No or lower added benefit	No outcome / withdrawn
CADTH	Positive decision without clinical and economic restrictions	Positive decision with any clinical and economic restrictions	Negative decision	No outcome / withdrawn
PBAC	Positive decision without clinical and economic restrictions	Positive decision with any clinical and economic restrictions	Negative decision	No outcome / withdrawn

Table e3 Classification of health technology assessment outcomes by agency

ASMR: Amélioration du Service Médical Rendu; CADTH: Canadian Agency for Drugs and Technologies in Health; G-BA: Federal joint Committee ("*Gemeinsamer Bundesausschuss*"); HAS: Haute Autorité de Santé; NICE: National Institute for Health and Care Excellence; PBAC: Pharmaceutical Benefits Advisory Committee; SMC: Scottish Medicines Consortium; SMR: Service Médical Rendu.

Molecule	**No. of indications**	**1st FDA approval**
Everolimus	7	30.03.2009
Nintedanib	3	15.10.2014
Aflibercept	6	18.11.2011
Dimethyl fumarate	2	27.03.2013
Ruxolitinib	2	16.11.2011
Pembrolizumab	15	04.09.2014
Cabozantinib	4	29.11.2012
Nivolumab	11	22.12.2014
Atezolizumab	6	18.05.2016
Avelumab	3	23.03.2017
Ramucirumab	4	21.04.2014
Pazopanib	2	19.10.2009
Tisagenlecleucel	2	30.08.2017
Ibrutinib	6	13.11.2013
Regorafenib	3	27.09.2012
Abiraterone Acetate	3	28.04.2011
Afatinib	2	12.07.2013
Blinatumomab	3	03.12.2014
Enzalutamide	3	31.08.2012
Rucaparib	2	19.12.2016
Osimertinib	2	13.11.2015
Crizotinib	3	26.08.2011
Bosutinib	2	04.09.2012
Alectinib	2	11.12.2015
Ceritinib	2	29.04.2014

Table e4 Sample of multi-indication cancer drugs

Variable	No.	(%)
Disease area		
Solid cancer	70	(70.0%)
Hematologic cancer	21	(21.0%)
Non-cancer	9	(9.0%)
Treatment type		
Monotherapy	82	(82.0%)
Combination	18	(18.0%)
Line of treatment		
1st line	38	(38.0%)
2nd, 3rd, 4th line	62	(62.0%)
FDA launch sequence		
1st indication	25	(25.0%)
2nd indication	24	(24.0%)
≥3rd indication	47	(47.0%)
Not launched	4	(4.0%)
Country		
England (NICE)	67	(67.0%)
Scotland (SMC)	68	(68.0%)
France (HAS)	78	(78.0%)
Germany (G-BA)	80	(80.0%)
Canada (CADTH)	57	(57.0%)
Australia (PBAC)	63	(63.0%)
US (FDA)	96	(96.0%)
Total no. of indications	**100**	**(100.0%)**

Table e5 Sample overview

CADTH: Canadian Agency for Drugs and Technologies in Health; FDA: US Food & Drug Administration; G-BA: Federal joint Committee ("*Gemeinsamer Bundesausschuss*"); HAS: Haute Autorité de Santé; NICE: National Institute for Health and Care Excellence; PBAC: Pharmaceutical Benefits Advisory Committee; SMC: Scottish Medicines Consortium.

Country	1st indication		2nd indication		≥3rd indication		Not launched	
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
England (NICE)	25	(25%)	18	(18%)	24	(24%)	33	(33%)
Scotland (SMC)	25	(25%)	16	(16%)	27	(27%)	32	(32%)
France (HAS)	27	(27%)	21	(21%)	30	(30%)	22	(22%)
Germany (G-BA)	27	(27%)	21	(21%)	32	(32%)	20	(20%)
Canada (CADTH)	18	(18%)	13	(13%)	26	(26%)	43	(43%)
Australia (PBAC)	25	(25%)	11	(11%)	27	(27%)	37	(37%)
USA (FDA)	25	(25%)	24	(24%)	47	(47%)	4	(4%)
Total no. of indications	**172**	**(25%)**	**124**	**(18%)**	**213**	**(30%)**	**191**	**(27%)**

Table e6 Number of indication launches by country

CADTH: Canadian Agency for Drugs and Technologies in Health; FDA: US Food & Drug Administration; G-BA: Federal joint Committee ("*Gemeinsamer Bundesausschuss*"); HAS: Haute Autorité de Santé; NICE: National Institute for Health and Care Excellence; PBAC: Pharmaceutical Benefits Advisory Committee; SMC: Scottish Medicines Consortium.