Supplementary 1 Search strategy

MEDLINE	
#1	"Neoplasms"[Mesh]
#2	carcinoma*[tiab] OR cancer*[tiab] OR adenocarcinoma*[tiab] OR malignan*[tiab] OR tumor*[tiab] OR tumour*[tiab] OR neoplasm*[tiab]
#3	"immune checkpoint"[tiab] OR CTLA-4[tiab] OR PD-1[tiab] OR PD-L1[tiab] OR ipilimumab[tiab] OR atezolizumab[tiab] OR durvalumab[tiab] OR pembrolizumab[tiab] OR nivolumab[tiab] OR avelumab[tiab] OR tremelimumab[tiab] OR cemiplimab[tiab]
#4	rechallenge[tiab] OR reintroduction[tiab] OR retreatment[tiab] OR readministration[tiab] OR intermittent[tiab] OR resum*[tiab] OR sequential[tiab] OR "ipilimumab-refractory"[tiab] OR "atezolizumab-refractory"[tiab] OR "durvalumab-refractory"[tiab] OR "pembrolizumab-refractory"[tiab] OR "nivolumab-refractory"[tiab] OR "avelumab-refractory"[tiab] OR "tremelimumab-refractory"[tiab] OR "cemiplimab-refractory"[tiab] OR "second course"[tiab]
#5	#1 OR #2
#6	#3 AND #4 AND #5
Embase	
#1	'malignant neoplasm'/exp
#2	'carcinoma*':ab,ti OR 'cancer*':ab,ti OR 'adenocarcinoma*':ab,ti OR 'malignan*':ab,ti OR 'tumor*':ab,ti OR 'tumour*':ab,ti OR 'neoplasm*':ab,ti
#3	#1 OR #2
#4	'immune checkpoint':ab,ti OR 'ctla-4':ab,ti OR 'pd-1':ab,ti OR 'pd-l1':ab,ti OR 'ipilimumab':ab,ti OR 'atezolizumab':ab,ti OR 'durvalumab':ab,ti OR 'pembrolizumab':ab,ti OR 'nivolumab':ab,ti OR 'avelumab':ab,ti OR 'tremelimumab':ab,ti OR 'cemiplimab':ab,ti
#5	'rechallenge':ab,ti OR 'reintroduction':ab,ti OR 'retreatment':ab,ti OR 'readministration':ab,ti OR 'intermittent':ab,ti OR 'resum*':ab,ti OR 'sequential':ab,ti OR 'ipilimumab-refractory':ab,ti OR 'atezolizumab-refractory':ab,ti OR 'durvalumab-refractory':ab,ti OR 'pembrolizumab-refractory':ab,ti OR 'nivolumab-refractory':ab,ti 'avelumab-refractory':ab,ti OR 'tremelimumab-refractory':ab,ti OR 'cemiplimab-refractory':ab,ti OR 'second course':ab,ti
#6	#3 AND #4 AND #5
#7	#6 NOT ('animal cell'/de OR 'animal experiment'/de OR 'animal model'/de OR 'animal tissue'/de OR 'cancer model'/de OR 'case report'/de OR 'case study'/de OR 'drug surveillance program'/de OR 'feasibility study'/de OR 'human cell'/de OR 'human tissue'/de OR 'model'/de OR 'mouse model'/de OR 'nonhuman'/de OR 'practice guideline'/de OR 'systematic review'/de)

#8	#7 AND (2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py OR 2020:py)
CENTRAL	
#1	MeSH: Neoplasms
#2	(carcinoma):ti,ab,kw OR (cancer*):ti,ab,kw OR (adenocarcinoma*):ti,ab,kw OR (malignan*):ti,ab,kw OR (tumor*):ti,ab,kw OR (tumour*):ti,ab,kw OR (neoplasm*):ti,ab,kw
#3	#1 OR #2
#4	(immune checkpoint):ti,ab,kw OR (CTLA-4):ti,ab,kw OR (PD-1):ti,ab,kw OR (PD-L1):ti,ab,kw OR (ipilimumab):ti,ab,kw OR (atezolizumab):ti,ab,kw OR (durvalumab):ti,ab,kw OR (pembrolizumab):ti,ab,kw OR (nivolumab):ti,ab,kw OR (avelumab):ti,ab,kw OR (tremelimumab):ti,ab,kw OR (cemiplimab):ti,ab,kw
#5	(rechallenge):ti,ab,kw OR (reintroduction):ti,ab,kw OR (retreatment):ti,ab,kw OR (readministration):ti,ab,kw OR (intermittent):ti,ab,kw OR (resum*):ti,ab,kw OR (sequential):ti,ab,kw OR (ipilimumab-refractory):ti,ab,kw OR (atezolizumab-refractory):ti,ab,kw OR (durvalumab-refractory):ti,ab,kw OR (pembrolizumab-refractory):ti,ab,kw OR (nivolumab-refractory):ti,ab,kw OR (avelumab-refractory):ti,ab,kw OR (tremelimumab-refractory):ti,ab,kw OR (cemiplimab-refractory):ti,ab,kw OR (second course):ti,ab,kw
#6	#3 AND #4 AND #5

Supplementary 2 Risk of bias assessment of included studies

	Bias due to confounding	Bias in selection of participants	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Overall bias
Chiarion-Silenti et al. (2014)	high	low	low	moderate	low	low	low	high
Robert et al. (2013)	moderate	low	low	moderate	low	low	low	moderate
Lebbé et al (2014)	high	low	low	moderate	moderate	low	low	high
Robert et al. (KEYNOTE-001, 2014)	moderate	low	low	moderate	low	low	low	moderate
Hamid et al. (2017)	moderate	low	low	moderate	low	low	low	moderate
Larkin et al. (2017)	moderate	low	low	moderate	low	low	low	moderate
Weber et al. (2016)	moderate	low	low	moderate	low	low	low	moderate
Long et al. (KEYNOTE-006, 2020)	moderate	low	low	moderate	low	low	low	moderate
Herbst et al. (2020)	moderate	low	low	moderate	low	low	low	moderate
Diaz et al. (2020)	moderate	low	low	moderate	low	low	low	moderate

Sheth et al. (2019)	moderate	low	low	moderate	moderate	low	low	moderate
Garassino et al. (2018)	moderate	low	low	moderate	low	low	low	moderate
Lee et al. (2019)	high	low	low	moderate	low	low	low	high
Sandhu et al. (2019)	high	low	low	moderate	moderate	low	low	high
Robert et al. (2019)	high	low	low	moderate	moderate	low	low	high
Marquez-Rodas et al. (2019)	high	low	low	moderate	moderate	low	low	high
Niglio et al. (2020)	moderate	low	low	moderate	moderate	low	low	moderate