Immuno-oncology treatments: factors influencing approval by the UK National Institute for Health and Care Excellence (NICE), 2011-2020

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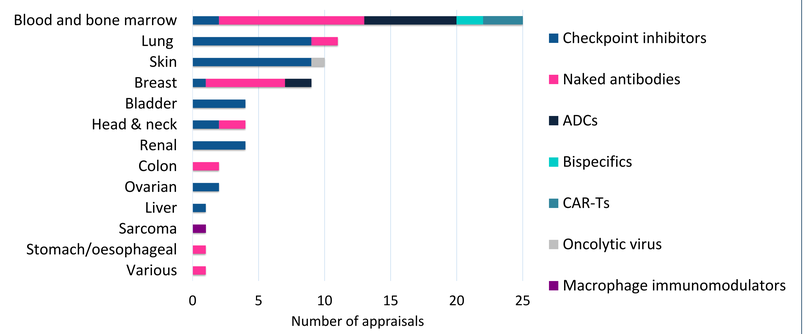
Immuno-oncology treatments: the promise

- Immuno-oncology (I-O) therapies harness the body's own immune system to prevent, control and eliminate cancer.[1]
- Over the last decade, I-O therapies have significantly widened the treatment options for various types of tumours, by providing more durable clinical outcomes and higher quality of life than cytotoxic chemotherapy, targeted therapies or radiation.[2,3]

Appraisals submitted to NICE for different I-O drug types, by indication



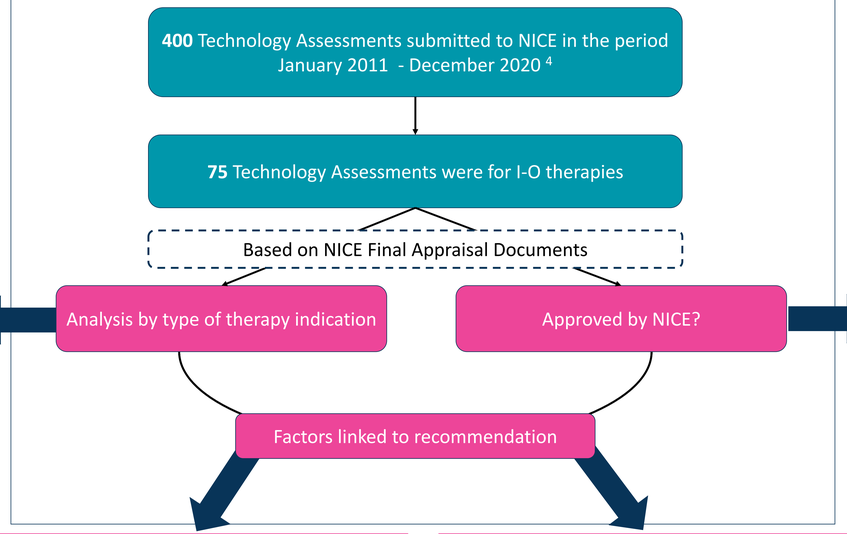
- The **most common indication** for fully appraised I-O drugs was blood and bone marrow cancers (33.3%), followed by lung cancers (14.7%).
- The **most frequently appraised** I-O drug types were checkpoint inhibitors (42.7%) and naked antibodies (36%).
- **Checkpoint inhibitors** were assessed mainly for the treatment of solid tumours; **naked antibodies** and **antibody-drug conjugates,** mainly for treatment of blood and bone marrow malignancies and breast cancer; and **bispecific antibodies** and **chimeric antigen receptor T cells**, only for treatment of blood and bone marrow cancers.

Immuno-oncology treatments: the challenge

- Health technology assessment (HTA) agencies are faced with a substantial volume of I-O therapy appraisals for oncology indications. It is unclear what aspects of I-O therapies may be more important when manufacturers seek approval for reimbursement by national insurers.

We evaluated factors that have influenced the success of I-O therapies for reimbursement in the UK by the National Institute for Health and Care Excellence (NICE) from 2011 until 2020.

Identifying factors linked to reimbursement success



Immuno-oncology treatments: lessons learned for reimbursement success

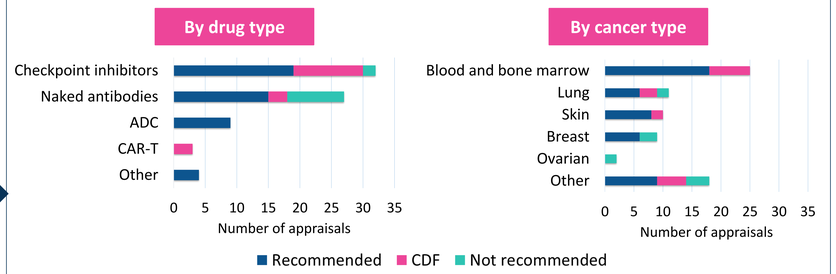
Conclusions:

- **62.6% of I-O treatments submitted to NICE during 2011-2020 were approved**, while 22.7% were recommended within the Cancer Drugs Fund because of uncertain clinical benefit. Another 14.7% were not recommended.
- **High incremental cost-effectiveness ratio, failure to meet end-of-life criteria** and **uncertain long-term survival** benefit can undermine approval by NICE.

Limitations:

- Evidence contained in NICE documents other than the final appraisal document (e.g., manufacturer's submission, Evidence Review Group report) was not examined.
- NICE appraisals were carried out by several appraisal committees, so critiques to I-O treatments may vary by committee.

I-O appraisal recommendations by NICE

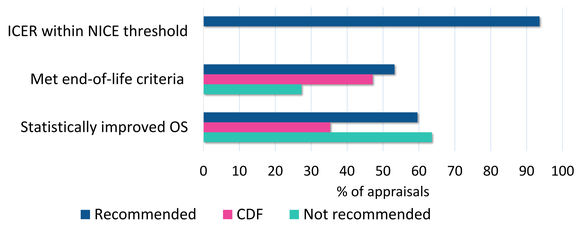


- Rates of recommendation were highest for **antibody-drug conjugates** (100.0%) **and checkpoint inhibitors** (59.4%). Most treatments included in the Cancer Drugs Fund were checkpoint inhibitors (64.7%). Most negative recommendations concerned **naked antibodies** (81.8%).
- The majority of I-O treatments were recommended for **blood and bone marrow cancers**.

Factors influencing recommendation by NICE

Appraisals recommended by NICE

- Most recommended treatments (59.6%) demonstrated **significantly improved OS** during clinical trials.
- 53.2% of recommended treatments met NICE **end-of-life criteria**.
- In 93.6% recommended appraisals, the treatment was considered a **cost-effective use** of NHS resources. In the remaining recommended appraisals, the treatment was not cost-effective but poor prognosis or young age of affected individuals **overrode this concern**.



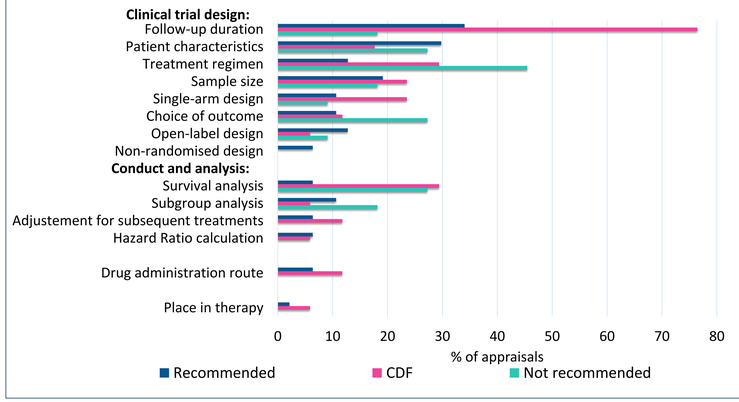
Appraisals recommended within the Cancer Drugs Fund

- Only 35.3% of Cancer Drugs Fund-recommended treatments demonstrated **significantly improved OS** during clinical trials, while 47.1% met **end-of-life criteria**.

Appraisals not recommended

- The main barrier to reimbursement was **failure to meet** the NICE threshold for the incremental cost-effectiveness ratio.
- Only 27.3% of non-recommended treatments met NICE **end-of-life criteria**.

Additional NICE critiques



- **Short follow-up** was the most frequent critique (76.5%), especially among appraisals recommended for the Cancer Drugs Fund.
- Other critiques of I-O treatments involved **clinical trial design** (discussed in 73.3% of all appraisals); **conduct and analysis**, including all faults in data collection and analysis (33.3%); **drug administration route** (6.7%); **place in therapy** (2.7%).
- NICE criticised the treatment regimen during clinical trials in 45.5% of non-recommended appraisals, most often because of **subsequent treatments confounding** the drug effect.
- NICE often raised concerns about **survival analysis** among appraisals recommended for the Cancer Drugs Fund (29.4%) and among non-recommended appraisals (27.3%).

References: (1) Cancer Research Institute website. https://www.cancerresearch.org/immunotherapy/treatment-types. (2) Kaufman HL, et al. The promise of Immuno-oncology: implications for defining the value of cancer treatment. J Immunother Cancer. 2019 May 17;7(1):129. (3) Campbell CM, et al. Health Technology Assessment Decisions in Immuno-Oncology Therapies: Results, Rationales, and Trends. Value in Health. 2017 October 1;20(9):PA401. (4) NICE website. https://www.nice.org.uk/guidance. Accessed March 2021.