COST EFFECTIVENESS OF TREATMENT OPTIMIZATION WITH BIOMARKERS FOR IMMUNOTHERAPY IN SOLID TUMORS: A SYSTEMATIC REVIEW

Mucherino Sara 1, Lorenzoni Valentina 2, Orlando Valentina 1, Triulzi Isotta 2, Del Re Marzia 3, Capuano Annalisa 4, Danesi Romano 3, Turchetti Giuseppe 2, Menditto Enrica 1

1 CIRFF, Center of Pharmacoeconomics and Drug utilization Research, Department of Pharmacy, University of Naples Federico II, Naples, Italy

2 Institute of Management, Scuola Superiore Sant'Anna, Pisa, Italy

3 Unit of Clinical Pharmacology and Pharmacogenetics, University Hospital of Pisa, Pisa, Italy

4 Department of Experimental Medicine, Section of Pharmacology 'L. Donatelli', University of Campania 'L. Vanvitelli', Naples, Italy

CIRFF Dipartimento di Farmacia Università degli Studi di Napoli "Federico II"

sara.mucherino@unina.it

BACKGROUND

The combination of biomarkers and drugs represents an opportunity to improve effectiveness and costs of treatment for solid tumours thus also attracting growing interest of regulators, physicians and companies.

OBJECTIVE

To describe literature evidence about the cost-effectiveness and cost-utility of biomarkers use in solid tumours as tools for customizing immunotherapy to identify what further research needs in the framework of the PRIN 2017 funded Project.

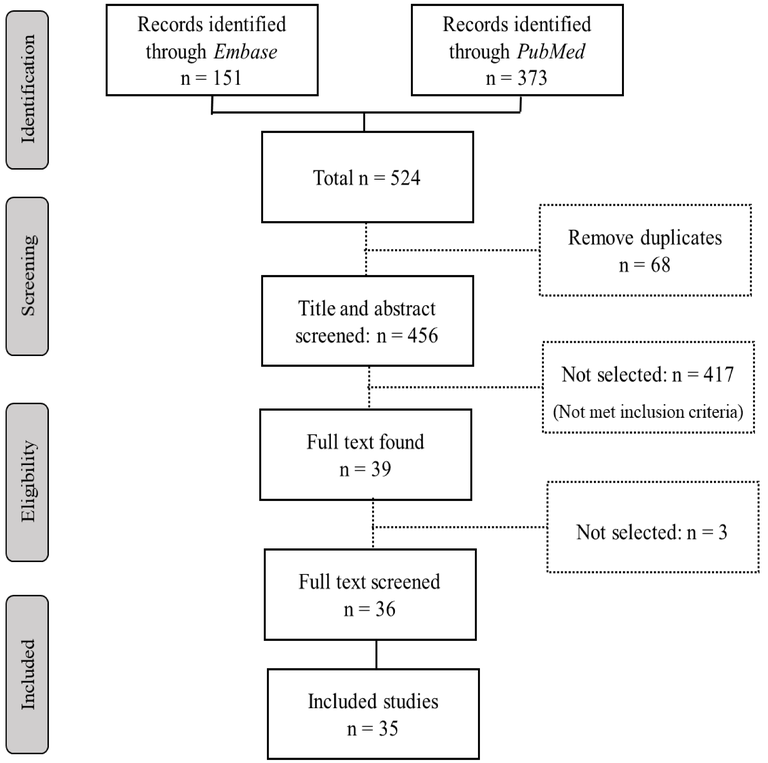
METHODS

- ✓ Systematic review of the literature carried out according to the PRISMA statement guidelines
- ✓ PROSPERO Registration code: CRD42020201549
- ✓ PubMed and Embase queried from 2010 to 2020
- ✓ The **PICOS Model** applied:

Patient	Patients with solid tumours treated with immune checkpoint inhibitors (monotherapy or combination therapy: *nivolumab, pembrolizumab, ipilimumab, atezolizumab, durvalumab, avelumab, cemiplimab)*
Intervention	Test of the immune checkpoint predictive biomarkers *(PD-1, PD-L1 CTLA-4, IL-6)*
Comparator	Any other targeted or non-targeted therapy
Outcomes	Health-economic outcomes (*incremental cost-effectiveness ratio, net health benefit, net monetary benefit, LYs, QALYs*)
Study design	Health-economic evaluations *(cost-effectiveness analysis, cost-utility analysis, net-monetary benefit)*

RESULTS

Figure 1. Flow chart



- ➢ **74%** of all articles included are **cost-effectiveness analysis**, and more than half of those analyses were based on a Markov model.
- ➢ Among patients diagnosed with non-small cell lung cancer (NSCLC), nivolumab was not cost-effective (CE) unless combined with previous biomarker test (PDL-1).
- ➢ Treatment with pembrolizumab with previous PDL-1 test is cost-effective compared to chemotherapy.
- ➢ Nivolumab and pembrolizumab were not cost-effective over chemotherapy for head/neck cancers (HNCs) also with previous biomarker test.

CONCLUSIONS

- ❖ The use of predictive biomarkers increases cost-effectiveness of immunotherapy in solid tumours.
- ❖ The identification of new biomarkers can be an auxiliary tool for early detection of solid tumours, opening up promising new targets in therapeutic intervention strategies that are sustainable for the healthcare system.