

**FAST FACTS AND CONCEPTS #434**  
**EASTERN COOPERATIVE ONCOLOGY GROUP PERFORMANCE STATUS**  
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**Background** The Eastern Cooperative Oncology Group Performance Status scale (“ECOG-PS,” also sometimes referred to as the “Zubrod” score) is one of the most important functional status indices in adult cancer care. *Fast Fact #416* discusses functional scales in serious illness in general. This *Fast Fact* discusses the features and use of the ECOG-PS in more depth.

**History** The use of performance scales in oncology dates to 1948 when Karnofsky explored ways to evaluate the efficacy of the first cytotoxic chemotherapy treatments for lung cancer. The Karnofsky Performance Scale (KPS), which rates an adult’s functional status on 0-100% scale, came out of this work (1). In 1974, the Eastern Cooperative Oncology Group in the US developed the ECOG-PS as a simplified version of the KPS to standardize toxicity and functional assessment for cancer research (2).

**Features of the ECOG-PS** The ECOG-PS is a 6-point (0-5) scale that inversely aligns with the KPS.

ECOG	Description	KPS (%)
0	Fully active, able to carry on pre-disease performance without restriction.	90-100
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature (light housework/office work).	80-90
2	Ambulatory and capable of self-care but unable to carry out work activities. Up and about more than 50% of waking hours.	60-70
3	Capable of limited selfcare, confined to bed/chair more than 50% of waking hours.	40-50
4	Disabled, unable to perform any self-care, and totally confined to bed or chair.	10-30
5	Dead	0

**ECOG-PS and prognostication** Multiple studies have shown a strong relationship with solid tumor cancer survival and ECOG-PS, although median survival varies by specific patient population (3-6).

- In patients with small cell lung cancer, median survival for those with ECOG-PS 3 was 64 days and ECOG-PS 4 was 7 days (7).
- In patients with metastatic colorectal cancer treated with chemotherapy, median survival for those with ECOG-PS 0-1 was 18.4 months, 2 was 10.8 months, and 3-4 was 6.8 months (8).
- In patients receiving chemotherapy for metastatic cancer of unknown primary, those with ECOG-PS 1 had median survival of 25.9 months, 2 was 7.4 months, and 3 was 7 months (9).
- Among terminally ill cancer patients who were receiving supportive only care, an ECOG-PS of 1 had a median survival of 92 days; 2 of 58 days; 3 of 32 days, and 4 of 16 days (10).

**Use in chemotherapy research and clinical care** The ECOG-PS is clinically used in making therapeutic decisions such as whether to use cytotoxic chemotherapy, and whether the intensity of such a regimen needs modification. Eligibility for most chemotherapy trials has traditionally required a patient to have an ECOG-PS of 0-1. Clinical trials leading to subsequent FDA drug approval involved less than 5% of patients with an ECOG PS of 2 or greater (11,12), which means that much of our current knowledge of the benefits vs toxicity of chemotherapy is based on patients with ECOG-PS of 0-1. Despite research excluding patients with ECOG-PS of 2, in clinical practice, cytotoxic chemotherapy is commonly recommended for patients with solid tumors and an ECOG-PS of 0-2 (13,14) in most circumstances.

**Immunotherapy and ECOG-PS** Immunotherapy treatments have different toxicities than those found with cytotoxic chemotherapy. There are ongoing discussions amongst experts whether a poor ECOG-PS should (or should not) exclude patients from receiving immunotherapy in advanced cancer.

- Overall survival in non-small cell lung cancer has been strongly associated with better ECOG-PS in at least 2 immunotherapy studies (15,16). However, a 2020 meta-analysis of immune checkpoint inhibitor therapy trials did not show any correlation between ECOG-PS and overall survival (17). Importantly, in this meta-analysis, only ECOG-PS of 0 vs 1 or greater were compared, and it is unclear how many patients with ECOG-PS >1 were included in the analysis.

- In a real-world study of patients with advanced urothelial cancer, similar overall response rates were seen in patients with ECOG-PS of 0-1 and those with ECOG-PS  $\geq 2$  who received first-line immunotherapy. However, there were significant differences in median overall survival: 15.2 months for those with an ECOG PS 0-1, vs 7.2 months for those with an ECOG PS  $\geq 2$  (18).
- Overall, it appears immunotherapy is being given to patients with poor ECOG-PS scores who would not be similarly offered cytotoxic chemotherapy. This may be related to hopes for the “Lazarus syndrome,” in which patients with a poor performance status from a high cancer burden (not comorbidities) manifest dramatic responses to immunotherapy over the course of months (19,20).

**Limitations of the ECOG-PS** While meant to be objective, there is significant variability in assessing ECOG-PS. Interestingly, palliative care providers, nurses, and patients themselves assess ECOG-PS as higher (worse) than oncologists for the same patients (21). The ECOG-PS is meant to capture functional impairments from cancer or cancer treatments. It is difficult to interpret for functional limitations from unrelated processes (e.g., a preexisting spinal cord injury) and it is not validated in children nor for prognostication in people without cancer.

**Summary** The ECOG-PS is a nearly 50-year-old tool used in both research and oncologic care. It is strongly associated with survival in advanced cancer. Inclusion of more patients with ECOG-PS of  $\geq 2$  in both immunotherapy and chemotherapy trials is needed to validate its utility in a wider patient population.

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