

Healthcare Information & Decision Equation: **Information → Decision → Action → Outcome**  
 Is it true → Is it useful → Is it usable?

### Typical Oncology Outcomes

Endpoint	Description	Comment
Overall Survival	Defined as the time from randomization until death from any cause and is measured in the intent-to-treat population	Preferred overall
Progression-Free Survival (PFS)	Defined as the time from randomization until objective tumor progression or death	Preferred to Time-to-Progression; Used for some accelerated approvals  Prone to tumor assessment biases  If patients are measured until progression and are still followed until death, there is potential for confounding of results post-progression if other treatment is utilized.
Disease-Free Survival (DFS)	Defined as the time from randomization until recurrence of tumor or death from any cause	Prone to tumor assessment biases
Objective Response Rate (ORR)	Defined as the proportion of patients with tumor size reduction of a predefined amount and for a minimum time period	Prone to tumor assessment biases
Time-to-Progression (TTP)	Defined as the time from randomization until objective tumor progression	Prone to tumor assessment biases
Time-to-Treatment Failure (TTF)	Defined as a composite endpoint measuring time from randomization to discontinuation of treatment for any reason, including disease progression, treatment toxicity and death	Not recommended as a regulatory approval endpoint – likely to report biased outcomes as it does not adequately distinguish efficacy from other variables

### Key Points About Oncology Studies & Outcomes

#### Rank of Endpoint Quality

1. Death
2. Death plus tumor assessment judgments
3. Tumor assessment judgments

- In addition to usual biases in clinical trials, there is a higher likelihood of bias and the risk of potentially misleading results when studies are **small** and **brief** and **when survival is not the primary outcome measure**.
- Progression-free survival (PFS) may be a composite endpoint including tumor response.
- Tumor response may not be a good proxy for survival even if assessment is blinded.
  - Tumor may shrink, but may otherwise have increased metastatic disease or other tumor growth as tumors do not grow at the same rate.
  - Toxicity of treatment may be so great that patients die from it even if tumor is stable or shrinking.
- Quality of life and functioning may be important endpoints to study in absence of true survival information.
- Overall survival differences even when statistically significant may be small.