Validity and Reliability of Three Value Frameworks for Oncology Therapeutics: A Pilot Study

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BACKGROUND
• In response to rising spending in oncology care, various frameworks have been developed to assess the value of oncology drugs.
• These organizations include the American Society of Clinical Oncology (ASCO), European Society for Medical Oncology (ESMO), and Institute for Clinical and Economic Review (ICER).
• Despite their common goals, it is unclear whether the frameworks actually provide valid and reliable measurements of value and how to assess such validity and reliability in practice.

OBJECTIVE
In this pilot study, we evaluated the validity and reliability of three value frameworks to understand the extent to which these tools can facilitate value-based treatment decisions in oncology.

Figure 1. Value Frameworks

METHODS
Value Framework Assessments
• We applied 3 frameworks (ASCO, ESMO, and ICER) to 6 drugs for 3 cancer types (colon, lung, and multiple myeloma):
  1. 5 advanced cancer drugs
  2. 1 adjuvant therapy drug
• Each framework had unique strengths and limitations, including different scales and hypothesis.
• Panelists were given a survey after completing the value framework assessments.
  • Provided comments regarding their experiences.

Analyses
Validity
• Among the 5 advanced cancer drugs, we evaluated convergent validity: the correlation among drug rankings across frameworks:
  1. Kendall’s Coefficient of Concordance for Ranks (Kendall’s W) was the statistical measure used for the 5 advanced cancer drugs.
  2. Calculated mean scores for each drug.
  3. Ranked mean scores of each of the 5 drugs within each framework from highest to lowest.
  4. Compared rankings among the frameworks.
  5. Kendall’s W ranges from 0 (no agreement) to 1 (complete agreement). P-values tested alternative hypothesis (W > 0) against null hypothesis.

Reliability
• Inter-rater reliability measured the stability of frameworks’ value estimates across users:
  • Intraclass correlation coefficients (ICC) with 95% confidence intervals (CI) were the statistical measure.
  • ICC was calculated separately for each framework.
  • ICC calculations were done assuming the 8 reviewers represent a random sample from a larger population of 5.

RESULTS
Overview
Results are shown in Figure 3 (validity) and in the Table (reliability).
• Raw scores are on different scales and cannot be compared.
• When re-scaled from 0 (worst) to 100 (best), score ranges varied among frameworks.
  • ICER had the widest range: 86 points, and ASCO had the narrowest range: 30 points.
  1. ASCO: 11-41
  2. ESMO: 13-80
  3. ICER: 8-84
  4. ASCO scores were the lowest, and ICER scores were highest.
  5. Kendall’s W=0.689

CONCLUSIONS
• This is the first study to provide quantitative analyses of value assessment frameworks’ validity and reliability.
• When applied to 6 oncology drugs:
  • Frameworks ranked similarly, indicating convergent validity (5 advanced cancer drugs only).
  • Overall, reliability was quite good.
• Our analysis ranked drugs across different cancers, although in practice, only within-cancer comparisons are useful. Future analyses will evaluate multiple drugs within each cancer type.
• The NCCN Evidence Blocks will also be included in future analyses.
• All frameworks should be refined using real-world testing and feedback, considering in particular the impact of using them to guide decisions on for patients.

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