Real-World Impact of Interactive Decision Support Tools in Changing Clinical Practice at the Point of Care

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Decision Making Challenges in Oncology

In the last decade, clinical advances in treating solid tumors and hematologic malignancies have surged toward tsunami proportions. In 2017 alone, the FDA added 16 new agents to its current list of more than 200 approved anticancer drugs, as well as additional indications for 28 existing drugs, and several new cancer diagnostic tests.[1] These advances in treatment are welcome and have substantially improved patient outcomes. Yet the rapid introduction of multiple new therapeutic options adds significant complexity to oncology treatment decision making.

Clinical practice guideline recommendations are reliable and familiar resources that help oncologists make evidence-based decisions and translate cutting-edge advances into practice. Clinical practice guidelines have evolved as standard tools to support evidence-based medicine, reduce variability in clinical practice, and improve the quality of oncology care.[2,3]

However, the standardized structure of oncology clinical practice guideline recommendations seldom maps adequately to the complex comorbidities and chronic degenerative diseases that oncology patients experience in the real world, nor do they provide specific treatment recommendations to optimize the care of specific patients.[7,8] Thus, clinicians are forced to choose from among multiple "reasonable" therapeutic options that, in practice, may be insufficiently adaptive to unique patient and disease characteristics.

> Although guidelines can be helpful in steering clinicians toward evidence-based decision making, they have a **poor record in changing clinical practice**, and their **implementation is associated with well-documented barriers**.[2,4-6]

Interactive Decision Support Tools

Interactive decision support tools (IDST) offer a means to narrow the gap between clinical practice guideline recommendations and individualized treatment decision making. To be effective in generating significant improvements in clinical decision making, IDSTs must ***involve experts*** in the translation of research into practice and actively offer evidence-justified, patient-specific advice ***at the point of decision making*** that encourages learners to ***modify behaviors*** or reinforces effective practice.[8-10]

Accordingly, Clinical Care Options (CCO) recognized the need for an innovative approach and developed entirely new software for an extensive series of tumor-specific IDSTs, each authored by a panel of multiple experts, to address changing treatment paradigms in oncology and address gaps in guideline specificity across a range of tumor types.

For information on how IDSTs work, refer to the Appendix.

Our hypothesis was that individualized and/or consensus recommendations (≥ 3 experts recommending the same treatment) for specific cases from known and trusted experts will change clinician behavior. To optimize learning, our IDSTs were designed according to the following principles of clinical education[11-13]:

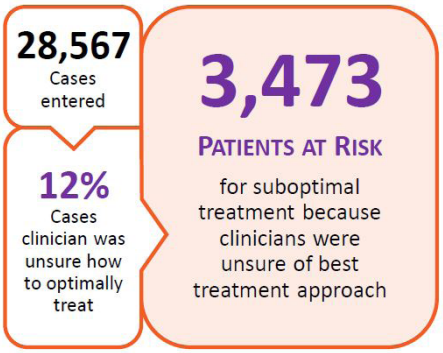
- Expert guidance is distilled in an accessible, readily usable format
- Users can access the tool when they are ready to learn (ie, when they have a challenging case)
- Baseline assessment captures current practice
- Expert recommendations provide feedback for learners on their practice
- Assessment following tool use captures and reinforces the impact of expert recommendations on learner intentions to change their practice
- Ongoing educational needs are pinpointed via the accrual of outcomes data over time

Optimizing Learning, Improving Clinical Practice

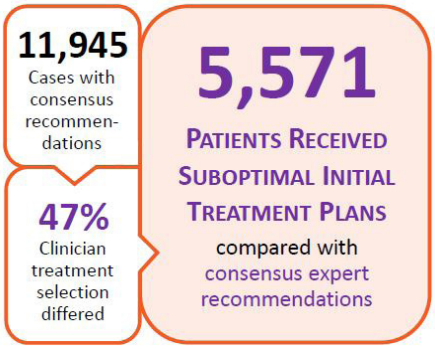
To further explore the utility of IDSTs as an educational resource, CCO conducted a meta-analysis of 21 IDSTs developed since 2013, each with treatment recommendations for thousands of case scenarios across multiple disease treatment settings. These 21 distinct IDSTs covered 10 different cancer diagnoses and issues and also included 21 individual outcome studies designed to measure their effectiveness and impact.

Users entered 28,567 specific patient cases into the IDSTs. These cases span 7124 unique scenarios across multiple tumor types and issues (Table).

Overall, when analyzing clinician confidence in their intended treatment, 12% reported uncertainty with how to optimally treat their patient. Across all disease treatment settings, 3473 patients were at risk for suboptimal treatment as a result.



We further examined 11,945 patient cases for which there was an expert consensus treatment recommendation (≥ 3 experts recommended the same treatment). Clinicians' intended treatment for 47% of these cases differed from the expert consensus recommendation, again indicating that these patients (n = 5571) were at risk for suboptimal treatment.



An important question is whether the use of IDSTs have an impact on actual clinical practice. As part of the IDST design, we captured tool impact and changes in learners' treatment planning intentions by offering an optional survey following each tool interaction. In almost one half of the cases (41%) across tools, clinicians reported that they changed their treatment plan for a specific case in response to the customized expert recommendations they received via the IDSTs.

In addition, tool survey data indicate that approximately 38% of clinicians have used the tools to get treatment advice on an actual patient in their practice vs 62% who used the IDSTs as an educational resource and entered a hypothetical patient. This finding underscores the power of IDSTs to support clinical decision making in real-world patient care.

In total, as many as 9044 patients (32%) were at risk for suboptimal treatment due to either clinician uncertainty or selection of suboptimal treatment.

Table. Details of Tools Included in Meta-analysis

Tumor Type/Topic	No. of Tool Versions	No. of Patient Scenarios Addressed	No. of Patient Cases Entered
Lung cancer	3	532	3981
Kidney cancer	2	972	1992
Multiple myeloma	4	1794	4317
Chronic lymphocytic leukemia	3	2134	3101
Immune-related adverse events	1	29	3572
Chronic myeloid leukemia	1	78	722
Malignant melanoma	1	90	1446
Myeloproliferative neoplasms	1	26	443
Breast cancer	3	1040	7082
Non-Hodgkin lymphoma	2	429	1911

Benefits of IDSTs

Clinical decision making in oncology is a multifaceted process that demands attention to the specificities of both disease and patient characteristics. As oncology shifts toward value-based care, rapid learning systems based on systems biology (eg, genomics, proteomics), and healthcare systems data (eg, patient-reported outcomes),[14] clinical decision making will become increasingly complex. Guidelines can be difficult to apply to individual patients, particularly when there are 2 or more treatment options with similar levels of evidence. Therefore, clinicians will need access to tools and resources beyond guideline recommendations that enable them to navigate around gray clinical practice areas.[15-17]

Continuing medical education (CME) is uniquely poised to provide such navigation and reinforce evidence-based frontline decision making via IDSTs. Such tools are able to capture real-world clinical practice at ***baseline*** as a resource for identifying ongoing educational needs. Through IDSTs, known and trusted experts can provide customized, patient-specific clinical expertise on either real or hypothetical cases, at the point when clinicians are ***ready to learn***. In turn, exposure to expert recommendations serves as ***feedback*** for learners, which, when delivered in a usable format, can strengthen the capacity of clinicians to select real-time, individualized treatment that is based on the optimal course of action at a specific point in a patient's disease trajectory.[15] Such tools can also ***reinforce*** expert recommendations by assessing learner intentions to change their practice following interaction with the tool.

> Analysis of CCO's IDSTs shows that although the intended practice of clinicians at baseline often varies from expert recommendations, interaction with the tool prompts the adoption of expert-recommended treatment strategies. Since 2013, ***almost one third of learners have changed their planned treatment*** for a specific patient for whom they sought expert advice.

Call to Action:

CCO's scalable IDSTs have broad applicability across multiple disease states and global impact. They provide customized, patient-specific expert advice that support learning, influence real-time clinical decision making, and increase the number of clinicians who make optimal treatment decisions for patients. The CME community can use clinically relevant innovations—such as IDSTs—to improve educational programming in ways that change practice and affect patients.

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APPENDIX

How IDSTs Work: CCO Decision Support Tools in Practice

For each tumor-specific IDST, learners enter a myriad of information about their planned treatment for one patient via a drop-down menu (Figure 1) and specify whether the case they have entered is hypothetical (ie, as a foundation for learning) or an actual patient in their practice.

A group of experts—we recommend 5 in each IDST group to promote consensus—supplies data points that map to all possible patient permutations for that tumor type (eg, age, performance status, prior treatment). For each specific tumor area or topic, experts also provide a single treatment recommendation for each case entered into the tool, rather than multiple "reasonable" options as presented in guideline recommendations (Figure 1).

After learners have entered the details of their patient case, they receive a custom report showing exactly how experts would treat that patient. Subsequently, learners can opt to complete a survey that asks if the expert recommendations changed their planned treatment for that patient. Structured query language is used to extract participation and outcomes data, and standard data analysis techniques are used to evaluate individual program metrics, such as number of cases entered, whether cases represent real or hypothetical patients, and learner-reported impact on practice.

Capturing Practice Discrepancies at Baseline

Across IDSTs, 12% of users indicate uncertainty about their treatment planning approach at baseline, and wide gaps are also evident between the intended treatment of healthcare providers (HCPs) and expert recommendations. A 2017 analysis of 2 annually updated multiple myeloma IDSTs illustrates the extent of these gaps in the context of induction therapy for patients with specific comorbidities.[18] For instance, experts recommended bortezomib/lenalidomede/dexamethasone (VRd) for 87% of patient cases with cardiac dysfunction compared with 41% of HCPs, whereas in cases involving peripheral neuropathy, experts recommended carfilzomib/lenalidomide/dexamethasone (KRd) in 60% of cases vs 10% of HCPs (Figure 2).

Figure 1. Patient case drop-down menu and expert insights in multiple myeloma.

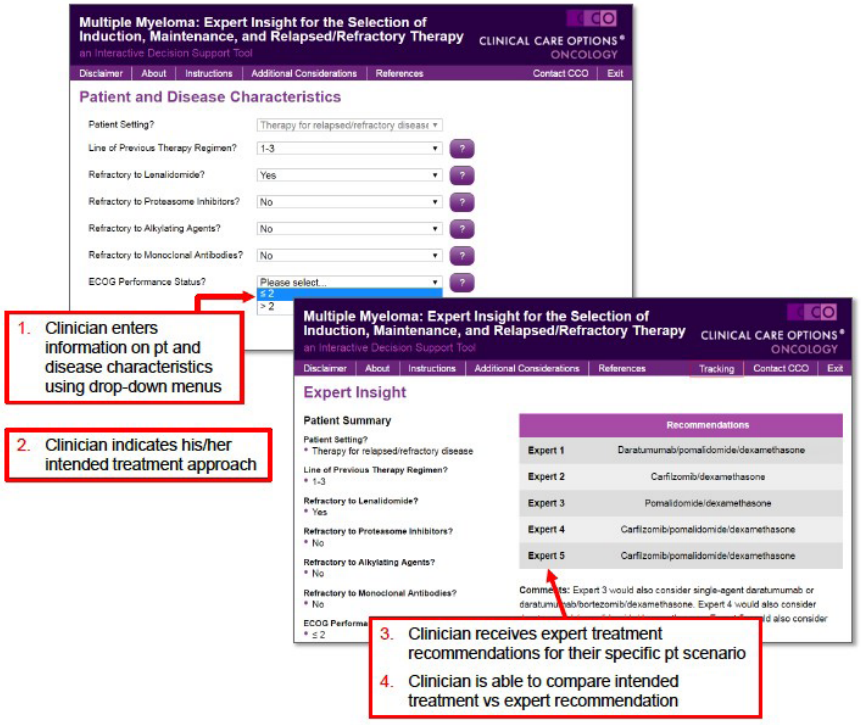
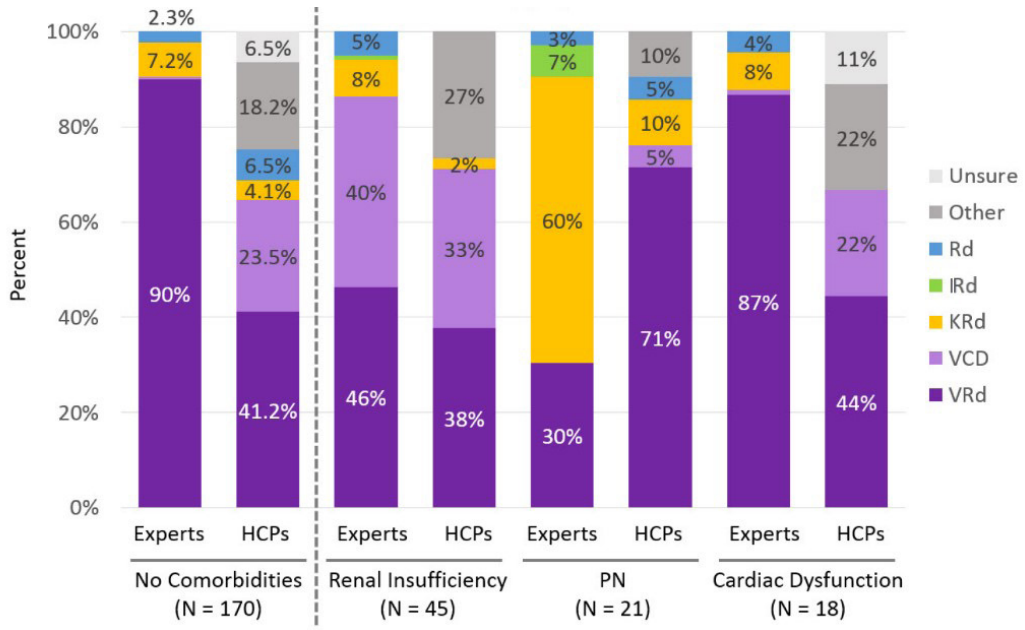


Figure 2. Gaps between learners and experts in multiple myeloma induction therapy.



Assessing the Impact of Expert Recommendations on Planned Treatment

We captured tool impact and changes in learners' treatment planning intentions by fielding an optional survey following tool interaction. In almost one half of the cases (41%) across programs, learners report that they changed their treatment plan for a specific case in response to the customized expert recommendations they received via interaction with the tools.

In this tool, experts compiled recommendations for 235 different patient case scenarios based on the following variations: neoadjuvant or adjuvant therapy, subtype, nodal status, tumor size, menopausal status, recurrence score, and BRCA1/2 status.[19] Between April and November 2015, 796 HCPs sought guidance on 1476 patient case scenarios from (53% real, 47% hypothetical), including scenarios in neoadjuvant treatment for hormone receptor–positive (HR+) early breast cancer (EBC). Comparison of expert and HCP choices showed distinct lack of concordance at baseline between expert recommendations and learners for use of neoadjuvant therapy. Although none of the experts recommended hormonal neoadjuvant therapy for HR+ EBC, 71% of tool users intended to use this approach. ***In 86% of cases, learner interaction with the tool either changed the user's intended clinical approach or confirmed their approach in line with expert recommendations.***

About Clinical Care Options

CCO, a leader in the development of innovative, interactive, online, and live CME/CE-certified programs and proprietary medical education technologies, creates and publishes original CME/CE and information resources that are designed specifically for healthcare professionals. CCO's educational programs are developed not only to provide the latest scientific information, but also to support the understanding, confidence, application, and competence of healthcare professional learners. In addition to the latest point-of-care resource—*in*Practice®—CCO provides a spectrum of live and online educational programs and formats.

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