

Practice Economics and the Decision to Prescribe Oral Oncolytics

Karen E. Van Nuys, PhD; Joseph J. Conoshenti Jr, BPharm, RPh, MBA; and Dana P. Goldman, PhD

The global market for oncology drugs is large and growing quickly. In 2010, oncology drugs accounted for \$57.1 billion in sales, and that number is expected to reach \$75 billion by 2015.¹ Within this already growing class of agents, oral oncolytics are poised to grow particularly rapidly. By some estimates, nearly one-fourth of the antineoplastic drugs in the development pipeline today are oral agents.^{2,3} Among them are many oral oncolytics that would substitute for currently available intravenous (IV) formulations. At first glance, it would seem that oral formulations would be preferred, at least by some parties, to their IV equivalents. Yet the uptake of oral substitutes for IV chemotherapy has been mixed,⁴ leading one to wonder why a drug that is equally effective yet more convenient is not more popular in the marketplace.

Many factors influence the decision to prescribe oral versus IV oncolytics, most importantly the drugs' relative efficacy and safety. But even in cases where oral and IV formulations have equivalent efficacy/safety profiles and patients prefer the convenience of an oral regimen, the oncologist's choice is not straightforward. Other issues such as patient adherence and out-of-pocket costs, uncertain reimbursement for adverse event management, and practice infrastructure and processes may dictate one form of treatment over another.

In addition, the profit implications of prescribing oral versus IV therapies are different, and prescribing oral instead of IV therapies will divert patients from IV regimens, which in many cases are profitable, into oral regimens which may not be. In these cases, oncologists face complex and sometimes conflicting incentives for how best to treat their patients. We call these incentives and how they vary with oncology practice characteristics the "practice economics" that oncologists face, and they are an important element of understanding the eventual market response to new oral chemotherapy agents.

ABSTRACT

Objective: To better understand the impact of practice financial considerations in oncologists' decision to prescribe intravenous (IV) versus oral oncology agents.

Study Design: A survey of oncology practice managers was used to obtain quantitative and qualitative data on practice characteristics and treatment patterns. Treatment patterns were compared across types of practices to identify statistical patterns.

Methods: A web-based survey was administered to a convenience sample of 225 US-based oncology practice managers. Data were collected anonymously, but respondents were given the option to enter a drawing for a prize upon completion of the survey. Forty surveys were returned (17.8% response rate), and responses were analyzed for differences in practice patterns, particularly the frequency of using oral rather than equivalent IV formulations of oncolytics, across practice characteristics such as ownership structure and the inclusion of a dispensing pharmacy in the practice.

Results: Oncology practices that were willing to use oral oncolytics when an equivalent IV formulation was available were also more likely to have an onsite dispensing pharmacy and less likely to pay their doctors profit-based bonuses. They were not, however, less likely to be owned by physicians or to include physicians in profit-sharing programs.

Conclusions: Our results are consistent with oncologists' considering the profit implications of their decisions to prescribe oral or IV formulations of oncolytic agents. As more oral agents are introduced, understanding this and other determinants of prescribing behavior will be increasingly important, and warrants further investigation.

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PRACTICAL IMPLICATIONS

Oncologists face conflicting incentives when choosing between oral and intravenous (IV) oncology drugs with equivalent efficacy/safety profiles, since oral prescriptions do not generate reimbursement for infusion services or IV drug margins. Our data suggest doctors may respond to these incentives, substituting oral for IV medications when they can capture greater profit from the oral formulation. Our work contributes to the ongoing process of hypothesis generation in the following areas:

- How physicians are balancing financial incentives with other considerations
- Why some oral oncology agents are not widely adopted
- What types of practices are most likely to adopt oral agents

Practice Economics' Role in Prescribing IV Versus Oral Oncology Agents

Physicians routinely alter their practice patterns in response to changes in financial incentives: one study recently profiled here found significant changes in treatment patterns for lung cancer in response to changes in reimbursement rates.⁵ Similar responsiveness to financial incentives might be expected in the case of oral versus IV oncolytics.

Typically, with a patient visit for infusion of an IV agent, the oncology practice is reimbursed for the office visit, the IV infusion services, and for the drug, including a “buy-and-bill” margin (average sales price + x%). By contrast, if an oral oncolytic is prescribed instead of an IV-infused drug, the practice is reimbursed for the office visit only, as illustrated in the **Figure**. Any profit margin on the cost of the oral drug will be captured by the dispensing pharmacy and, unless the oncology practice incorporates the dispensing pharmacy, lost to the practice. Depending on the relative size of these reimbursement elements, a practice could easily make more profit on IV compared with oral chemotherapy.

About the Study

We conducted a survey to explore the incentives that prescribing physicians face when choosing between oral and IV chemotherapy regimens, and the role they play in the market uptake of oral chemotherapy agents. We began with structured telephone interviews with 5 oncologists, practice managers, and account managers at a large pharmaceutical manufacturer to gain insight into the economics of oncology practices. We then e-mailed a convenience sample of 225 oncology practice managers across the country, inviting them to complete the online survey. Forty surveys were returned, with an average question-level response rate of 68%. On

average, survey respondents came from relatively large practices (average practice size was 11 oncologists seeing 600 patients per week), mostly from community-based partnerships in urban settings. Twenty percent of responding practices were affiliated with a hospital.

RESULTS

Responding practices reported that, on average, 17% of their patients received some kind of oral oncolytic. Of the top 5 oral oncolytics named at each practice, 4 drugs had IV-equivalent formulations: capecitabine, temozolomide, cyclophosphamide, and melphalan (in order of the frequency with which they were mentioned). We classified practices according to how many of their top 5 prescribed oral oncolytics had IV equivalents. Practices naming 1 or more drugs with an IV equivalent among their top 5 oral oncolytics were classified as “willing to substitute” (87%); practices with no oral drugs with IV substitutes in their top 5 were classified as “not appearing to substitute” (13%). We then compared the economic incentives faced by doctors in the 2 types of practices.

We found that among survey respondents, practices that were willing to substitute oral for IV oncolytics tended to be larger (92% vs 50% with average monthly revenues over \$1 million) and less likely to be affiliated with an academic institution (8% vs 50%). Interestingly, they were much more likely to have a dispensing pharmacy onsite than those who did not appear to substitute (62% vs 0%). That is, practices willing to substitute oral for IV oncolytics were in a better position to capture the profit stream associated with the oral medications than practices that did not appear to substitute.

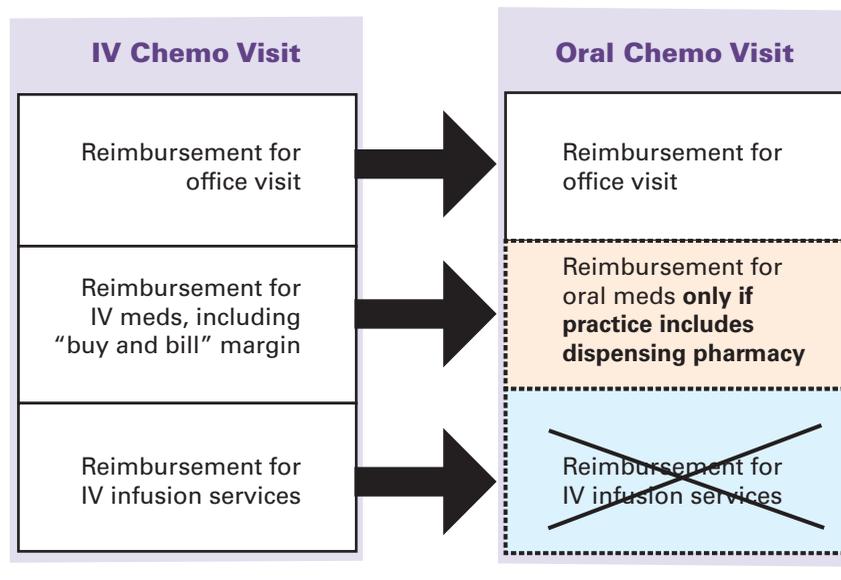
Doctors' individual financial incentives could also matter in the decision to prescribe oral versus IV medications. Doctors whose pay depends in part on the overall profitability of the practice, through ownership, profit-sharing arrangements, or bonuses based on practice performance should be more sensitive to practice profitability than doctors who receive only a fixed salary. In fact, we found that practices that did not appear to substitute oral for IV oncolytics were also more likely to pay doctors bonuses based on the practice performance, that is, practices that did not appear to substitute less profitable oral oncolytics for more profitable IV oncolytics were also less likely to pay their doctors profit-based bonuses. However this did not hold true for practices' likelihood of being owned by physicians or including them in profit-sharing programs. Oncologists may also have relationships with drug



providers that further complicate their prescribing incentives, although we did not collect data on these factors so we cannot assess their significance.

We also looked at other elements of practice economics including the profitability of IV infusion services or drugs relative to other services such as treatment planning, and how important convenience was likely to be for a practice's patients based on average age or distance traveled for treatment. However, these factors, did not show strong correlations with practices' willingness to substitute oral for IV oncolytics.

Figure. Revenue/Profit Sources for IV Versus Oral Chemo



IV indicates intravenous.

CONCLUSION

Our informal survey was designed to explore practice economics' role in prescribing behavior rather than to test these theories rigorously. While our small convenience sample and inability to completely control for selective responses limit the generalizability of our results, our data suggest that practice economics may indeed influence doctors' decisions to substitute oral for IV therapies. One implication is that patients trying to make informed decisions about their treatment might find greater transparency into these factors useful, and a larger, more generalizable study to test these hypotheses more rigorously would be illuminating.

There are, of course, many other factors influencing a doctor's decision to prescribe an oral or IV agent, which may either augment or counterbalance their financial incentives. For example, patient out-of-pocket expenses may be higher for oral medications, and compliance with oral chemotherapy is more difficult for the physician to monitor than with IV therapy. On the other hand, oral therapies would likely not require the physician to assume the same level of inventory risk that IV medications would. Yet an understanding of the role of oncology practices' economic situations in explaining or describing oncologists' prescribing behavior will be increasingly important to effectively introduce more oral chemotherapy agents in the future.

Author Affiliations: From Precision Health Economics LLC (KEVN), Los Angeles, CA; Sanofi US (JJC), Bridgewater, NJ; Leonard D. Schaeffer Center for Health Policy and Economics, The University of Southern California (DPG), Los Angeles, CA. Mr Conoshenti Jr is now with Novartis.

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Address correspondence to: Karen E. Van Nuys, PhD, Senior Research Economist, Precision Health Economics, 11100 Santa Monica Blvd, Santa Monica, CA 90025. E-mail: karen@precisionhealththeconomics.com.

REFERENCES

1. The Global Use of Medicines: Outlook Through 2015, 2011, IMS Institutes for Healthcare Informatics. Parsippany, NJ.
2. Barefoot J, Blecher CS, Emery R. Keeping pace with oral chemotherapy. *Oncol Iss.* 2009;36-39.
3. Birner A. Safe administration of oral chemotherapy. *Clin J Oncol Nurs.* 2003; 72:158-162.
4. Oral oncology drugs achieve rapid growth, but perhaps not yet as much as expected. *Spec Pharm News.* 2008;5(10):1-5.
5. Jacobson M, Earl CC, Newhouse JP. Geographic variation in physicians' responses to a reimbursement change. *N Engl J Med.* 2011;354(22):2049-2052. [ajpb](#)