virus without any observable resistance or physiological side-effects. This treatment has advanced to phase 2 clinical trials, which emphasises the strengths of anti-miR-122, including high efficacy and good tolerability without adverse effects.

As the results of years of effort begin to show the effects of miRNAs in cancer, a few candidate miRNAs have emerged as therapeutics to prevent and treat various stages of tumorigenesis. However, the notion of treating cancer with miRNA replacement or miR-inhibitors is still at its infancy and requires more functional in-vivo studies. Safe and efficacious delivery mechanisms also need to be established.

Development of miRNA therapy, which employs miRNA's pleiotropic role in gene regulation, has the potential to overcome the limitations of present cancer therapies. Although targeted therapies such as imatinib and erlotinib have given many cancer patients tremendous benefit by tailoring therapy to a tumour's genetic profile; redundancy and complexity of signal pathways often leads to relapse even with combined targeted therapies. Based on present preclinical trials, combination of miRNA therapy with targeted or traditional therapies might be able to create a synergistic effect for treatment of cancer and become an alternative treatment for cancer. Many biotechnology companies have miRNA therapeutics programmes, and human clinical trials, which should begin in the next few years, will show whether the high expectations of this novel approach are warranted.

*Minlee Kim, Andrea L Kasinski, Frank J Slack**
Department of Molecular, Cellular and Developmental Biology, Yale University, New Haven, CT, USA
frank.slack@yale.edu

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Value-based insurance design in oncology

In recent years, great advances have been made in our understanding of cancer, leading to the successful development of many novel drugs. However, this progress has been accompanied by a substantial increase in drug prices, which has affected the availability of these drugs for patients.[1] Additionally, some new drugs have benefits that can be measured in weeks of added life expectancy. In these cases, an alternative view, from the perspective of the health-care system, is that high prices are not justified by the gain in life expectancy that these interventions provide.

Furthermore, as new payment systems in oncology are being developed in the USA,[2] policy makers and involved stakeholders should consider the proven clinical value of interventions. In this context, section 2713 (c) of the Patient Protection and Affordable Care Act included a notion that allows the development of guidelines to use value-based insurance designs (V-BID) as an approach to improve alignment of a patient's out-of-pocket contribution to the value or cost–benefit tradeoff.[3]

The implementation of V-BID programmes in oncology would be based on three observations. First, high-cost sharing based only on price discourages the use of high-value, potentially life-saving interventions. Second, interventions differ in the clinical benefit that they provide, and one intervention might provide different benefits based on its indication (eg, breast *vs* colorectal cancer) or the clinical scenario (eg, adjuvant *vs* palliative setting). Third, the value of a specific intervention might be patient specific, and biomarkers can identify those who would benefit the most.

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The substantial increase in oncology drug prices challenges health-care systems and requires new payment approaches

Consider the example of bevacizumab, a drug approved for metastatic colorectal cancer and non-small-cell lung cancer (NSCLC). In the metastatic colorectal cancer trial that led to approval by the US Food and Drug Administration (FDA), bevacizumab prolonged median survival from 15·6 months to 20·3 months.[4] The median time to progression (TTP) in the bevacizumab group was 10·6 months. Given the approved dose of 5 mg/kg every 2 weeks at a price of US$4000 per month (Centers for Medicare and Medicaid, first quarter 2011 average sale price for a patient weighing 70 kg) until the tumour progresses, $42 400 will be spent only to acquire the drug. This cost buys 4·7 months of added life, yielding a cost of $9000 per month of life gained (and this amount does not take into account the costs of complications or admissions to hospital, or other benefits, such as quality of life). The value of bevacizumab for metastatic colorectal cancer can be contrasted with its value in advanced NSCLC, in which bevacizumab increased median survival from 10·3 months to 12·3 months.[5] At a price of $8000 per month (for 15 mg/kg every 3 weeks), the median TTP was 6·2 months. Thus $49 600 will be spent to increase the survival by 2·0 months, yielding a cost of $24 800 per month of life gained.

To exemplify the application of V-BID, we consider WHO's guidance that the value of life threshold in a cost-effectiveness analysis should be 300% of a country's per head gross domestic product.[6] With this approach, the US threshold would be about $140 000 per year, or $11 600 per month. The use of bevacizumab for metastatic colorectal cancer would be fully reimbursed in this context. By contrast, the cost of bevacizumab for NSCLC exceeds the threshold, and the excess ($13 200 per month) would be the co-payment.

We believe that incorporation of V-BID would promote the use and adherence of high-value interventions relative to low-value ones by reducing the relative out-of-pocket price of therapies with improved health outcomes or stronger evidence. As an example, non-adherence to imatinib for chronic myeloid leukaemia occurs in about 30% of patients.[7] Although the barriers to adherence are many, and the exact weight of the co-payment factor has not been fully studied, the $4000 wholesale acquisition cost has been suggested to have an important role in imatinib non-adherence.[1] Patients who are non-adherent to imatinib not only have worse outcomes than do their adherent counterparts, but they are substantially more costly to the health-care system.[8] In a pharmacoeconomic analysis of imatinib for chronic myeloid leukaemia from the perspective of the US health-care system,[9] the incremental cost-effectiveness ratio of imatinib was about $3600 per month of life gained (or $43 000 per life-year). This value is much lower than the $11 600 per month threshold, and would need no co-payment, probably improving access for this high-value drug in this setting.

We further argue that the incorporation of measures of effectiveness in a payment system would better promote evidence-based and personalised medicine than would current insurance coverage packages. By linking the reimbursement for the intervention to its clinical value, there would also be an added incentive to personalised medicine; during the drug development process, the value (and further reimbursement) of the intervention would increase by identification of which patient subgroups are most likely to gain benefit from it. Alternatively, if the drug reaches the market in a non-selected group of patients with cancer, its price would have to be lower to achieve the value threshold, or risk having the market limited by unacceptably high patient co-payments. As shown by the example of bevacizumab for NSCLC, to prevent a substantial reduction in use of bevacizumab, there would be a price reduction for this indication, the initiation of comparative effectiveness trials aimed at assessment of reduced doses, or identification of subsets of patients with NSCLC who have the greatest benefit from this agent.

In conclusion, V-BID would maintain patient and provider autonomy by allowing a continuum of options,

in which all oncology drugs (if deemed safe for a particular setting) are available, and demand would be determined by the patient's willingness to pay. With this programme, the use of high-value interventions is promoted relative to low-value ones. Patients with substantial disposable income will maintain access to drugs of marginal benefit, in the same way that such patients also have access nowadays to several unorthodox cancer treatments that are not covered by insurance (and for which little or no evidence of efficacy exists). Although the challenges to the involved stakeholders and policy makers are many, we argue that V-BID goes far beyond merely cost savings to the system, but instead promotes rational drug use and development.

*Jonas A de Souza, Blase N Polite, Willard G Manning, A Mark Fendrick, Mark J Ratain**

Section of Hematology/Oncology, Department of Medicine (JAdS, BNP, MJR), Center for Interdisciplinary Health Disparities Research (BNP), Comprehensive Cancer Center (BNP, MJR), Harris School of Public Policy Studies and Department of Health Studies (WGM), and Committee on Clinical Pharmacology and Pharmacogenomics and Center for Personalized Therapeutics (MJR), The University of Chicago, Chicago, IL, USA; and Department of Internal Medicine and Health Management and Policy and Center for Value-Based Insurance Design, University of Michigan Medical School, Ann Arbor, MI, USA (AMF)

mratain@medicine.bsd.uchicago.edu

BNP has served on a speakers bureau for Sanofi-Aventis. AMF has consulted for ActiveHealth, Avalere Health, BlueCross BlueShield Association, Center for Medicare and Medicaid Services, MedImpact HealthCare Systems, National Business Coalition on Health, National Pharmaceutical Council, Sanofi-Aventis, and WebMD; and has received grants from multiple pharmaceutical companies, including Sanofi-Aventis and Novartis. MJR has consulted for several pharmaceutical companies, including Genentech, Hoffman-La Roche, and Novartis; has provided expert testimony in patent litigation against Genentech, Pfizer, and OSI Pharmaceuticals on behalf of Mylan and Teva Pharmaceuticals; has received grants from multiple pharmaceutical companies, including Genentech and Novartis; and receives royalties related to UGT1A1 genotyping for irinotecan dosing. WGM and JAdS declare that they have no conflicts of interest.

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Principles for the best multidisciplinary meetings

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Several years ago, one of our mentors said, "I do not like to make rounds: at the end of the day the sum of everyone's opinions is not superior to the single best decision taken by the smartest doctor of the pack". Clinical practice has changed over the years, and, thanks to the application of evidence-based methods, subjective and often partisan opinions are being replaced with reliance on unbiased facts. Nowadays, the value of every investigation can be measured according to a scale of evidence,[1,2] and a series of guidelines, meta-analyses, consensus among experts, and composite scores are produced, enhancing medical judgment and allocating every patient to the best available treatment option.

In such an environment, multidisciplinary discussions between specialists provide the best setting in which opinions, ideas, and experience can be challenged with evidence from large case series or individual case studies. Diverse decisions made within tumour boards can also have financial benefits, especially in view of the challenges imposed on public and private health systems in developed countries by the current economic crisis.[3,4] We have developed a few ideas on some less obvious features of decision making in multidisciplinary teams to obtain the best possible outcome from any discussions.

We believe that the most important advantage of multidisciplinary discussion is the opportunity to give appropriate weight to features specific to individual cases. These features are often ignored in tumour-specific guidelines because of their variability or the difficulty encountered in their measurement, such as age, body shape, comorbidities, compliance, duration and result of previous treatments, tumour location with respect to surgery and interventional