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THE REIMBURSEMENT LANDSCAPE FOR Novel Diagnostics

- ▲ CURRENT LIMITATIONS
- ▲ REAL-WORLD IMPACT
- ▲ PROPOSED SOLUTIONS



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Acknowledgements

The Reimbursement Landscape for Novel
Diagnostics: Current Limitations, Real-World
Impact, and Proposed Solutions

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Executive Summary

Personalized medicine has the potential to revolutionize patient care. The fundamental goal in advancing our healthcare system through personalized medicine is to deliver the right treatment to the right patient at the right time. Novel diagnostics hold great promise as tools that allow physicians to differentiate patient-specific characteristics, design personalized treatment approaches, and ultimately improve patient outcomes. The successful delivery of novel diagnostics is the foundation of personalized medicine in our evolving healthcare system.

However, the success of personalized medicine is dependent on the healthcare industry's ability to overcome several clinical, economic, and logistical challenges to commercialization. Some of the most pressing challenges relate to the reimbursement system, specifically in obtaining affirmative coverage, appropriate coding, and value-based payment for novel diagnostics.

The current reimbursement system was designed to support relatively simple diagnostic tests that formed the basis of the traditional diagnostics industry. The system was not designed to support novel complex diagnostics, and research suggests that its shortcomings are compromising the progress of personalized medicine today. This report offers stakeholders a clear description of the current reimbursement system, its limitations, and an examination of how these limitations impact investment in novel diagnostics and may ultimately impede patient access to personalized medicine. Finally, this report offers a critical exploration of potential solutions for reform.

Key Findings:

Significant limitations exist in the current reimbursement system for novel diagnostics.

- The coverage evaluation process for novel diagnostics lacks transparency, varies across payers, and is inefficient in many ways. These problems lead to inconsistent coverage decisions that limit and delay patient access to personalized medicine.
- The current coding and payment systems do not accurately describe novel diagnostics, reflect the value of these tools to patients, or account for the need for increased development resources to support highly impactful claims.
- In an attempt to capture a reimbursement amount that reflects a diagnostic's true value to patients and providers, many developers use a method known as "code stacking" or pursue a miscellaneous code.
- These coding practices have led to increased payer scrutiny, in turn pushing developers to generate economic studies geared towards payers and providers to justify value-based pricing. However, without standardized approaches, these studies are often met with skepticism, leaving true value-based pricing elusive for many tests.

These limitations impede investment and the development of novel diagnostics, and they ultimately reduce patient access to personalized medicine.

- Novel diagnostic developers do not have a clear set of expectations for the level of evidence that is necessary for reimbursement, including specific clinical trial requirements and optimal outcome measures. This has created inefficiencies in the development of novel diagnostics and a ballooning in research and development (R&D) costs.
- Additional sales and marketing costs are also incurred by diagnostic developers as the payer community must be educated on the utility and value of these novel diagnostics. The current

coverage decision-making process often requires developers to devote costly resources to securing coverage payer by payer, in addition to education and marketing efforts directed towards providers.

- These costs help drive the need for higher pricing and earlier product launch to allow for quicker revenue generation. Without a clear regulatory system in place, some tests are launched prematurely without extensive data on clinical utility. These trends, in turn, increase payer scrutiny on all novel tests and force developers to outlay more resources, further feeding the cycle.
- Investment and innovation are affected by these limitations. Venture capital, alliance deals, and acquisitions are key sources of development funding for novel diagnostic companies and are declining at a rate faster than therapeutic deals. Investors recognize and point to the uncertain reimbursement environment as the key factor behind this trend.
- In addition, uncertainty around coverage can keep some physicians from ordering a novel diagnostic that could improve patient care.
- These limitations reduce patient access to novel diagnostics and, ultimately, to personalized medicine.

An array of potential reform options has been raised within the personalized medicine community.

Stakeholder support and a commitment to advance personalized medicine will be key drivers of reform.

- A continuum of niche, moderate, and broad reform solutions offer different levels of beneficial impact and feasibility of execution.
 - Niche solutions address specific issues in the short- to mid-term. Examples include establishing a set of complex analytics codes, a system of test-specific codes, and a set of economic study standards for novel diagnostics.
 - Moderate solutions impact multiple issues in the mid-term. Some examples involve facilitating diagnostic coverage with evidence development and/or risk-sharing payment schemes.
 - Broad reform solutions require significant time and resources but provide the most impact, such as the establishment of a single coverage and value assessment body for novel diagnostics.
 - No individual reform measure can positively impact the entire system. A multi-solution approach to the current system's limitations can provide short-term benefits while building towards broader diagnostic reimbursement reform.

Introduction

The major goal of personalized medicine—delivering the right treatment to the right patient at the right time—has been a fundamental objective in modern medicine for years. Recently, science has evolved to provide physicians new information and tools that allow them to differentiate patient-specific characteristics to an exquisite level of detail. This has led to more targeted clinical decision-making and a positive impact on patient outcomes.¹ Outcomes in oncology, in particular, have benefited from this evolving paradigm.

For example, researchers first utilized diagnostics to differentiate cancers by anatomical site (i.e. lung cancer vs. breast cancer) and treat accordingly which improved outcomes. Researchers then brought the characterization to the next level, demonstrating that different types of lung cancer responded better to different therapies based on diagnostic histology (i.e. small cell vs. non-small cell lung cancer). Even more recently, researchers have further stratified lung cancer based on diagnostic genetic analysis (i.e. EGFR² mutated vs. EGFR wild type tumors) and have proved that certain genetic subtypes respond strongly to certain targeted agents. This series of differentiations and the diagnostics that uncovered them has progressively improved the management of lung cancer.

Novel diagnostic tests—specifically complex or molecular diagnostics—are the tools that make the evolution of personalized medicine possible. With these tests, physicians are able to characterize patients accurately and improve or better predict outcomes. As exemplified above, the strongest impact of these tests to date has been seen in oncology. Figure 1⁴ illustrates how novel diagnostics have transformed every aspect of the cancer treatment paradigm. This transformation can be seen in other disease states as well, from infectious disease to post-transplant monitoring to chronic conditions like multiple sclerosis and cardiovascular disease.

In addition to the clinical implications of these novel diagnostics, their use also has broad economic implications, from reducing drug development timelines and costs to reserving expensive therapies for patients most likely to respond. But in order to realize the clinical and economic benefits of personalized medicine, adequate coverage and payment for novel diagnostics must be solidified.

The results of IPASS (Iressa Pan-Asia Study) also illustrate the evolution of personalized medicine in lung cancer. After failing to provide a significant overall survival benefit in a broad population of non-small cell lung cancer patients, Iressa, an EGFR inhibitor, was investigated in a selected lung cancer population that appeared to be more likely to derive benefit. The IPASS study compared Iressa to conventional chemotherapy in Asian patients who were never or formerly light smokers, as this population of patients were previously observed to obtain the greatest survival benefit from Iressa. Patients were further characterized by EGFR mutation status as this was also shown to be a predictor of favorable response to Iressa. The trial showed a highly significant improvement in average progression-free survival in the Iressa arm compared to the chemotherapy arm for EGFR mutation-positive patients (9.5 months vs. 6.3 months).³ However, in mutation-negative patients Iressa was associated with a significant decrease in average progression-free survival compared to chemotherapy (1.5 months vs. 5.5 months). Even in a population selected to be high responders to the experimental drug, there was a significant portion (roughly 40 percent) that were far better off receiving the conventional chemotherapeutic agent. The introduction of this molecular characterization and the test to proactively identify patients with a given profile is a critical next step in the evolution of managing this particular subset of lung cancer.

1. The Lewin Group (for Advamed), (July, 2005); The Value of Diagnostics Innovation, Adoption, and Diffusion into Healthcare.
 2. Epidermal Growth Factor Receptor.
 3. 2009 Annual Meeting of the American Society of Clinical Oncologists (ASCO): Abstract 8006.
 4. Health Advances analysis, 2010.

This is not an easy task. Despite the clinical and economic value of these technologies as the foundation of personalized medicine, payers have not reformed their systems for reimbursing novel diagnostics to reflect the evolution of healthcare toward a system of personalized medicine. Today, gaining coverage and appropriate payment for novel diagnostics are difficult. A key challenge involves the CMS⁵ rate-setting methodology. Originally designed to support simpler, more traditional diagnostics, the CMS process is inconsistent, opaque, and unable to capture the value of these novel tests to the overall healthcare system. This report will illustrate that as a result, many novel diagnostics are under-reimbursed or not reimbursed at all, an issue that ultimately restricts patient access to needed tests and optimal care. Furthermore, investment in the industry is waning as this uncertain reimbursement environment is increasingly of concern to investors.

FIGURE 1: NOVEL DIAGNOSTICS APPLICATIONS ACROSS CANCER

	Risk Assessment	Screening	Diagnosis	Staging and Prognosis	Therapy Selection	Monitoring
Test Description	<ul style="list-style-type: none"> Diagnostic tests to complement traditional risk factors 	<ul style="list-style-type: none"> Applied to high-risk patients to identify disease early 	<ul style="list-style-type: none"> Used for definitive diagnosis and general cancer typing 	<ul style="list-style-type: none"> Assess severity and/or risk of recurrence Inform adjuvant chemo decision 	<ul style="list-style-type: none"> Used to predict efficacy or safety response to specific treatments 	<ul style="list-style-type: none"> Recurrence monitoring Monitoring for treatment efficacy
Test Examples	<ul style="list-style-type: none"> BRACAnalysis[®] COLARIS[®] MELARIS[®] deCODE Prostate Cancer[™] 	<ul style="list-style-type: none"> PreGen-Plus[™] EarlyCDT-Lung[™] 	<ul style="list-style-type: none"> CancerTYPE ID[®] C-kit OVA1[™] PathFinderTG[®] miRview[™] 	<ul style="list-style-type: none"> Oncotype DX[®] Breast and Colon Previstage[™] MammaPrint[™] Prezeon[™] Adjuvant! Online 	<ul style="list-style-type: none"> HER2/neu TheraScreen[®] K-RAS and EGFR Mutation Kits ResponseDx[™] VeriStrat[®] OnDose[™] ChemoFx[®] 	<ul style="list-style-type: none"> CellSearch[™] BCR/ABL

Reimbursement reform will promote novel diagnostic development and facilitate personalized medicine. Transparency, consistency, and speed should be brought to the coverage and payment process through these reforms. The optimal solution would fairly compensate diagnostics based on standardized value justifications while limiting incremental cost to the system and encouraging use of well-validated diagnostics over poorly-validated tests. A complete solution cannot be expected overnight, but progress can be made with short-, medium- and long-term reform efforts.

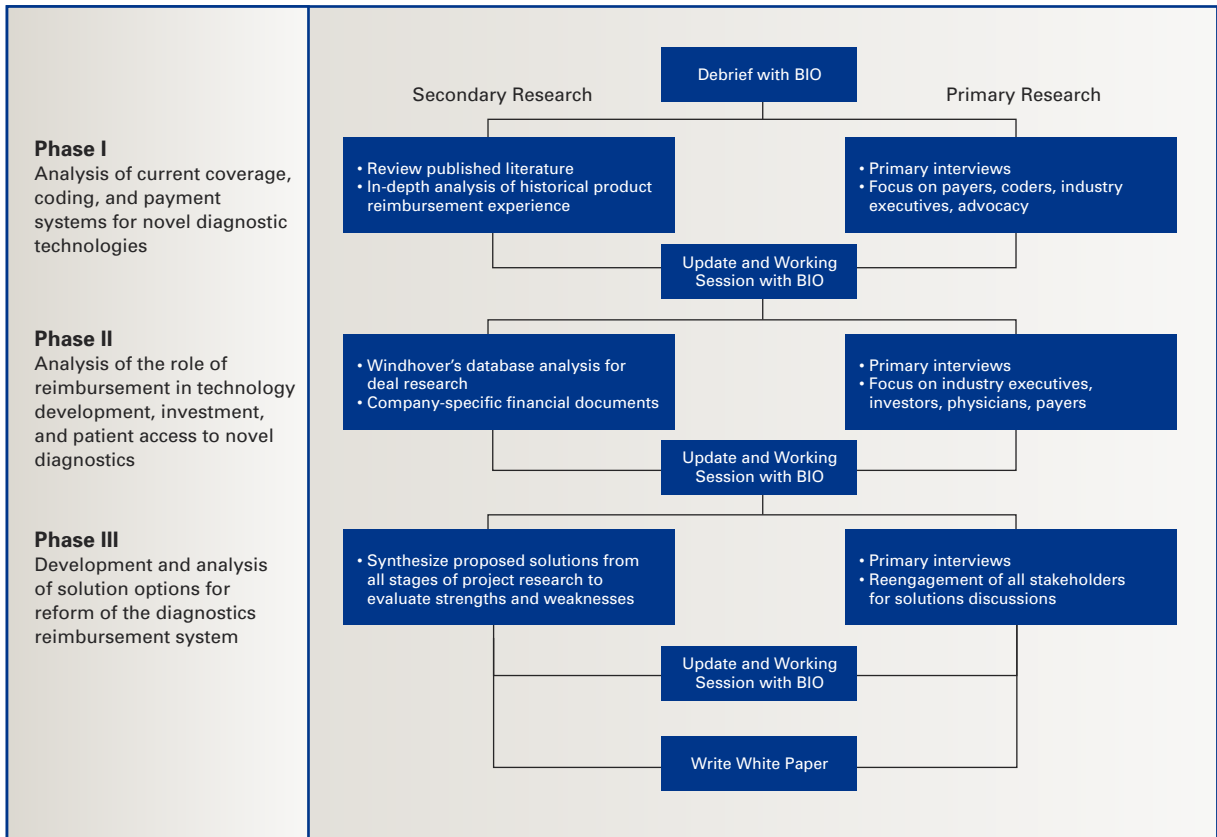
5. Centers for Medicare and Medicaid Services.

Methodology

To date, no source has comprehensively and methodically outlined the specific issues with the current coverage, coding, and payment system for novel diagnostics; addressed the effect of the current system on investment, development and adoption of novel diagnostic tests; and analyzed specific solutions for coverage, coding, and reimbursement reform. To develop this resource for the industry, the Biotechnology Industry Organization (BIO) commissioned Health Advances to embark on a detailed research program spanning six months in 2010.

The research project was organized into three distinct phases (Figure 2). Phase I focused on identifying and characterizing the limitations of the current reimbursement system. Phase II analyzed the impact of those limitations on investment, innovation, and patient access to novel diagnostics. Phase III synthesized potential solutions and analyzed the benefits and feasibility of each potential solution. In addition to a thorough secondary research program and data analysis, Health Advances embarked on a primary research program, conducting in-depth interviews with over 50 different

FIGURE 2: PROJECT METHODOLOGY



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stakeholders representing senior leaders in payer, provider, government, investment, advocacy, therapeutics, and diagnostics companies and organizations (Figure 3). Discussion guides were generated for each stakeholder category during each phase of research.

All research and feedback was then assimilated into this summary report which aims to provide a valuable resource to the industry as both an educational tool for all stakeholders and a foundation for reforming reimbursement for novel diagnostics.

FIGURE 3: PRIMARY RESEARCH PROGRAM

	Key Decision Maker	Example Organizations (not a complete list)
Private Payers and Coders	<ul style="list-style-type: none"> • Sr. level medical directors and coverage decision-makers in small/large US plans • Sr. level coders in US institutions that frequently code novel diagnostics 	<ul style="list-style-type: none"> • Blue Cross Blue Shield • MagnaCare • Medco • NHIC (CMS contractor) • Predictive Health
CMS/ Government	<ul style="list-style-type: none"> • Sr. level diagnostics coverage decision-makers recently at CMS • Sr. level representatives from government agencies 	
Physicians	<ul style="list-style-type: none"> • Key opinion leader physicians with experience in personalized medicine • Physician leaders involved in developing practice guidelines 	<ul style="list-style-type: none"> • Brigham & Women’s Hospital • Partners HealthCare • San Jose Medical Group
Industry/ Investors	<ul style="list-style-type: none"> • Experts who develop or market novel diagnostics or personalized medicine therapeutics • CEOs, CSOs, VPs of business development, sales executives • Venture capital or private equity partners who invest in novel diagnostics 	<ul style="list-style-type: none"> • bioMérieux • Caris Life Sciences • Clariant • DiagnoCure • Foundation Medicine • Hologic • North Bridge Venture Partners • Pathwork Diagnostics • Precision Therapeutics • Prometheus Laboratories • Roche • Third Rock Ventures • Vermillion
Industry Advocacy and Research	<ul style="list-style-type: none"> • Leaders of key industry advocacy or policy research groups steeped in personalized medicine 	<ul style="list-style-type: none"> • UCSF TRANSPERS Center • Foley Hoag • Center for Business Models in Healthcare

Permission was received to list the names of the organizations recorded as examples in this table.

Limitations of the Reimbursement System

The growth of novel diagnostics and personalized medicine are challenged by scientific, technical, regulatory, and commercial hurdles.⁶⁻⁸ But according to the vast majority of stakeholders interviewed, the paramount challenge to personalized medicine is the current reimbursement landscape. Stakeholders across personalized medicine are frustrated by the inconsistency and inefficiency of the current coverage and payment processes and see reimbursement as the key barrier to the current and future adoption of personalized medicine.^{9,10} In order to fully characterize this issue it is necessary to investigate the three discrete parts of the reimbursement process: coverage, coding, and payment.

Coverage Evaluation Process

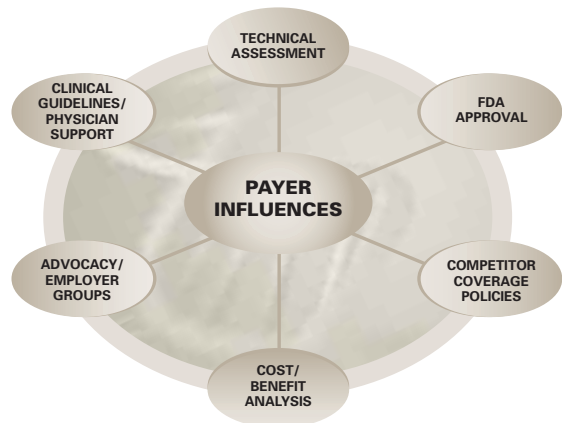
Although the coverage process for traditional diagnostics has worked well for years, the system was not designed to support the influx of more complex tests like those being developed today. As a result, the coverage protocol for these diagnostics is still unclear. While there is a clear timeline and process for the review of therapeutics, no such formal process exists for the evaluation and coverage of new diagnostic tests. Over the past five years, some tests have successfully achieved widespread coverage through their developers’ aggressive pursuit of payers; others have benefitted from their inclusion in a drug label; and still others have had to rely on CPT¹¹ code stacking. In all cases, though, there are no standardized coverage criteria for innovative tests, and there remains a number of tests for which coverage is limited or inconsistent despite years of market experience.

Payer organizations interviewed admit to this challenge. They use far more informal processes for identifying and establishing coverage policies for novel diagnostics than they use for drugs and devices. Few payers have a dedicated group responsible for evaluating these new technologies on a regular basis, like they have with the biannual P&T¹² committee review of approved drugs. Coverage decisions for novel diagnostics are made ad hoc when the payer organization deems it necessary. These coverage decisions are most often triggered in response to significant physician demand. However, what is deemed significant varies depending on the size of the payer and demographics of its patient population.

When a coverage decision must be made, payer organizations—large and small, public and private—are influenced by multiple health system factors (see Figure 4). What is most interesting is the level of influence each factor has on decision-making across each payer type.

For example, consider CMS, which is responsible for covering roughly one in seven U.S. citizens through its Medicare program. While CMS has the capability to issue national coverage decisions dictating coverage for all of its beneficiaries, the organization has not issued frequent decisions for novel diagnostic tests. Instead of issuing a national decision, the agency has relied upon its regional contractors to set local coverage policies in their respective regions. For diagnostics companies with a laboratory-developed test (LDT), Medicare coverage in the region of the lab’s

FIGURE 4: FACTORS INFLUENCING COVERAGE DECISIONS



6. Aspinnall MG, Hammeresh RG (2007); Realizing the Promise of Personalized Medicine. Harvard Business Review.
 7. Billings P (2006); Three Barriers to Innovative Diagnostics. Nature Biotechnology 24:917-918.
 8. Pothier K, Hochberg D (January, 2008); Biomarker Diagnostics: Place Your Bets Wisely. IN VIVO.
 9. President’s Council of Advisors on Science and Technology (PCAST), (September, 2008); Priorities for Personalized Medicine.
 10. Foley and Hoag (Quinn) (Oct. 24, 2008); Coverage and Reimbursement for Molecular Diagnostics: Current Issues and Options.
 11. CPT: Current Procedural Terminology.
 12. P&T: Pharmacy and Therapeutics.

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location serves as a de facto national coverage decision: all Medicare claims, across the country, processed on-site, are covered. Regional contractors are left to their own resources for coverage decisions, and take differing approaches in assessing a given technology, which creates particular challenges for diagnostic manufacturers. Generally speaking, Medicare contractors are influenced most strongly by their evaluation of the available clinical data and external technical assessments, particularly from government agencies (e.g. AHRQ¹³ and NIH¹⁴). To a lesser extent, Medicare contractors are influenced by the decisions of their colleagues at other contractors and by FDA approval.

Large private payers (>5MM covered lives) generally have the greatest analytical resources and are therefore better able to conduct internal analyses when assessing a given technology. Payer organizations vary in their approaches to technology assessment, oftentimes considering external technical assessment frameworks in addition to their own technology evaluations. Budget impact models and cost benefit analyses are also utilized to inform coverage policies due to the large populations covered and rising healthcare costs incurred by large payers. The sheer number of beneficiaries covered by the large payers also makes them the target of advocacy and large employer group campaigns to provide coverage for specific products and services. Even with all these inputs, large payers are challenged by the task of fairly assessing and granting coverage to novel diagnostics.

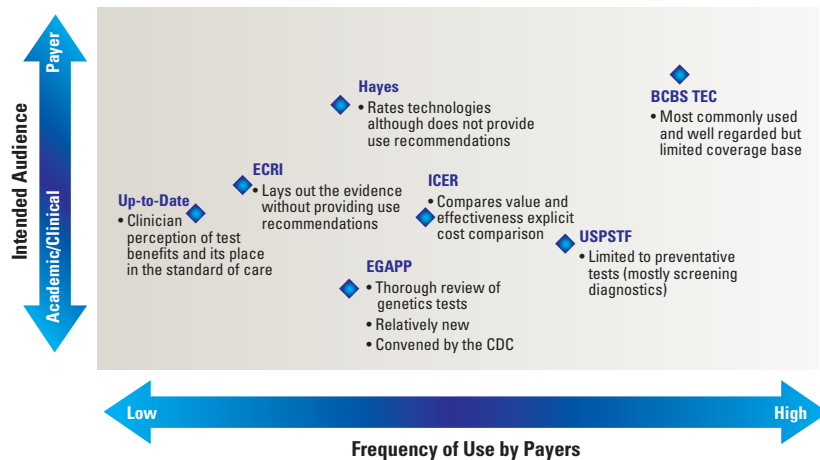
“It is such a gray zone for when these tests are considered “standard.” We’re looking at the same data, but our frameworks and underlying philosophies are different which results in big discrepancies.”

Large private payer

Small payers (<5MM covered lives) are generally more resource-constrained, but they are also more flexible in their technology evaluation process since they have a smaller number of beneficiaries. Small payer organizations gather external technology assessments and vet them through their own network of physician advisors to determine coverage. Small payers also report being significantly influenced by physicians in their network, who may raise issues if coverage policies do not support their practice patterns. “We are in a competitive environment,” said one small payer. “We constantly keep tabs on our physicians’ needs because if we don’t cover the tools they need, they may go elsewhere.”

Across all payer types, internal and external technology assessment frameworks play a vital role in the decision-making process. However, that is where the consistency ends. Of the frameworks most commonly cited by payers, each approaches technology assessment in a unique way (see Figure 5). Each framework is prepared by a different group with unique intentions, interests, and influencers. Some frameworks serve as a go-to policy for payers, while others are specifically intended for use by clinicians. Additionally, there is significant variability in use of evaluation frameworks even though payers admit that they are familiar with most frameworks. Among four of the largest payers, there is little consistency in the overall use of frameworks. One large private payer uses

FIGURE 5: COVERAGE FRAMEWORKS



13. AHRQ: Agency for Healthcare Research and Quality.
14. NIH: National Institutes of Health.

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seven frameworks to develop its decisions, including BCBS TEC¹⁵, Hayes, ECRI¹⁶, EGAPP¹⁷, ICER¹⁸, USPSTF¹⁹, and Up-To-Date. Another payer uses only BCBS TEC. Another uses only Hayes and USPSTF, and still another only EGAPP and ICER.

“Just the knowledge that there is variation amongst the coverage of tests is extremely important. I don’t think that most people realize how significant it is.”

Large private payer

Inconsistency in payer evaluation processes for novel diagnostics leads to inconsistent coverage policies. Figure 6 illustrates this trend across a number of novel diagnostics most cited by payers. Tests such as XDX’s AlloMap, Agendia’s MammaPrint, and Vermillion’s OVA1 have positive coverage policies from certain carriers and negative coverage decisions from others. When leading payers develop conflicting coverage stances on the same diagnostics, it is clear that there are discrepancies in the way payers review and assess diagnostics.

Figure 6 also illustrates that some of the most successful complex novel tests with the broadest coverage are actually not FDA-cleared at this point as this does not carry significant weight with most payers today. These practices can confuse developers who strive to understand what is needed to secure coverage, and sends mixed messages to physicians and patients as to the clinical value of the tests.

One subset of novel diagnostics that has been more successful in gaining consistent coverage decisions is companion diagnostics: tests that are tied directly to specific therapeutics. For example, KRAS mutation analysis is indicated for colorectal cancer patients initiating EGFR inhibitor therapy. In the case of KRAS, payers describe its path to reimbursement as relatively eventless due to its inclusion on the FDA label for drugs like Vectibix® and Erbitux®. Payers believe that the decision-making process is more straightforward if the test is a necessary part of the drug’s safety and efficacy profile. This phenomenon has helped bring some coverage consistency to the companion diagnostic subset of novel diagnostics.

Other novel diagnostics, such as Myriad’s BRACAnalysis and Genomic Health’s Oncotype DX also appear to have consistent coverage determinations today. But this has not always been the case. In fact, it is clear from an observation of Oncotype DX’s coverage over time that coverage decisions were fraught with

“Everyone is looking at the exact same data from the companies, but by using different frameworks, they come to very different decisions on the utility of new technologies. It is incredible to see the varied interpretations.”

Large private payer

FIGURE 6: COVERAGE INCONSISTENCIES FOR EXAMPLE DIAGNOSTICS

Innovative Test Examples	FDA Cleared	Positive Coverage Policies			
		Aetna	Regional CMS	Cigna	Regional BCBS
AlloMap	Yes		✓		
Oncotype DX (breast cancer)	No	✓	✓	✓	✓
MammaPrint	Yes		✓		
Pathwork Tissue of Origin	Yes				
BRACAnalysis	No	✓	✓	✓	✓
OVA1	Yes		✓		~
KRAS (colorectal cancer)	No	✓	✓	✓	✓

“For tests that are truly companion diagnostics, they are reviewed at the same time as the drug is approved. For KRAS, the decision was made within 6 months of the launch. It was a significantly shorter timeline than we typically issue coverage policies on diagnostic tests.”

Small private payer

15. BCBS TEC: Blue Cross and Blue Shield Technology Evaluation.
 16. ECRI: Emergency Care Research Institute.
 17. EGAPP: Evaluation of Genomic Applications in Practice and Prevention.
 18. ICER: Institute for Clinical and Economic Review.
 19. USPSTF: US Preventive Services Task Force.

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“The review process for a drug or even a medical device is fairly straightforward. These novel diagnostics, however, are a real unknown. We like to wait at least 6-12 months for things to shake out before even talking about a policy.”

Large private payer

“A big issue is the inability of insurers to dictate what they actually want from diagnostic developers. Many don’t even know what they want, how are developers supposed to know?”

Former CMS contractor

inconsistency. A quarterly analysis of Oncotype DX’s coverage as a percent of total covered lives in the US from its launch in 2004 to its near complete coverage in early 2010 shows how extended the coverage process was; there was nearly a four-year gap between the earliest coverage decisions and some of the latest coverage decisions (see Figure 7).

The drawn-out coverage adoption for Oncotype DX is not an anomaly. Payers admit that it takes these novel diagnostics far longer to establish broad coverage than it does for therapeutics. Due to differences in decision frameworks and underlying philosophies—in the absence of a guiding organization—coverage timing can vary greatly. Stakeholders believe future novel tests may encounter the same coverage inconsistencies and extended timeframes to widespread coverage.

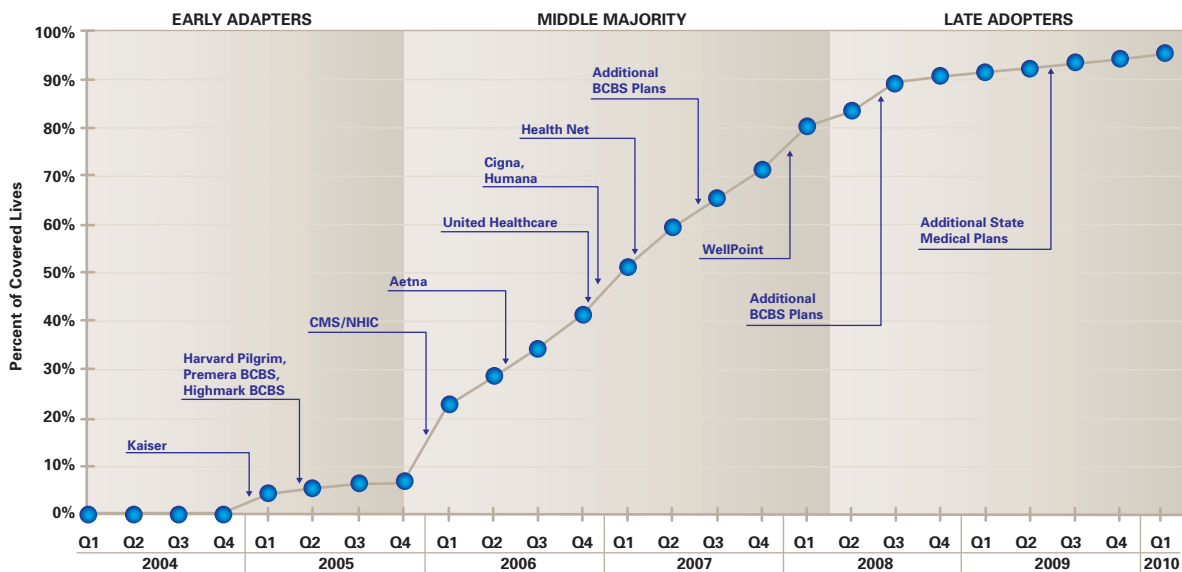
“The lack of transparency really hurts developers. I can’t tell you how many trials I’ve seen that were designed in such a way that it is impossible for payers to get what they need.”

Large private payer

Diagnostic company executives express frustrations over the inconsistencies throughout the coverage decision-making process. Without clarity into payer decision-making, diagnostic companies have struggled to obtain widespread coverage for their tests. Developers are challenged to efficiently allocate development resources in order to satisfy payers and drive coverage in today’s environment. These challenges ultimately slow the penetration of important novel diagnostics central to personalized medicine.

FIGURE 7: ONCOTYPE DX COVERAGE TIMELINE

Positive coverage as percent of total US covered lives over time



Coding and Payment Process

The coding and payment process also carries limitations that stem from a system not designed to support novel complex diagnostics.²⁰ At present, novel diagnostics are coded through one of three coding paths—code stacking, a new code, or a miscellaneous code—each of which carries unique advantages and disadvantages. Today, most novel diagnostic tests are reimbursed through stacking CPT codes that describe each step in the laboratory protocol. This system reflects the cost of performing various laboratory analyses—but code-stacking does not reflect the diagnostic company’s additional development costs or the inherent value of the diagnostic test itself. Payers, in turn, express frustrations with code stacking since the practice makes it difficult to track what specific tests are represented by various combinations of individual codes. Overall, this approach forces many diagnostic companies to consider alternative paths.

A second path—obtaining a new unique code from the AMA— involves significant risk and the potential for only modest reimbursement. The time it takes to advocate for and receive a new code can stretch to multiple years, a timeline that may not be financially feasible for many companies. An additional risk is that some tests may be perceived as investigational and given category II or III codes, which are rarely reimbursed by payers. Finally, a new code does not guarantee that payers will cover the test.

“The current system really incentivizes companies to work outside of the system. We saw it with Genomic Health and we’re seeing it more and more with new tests.”

HHS official

“I think the payer community recognizes that the current diagnostics coding system has its limitations when it comes to tests like *Oncotype DX*.”

Small private payer

“It’s clear that the current coding system isn’t set up for these new high value tests. Everyone tries to fly under the radar with a miscellaneous code until you have enough volume that the payers start to notice.”

Diagnostics company executive

“At both of the companies I have worked at, we decided that getting a new code was not worth the risk involved. Even if you are able to get a new code, then you run the risk of having Medicare reducing payment by 10% every year.”

Diagnostics company executive

Given the challenges in the current coding options, some manufacturers are using miscellaneous coding with manufacturer-determined reimbursement rates. The allure of this approach is the possibility of value-based pricing upon launch. Figure 8 illustrates this practice for both Genomic Health’s *Oncotype DX* and Vermillion’s *OVA1*, comparing the payment outcome for the various coding options. For both examples, stacking existing codes based upon laboratory analyses would have yielded significantly lower reimbursement, roughly one sixth of the list price. While miscellaneous codes represent attractive options for developers, they are often red flags for payers, especially when the associated price is high. Furthermore, miscellaneous codes are not track-able, so payers cannot ascertain the volume of use without taking additional steps.

These limitations in the current coding and payment system make it difficult for developers to receive value-based reimbursement for novel diagnostics. They push developers to work outside the traditional coding system, which undoubtedly raises questions from the payer community and can lead to inconsistent payment across payers. In an attempt to justify premium pricing and improve payment consistency, some diagnostic companies embark on health economic studies for their novel diagnostics. Prominent examples include studies from Genomic Health, and *XDx*.²¹

20. Foley and Hoag (Quinn) (2008); Crossing the three chasms: Complex molecular testing and Medicare Regulations.

FIGURE 8: CODING OPTION ANALYSIS

Impact of coding options on potential payment for example complex diagnostics

Complex Diagnostic Example	Code Stacking				New Code		Miscellaneous Code		
		CPT Codes	Rates	Stack	CPT Codes	Rate	CPT Codes	Rate	
Oncotype DX	Molecular diagnostics								
	RNA extraction	83891	\$5.85	x1					
	Reverse transcription	83902	\$20.72	x1					
	Gene amplification	83898/901	\$24.47	x21					
	Interpretation and report	83912	\$5.85	x1	XXXX	\$XX	84999	\$3450	
	Total				\$546.29	Total	\$XX	Total	\$3450
OVA1	Immunoassays								
	Transthyretin	82784	\$13.32	x1					
	Apolipoprotein A-1	82172	\$22.19	x1					
	Beta-2 Microglobulin	82232	\$23.17	x1					
	Transferrin	84466	\$18.29	x1					
	CA 125	86304	\$29.81	x1					
	Interpretation and report	83912	\$5.85	x1	XXXX	\$XX	84999	\$650	
		Total				\$112.63	Total	\$XX	Total

Early in Genomic Health’s development of its flagship product, the Oncotype DX breast cancer assay, the company studied the economic impact of its diagnostic on the healthcare system. Genomic Health analyzed the potential cost savings of its test on the system, and found that even after using the test at a price of roughly \$3,500, there was an average cost savings to the system of about \$2,000 per patient. The savings derive from the test’s ability to help steer patients with a high recurrence score to chemotherapy, and to steer those with a low recurrence score, who are less likely to benefit, away from chemotherapy. In order to raise the credibility and visibility of its analyses, Genomic Health published the study in the *American Journal of Managed Care* in May 2005, just over a year after launch.²²

“Payers worry that covering a new expensive test will be a huge additional cost, but in many cases they are very valuable and can save money. Diagnostic companies need to make this as clear as possible.”

Former CMS contractor

Similarly, Xdx published a health economics study for AlloMap which projected a savings of about \$6,500 per patient in five-year monitoring costs, which more than justified the \$2950 price for the diagnostic. Figure 9²³ illustrates the methodology and results of that study which hinged upon AlloMap’s ability to replace the majority of more expensive biopsies

after heart transplant with less expensive molecular diagnostic tests.

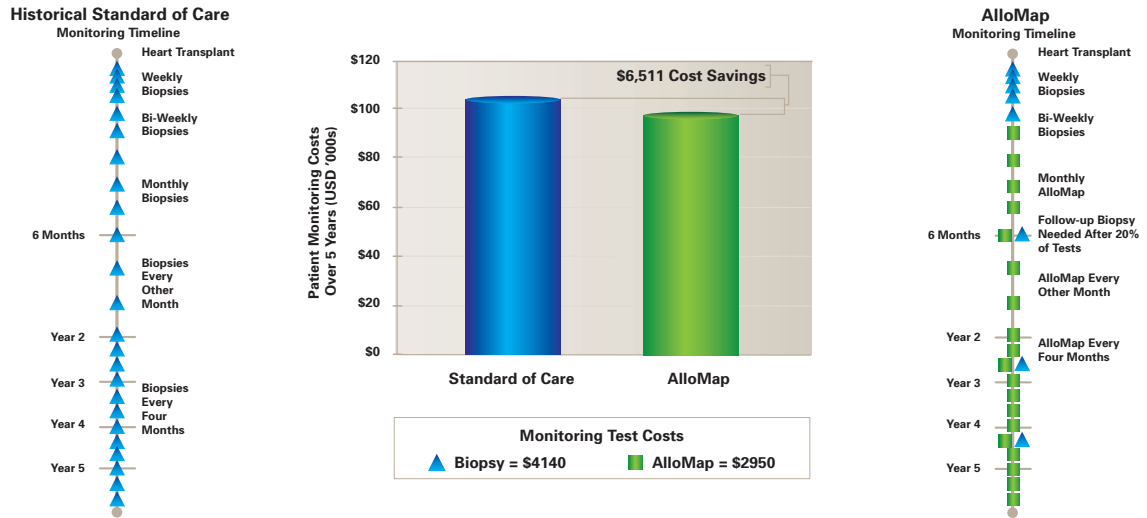
In both cases, the companies went beyond most diagnostic company resources to produce viable clinical and economic arguments in support of coverage. Interestingly, the payer response has been mixed in both cases. Some payer organizations admit that the economic justification provided by Genomic Health and Xdx was the “tipping point” in their process of coverage decision-making. Other payer organizations were less interested in the results, characterizing company-sponsored economic analyses

“The development of a system economic model was certainly helpful internally but also served as a good conversation topic when speaking with payers and pushing for coverage.”

Diagnostic company executive

21. Pothier K, Gustavsen G (March, 2009); How to Earn the Economic Payback Diagnostics Companies Deserve. IN VIVO.
 22. Hornberger J, et al. (2005); Am J Manag Care 11: 313–324.
 23. Evans RW, et al. (2005); Am J of Transplantation 5: 1553–1558. Health Advances analysis.

FIGURE 9: ALLOMAP SYSTEM ECONOMICS STUDY
5 Year Monitoring Costs per Patient



as marketing tools that should not be considered during the coverage and payment decision-making process. Both developers and payers agree that without standardization, the ultimate utility of these studies will remain in question. Without buy-in across stakeholders, payment variation will persist and the justification of value-based pricing for novel diagnostic will remain elusive.

“I would like to know that before we embark on a system economics study that we are designing it in a way that would really speak to payers. I just don’t get the sense that payers know exactly what they’d like to see.”

Diagnostic company executive

Significant limitations exist around the coverage, coding and payment of novel diagnostics. But how does that impact the industry as a whole? Are these limitations actually impeding investment, innovation, and patient access, or are they simply wrinkles to be ironed out over time?

“We see a lot of variation in the quality and design of these analyses, a standardized method might help us to value them a it more.”

Large private payer

“Believe it or not, the publishing of Genomic Health’s system economics study in the *American Journal of Managed Care* was a key turning point in our evaluation process.”

Former CMS contractor

Impact of the Current System

Investment and Innovation

Novel diagnostics today are striving for a higher level of influence over life-altering health decisions. In order for novel diagnostics to be trusted and used as directed, the clinical evidence backing their use in these decisions must be extensive, moving past biological measurement equivalence and into clear links to clinical outcomes. However, novel diagnostic developers do not have a clear set of expectations for the specific trials, level of evidence, and optimal outcome measures necessary for regulatory approval and reimbursement. The growing need for more clinical evidence in combination with a confusing regulatory and reimbursement path has created great inefficiencies in the development of novel diagnostics. These problems have led to a significant ballooning in R&D costs. Compared to the late 1990s, diagnostic companies are now spending as much as three times more on R&D in the three years prior to product launch (see Figure 10).

“The inconsistency and non-transparency across payers is what really frustrates me. I don’t know where to put my resources.”

Diagnostic company executive

FIGURE 10: R&D EXPENDITURES – PAST VS. MORE RECENT NOVEL DIAGNOSTICS
Cumulative total – 3 years prior to product launch

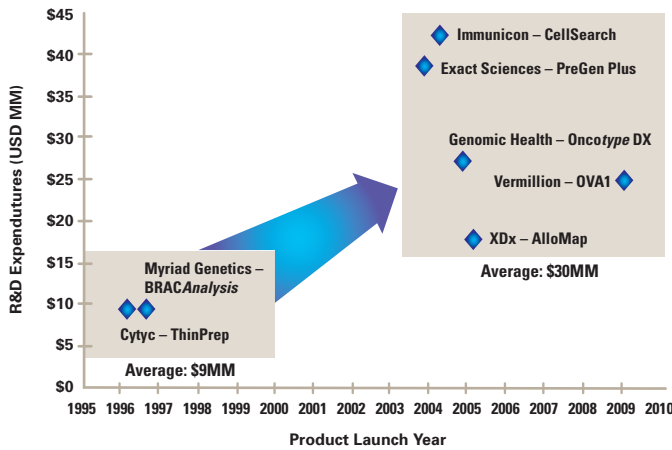
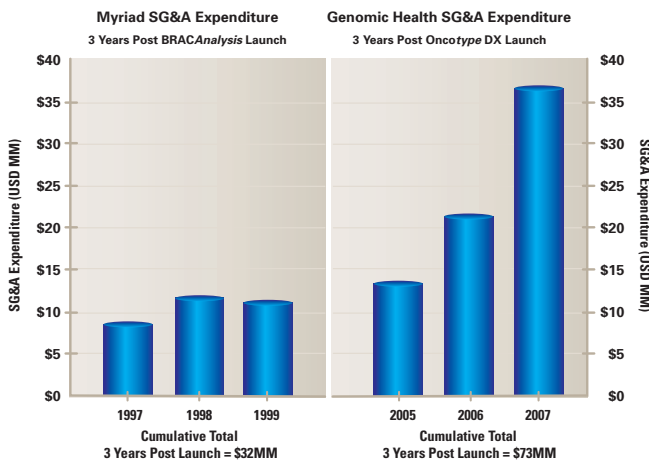


FIGURE 11: LAUNCH COST COMPARISON



Sales and marketing expenditures are also rising for several reasons. First, communicating the benefits of a complex personalized medicine diagnostic is a critical component of a test’s success. Many practicing physicians have not received formal training in the complex genetics at the heart of personalized medicine. As a result, tests require a highly-trained team to educate physicians and communicate their value. Second, many payers look to their physician networks to advocate for the use of a test before forming a coverage policy on a given technology, making the presence of well-developed sales and marketing networks crucial. Third, the payer community itself is an essential target for sales and marketing efforts for these novel diagnostics. Because the coverage decision-making process is so drawn-out, non-transparent, and inconsistent, companies are devoting more and more resources to securing coverage. The inadequate coding system, especially the trend towards miscellaneous codes, places pressure on diagnostic companies to work payer by payer to solidify reimbursement. Figure 11 illustrates this trend, comparing SG&A²⁴ costs for the three years post launch

24. Selling, General & Administrative.

“I don’t know how many companies can do what Genomic Health did. If you take all the money invested in Genomic Health, it will take a long time to get that back – and that’s one of the most successful examples.”

Diagnostic company executive

between Myriad’s BRCA*Analysis* and Genomic Health’s *Oncotype DX*. Expenditures for Genomic Health were more than twice as high in those critical post-launch years. Conversations with industry experts confirmed that much of that additional expense was applied to painstakingly supporting appeals and working payer by payer to secure coverage and payment. Other novel diagnostics companies, such as X*Dx*, *DiagnoCure*, and *Vermillion*, report similar experiences. Although it is doubtful that diagnostic companies in the future will be able to support these types of sales and marketing structures, this structure is necessary to secure commercial viability until the limitations in the current system are resolved.

With any investment comes pressure to recoup costs in an attractive and timely manner: novel diagnostics are no different. With clinical development and commercialization costs rising, historical per-test diagnostic price tags are no longer sustainable. Developers have been relying on the hope of pricing based on the true value of the diagnostic

to recoup a portion of the increasing development costs. However, the reimbursement system provides little reference or benchmark for pricing of novel diagnostics. Payers express frustration at the lack of pricing benchmarks, and perceive that the many developers are pricing without solid evidence to justify that value. As the prices of diagnostic tests increase—along with total healthcare spending—payers are looking more critically at these test prices.

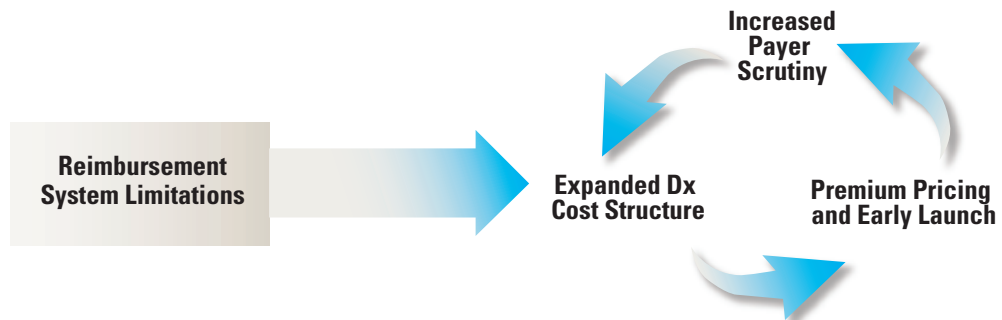
Development timelines are also a source of pressure, as companies strive to recoup investments sooner. Without a clear regulatory system in place, many tests are launched prematurely without extensive data on clinical utility. This, in turn, has further put payers on the defensive as they are forced to sift through numerous tests with questionable levels of evidence. The influx of higher-priced tests with varying levels of evidence creates an even more tenuous landscape for all involved, exacerbating the same issues that led to the expanding cost structure in the first place. Figure 12 illustrates this cycle.

To underscore this argument, consider Genomic Health. While many see *Oncotype DX* as one of the most successful novel diagnostics, most developers and investors do not see their model as

“With a weak regulatory system it has been up to the payers to serve as a key gatekeeper, hence the ever-increasing clinical evidence bar as many new diagnostics flood the market.”

Diagnostics industry advocacy group

FIGURE 12: REIMBURSEMENT SYSTEM LIMITATION EFFECTS



25. Windhover SIS Database, Windhover Information Inc; accessed July 13, 2010.

THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

desirable or easily replicable. While it has secured near-complete reimbursement coverage on its own, the company has yet to overcome the high costs it incurred in the process, more than six years after launch. Instead, many developers of innovative diagnostics, particularly those from single-product companies, look to other diagnostic (or therapeutic) companies for development alliances.

FIGURE 13: ALLIANCE DEALS
Number by Sector

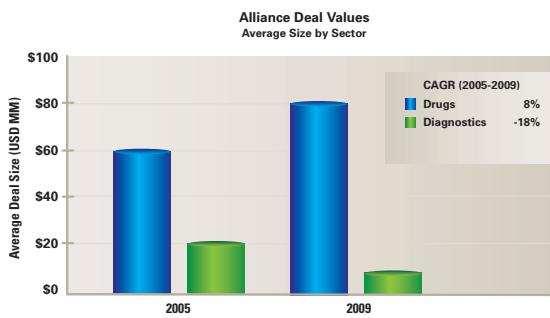
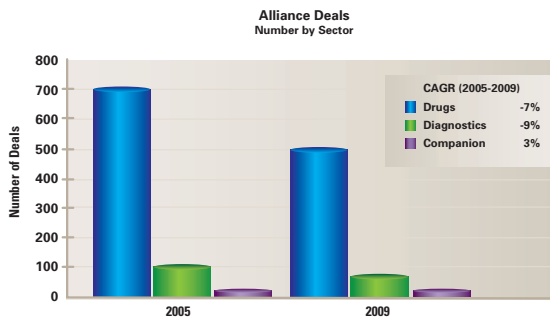
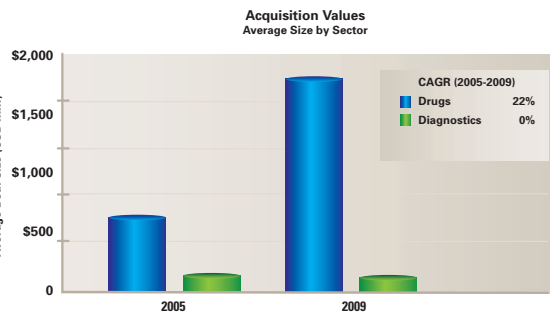
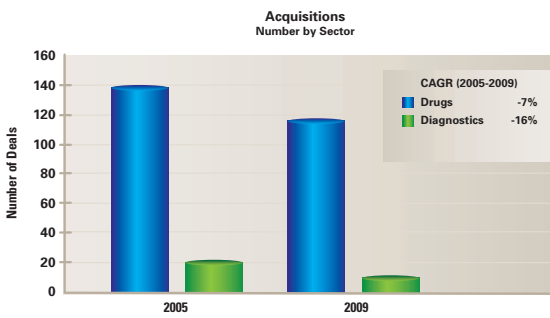


FIGURE 14: ALLIANCE DEALS
Number by Sector



Such deals are designed to provide necessary development resources and to mitigate some of the risk involved with bringing novel complex diagnostics to market. Unfortunately, investors and development partners do not look favorably on the growing need to collaborate. In fact, the uncertain reimbursement landscape and the expanding cost structure cycle are red flags for investors and new development deals.

From 2005 to 2009, a crucial period for personalized medicine, diagnostic deals have actually been on the decline. The macroeconomic environment has certainly been a recent contributing factor, but compared to the therapeutic deal landscape, diagnostics have fared disproportionately worse. Figure 13²⁵ illustrates the decline in alliance deals, which are a key financing source of development opportunities for small companies. The number of deals has declined faster for diagnostics than therapeutics. Even more striking is the sharp divergence in deal size between therapeutics and diagnostics. Similarly, Figure 14²⁶ illustrates a more significant deficit in both the number and size of acquisitions as well, another key mechanism for innovative diagnostics to accelerate development. While 2010 is not yet over, early data suggests these trends will continue, with deals falling faster in the diagnostics sector than the therapeutics sector.

“The regulatory and reimbursement environments for diagnostic tests are unpredictable, arbitrary, and roll with the populist view which results in horrific policy, the outcome of which is innovation dying on the vine.”

Venture capitalist

“The reimbursement environment has had the exact opposite effect as it should; it keeps innovative companies from acquiring the required investments. It has steered money away from diagnostics.”

Venture capitalist

“Investment is completely impacted by reimbursement. The VCs that come to us want to know how we expect to get paid, because that directly factors into the risk associated with their investment. They loathe uncertainty, and unfortunately the diagnostics industry is full of it.”

Diagnostic company executive

The health of the industry or overall economy cannot adequately explain the consistent shortfall of diagnostics compared to therapeutics in this data.

Primary research with both diagnostic executives and investors confirmed the hypothesis that the uncertain reimbursement environment was the paramount factor behind this trend. Investors look at the risk/reward ratio very carefully, and the uncertainty in the reimbursement system coupled with the expanding cost structure raise the risk portion of the equation significantly. When money is tight, investments with the least clear return are the first to fall through, which is how investors described the diagnostics industry. At the same time, larger diagnostic developers may require increased evidence from potential partners in order to complete deals, a requirement that is challenging for potential partners to achieve prior to partnership. Some investors and diagnostic

“Upfront cash is getting more thin which is an issue because that’s when you need the funds the most.”

Diagnostic company executive

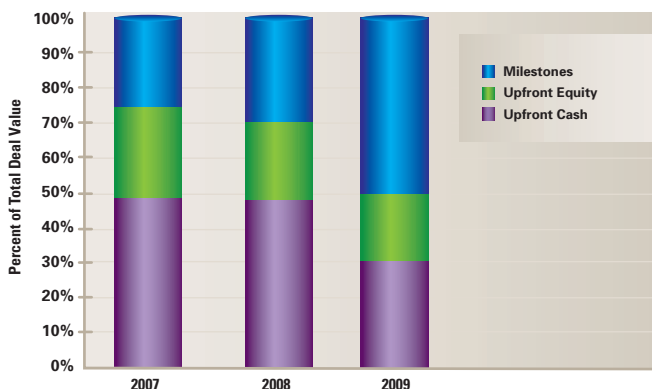
“I am living this deal structure trend and I can tell you it is due to the increasing uncertainty around the regulatory and reimbursement environment.”

Venture capitalist

company executives describe the landscape as one that is beginning to expect pharma-level evidence without pharma-level return, especially as

FIGURE 15: IVD DEAL STRUCTURE

Percent of total deal value by payment type



value-based pricing becomes more difficult to attain. These issues create disincentives for investments and development deals for novel diagnostics.

Not only have the number and sizes of deals become less favorable over time, but the terms of alliance deals are becoming less advantageous for the developer as well. As Figure 15 shows, there has been a movement away from upfront cash payments to milestone payments (e.g. clinical trial completion, regulatory approval, etc). Upfront payments comprised nearly half of the total deal value in 2007,

but in 2009 they represented less than a third of the total deal value. Companies rely upon upfront payments to fuel the clinical development of products, and when payment is deferred on a milestone payment system, companies have more difficulty funding product development. This payment trend has exacerbated the already extraordinary challenge of obtaining resources for technology development. Again, industry experts point to the uncertain reimbursement landscape as a key driver behind this trend.

As observed elsewhere, companion diagnostics represent a subset of novel diagnostics with less regulatory and reimbursement uncertainty. While alliances have declined

“We need to see a demonstrable ROI to invest and I think that the best opportunity is in companion diagnostics.”

Venture capitalist

“I can see why investing in diagnostics is a challenge, but I think companion diagnostics do not suffer the same uncertainties. If you can get a diagnostic involved in a therapeutic compound early in its development, there is a more assured path through the FDA and payers.”

Diagnostic company executive

at a rate of 10 percent within the more general diagnostics industry, deals involving companion diagnostics have actually grown by 3 percent over the same time period. Feedback from industry experts supported this data and pointed to the more straightforward regulatory and reimbursement paths as the key explanation for this trend. As discussed previously, companion diagnostics do not suffer from many of the same coverage inconsistency and transparency issues as other novel diagnostics. Payers view these tests differently since they may be required for a physician to utilize the covered companion therapeutic. Based on the lower level of uncertainty in companion diagnostics, it is not surprising that the deal metrics for this subgroup have not manifested the significant declines seen with other novel diagnostics. This unique exception further supports the hypothesis that the downturn seen in diagnostics deal number, size, and structure can be attributed in large part to the uncertain reimbursement landscape. The worsening investment and strategic partnership climate across the diagnostics sector directly limits the ability of diagnostic companies to develop these important tests, ultimately reducing physician and patient access.

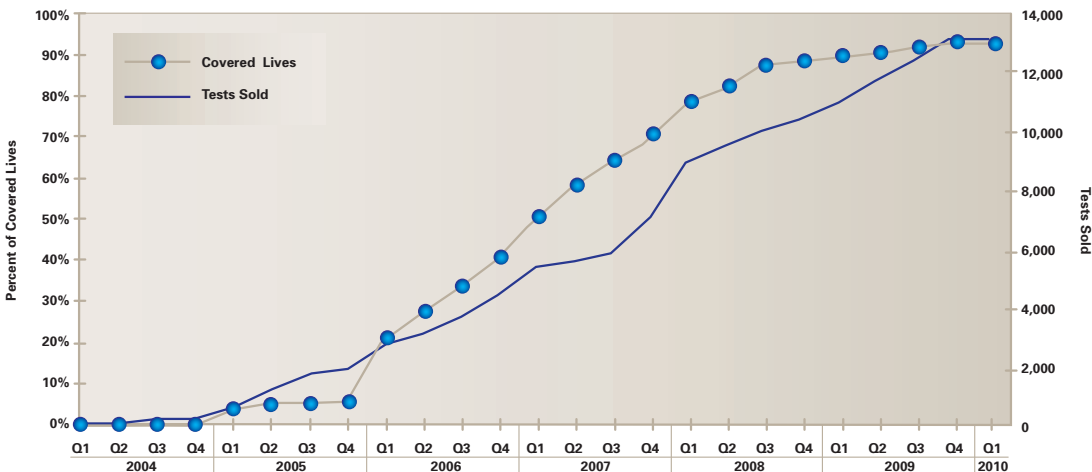
Patient and Provider Access

As a result of the trends described thus far, patient access to novel diagnostics is directly and indirectly limited by the current reimbursement system.

Inconsistent and drawn-out coverage decisions directly impact patient access, since novel tests cannot thrive without reimbursement. Reimbursement coverage and payment is the culmination of a diagnostic’s value proposition, transcending other levels of validation. As such, a product’s success can be linked to its reimbursement status. As seen with *Oncotype DX*, the four-year period between coverage from the first major payers to the last remaining payers represented a time of reduced patient access due primarily to limitations in the reimbursement system. The extremely close relationship between insurance coverage and patient access can be seen when mapping the percent of covered lives with the number of tests sold for *Oncotype DX* (see Figure 16). An impressive correlation exists between the reimbursement coverage for *Oncotype DX* and tests sold each quarter. This evidence attests to the sensitivity of diagnostics to the reimbursement landscape, and to the suggestion that any limitations in the system can directly impact patient access to personalized medicine.

“For private pay we can often go through an extensive appeals process taking up to a year. We have to ask the physician office to supply letters of medical necessity, medical records, etc. All of that is uncompensated time. On top of that, we can’t even let physicians know upfront because of all the inconsistency. It’s a huge issue.”
Diagnostic company executive

FIGURE 16: ONCOTYPE DX COVERAGE VS. TESTS SOLD



THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

The same trend was observed when investigating diagnostics that have yet to attain broad coverage. Conversations with executives and sales representatives from struggling diagnostic companies

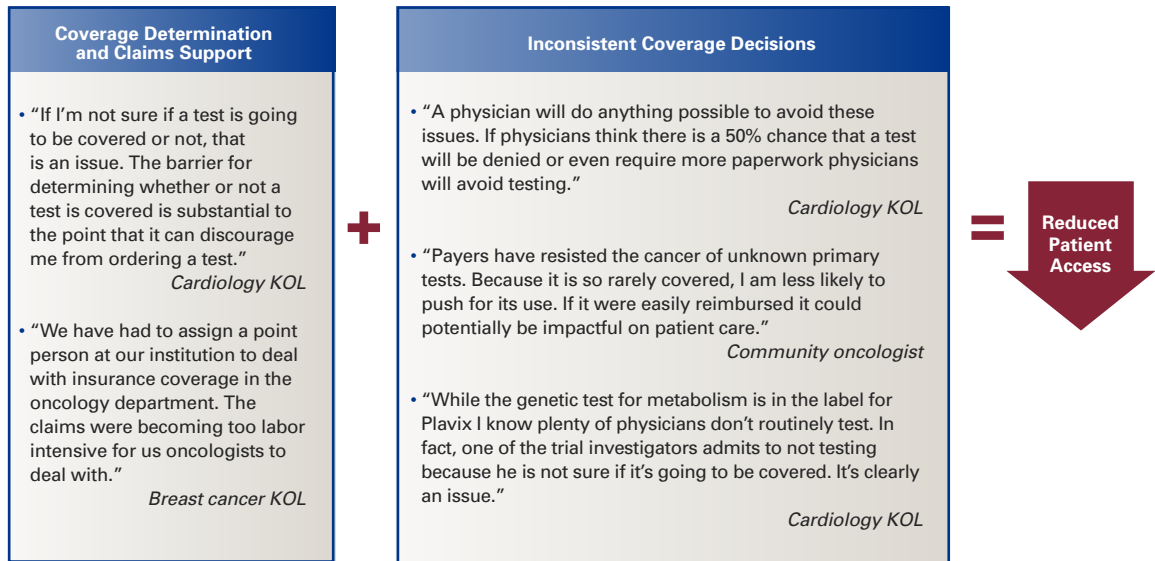
"I can prove it's a real issue because we don't see problems pop up in the ordering stage. Talented reps can sell the product initially but upon re-ordering that's where we lose physicians. They have gone through the reimbursement hassle in the past and that's the end of it."

Diagnostic sales executive

highlighted the reimbursement system at times as the sole barrier to physician adoption. Reimbursement is a key topic of sales calls, especially for struggling diagnostics. The current inconsistent system creates an overly burdensome situation for physicians, which has been shown at times to be the only thing keeping physicians from ordering a test.

Ultimately, patient access is paramount, and physicians and payers recognize that the current reimbursement landscape hinders the progress of otherwise important tests. Without robust coverage, physicians report hesitation to order expensive novel diagnostics. In fact, simply determining coverage policies or dealing with claims support for high-value tests for each patient puts a strain on physician time and resources. The difficulty of navigating inconsistent coverage decisions frustrates physicians to a point that they may choose not to prescribe an otherwise useful test (Figure 17).

FIGURE 17: DIRECT REDUCTION IN PATIENT ACCESS



THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

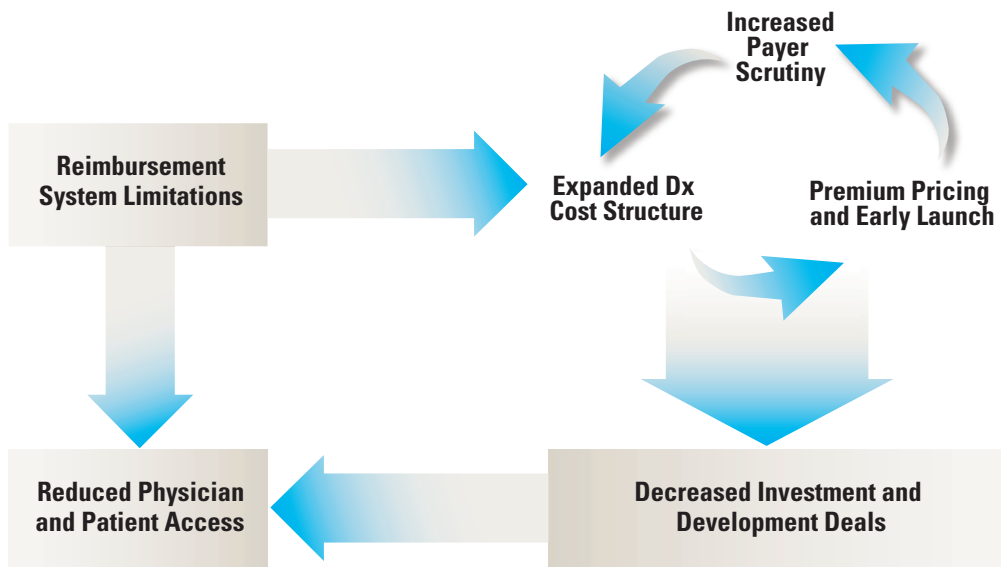
The limitations of the current reimbursement system directly reduce the ability of diagnostic companies to develop and market novel diagnostics in a sustainable fashion. These limitations are stifling investment and innovation around novel diagnostics. If this is where the story ended we would merely be talking about a business sector problem. However, the current reimbursement system, along with the challenges it is placing on the diagnostic industry, directly reduces patient access to these novel diagnostics that are critical for the promise of personalized medicine to be realized. Society has both a medical and economic obligation to promote and advance personalized medicine, and without these important diagnostics it could fail in that obligation. The limitations in the current reimbursement system therefore should be addressed and solved if personalized medicine is to succeed.

“Patient outcomes are our number one priority. We try our best to evaluate and reimburse important diagnostics quickly but it is clear with all the limitations we talked about that often patients have to wait for access longer than they should. We can do better.”

Large private payer

Impact of the Current System

FIGURE 18: REIMBURSEMENT SYSTEM LIMITATION EFFECTS



Solutions Analysis

Stakeholders have acknowledged the limitations and detrimental effects of the current reimbursement system, and they were passionate in their suggestions for change. Research across stakeholders yielded myriad ideas and alternatives from concrete solutions to suggested concepts (see Figure 19). A discrete set of solutions was compiled that resonated across stakeholders. In order to present the merits and limitations of each solution objectively, an assessment system was devised focusing on two balancing aspects: impact and feasibility. Each solution was first assessed on the basis of its ability to address and impact key limitations within the current system, including specific coverage, coding, and payment issues, the stifling of novel diagnostic development and patient access to personalized medicine. At the same time, the feasibility of each solution was evaluated, assessing the relative resource requirements, stakeholder support, and timeline to implementation across solutions (Figure 20). Solutions can be placed on a continuum from those that have less overall system impact but are relatively feasible in the short term (Niche Solutions) to those that have a far-reaching impact on current problems but require significant time and resources for implementation (Broad Reform).

FIGURE 19: EXAMPLE IDEAS ACROSS LIMITATIONS

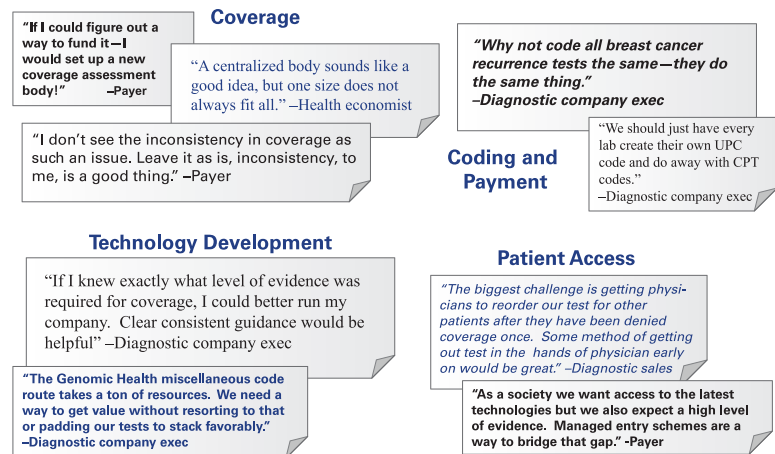


FIGURE 20: SOLUTION ASSESSMENT CRITERIA

Impact Sub-Criteria		Feasibility Sub-Criteria	
System Concerns	<ul style="list-style-type: none"> Coverage • Improves transparency, consistency, and speed of coverage Coding • Streamlines coding and tracking for novel diagnostics Payment • Facilitates value-reflective pricing and payment consistency 	Resource Requirements	<ul style="list-style-type: none"> • Level of financial and personnel resources required across all key stakeholders to implement solution
Development of Novel Diagnostics	<ul style="list-style-type: none"> • Impact on diagnostic development costs around R&D, clinical data, regulatory/reimbursement, and S&M • Impact on diagnostics company access to investment resources, ability to reverse the trend of declining alliances and deal values 	Stakeholder Support	<ul style="list-style-type: none"> • Likelihood of key stakeholders initiating work and supporting solution based on incentives, resources, and current trends
Access to Personalized Medicine	<ul style="list-style-type: none"> • Enables physicians and patients to gain access to impactful, safe, novel diagnostics that may directly benefit outcomes 	Time to Implementation	<ul style="list-style-type: none"> • Extent of time needed to put solution into place and recognize beneficial impact

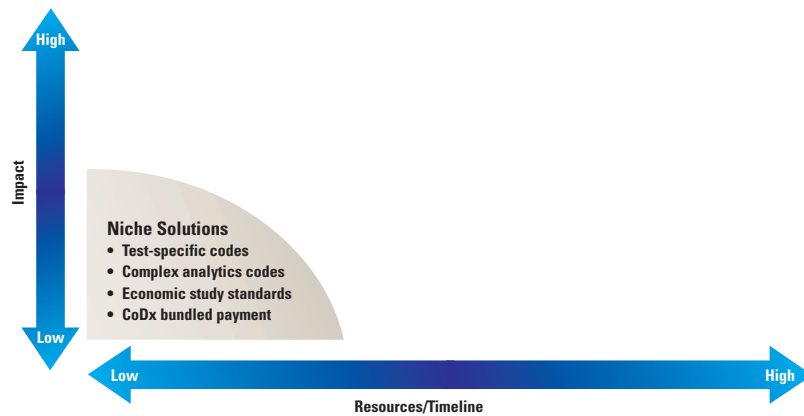
Niche Solutions

Niche solutions address specific limitations of the system in a targeted fashion, which allows them to be executable in the shorter term with fewer resources than other solutions (Figure 21).

Test-specific codes

Assigning test-specific codes for all novel advanced diagnostics directly addresses many limitations associated with the current coding system. As discussed, many see the widespread use of excessive code stacking and miscellaneous codes as unsustainable, since these codes are not able to be tracked in public and private payer systems. Code stacking and miscellaneous codes ultimately inhibit the collection of accurate utilization data, raise payer scrutiny, and increase payment variability.

FIGURE 21: SOLUTION CONTINUUM – NICHE SOLUTIONS



This solution would require that all novel advanced diagnostics apply for a unique CPT code. To expedite the process, a new set of codes would have to be established. A logical approach to the solution referenced by one interviewee is to devise a system where each digit represents a separate test characteristic. For instance, the first digit relates to the test category (prognostic, predictive, diagnostic, etc.), another for the analysis type (immunoassay, FISH, etc.), another for the marker (HER2, EGFR, etc.), and a final digit or set of digits for the company or lab performing the test. Miscellaneous codes or code stacking will only be available for use for a short period post product launch, prior to new test-specific code issuing.

“Having a system that had one code for every test would be great for us in the payer community. Being able to track newly launched technologies could help us to follow tests in their infancy.”
Small private payer

While this solution does not impact coverage issues, it does alleviate many of the problems associated with coding. A new coding system would improve the ability to track test utilization and ideally improve the efficiency of granting new codes. Codes tied to individual tests may also improve payment consistency, as claims for miscellaneous codes not associated with standard payment rates will decrease. There would be minimal indirect impact on technology development as test-specific codes improve visibility of newly launched tests and may reduce post-launch costs associated with payer-by-payer lobbying around miscellaneous codes.

In terms of feasibility, this solution is fairly attractive. While the resources needed to implement this new system may be moderate, the stakeholder support appears to be strong and broad. This solution will be most feasibly executed through the AMA²⁶ and it is clear that the AMA is already actively

“We know that the AMA/CAP working group is currently working on coding issues. I think that this idea has been part of their discussion, so the ball is already rolling.”
Advocacy group

26. AMA: American Medical Association.

engaged in coding reform at this time. In addition, other areas such as vaccines already work through a paradigm where the AMA may assign new codes prior to launch. Interviews with key stakeholders including payers and developers suggest support around a new system for test-specific codes as well. In fact, some payers are already taking preliminary steps towards this type of approach. Palmetto, a regional CMS contractor, recently announced that it would require all miscellaneous codes and all stacked codes to include the test name in the description field²⁷. Successful implementation of this solution will require careful definition of tests included in the new set of codes. In addition, the new claims coding processing for this subset of tests in both public and private payer organizations will require some time and effort to establish.

Complex analytics codes

Establishing a small number of new CPT codes specifically to value the sophisticated analytics inherent in complex diagnostics was suggested as an even shorter-term solution. Genomic Health and others have noted that code stacking does not reimburse at a fair value for complex novel diagnostics that include proprietary algorithms or advanced informatics. The aim of this solution is to close that gap through a small set of codes that align with novel, more complex analytical processes that drive value. This would then allow diagnostic companies to avoid the challenges associated with miscellaneous codes or reliance on large panels of analytes²⁸ to stack to a value-based price.

The impact of this solution would be similar to that of the test-specific codes solution described above. Coding issues would be partially addressed by removing the need for miscellaneous codes. This solution would also simplify value-realization and payment consistency for certain novel diagnostics.

While the overall impact of this solution is somewhat modest, the solution is fairly feasible in the short term. Resource requirements would be relatively minimal with the addition of a small set of complex analytic codes. Payer and diagnostic companies alike see the potential benefits of implementing this type of a solution as a stepping stone to broader coding reform. The challenge lies in the details. The AMA would have to clearly define the codes and appropriately set payment rates for each new analytical code. Most importantly, a clear set of criteria that diagnostics must satisfy in order to qualify for a given code would have to be established with broad buy-in.

Health economic study standards

Shifting to the payment issues within the current system, numerous stakeholders called out for a set of standards to guide the development of and bring credibility to health economic studies for novel diagnostics. Diagnostic companies recognize the need to justify higher value-based prices through health economic studies, but they struggle to construct studies in a way that will resonate with payers. Payers appreciate the value of the studies, but they are often skeptical of study conclusions, assuming their designs are biased. Stakeholders therefore clearly see the need for standardization. As part of this solution, a representative panel of payers and other key stakeholders would convene to determine a standardized approach for health economic evaluations for high-value diagnostics. The resulting published guidelines would then serve as a guide for manufacturers in justifying value-based pricing. Naturally, no one approach will apply to every situation, but the hope would be that system economic studies adhering to instructed guidelines would be considered legitimate benchmarks for pricing and payment.

“At this point we need standards that are beyond any one payer to guide complex economic analyses. As long as the guidance was drafted by a renowned group of diverse stakeholders, it would be welcomed by payers who are currently frustrated by imperfect analyses.”

Payer consultant

27. Palmetto GBA Laboratory and Molecular Diagnostic Services Program 8/30/2010.
 28. An analyte is a substance being identified and measured in a chemical analysis.

The impact of this solution focuses narrowly on the payment process. It would improve payment transparency and consistency by enabling pricing that is considered legitimate by all stakeholders. This solution also offers indirect benefits to the development process. Manufacturers could more

“Clearly establishing a set of guidelines will come together much sooner than forming a formalized assessment body for diagnostics. I think this is completely feasible to come up with guidance, its stakeholder buy-in that could take more time.”

Large private payer

efficiently allocate resources toward a single economic study to justify their price, which would then ideally be accepted by payers covering the test.

This solution is feasible in the shorter term with only minimal resources required for the creation of the standardized guidelines. The greatest difficulty in the execution of this solution will be recruiting and convening a group that is considered representative of the industry and has widespread buy-in. Another key challenge will be to develop a set of guidelines that covers the many unique aspects of different diagnostics.

Companion diagnostic bundled payment

The next solution takes a different approach to payment issues for a specific set of novel diagnostics. Some have argued that payment for companion diagnostics could be bundled with the payment for the companion therapeutic. This would shift the value justification argument away from the payer and toward the therapeutic company or companies who may appreciate the value much more clearly. The diagnostic payment would then be the result of a negotiation between the diagnostic and therapeutic manufacturers.

This solution would clearly improve the payment process for this subset of novel diagnostics. Consistent and value-based payment would come from the pharmaceutical partner as a fraction of the bundled payment. Coding would also be simplified for these diagnostics through the use of a single bundled code. To a lesser extent, diagnostic development resources could be allocated more efficiently as the value justification case could be focused on a single therapeutics partner or partners rather than spread across many different payer groups.

“We would welcome a bundled payment for companion diagnostics so that the responsibility falls on the manufacturers to determine where the value lies.”

Diagnostic company executive

“This solution just makes sense. It will ensure that tests are ordered before a particular therapeutic is ordered. No doubt it could impact patient outcomes.”

Diagnostic company executive

From a feasibility perspective, this change in coding and payment for companion diagnostics would require moderate adjustments to claims processes across all payer groups. Overall, though, resource requirements for this solution are likely lower than for many other solutions. Stakeholder support was relatively high, as this was seen as a logical and meaningful solution across interviewees. Prescribing physicians did not see any financial disincentives as they typically do not receive direct reimbursement for these novel diagnostics. However, there remain unresolved logistical issues, including having to

assess payment for the diagnostic when the drug is not used or when multiple drugs rely on the same companion diagnostic. Stakeholders from therapeutic companies were quick to point out

THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

these potential obstacles, but other stakeholders felt that these issues could be overcome through appropriately compensated payment rates, well-vetted deal structures, and clear communication among all stakeholders.

Figure 22 illustrates the overall assessment across impact and feasibility sub criteria for each niche solution. Overall, the assessment indicates that these niche solutions can offer a focused impact on certain issues and can be implemented over the shorter term with relatively modest resource allocation.

FIGURE 22: SOLUTION ASSESSMENT – NICHE SOLUTIONS

Systemic Change					Technology Development	Patient Access		Resource Requirements	Stakeholder Support	Time to Implementation
Coverage	Coding	Payment								
○	●	○	○	○	Test-Specific Codes • New coding system that assigns a unique code to each novel advanced diagnostic	• Would improve test tracking while eliminating the need for misc. codes not associated with standard payment rates	○	●	○	• Strong stakeholder support alongside AMA reform efforts • Coding reform would require moderate resources and a longer implementation time than other niche solutions
○	○	○	○	○			Complex Analytics Codes • New codes established to value the sophisticated analytics inherent in complex diagnostics	• Will improve coding consistency and streamline value-realization by removing the need for misc. codes	●	
○	○	○	○	○	Companion Diagnostic Bundled Payment • Payment for CoDx and Tx are bundled leading the developers to determine the value split	• Would moderately simplify coding for certain tests • Value realization improved through pharma negotiations	●	○	●	• Many stakeholders see the logic and would likely support • Potential issue when multiple drugs rely on the same Dx
○	○	○	○	○			Economic Study Standards • Panel produces a set of guidelines on a standardized approach for economic evaluations to justify price to payers	• Consistency and transparency enables pricing that is considered legitimate by all stakeholders • More efficient allocation of Dx development resources	●	
○	○	○	○	○						

○ Not Attractive ○ Minimally Attractive ○ Modestly Attractive ○ Moderately Attractive ● Most Attractive

Moderate Solutions

Moderate solutions take a broader approach to addressing the issues identified within the current reimbursement system. These solutions will provide more impact than the niche solutions but will also require more significant resources and time to implement (See Figure 23).

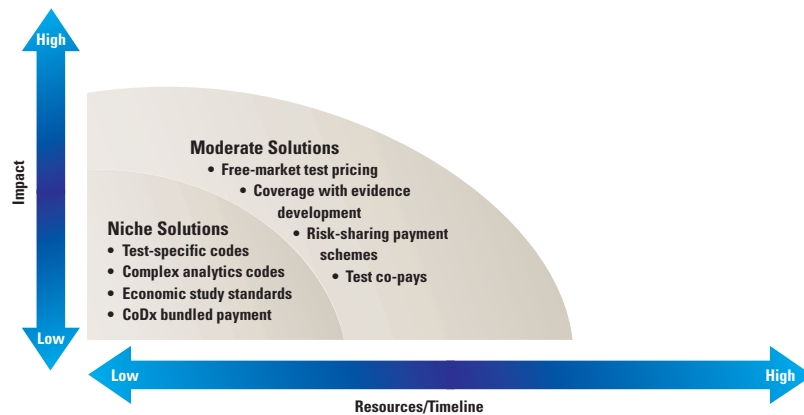
Free-market pricing with test-specific codes

This solution builds on the idea of test-specific codes but focuses on payment as well. The solution suggests a pricing and payment model more similar to therapeutics where the manufacturer sets the price for each novel diagnostic just as a drug manufacturer sets the price for each novel drug. This price would align with a test-specific CPT code, granted at the time of test launch.

Payers would then choose to reimburse or not reimburse a given test and payment could follow a modified ASP²⁹ paradigm similar to the pharmaceutical model. This is in contrast to the current crosswalk and gap-fill processes that CMS implements to calculate reimbursement for new codes based on similar existing tests and codes. The solution would have the same benefits of an improved coding system and will impact payment issues significantly. Free-market pricing would facilitate a more value-based than cost-based pricing model for diagnostics and a standardized payment around an ASP would improve payment consistency. There would likely be indirect technology development benefits as well; a system which allows manufacturers to set prices improves their ability to recover development costs and could even make investments and alliances in the space more attractive.

While impactful, the feasibility of this solution is more in question. On top of the resources needed to set up a new coding system, this solution will meet some resistance from certain stakeholders. Creating a free-market for diagnostics with limited pricing controls is likely to encounter significant hurdles from the government and CMS, both integral stakeholders required for implementation. In addition, the new coding and payment scheme would require significant systemic change in both the public and private claims processes including legislative support for an ASP-based system mandating payer compliance. Broad stakeholder support, especially across the government and payer community, will be this solution’s highest hurdle.

FIGURE 23: SOLUTION CONTINUUM – MODERATE SOLUTIONS



“We need to get away from counting up the number of genes – more genes doesn’t make a better test. Allowing us to set a price, that we have to justify, and allowing payers to make decisions on whether or not they will pay is a very fair system.”

Diagnostic company executive

29. Average Sales Price.

Coverage with evidence development

“It is impossible to recover the costs of development with stacked codes. Setting our own price would give our shareholders a return, and allow us to get what our test is worth.”

Diagnostic company executive

The next three solutions are designed to close a critical gap between the need for rapid diagnostic launch and patient access and the demand for strong evidence by payers. Today, a large gap exists between stakeholders when it comes to the optimal point at which to launch a novel diagnostic. On one end, payers demand very strong evidence of clinical utility. On the other end, diagnostic companies must launch a novel test as early as can be justified in order to begin generating market experience and revenue. Caught in the middle are the patients who expect tests to be safe and reliable but at the same time are desperate for access to cutting edge technology. Solutions that encompass “managed entry” attempt to

address these issues by facilitating patient access to promising technologies somewhat earlier than would otherwise be the case. Coverage with evidence development (CED) is the first of these managed entry options.

“There is no way that the government would make the same mistake twice. They see the skyrocketing costs of therapeutics – what makes you think they would be willing to do that again?”

Ex-CMS contractor

“At the time of product launch we rarely know the clinical and economic benefits of a product with confidence. CED allows us to further measure these benefits in real-world conditions so that payers are better informed to make coverage decisions.”

Personalized medicine policy researcher

CED describes a paradigm in which payers provide coverage for newly launched diagnostics at a reduced rate for a specified period of time, while monitoring test usage for additional clinical outcomes data. This solution would call for the formation of a payer CED consortia (public and private representatives) to create large enough patient data sets for meaningful analyses. After assessing the data generated, payers would issue a formal coverage policy and reimburse at the full negotiated rate if the results were positive. Outcomes data would then be published and used to generate coverage policies for other payers not involved in the consortia.

The impact of CED begins by providing rapid, temporary coverage for tests while building a dataset available for providers and payers. This would improve the transparency and speed issues associated with the current coverage process and would indirectly benefit the development process through early revenue and market experience during a period of supported evidence development. Most importantly, patient access is directly improved as providers and patients are able to utilize technologies before formal coverage policies are issued.

“I love the that idea. I would sign up in a heartbeat. It takes time to prove economic value, and its not feasible to have all of that real-life market data at launch.”

Diagnostic company executive

“The operational details are definitely the biggest challenge facing CED at this point. The payer community has already bought into the concept with both Medicare and major private plans showing interest.”

Personalized medicine policy researcher

Theoretically, the concept of CED is well supported by stakeholders. However, the logistical details surrounding implementation will lengthen the time to realization. Only a limited number of payers are currently equipped to execute CED efficiently. In addition, a coordinating entity will be needed to plan and oversee multi-payer population studies—the Center for Medical Technology Policy is already working toward filling this role. Finally, CED is likely a mid-term solution with

potential challenges surfacing around constructing agreements, defining and tracking outcome measures, and following through on proper payments.

Risk-sharing payment schemes

A second managed entry scheme has been successfully implemented in the past for certain therapeutics, most notably in the UK with Velcade® (Johnson & Johnson). Manufacturers and payers enter into individual agreements under which payers reimburse a product only if it meets a predefined outcome measure agreed upon by both parties. Manufacturers

or payers may cover the cost of the test upfront, and are then reimbursed or refunded depending on the agreement. The premise in risk-sharing payment schemes is that payers are able to ease coverage requirements somewhat since they are protected from paying for tests that fail to meet a desired outcome.

As with other managed entry schemes, this solution will make a primary impact around coverage. Presumably, requirements would be eased and coverage provided earlier in a

product's lifecycle, since tests not performing to the level of clinical utility laid out ahead of time would not be reimbursed. Patient access would be expected to improve as tests would be available earlier than they otherwise would be without the risk-sharing agreements.

Conceptually, this solution resonated across stakeholders, including many payers. But outside of a few large integrated health systems, the administrative costs of such a program are likely prohibitive. Ultimately, risk-sharing schemes will be driven and executed by individual diagnostic manufacturers and payers, which may be feasible in particular cases over the short to midterm.

Test co-pays

The application of test co-pays is a third managed entry scheme that was discussed with stakeholders. A common fear across payers is that these novel value-priced diagnostics will be over-utilized by physicians, who may order these tests when it is unlikely to alter treatment decisions in a meaningful way. Some payers proposed the idea of imposing a co-pay on such tests to guarantee

that thoughtful dialogue is occurring between patients and physicians and that these tests are more than simply "nice to have" in a given situation. A tiered structure could be put into place where expensive new technologies with limited market experience are placed at the highest tier and, as more information is gathered, the test "steps down" until it no longer requires a co-pay.

The impact with the test co-pay solution is similar to other managed entry schemes, but not as significant. Tests will benefit from earlier coverage due to a slightly relaxed set of clinical

"This is a way to increase patient access for test early on when they don't have the level of evidence that convince payers it's worthwhile."

Health economist

"What speaks to me is that the diagnostic companies will take on some of the monetary risk and really stand behind their product. That would definitely get me to cover technologies earlier, in a controlled way."

Small private payer

"Innovative payment schemes are a great idea. If it is applicable to a specific technology, that can be linked to outcomes, then I think it would certainly be a real strategy for a diagnostic developer."

Venture capitalist

"Risk-sharing is just far too complex to administer. It's a great idea but unimplementable due to the monitoring systems it requires."

Large private payer

"This definitely creates an interesting new way for patients and providers to think about risk. I think it would make things a lot more clear to them, and in a way put the patient's access in their own hands."

Health economist

THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

“I would hate to have a co-pay be a barrier especially during the time when physicians are still getting comfortable with using the test. They would certainly be less likely to order if they knew costs were getting pushed on the patient.”

Diagnostic company executive

utility requirements as payers shift more of that responsibility onto the physicians and patients. Patient access would improve, but would necessitate patient assistance programs to extend benefits to patients who cannot afford the co-pay.

Implementation of a co-pay system could be a shorter-term solution for many private plans. Administrative costs around this solution would be far less than many other proposed solutions. Interestingly, stakeholder support may hold back realization of this solution. Payers were mixed in their feedback and many diagnostic companies flat-out feared this approach. Some developers envisioned a co-pay backfiring and inhibiting their ability to sell the test. Overall, while implementable and marginally impactful, co-pay systems are likely to encounter resistance from key stakeholders for being regressive in nature.

Figure 24 illustrates the relative assessments across the various sub criteria for each moderate solution. This assessment analysis highlights the broader impact of many of these moderate solutions at the expense of resources, stakeholder support, and time to implementation, but also underscores the shortcomings of each solution in the longer term.

FIGURE 24: SOLUTION ASSESSMENT – MODERATE SOLUTIONS

Systemic Change			Technology	Patient		Resource	Stakeholder	Time to
Coverage	Coding	Payment	Development	Access		Requirements	Support	Implementation
○	●	●	●	○	Free-Market Pricing with Test Specific Codes <ul style="list-style-type: none"> Manufacturers set price which aligns with a test-specific code Payers chose to reimburse at ASP +/- % 	○	○	○
<ul style="list-style-type: none"> Coding issues addressed through test-specific codes Value based pricing is facilitated which improves ability to recover development costs 						<ul style="list-style-type: none"> Significant resources needed to develop unique codes Government and payers are unlikely to support a free-market system that does not include price controls 		
●	○	○	●	●	Coverage with Evidence Development (CED) <ul style="list-style-type: none"> Partial coverage for diagnostics with limited evidence while monitoring usage for additional clinical outcomes data 	○	●	●
<ul style="list-style-type: none"> Provide quick, transparent, temporary coverage for tests while building a dataset available for providers and payers Subsidizes development and improves patient access 						<ul style="list-style-type: none"> Limited number of payers currently equipped to execute Strong stakeholder support with pilot programs initiated 		
●	○	○	○	●	Risk-Sharing Payment Schemes <ul style="list-style-type: none"> Agreements for new diagnostics with limited data; payers reimburse only if pre-defined outcomes are met 	●	●	●
<ul style="list-style-type: none"> Impact across identified issues similar to CED solution Improved patient access and coverage efficiency 						<ul style="list-style-type: none"> Resources around monitoring and managing programs may be challenging for many plans Alignment and negotiations on outcomes may be difficult 		
○	○	○	○	●	Test Co-Pays <ul style="list-style-type: none"> Co-pay imposed on novel diagnostics with limited data to force a provider/patient discussion on clinical utility 	●	○	●
<ul style="list-style-type: none"> Payers may not greatly ease coverage requirements as they are still paying for the majority of the diagnostic 						<ul style="list-style-type: none"> Relatively low administrative costs Mediocre enthusiasm across stakeholders Implementable by private plans in the nearer term 		
○	○	○	○	○	○	○	○	○
<p>○ Not Attractive ○ Minimally Attractive ● Modestly Attractive ● Moderately Attractive ● Most Attractive</p>								

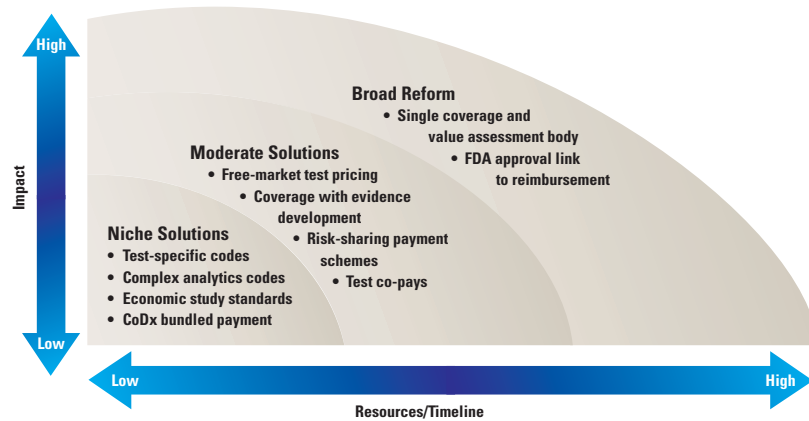
Broad Reform

The last set of solutions falls under the category of broad reform because of their wide range of impact across the majority of identified issues. These solutions would represent a true paradigm shift in the reimbursement system, but they would require significant resource allocation over many years to realize their potential (see Figure 25).

FDA approval link to reimbursement

There was a prevailing theme of concern by diagnostic companies that reimbursement implications were not discussed during the FDA's public meeting on the oversight of LDTs in July 2010. With increased regulation on the horizon for complex novel diagnostics, many developers fear that the additional work needed for FDA clearance will not put them in a better position to receive reimbursement. To date, attaining FDA clearance has not served as a significant point of differentiation for many complex novel

FIGURE 25: SOLUTION CONTINUUM – BROAD REFORM



diagnostics when it comes to widespread payer coverage (i.e. MammaPrint, AlloMap, Pathwork Tissue of Origin, and OVA1 from Figure 6).

However, some stakeholders see this as an opportunity. Many argue that the relatively weak regulatory bar for novel diagnostics has put more pressure on payers to serve as gatekeeper for these technologies—pressure that has ultimately led to many of the problems and limitations of the current system. Some stakeholders believe that if the regulatory bar were raised, the diagnostics paradigm might more closely resemble the therapeutics paradigm: if a drug is strong enough to pass a rigorous FDA review process then the majority of payers quickly and consistently reimburse the

drug. This serves as the premise for the next solution. It involves establishing a more rigorous evaluation process that not only assesses analytical validity (accurate measurement of the analyte) and clinical validity (sensitivity and specificity) but considers clinical utility as well (impact on treatment decisions and patient outcomes). The final critical component is an understanding among stakeholders that CMS and private payers will hinge test coverage on FDA approval, as is the experience with therapeutics today.

This solution would offer fairly broad impact stemming from a more straightforward coverage process. Establishing a clear set of FDA approval criteria would bring significant transparency to the process. Assuming

“How can you talk about increased regulation without addressing how that will affect the reimbursement landscape? The FDA should have included CMS at this meeting as well.”

Diagnostic company executive

“If the FDA were to raise the bar on what they expected from diagnostic technologies, it could be a very consistent evaluation body that payers could rely upon.”

Health economist

support across major health plans, FDA approval would serve as a source for consistent and timely coverage decision-making by payers. From a technology development standpoint, stakeholders believe that more stringent evidence requirements for regulatory approval would increase pre-launch development costs for many novel diagnostics, but savings could accrue from

“FDA simply does not have the resources to regulate all these tests. This would take a very long time given that the FDA tends to move slowly, and we are describing a very drastic overhaul.”

Large private payer

more efficient study design with more transparent criteria. Also, costs may be saved as developers would spend less time working with each payer to cover the test. In addition, consistent and transparent coverage determinations may alleviate uncertainty around regulation and reimbursement, which would benefit the investment and deal landscape. Finally, consistent and quick coverage closely following FDA approval allows a broader set of patients to gain access to these diagnostics in a timely fashion.

“With increased FDA scrutiny, I think that the industry would rid itself of much of the questionable technology out there today. That could improve the investment environment for good, clinically sound, tests.”

Venture capitalist

This shift in decision making would require significant public resources and government support, making it feasible

only in the long term. The solution requires that FDA have the in-house know-how and resources to provide timely technology assessment for approval, and monitoring programs to follow diagnostics after approval. The current FDA initiative around LDTs may provide an opportunity for this solution to gain momentum. In addition, FDA and CMS recently announced their intention to potentially establish a process for parallel review of medical products³⁰.

Stakeholder support is of utmost importance if this solution is to achieve its intended impact. Success hinges on complete buy-in from the payer community, which is why the evaluation of clinical utility is a key component of this solution. This does present challenges in defining how and to what level diagnostic companies should prove the clinical utility of their tests in a cost-effective manner. Without complete buy-in from the

“If the FDA were to incorporate clinical utility and even comparative effectiveness into their assessment of diagnostics, I think that they could expect buy-ins from payers. However, this is a lot to ask from the FDA today.”

Small private payer

payer community however, this concept could run the risk of adding yet another hurdle to patient access without realizing the reimbursement-related benefits. Ultimately this solution has the potential to be highly impactful but carries many challenges and potential risks that may impede implementation.

“A single body would be able to set a consistent standard across technologies. It would be completely clear what evidence was required of manufacturers for coverage and if it was a carefully created group of diverse stakeholders, the results of their evaluations would be consistent with strong buy-in.”

Large private payer

Single coverage and value assessment body

This solution shares many of the same themes as the FDA solution, but instead suggests the formation of an independent third party body to serve a central assessment role. Interviewees envisioned a multi-stakeholder private committee to lead this group which would be responsible for a complete evaluation of novel diagnostics in a transparent and timely fashion. In addition to assessing the clinical utility and providing coverage recommendations, the committee would determine an appropriate payment range as a part of technology

30. Federal Register /Vol. 75, No. 180 / Friday, September 17, 2010 /Notices.

assessment. Payers would retain their autonomy to make final decisions, but this central group would consolidate many of the similar, redundant analyses currently being performed across payers. Coverage recommendations would be non-binding, but would have strong buy-in across the payer community. Payment rates would still be contracted individually but would reflect the economic analyses provided through this assessment.

This solution has the potential to be impactful across nearly all limitations of the current system with the exception of coding. A single set of evidence standards would bring clarity to the coverage processes. Broad payer buy-in would bring consistency and speed to the process. Stakeholders would expect improved payment consistency through the use of pricing benchmarks vetted through standardized economic evaluations. As with the FDA solution, development efficiency and the investment landscape would also be expected to improve. In addition, a more consistent and swift coverage process would improve patient access to personalized medicine.

Given the breadth and depth of this solution’s potential impact, significant resources, likely both public and private, would be required to create efficient review processes that overcome lengthy historical timelines. Payer buy-in would be paramount, since payers would not

only be expected to follow the group’s recommendations but would also likely be asked to help fund it as well. Payer support will hinge on the credibility of those involved, the group’s management, and the assessment techniques employed.

One of the underlying premises of this solution has already begun to bear fruit: standardized coverage guidelines. Palmetto released a coverage submission checklist for novel diagnostics to help bring some transparency, consistency, and speed to their coverage decision making process. While that is only one small step towards the ultimate embodiment of this solution, it reflects the fact that payers see the value in improving the process. Regarding the grander

single assessment body, many payers theoretically bought into the concept but questioned its ability to be executed. Ultimately this solution amounts to a monumental undertaking over a long period of time. But it is ultimately a solution that could offer significant benefits across many of the identified limitations within today’s reimbursement system for novel diagnostics.

Figure 26 illustrates the overall assessment for the complete set of solutions. As solutions become more impactful across different issues the corresponding feasibility is reduced. The broad reform solutions clearly offer extensive benefit across many problem areas but will be the most difficult to implement given the high resource requirements, weaker stakeholder support, and long-term implementation time.

“Coupling a technology’s economic value proposition at the same time the clinical utility is being evaluated would certainly provide a credible payment benchmark for contracting.”

Health economist

“I worry about the applicability of a single assessment process across the very heterogeneous payer community. A one-sized fits all approach is not always the most useful or well-received.”

Health economist

“I don’t see why you couldn’t conceive of payers partially funding a third party for technology evaluation. We do that today – in a fragmented way.”

Large private payer

THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

FIGURE 26: SOLUTION ASSESSMENT

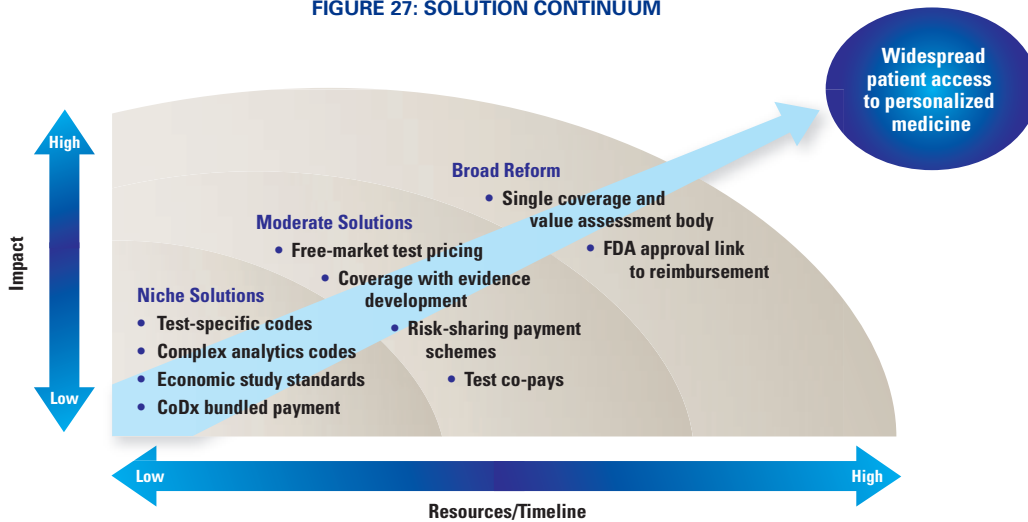
Systemic Change					Technology Development	Patient Access		Resource Requirements	Stakeholder Support	Time to Implementation
Coverage	Coding	Payment								
							Comparison Diagnostic Bundled Payment			
<ul style="list-style-type: none"> • Would moderately simplify coding for certain tests • Value realization improved through pharma negotiations 							<ul style="list-style-type: none"> • Payment for CoDx and Tx are bundled leaving the developers to determine the value split 	<ul style="list-style-type: none"> • Many stakeholders see the logic and would likely support • Potential issue when multiple drugs rely on the same Dx 		
							Complex Analytics Codes			
<ul style="list-style-type: none"> • Will improve coding consistency and streamline value-realization by removing the need for misc. codes 							<ul style="list-style-type: none"> • New codes established to value the sophisticated analytics inherent in complex diagnostics 	<ul style="list-style-type: none"> • Resource requirements would be relatively minimal with the addition of a small set of complex analytic codes • Definition and buy-in of code criteria will be challenging 		
							Economic Study Standards			
<ul style="list-style-type: none"> • Consistency and transparency enables pricing that is considered legitimate by all stakeholders • More efficient allocation of Dx development resources 							<ul style="list-style-type: none"> • Panel produces a set of guidelines on a standardized approach for economic evaluations to justify price to payers 	<ul style="list-style-type: none"> • Resources are likely lower than other solutions and stakeholders are likely to support • However, development of guidelines covering the unique aspects of different diagnostics with buy-in will be difficult 		
							Test-Specific Codes			
<ul style="list-style-type: none"> • Would improve test tracking while eliminating the need for misc. codes not associated with standard payment rates 							<ul style="list-style-type: none"> • New coding system that assigns a unique code to each novel advanced diagnostic 	<ul style="list-style-type: none"> • Strong stakeholder support alongside AMA reform efforts • Coding reform would require moderate resources and a longer implementation time than other niche solutions 		
							Test Co-Pays			
<ul style="list-style-type: none"> • Payers may not greatly ease coverage requirements as they are still paying for the majority of the diagnostic 							<ul style="list-style-type: none"> • Co-pay imposed on novel diagnostics with limited data to force a provider/patient discussion on clinical utility 	<ul style="list-style-type: none"> • Relatively low administrative costs • Mediocre enthusiasm across stakeholders • Implementable by private plans in the nearer term 		
							Risk-Sharing Payment Schemes			
<ul style="list-style-type: none"> • Impact across identified issues similar to CED solution • Improved patient access and coverage efficiency 							<ul style="list-style-type: none"> • Agreements for new diagnostics with limited data; payers reimburse only if pre-defined outcomes are met 	<ul style="list-style-type: none"> • Resources around monitoring and managing programs maybe challenging for many plans • Alignment and negotiations on outcomes may be difficult 		
							Coverage with Evidence Development (CED)			
<ul style="list-style-type: none"> • Provide quick, transparent, temporary coverage for tests while building a dataset available for providers and payers • Subsidizes development and improves patient access 							<ul style="list-style-type: none"> • Partial coverage for diagnostics with limited evidence while monitoring usage for additional clinical outcomes data 	<ul style="list-style-type: none"> • Limited number of payers currently equipped to execute • Strong stakeholder support with pilot programs initiated 		
							Free-Market Pricing with Test Specific Codes			
<ul style="list-style-type: none"> • Coding issues addressed through test-specific codes • Value-based pricing is facilitated which improves ability to recover development costs 							<ul style="list-style-type: none"> • Manufacturers set price which aligns with a test-specific code. • Payers chose to reimburse at ASP+/- % 	<ul style="list-style-type: none"> • Significant resources needed to develop unique codes • Government and payers are unlikely to support a free-market system that does not include price controls 		
							FDA Link to Reimbursement			
<ul style="list-style-type: none"> • Transparent evidence requirements with improved coverage consistency and speed from payer community • Technology development and patient access will improve 							<ul style="list-style-type: none"> • Broad reimbursement coverage for diagnostics approved under a more rigorous FDA evaluation 	<ul style="list-style-type: none"> • High resource needs but current FDA initiative will provide momentum • Stakeholder buy-in may be challenging; long term solution 		
							Single Coverage and Value Assessment Body			
<ul style="list-style-type: none"> • Provides consistent and quick coverage recommendations • Establishes payment justification for diagnostics • Improves development outlook and patient access 							<ul style="list-style-type: none"> • A third party group that provides consistent and rapid coverage recommendations and payment evaluation for novel diagnostics 	<ul style="list-style-type: none"> • Enormous resource allocation needed for new group • Buy-in is critical, widespread payer buy-in may be challenging; long-term solution 		

Not Attractive
 Minimally Attractive
 Modestly Attractive
 Moderately Attractive
 Most Attractive

Conclusion

Figure 27 illustrates the full continuum of solutions and how these solutions can ultimately help facilitate widespread patient access to personalized medicine. No individual idea provides a comprehensive solution across all limitations and issues. In addition, the most influential solutions will require the most significant resources and will offer a beneficial impact only in the longer term. It is for these reasons that stakeholders shared a vision of championing multiple solutions across tiers in order to begin providing near-term relief of certain problems while spearheading broader reform.

FIGURE 27: SOLUTION CONTINUUM



Call to Action

Overall, this body of research has provided a detailed account of the current reimbursement system’s limitations as they relate to novel diagnostics. The research conclusively implicates these limitations in stifling investment and innovation in novel diagnostics and ultimately in reducing patient access to personalized medicine. If the healthcare system is to fully embrace the clear medical and economic benefits of the evolving personalized medicine paradigm, stakeholders must solve what many have identified as being its paramount barrier: the limitations in the current reimbursement system.

There is no shortage of impactful, feasible solutions. While no solution has perfectly aligned stakeholders and several solutions may have to be combined for the most sustained impact, it is imperative that stakeholders take action and begin the reform process for the greater medical and economic good. At this crucial time in our nation’s mandate to reform healthcare delivery and at this critical time for the survival of novel diagnostics that form the foundation of personalized medicine, stakeholders have a responsibility to patients and society to do everything in their power to help bring personalized medicine to bear. That begins with reforming the reimbursement system for novel diagnostics.

THE REIMBURSEMENT LANDSCAPE FOR NOVEL DIAGNOSTICS

Appendix I: Most Referenced Novel Diagnostics

Appendix I: Most Referenced Novel Diagnostics

	Test	Company	Description
Covered	KRAS	Various (DxS/Qiagen, others)	Therapy selection in colorectal cancer, lung adenocarcinoma, pancreatic, gall bladder, bile duct, and thyroid cancers
	Oncotype DX® Breast	Genomic Health	Breast cancer recurrence risk
	Trofile™	Monogram Biosciences (Now LabCorp)	Companion diagnostic for use of Selzentry®
	BRCA ^{Analysis} ® C-kit	Myriad Genetics	Breast and ovarian cancer risk assessment Diagnose and select therapy for C-kit mutated tumors such as GIST
	HER2/neu	Not proprietary	Companion diagnostic for use of Herceptin® and Tykerb®
	BCR/ABL		CML diagnosis and therapeutic monitoring
	MammaPrint™	Agendia	Breast cancer recurrence risk
Variable/Not Covered	septin 9 biomarker	ARUP Labs	Colorectal cancer screening
	VeriStrat®	Biodesix	Therapy selection in NSCLC
	CancerTYPE ID®	Biotheranostics	Cancer of unknown origin diagnosis
	Caris Target Now™	Caris Life Sciences	Tumor molecular profiling test
	Pulmotype®	Clariant	Non-small cell lung cancer diagnostic
	HemeScan™	Combimatrix/Clariant	Chronic lymphocytic leukemia diagnostic
	Ovachek®	Correlogic Systems	Ovarian cancer risk assessment
	deCODE Prostate Cancer™	deCODE Diagnostics	Genetic tests for cancer risk assessment
	deCODE Breast Cancer™		
	Previstage™	DiagnoCure	Colorectal cancer recurrence risk
	ColonSentry™	GeneNews	Colorectal cancer risk assessment
	Oncotype DX® Colon	Genomic Health	Colorectal cancer recurrence risk
	PreOvar™	Mira Dx	Ovarian cancer risk assessment
	HERmark®	Monogram Biosciences (Now LabCorp)	HER2 total protein and homodimer assay
	COLARIS®	Myriad Genetics	Colorectal cancer risk assessment
	MELARIS®		Hereditary melanoma risk assessment
	Prezeon™		Progression risk in breast, colon, prostate, and glioma cancers
	OnDose™		Dosing of 5-FU chemotherapeutic
	Cytochrome P450 CYP2C9	Not proprietary	Warfarin dosing
	EarlyCDT-Lung™	Onclmmune	Lung cancer diagnostic
	Pathwork® Tissue of Unknown Origin	Pathwork Diagnostics	Cancer of unknown origin diagnosis
	ChemoFx®	Precision Therapeutics	Therapy selection for chemotherapeutics
	ColoVantage™	Quest Diagnostics	Colorectal cancer screening
	PathFinderTG®	RedPath Integrated Pathology	Cancer of unknown origin diagnosis
	ResponseDx: Lung™ ResponseDx: Colon™ ResponseDx: Gastric™	Response Genetics	Therapy selection for multiple cancers
	miRview™ squamous	Rosetta Genomics/ Prometheus Labs	Differentiates squamous from nonsquamous NSCLC
	miRview™ meso		Mesothelioma diagnosis
	miRview™ mets		Cancer of unknown primary tests
	UGT1A1	Various (Roche's Amplichip™, Invader®)	Identify adverse reactions to Camptosar®
	CellSearch™	Veridex (J&J)	Metastatic breast, colorectal or prostate cancer prognostic
	OVA1™	Vermillion	Ovarian cancer risk assessment to determine surgical specialist
	AlloMap®	XDx	Heart transplant rejection monitoring

Appendix II: About the Authors

- Health Advances is a global strategy firm focusing entirely on the development of commercialization strategies for products and services for the healthcare industry, including diagnostics, devices, therapeutics, and life sciences. The Health Advances Diagnostics Practice works with senior management teams and investors from small start-up companies to the largest core lab consolidators in the industry to help develop their product commercialization strategies and associated R&D, sales and marketing, partnering strategies, and overall corporate investment decisions. In addition, Health Advances performs diligence for venture capital firms, private equity firms and diagnostic/life science tools companies, evaluating and advising on potential transactions, novel technologies, and benefits and risks to the industry. Evaluation of these risks includes the analysis of the current reimbursement environment and the basis for investment in diagnostic companies and R&D of novel diagnostics. Health Advances has experienced first-hand how the reimbursement environment can impact a potential investment or acquisition in a diagnostics company or technology. We used our experience to provide a strong baseline for the analysis in this report.
- The Health Advances team was led by Kristin Pothier, Partner and Gary Gustavsen, Associate. In addition to their work for clients across the industry, Kristin and Gary are frequent speakers, workshop leaders, and writers in the diagnostics and life sciences industry, covering topics such as the economics and commercialization of novel diagnostics, the transition of life science tools to the clinical laboratory, and innovations in personalized medicine. They were supported by a team of individuals responsible for the primary and secondary research analysis, led by Kerry Philips, Senior Analyst along with editorial and strategic support from BIO.
- For more information about Health Advances, please visit our website at www.healthadvances.com or email kcpothier@healthadvances.com.

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The Reimbursement Landscape for Novel
Diagnostics: Current Limitations, Real-World
Impact, and Proposed Solutions

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