Also inside:
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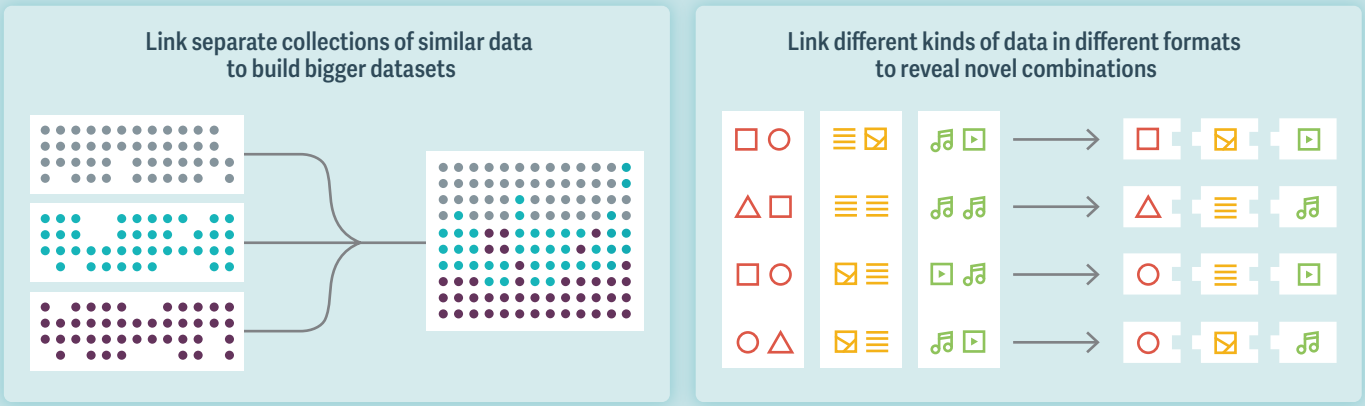
ANALYSIS GROUP ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

Health Care Bulletin

Winter 2019/2020

Artificial Intelligence Can Open the Door to Better Learning, Better Care, and Better Coverage

If providers, regulators, and insurers can work together to increase the linkages between datasets...



...the capabilities driven by AI can lead to a variety of quality improvements and cost savings in health care.

In health care, newly developed artificial intelligence (AI) tools are opening the door to new diagnostic, research, and claims processing possibilities. (See figure.)

As described in our article in *PharmacoEconomics* (see text box on next page for full reference), AI tools can analyze the massive datasets created by combining claims data with data from other sources, such as census data, electronic medical record (EMR) systems, real-world evidence from clinical practice, and other patient information. Standard analytical methodologies can be overwhelmed by the size and complexity (continues on page 2)

Supplementing claims data with real-world evidence: An excerpt[1]

"The lack of lifestyle characteristics information is often cited as a main limitation of claims data. Information on how the recommended treatment was followed by the patient or the 'quality of care' may also be missing. The ability of AI to find complex patterns in the data can potentially approximate this missing information via combinations of the variables that are available. This can improve the matching of treated and untreated patients, which in turn helps correct for treatment selection biases in retrospective studies of treatment efficacy or safety.

For example, it is notoriously difficult to compare the effect of different treatments based on retrospective studies. The decision to prescribe one treatment over another is generally informed by a doctor's evaluation, and the factors that affect that evaluation, such as the patient's disease severity, other co-morbidities, and history of compliance, may be unobservable to the researcher. If, say, one treatment tends to be used for more severe cases, comparing its efficacy (or safety) against another treatment without controlling for this tendency will bias the results in favor of the treatment that is typically used for easier cases. … Recent research demonstrates that … the use of AI can significantly reduce, and essentially eliminate, such biases."

1. FROM "COMBINING THE POWER OF ARTIFICIAL INTELLIGENCE WITH THE RICHNESS OF HEALTHCARE CLAIMS DATA: OPPORTUNITIES AND CHALLENGES," *PHARMACOECONOMICS*, JUNE 2019.

Artificial Intelligence (continued from page 1)

of such combined datasets. AI algorithms and systems, on the other hand, can be used to detect intricate and previously unrecognized patterns in the data.

Pooling Knowledge to Provide Better Care

The ability to combine various data sources gives researchers using AI tools access to a vast amount of medical knowledge, experience, and patient histories for particular conditions. Identification of novel patterns in previously untapped data of this sort can aid in:

- Finding new predictors for early onset of diseases
- Improving the detection of underdiagnosed or rare diseases
- Providing more accurate diagnoses
- Developing personalized treatments and preventive services

Identifying and Reducing the Effects of Biases

The greater knowledge and broader experience available from combined datasets can also help reduce bias in decision making. Bias may be introduced in a number of ways, such as a doctor having limited or incomplete information, or a physician's over-reliance on his or her own experience.

By supplementing a physician's experience and knowledge with a wealth of other information at the prescribing moment, AI tools can substantially increase that physician's objectivity. AI applications are also being developed to address other inherent data biases, including "omitted variable bias." (See sidebar for an example.)

Improving Insurance Coverage Processes and Fairness

AI can reduce costs at multiple stages of the insurance process: claim submission, claim adjudication, and fraud monitoring. For example, AI can increase the use of automation in the process for settling claims based on their complexity and known patient history, or can be used for early detection of abnormal price patterns or other warning signs.

If providers, regulators, and insurers can work together to increase the linkages between datasets, the capabilities driven by AI can lead to a variety of quality improvements and cost savings in health care. ■

NICK DADSON
MANAGER

PAUL GREENBERG
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LISA PINHEIRO
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A New Way to Quantify Quality of Life

A discrete choice experiment methodology allows researchers to better assess the burden of disease on people with rare conditions.

One of the biggest challenges when developing effective treatments for rare diseases is gathering sufficient data to quantify disease impact or gauge responses to treatment. A study by Analysis Group and academic and industry researchers describes a more efficient and flexible method for determining the impacts of diseases or treatments on patients.

Our study of acute myeloid leukemia (AML), a rare blood cancer, was the first to use a discrete choice experiment (DCE) methodology to establish societal preferences directly for disease-specific health states, also known as health state utility values. Utilities represent values linked to well-being, such as disease-related symptoms, energy level, emotional health, or functional status, such as ability to work. A utility value of 0 represents death, and a value of 1 represents perfect health. Values are used to derive quality-adjusted life years (QALYs) to reflect disease status. Taking into account both quality and quantity of years of life, QALYs can influence regulatory, reimbursement, and pricing decisions.

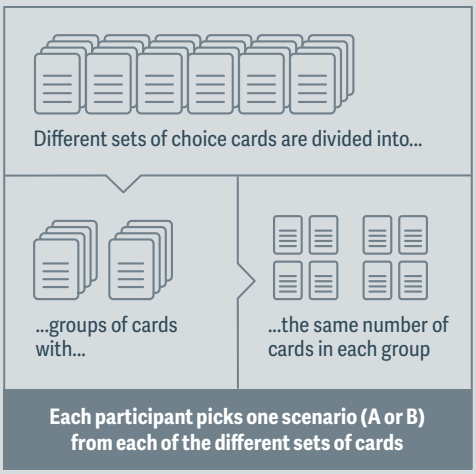
We applied the DCE methodology in an online survey of a representative sample of the general US population. Study participants chose between two alternatives in 12 life scenarios related to AML. (See figure.)

This novel use of the DCE methodology provides greater sensitivity for utility value assessment, particularly for rare diseases, than conventional methods such as EuroQol's EQ-5D (frequently used for cost-effectiveness models). It allows preference values to be estimated accurately with improved efficiency and greater flexibility than had been possible with other approaches. ■

MIN YANG
VICE PRESIDENT

ANNIE GUÉRIN
VICE PRESIDENT

ADAPTED FROM "ASSESSING UTILITY VALUES FOR TREATMENT-RELATED HEALTH STATES OF ACUTE MYELOID LEUKEMIA IN THE UNITED STATES" BY EYTAN M. STEIN, MIN YANG, ANNIE GUÉRIN, WEI GAO, PHILIP GALEBACH, CHERYL Q. XIANG, SUBRATA BHATTACHARYYA, GAETANO BONIFACIO, AND GEORGE J. JOSEPH, *HEALTH AND QUALITY OF LIFE OUTCOMES*, SEPTEMBER 2018.



Example of a discrete choice experiment card
(6 out of 11 attributes shown)

Attributes	Scenario A	Scenario B
Fever	Occasionally	Frequently
Lack of energy	Frequently	All the time
Problems with daily function	Not able to take care of self, bedridden most of the time	Able to work normally
Anxious/depressed	Occasionally	Frequently
Hospitalized	All the time	Rarely/never
Duration of life	4 years	1 year

Participants placed the ***lowest value on energy levels...***

...and the ***highest value on having few problems with daily function***

Protecting Access, Encouraging Innovation: A Discussion About Drug Pricing

Drug prices dominate the news in a way few other health care topics do.

Spending on prescription drugs, which accounts for about 10–15% of annual health care spending, is the fastest-growing part of most commercial insurance plans, and has become a highly visible symbol of the challenges of controlling overall health care spending in the United States. What tools might help make pharmaceuticals more accessible to people who need them? Does drug pricing adequately reflect the necessary capital costs of bringing new therapies to market? What role do negotiated rebates play in this system? Can increased competition play a role in controlling prices?

These and other topics were the subject of a lively debate about drug pricing at Analysis Group's annual **Law & Economics Symposium** on life sciences topics. Moderated by Managing Principal Noam Kirson, the expert panel comprised Jennifer Bryant of PhRMA, Rena Conti of Boston University, David Cutler of Harvard University, Craig Garthwaite of Northwestern University, and former FDA Commissioner Scott Gottlieb. Below we briefly recap the three main topics the panelists discussed.

Balancing Priorities in Drug Pricing

NOAM KIRSON, MANAGING PRINCIPAL

This panel was a valuable opportunity to bring together a group of leading researchers and experts to discuss current drug pricing issues and assess various policy options. Though the panel covered a range of different topics, they all revolved around a central tension in this area: the need to balance budgetary impact and affordability with maintaining incentives for research and development of future therapies. In other words, how can drugs be priced and financed so that people who need them have access to them while maintaining a market structure that encourages the development of future breakthroughs?

The ideas that the panelists suggested, questioned, and debated represent some of the mechanisms that stakeholders have proposed to address this basic tension. None of these policies is likely to provide an easy solution, but rigorous and open debates such as the one this panel engaged in will be key to charting a way forward in the future.

Rebates: Who Reaps the Benefits?

Much of the conversation centered on the topic of rebates – confidential discounts off the list price negotiated by either insurers or pharmacy benefit managers (PBMs) with drug manufacturers in exchange for placing those drugs on the insurer's formulary of covered medications. Panelists debated whether these discounts – which are not directly passed through to plan participants – should be eliminated as part of a strategy for reducing out-of-pocket costs.

The panel also discussed recent calls to allow Medicare to directly negotiate drug prices.

Price Benchmarks: Looking to the World

One frequently discussed way of controlling drug prices is the use of an international price index (IPI) benchmarking system. The goal of such a model would be to reduce the price paid by Medicare for a drug by setting its target price closer to what other nations pay.

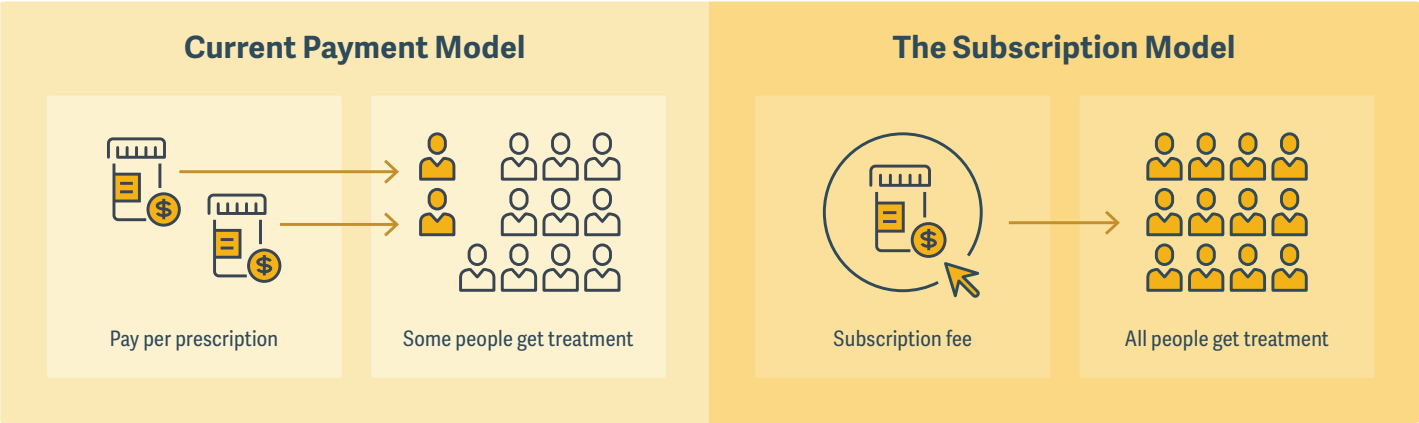
Some reservations about the efficacy and the effects of the system were raised by panelists, such as that it would be detrimental to competition and would significantly reduce investment in future therapies. And, as a recent Analysis Group article points out, even in European drug markets, where benchmark comparisons are mandatory in certain situations, determining the appropriate target prices is a highly complex undertaking.[1]

New Pricing Models: Netflix, Anyone?

The panel addressed whether innovative pricing methods might help ensure access to higher-priced therapies. Such models have already been proposed and debated for gene therapies – including, for example, long-term financing plans for expensive, "one and done" treatments, and agreements that link payments to therapeutic outcomes.[2]

One that was much discussed by panelists was the so-called "Netflix model," a subscription model that Louisiana has recently employed to cover hepatitis C treatments for its Medicaid and prison populations. The state agreed to pay a drug manufacturer a fixed amount and, in return, receive unlimited doses of the medication. (See figure.) The program was described by some panelists as a "win-win" because it would greatly expand the number of people who would have access to a particular treatment and give drug manufacturers certainty about revenue.

There was some discussion, however, about the conditions under which such a model could be successful, and whether it could be broadly applicable. There were also reservations expressed about the market signals that would be sent by lowering an already cost-effective price for a drug, which might in turn contribute to underinvestment by venture capital in the pharmaceutical market. ■



1."ECONOMICS OF EXCESSIVE PRICING: AN APPLICATION TO THE PHARMACEUTICAL INDUSTRY" BY CLAUDIO CALCAGNO, ANTOINE CHAPSAL, AND JOSHUA WHITE, *JOURNAL OF EUROPEAN COMPETITION LAW & PRACTICE*, MARCH 2019.

2."ARE PAYERS READY TO ADDRESS THE FINANCIAL CHALLENGES ASSOCIATED WITH GENE THERAPY?" BY MICHAEL CIARAMETARO, GENIA LONG, MICHAELA JOHNSON, NOAM KIRSON, AND ROBERT W. DUBOIS, *HEALTH AFFAIRS BLOG*, JUNE 28, 2018.

A Collaboration to Advance Hematology Research

There is a significant gap in the treatment for hematological diseases in China compared to other developed countries, according to Dr. Tao Cheng, scientific director and deputy president of the Institute of Hematology & Blood Diseases Hospital (IHBDH). "High-quality research based on real-world evidence can help us understand the reasons for this gap and improve the treatment of blood disease in China," said Dr. Cheng.

To help address this situation, IHBDH, a clinical and research institute of the Chinese Academy of Medical Sciences and Peking Union Medical College, invited Analysis Group to partner with the institute to create the National Longitudinal Cohort of Hematological Diseases in China (NICHE), China's first comprehensive blood disease research platform.

Analysis Group will work closely with IHBDH to design and build the platform, which will lay the foundation needed to evaluate treatment patterns, effectiveness, and safety; facilitate clinical decision making; and inform health policies and regulatory and reimbursement decisions.

The project will be designed to facilitate research on:

- Acute myeloid leukemia
- Lymphoma
- Multiple myeloma
- Hemophilia
- Pediatric hematological diseases
- Other blood diseases

"It is our aim to improve the survival rate and improve the quality of life of patients throughout China," said Dr. Jianxiang Wang, medical director of IHBDH. "Making the right health care decisions that lead to improved patient outcomes requires being able to look at real-world evidence on relevant populations."

Analysis Group will also assist IHBDH with assembling a scientific advisory committee drawn from experts in hematological diseases, health policy, health economics, epidemiology, biostatistics, bioinformatics, biotechnology, and biopharma. The committee will discuss and help address a range of important topics in the design, setup, and quality control of NICHE. ■

Additional information is available at **www.niche-study.org**.

"Our goal is to set up a world-class hematologic research platform that advances the patient-centric study of hematology in China. This is a complex challenge that has not been well addressed in China. We are excited to collaborate with IHBDH on this important undertaking."

ERIC WU, *MANAGING PRINCIPAL, ANALYSIS GROUP*

Analysis Group at Upcoming Conferences and Events

Analysis Group consultants will present recent work and participate on panels at major conferences in 2020. We also will host events to discuss current topics in the health care industry.

Business of Personalized Medicine (BPM) Summit

February 27, 2020

San Francisco, California

Healthcare Distribution Alliance (HDA) Distribution Management Conference and Expo

March 8–11, 2020

San Diego, California

Analysis Group Fireside Chat with Two Former FDA Commissioners

March 19, 2020

New York, New York

Academy of Managed Care Pharmacy (AMCP) Managed Care & Specialty Pharmacy Annual Meeting

April 21–24, 2020

Houston, Texas

International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 2020

May 16–20, 2020

Orlando, Florida

SAVE THE DATE

Analysis Group's Law & Economics Symposium

June 8, 2020

Cambridge, Massachusetts

www.laweconomicssymposium.com

Recent Health Care Videos

Our Health Care practice is distinguished by our capacity to provide expertise in matters related to HEOR, market access, epidemiology, and public policy, among other areas. In these recent videos, Analysis Group consultants address the challenges posed by rare disease research, the value of real-world evidence, and the importance of dossiers.

Rare Diseases

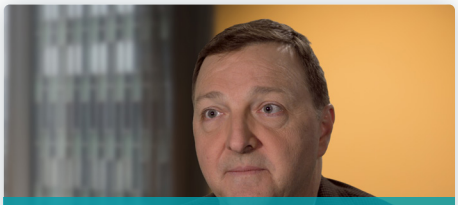
JAMES SIGNOROVITCH

Drug development is expensive, especially for rare diseases. But sophisticated economic modeling can guide decisions about pricing and reimbursement.

Real-World Evidence

PATRICK LEFEBVRE

With rigorous collection and analysis standards in place, real-world data from mobile phones, email, and even social media can boost a drug's prospects.



What Are Dossiers?

DAVE NELLESEN

Dossiers that effectively document a drug's value are critical for pricing, reimbursement, and coverage decisions.

To view these videos, please visit: **www.analysisgroup.com/health-care-videos**

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ABOUT ANALYSIS GROUP

Founded in 1981, Analysis Group is one of the largest international economics consulting firms, with more than 1,000 professionals across 14 offices. Analysis Group's health care experts apply analytical expertise to health economics and outcomes research, clinical research, market access and commercial strategy, and health care policy engagements, as well as drug-safety related engagements in epidemiology. Analysis Group's internal experts, together with its network of affiliated experts from academia, industry, and government, provide our clients with exceptional breadth and depth of expertise and end-to-end consulting services globally.

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