ISPOR Report

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18–22 May 2019

costello medical

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Foreword

Craig Brooks-Rooney, Scientific Director

This year is a major milestone in the development of Costello Medical, with a move to our new headquarters in Cambridge, UK, as well as the opening of offices in Shanghai, China and Boston, US. Whilst we already work extensively in both markets, the establishment of teams on the ground is a key next step for us in supporting greater engagement with our clients, as well as in bringing us closer to the rapidly evolving healthcare landscapes in these countries.

Given the imminent launch of our US office, we took the opportunity to expand our presence at this year's ISPOR Annual Conference in New Orleans. As ever, our focus was on presenting novel pieces of research and stimulating discussion through thought-provoking issue panels. It was an honour to have Dr Dan Ollendorf, the former Chief Scientific Officer at ICER, speaking at our issue panel on the future of HTA in the US. Our engagement with emerging HTA processes in the US was further supported by research we presented at the congress highlighting the rise in the inclusion of RWE as part of ICER evaluations as well as opportunities for manufacturers to provide input within the ICER evaluation process. Beyond ICER, we presented research that analysed the impact of the 2014 expansion of Medicaid eligibility in some US states on the provision of opioid replacement therapy: an important step in combatting the opioid epidemic. This was also the first year that we represented the company with a booth at the ISPOR Annual Meeting; it was a pleasure to meet some familiar faces, as well as many new contacts, throughout the conference.

Looking ahead to the remainder of 2019, myself and several senior colleagues will be relocating to Boston to take up leadership roles in the US expansion. We will bring with us a wealth of expertise in market access, HEOR, RWE and medical communications and we're incredibly excited to support existing and new clients, grow our network and contribute meaningful developments to HEOR and other aspects of healthcare in the US.

I hope you find the following report useful to your work; the team who attended would of course be happy to discuss anything of interest with you further. For those of you attending the ISPOR European meeting in Copenhagen later this year, we look forward to seeing you there!

For more information on our expansion, please contact Craig at: craig.brooks-rooney@costellomedical.com

The Conference

New Orleans, LA, USA | 18–22 May 2019

Rapid. Disruptive. Innovative: A New Era in HEOR

Costello Medical research contributions:

1 issue panel

10 research posters

~4,000 delegates

>1,800 presentations

Our report summarises key learnings and insights from the Costello Medical team that attended the meeting, covering the following themes and challenges for a new era in HEOR.

Expanding the 'Value' in Value Assessment Frameworks

The quality-adjusted life year (QALY) has been used extensively in value assessment frameworks for the past 40 years. Critics argue that the QALY does not capture **broader elements of 'value'** (e.g. the value of hope, scientific spillover) that could be considered when making coverage decisions, and the movement against the QALY as the central focus of decision making is growing. Supporters, however, argue that traditional cost-effectiveness analyses (CEA) based around the QALY are the best basis for decisions aimed at maximising health, and that other factors can be considered as part of a **deliberative decision-making process**.

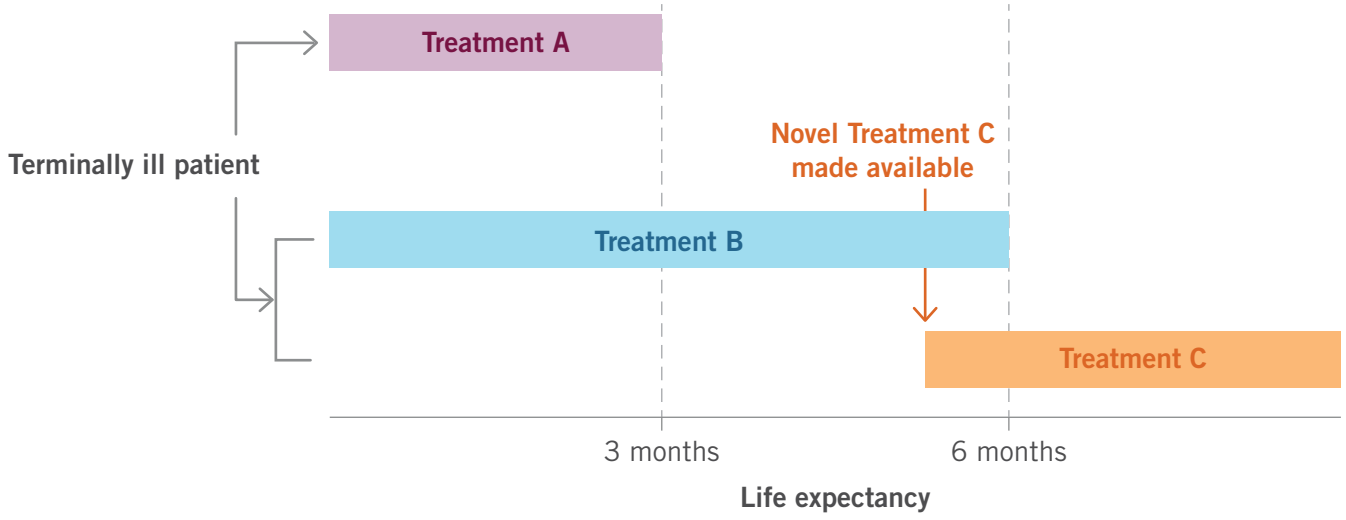
Wider elements of value

The conference discussed many **wider elements of value** that are not captured in traditional QALY-based CEA. Three in particular were mentioned repeatedly, albeit accompanied by a healthy dose of scepticism due to methodological challenges of measurement and the risks of double counting of value.

Real option value

Real option value reflects the value that a life-extending health technology can bring by creating opportunities for patients to **benefit from future advances in medicine**. For example, a terminally ill patient choosing between therapies that can extend life by either three months or six months might see value in the six-month option that goes beyond the inherent value of an additional three months of life; this is because the additional life extension **increases the chance that another effective treatment option** (perhaps even a cure) might become available to the patient (Figure 1). Issue panel IP16 provided a good overview of the current state of play regarding real option value. Dr Meng Li (University of Southern California, US) presented a framework for estimating the impact of real option value on cost effectiveness, using metastatic melanoma as a case study. Professor Adrian Towse (Office of Health Economics, UK) responded with potential concerns regarding the incorporation of real option value from a payer perspective.[1]

Figure 1: Real option value



Value of hope (for a cure)

The **value of hope** describes the concept that patients may not only value the average expected treatment benefit of a new technology, but also the **variance around that benefit**. Patients who value hope would associate some value with a higher variance treatment due to the chance that they could be one of the lucky few to experience **considerable benefit**. Another way to conceptualise the value of hope is whether one weights the whole area under the survival curve the same (no value of hope), or whether a greater weighting is placed on the tail of the survival curve (value of hope).

Insurance value

Conventional value assessments consider treatment benefits of health technologies in terms of the length and quality of life that are accrued to the person with the condition. **Insurance value** addresses the concept that the availability of new, effective medical technologies also offers some **value to healthy individuals** because it offers some **protection against potential physical and financial impacts** should the healthy individual fall ill in the future. The argument for capturing this value to healthy people is that health technologies are jointly financed (through taxes or insurance premium levels) by both ill and healthy individuals.

Shifting from traditional cost-effectiveness methods

Whilst health technology assessment (HTA) will never be devoid of judgement, issue panel IP11 panellists argued that these judgements need to incorporate additional elements of value beyond health gains (measured as QALYs) alone, whilst still being made in a consistent and transparent manner. **Multiple-criteria decision analysis (MCDA), extended CEA (ECEA) and augmented CEA (ACEA)** are three such approaches that were widely discussed at the conference.[2]

ECEA and ACEA aim to incorporate financial risk protection and social cost into value assessment, with ACEA having flexibility to integrate further additional elements.[3] ECEA and ACEA maintain the focus on the **core aspect of value** that the healthcare system is likely to be interested in paying for: health gain. Additional factors can be included in the incremental cost-effectiveness ratio (ICER) either through modifications/weightings to the QALY or through transformations into costs. Whilst individuals may have priorities that impact the 'weights' applied to variables within ECEA, payers are the decision makers, and their limitations (budgetary or otherwise) must be accounted for.

Professor Charles Phelps (formerly at University of Rochester, US) made the case for **MCDA**, explaining that ACEA falls short when issues of **equity and fairness** (e.g. racial disparities) and factors that **can't be measured in QALYs or assigned monetary value** (e.g. fear) need to be formally incorporated. MCDA, in contrast, can bring these and other variables into the decision. Professor Phelps suggested that whilst MCDA models are complex and data-heavy, their transparency and flexibility make them appropriate at different levels of decision making.

Matt Griffiths,
Head of HTA and Health Economics

The rise of MCDA has been well publicised at ISPOR over the last few years, but this conference was notable to me in giving more airtime to ECEA and ACEA as alternative approaches for incorporating broader elements of value. This is perhaps unsurprising given the field has now had time to digest ISPOR's Special Task Force report on 'Approaches to Aggregation and Decision Making' (published February 2018),[3] which helped formalise the terminology around these approaches. It perhaps also reflects a (welcome, in my view) recognition that MCDA continues to face methodological hurdles and may not provide a widely accepted solution any time soon.

The amount of discussion time devoted to MCDA, ECEA and ACEA at this international conference, where the US is always a key focus, is no doubt also directly reflective of the higher levels of scepticism in the US towards the QALY metric alone as an adequate measure of value, with real concerns over restriction of choice via QALY-based decisions. A key battleground for acceptance of CEA in the US seems to be the extent to which US payers (and indeed the public) accept that rationing decisions are effectively already being made (e.g. through tiered formulary listings), and that CEA can simply provide a tool to make the decision criteria more transparent.

ISPOR can be a bit of an echo chamber though. Whilst compelling and reasoned arguments in defence of QALY-based analyses as an aid to decision making in the US came across successfully during the three days in New Orleans, it seems to me that those who might need the most convincing (payers, the public and politicians) were not well represented at the conference.

The Evolving Role of Value Assessment Frameworks in US Market Access

Issue panel IP26 led by Wrik Ghosh from Costello Medical. Left to right: Wrik Ghosh, Dr Dan Ollendorf, Dr Thomas Butt and Sarah Breen.

The appropriateness of HTA in the US

Wrik Ghosh, Consultant Health Economist at Costello Medical, moderated an issue panel comprising Dr Dan Ollendorf (Tufts University, US), Dr Thomas Butt (Peking University, China, and University College London, UK), and Sarah Breen (MSD, UK), discussing the role **formal HTA** could play in the US.[4] Dr Ollendorf noted that previous national attempts at HTA in the US have succumbed to political pressure, and there are further legal and cultural barriers preventing formal HTA from being established. Commercial payers conduct their own HTA, though with varying degrees of ability and different levels of resources committed. However, the panellists concluded that **value frameworks**, such as the one produced by ICER, will **grow in influence** and continue to evolve as a platform for coverage and policy decisions.

The implications of the rise in value assessment frameworks for patient choice

Another issue panel addressed the question of whether the rise of ICER in the US means a loss of choice for patients.[5] Dr Robert Dubois (National Pharmaceutical Council, US) presented a critical assessment of the growth of ICER, arguing that a number of fundamental assumptions and assertions that one must accept in order to adopt ICER as a decision maker do not hold for the US. This included **challenges to the acceptance of the QALY** metric and an assertion that ICER's value framework implicitly **favours 'fairness' over 'choice'**. Indeed, he argued that ICER results in **denial of patient choice**, and that this runs contrary to prevailing American cultural and political preferences. Dr Michael Sherman (Harvard Pilgrim Health Care, US) defended the rise of ICER, arguing that in the absence of these kinds of frameworks, payers are still ultimately finding a way to establish **preferred drugs** and may end up reacting to price alone, leading to **sub-optimal decisions**. Finally, Professor Ron Akehurst (BresMed Health Solutions, UK) took a balanced view, noting that without a clear philosophical basis in the US an organisation such as ICER is bound to be contentious, but highlighting that there is **information value** in ICER reports even if they never represent formal, mandated national guidance.

Value assessment framework modifiers for rare diseases

The requirement for a **modified value assessment framework for rare diseases** is highlighted by the higher cost-effectiveness threshold many countries use when assessing orphan therapies, with ICER in the US discussing thresholds of up to **$500,000 per QALY gained** for ultra-rare diseases.

Workshop W8 provided an overview of additional elements that could be incorporated when assessing the value of treatments for rare diseases from the perspective of patients, health economists and the pharmaceutical industry, drawing on examples from recently approved high-value orphan drugs, including the CAR-T therapy Kymriah® (tisagenlecluce) and haemophilia A therapy Hemlibra® (emicizumab).[6] Paul Melmeyer (National Organization for Rare Disorders, US) highlighted that the benefits brought to orphan patients by new treatments for rare diseases often go beyond those included in traditional value frameworks and include greater feelings of **societal inclusion** and contribution for patients, as well as **benefits to families, caregivers and friends**. In disease areas where there are no current treatment options, a novel therapy may also lead to newborn screening eligibility and better insurance coverage of the relevant diagnostic tools.

Rose Wickstead,
Consultant
HTA and Health Economics

The debates on whether formal HTA should or could even be possible in the US were the most thought-provoking (and often most heated) parts of the conference for me. Working predominantly in the UK market, where national HTA methods based on the QALY framework have been established for many years, the strength of opinion against the QALY from a number of US-based speakers presented a clear contrast.

Beyond the acceptance of the QALY framework, a common conception is that there are significant structural differences between the US and UK healthcare systems that will continue to present as barriers to the adoption of formal HTA in the US. However, it was interesting to hear across several sessions that HTA is increasingly being used in parts of the US healthcare system that are structurally most different from the UK set-up (i.e. the private insurance market), with many payers conducting their own 'in-house' HTA and others referring to the conclusions of assessments made by ICER. In contrast, for parts of the US healthcare system more similar to the UK, and to which formal HTA might therefore more intuitively apply (e.g. Medicare, Medicaid), it seems that the use of formal HTA has essentially been ruled out.

Paying for the Next Wave of Innovation

A key theme from this year's conference was the need for novel funding approaches to pay for **innovative therapies**. Attention has recently focused on cell and gene therapies, which are often characterised as being associated with **transformative outcomes** (including the potential for cures), **short treatment durations, high upfront costs** and **uncertainty around long-term outcomes**. However, even for non-curative therapies, prices of new therapies coming to market – particularly in oncology – have continued to climb and pose challenges for payers in making coverage decisions. As such, a number of **novel funding approaches** are being used to bring high-cost, innovative therapies to market.

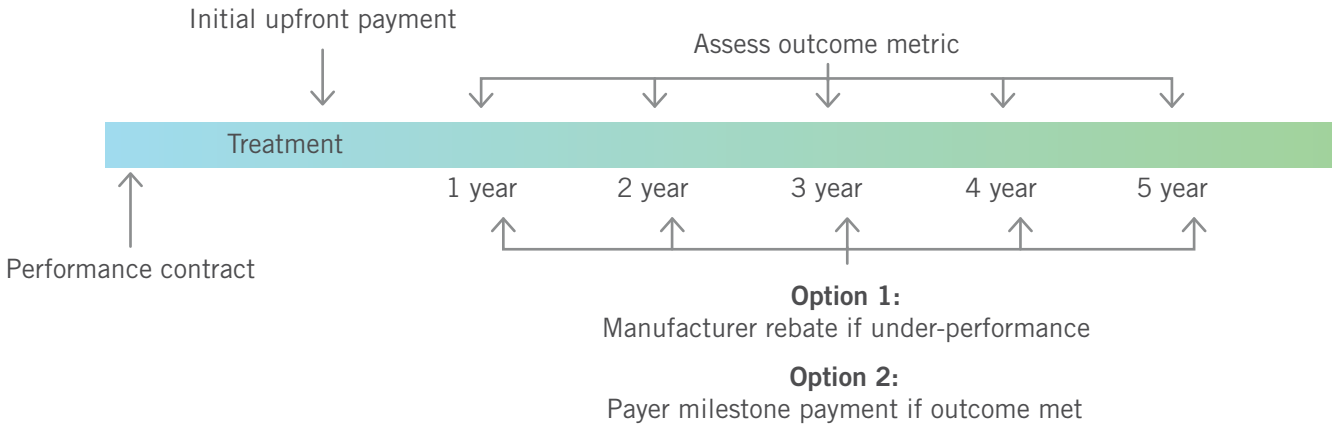
Cost effectiveness versus affordability

Outside of the US, cost effectiveness is commonly a key consideration for payers when determining access to innovative therapies. Despite high prices, some of these therapies are considered cost-effective due to their substantial clinical benefits. Nevertheless, this doesn't change the fact that high prices pose **affordability challenges** – healthcare systems simply may not be able to provide the **upfront payment** required to provide the technologies across the populations that need them (a payment timing issue), or individual payers may struggle to bear the risk associated with uncertainty over whether clinical outcomes will be realised. However, clear opinion was also expressed in issue panel IP18, that affordability should not be a barrier to access to truly innovative therapies that are cost-effective and can offer value for money.[7]

Potential innovative pricing models

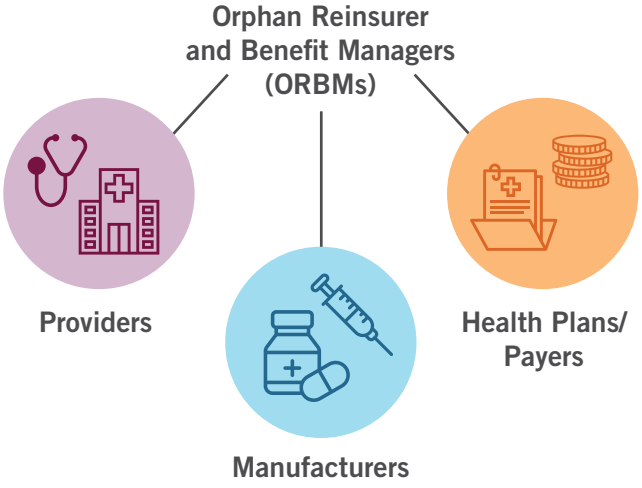
Whilst performance-based contracts (whereby payments are linked to clinical outcomes) have been used for over a decade to manage access to high-cost therapies, discussion has moved towards **performance-based annuities** for curative therapies in particular. These are designed to combine the benefits of annuities and performance-based contracts, allowing payments to be spread over time as well as being matched to the realisation of health benefits (Figure 2). Either annuity payments on completion of milestones, or manufacturer rebates if milestones are not met, can be used in such models. There are still challenges associated with these contracts, particularly when applied to the private health insurance market (where patients can switch insurer). For public payers however, performance-based annuities could help to manage the main challenges of high-cost curative therapies.

Figure 2: Performance-based annuities



Another approach, particularly relevant for smaller commercial payers and self-insured employers, is the use of **Orphan Reinsurer and Benefit Managers (ORBMs)**. These benefit managers would essentially take responsibility for certain groups of patients (e.g. those with diseases for which curative therapies are available) from multiple different health plans and provide comprehensive healthcare for the disease (Figure 3). ORBMs would contract with specialist providers and with manufacturers, bringing standardisation to contract terms and the potential to follow patients even when switching plans. In return, payers/health plans pay a predictable payment per patient per month, reducing the actuarial risk. Whilst particularly well-suited for the US market, ORBMs may also apply in other countries with extensive private health insurance coverage.

Figure 3: Use of ORBMs



Subscription models (so-called 'Netflix' models) help to manage the actuarial risk to a payer of a surge in demand at product launch, whilst providing patients with access to cures and manufacturers with a guaranteed revenue stream. Such models see a financial cap placed on the total spend on a therapy, with no patient limit; thus, the per-patient cost drops as the number of people who receive the therapy increases (also incentivising healthcare systems to address non-financial barriers to patient access). Subscription models are more applicable to curative products for diseases where there is a large prevalent population (and thus affordability concerns) and where the product has a low marginal cost of production. Such a model has been used in Australia and in Louisiana state to provide access to hepatitis C treatment for a fixed cost regardless of the number of patients, thus allowing these jurisdictions to target hepatitis C elimination.[8]

The Rise of Real-World Evidence and Big Data

Real-world evidence (RWE) embodied this year's ISPOR theme perhaps more than any other topic: advances in real-world data (RWD) sources and analysis techniques are disrupting the traditionally randomised controlled trial (RCT)-focused field, with industry keen to pioneer innovative approaches. The challenge is to maximise the value of evidence from rich data sources whilst ensuring that the 'disruption' does not lower safety standards or appear to abrogate the need for robust clinical trials where these are feasible.

Regulatory environment for real-world evidence

With the recent US Food and Drug Administration (FDA) framework for RWD and RWE at the forefront of attendees' minds, attention turned to the question of how to ensure RWE is 'regulatory-grade'. Dr David Thompson (Syneos Health, US) kicked off discussions in issue panel IP20 by observing the lack of consensus on what constitutes 'regulatory-grade' in the context of RWE; **evidence standards differ for different regulatory settings**, such as post-marketing, safety, new products or label change applications. Dan Riskin (Verantos, US) argued that there is a need to **focus on adequate study design** to avoid or overcome biases.[9]

An educational symposium presented case studies of the use of RWE in applications to the FDA.[10] Pfizer's success with Ibrance® (palbociclib) was hailed as an example of good practice – in particular, Pfizer engaged early with the FDA to ensure that their planned analyses would meet the FDA's requirements. As the FDA do not yet have standardised methodological guidance, anyone seeking to conduct regulatory-grade analyses should **engage early and often with the FDA**. The risk of not doing so was highlighted in the case study of Xpovio® (selinexor): the New Drug Application included a retrospective study, but the FDA's Oncologic Drug Advisory Committee (ODAC) had several concerns about methodological issues and bias, and judged that the RWE was not suitable either for context or for comparison. The symposium audience were in agreement with engaging with the FDA but questioned whether the FDA currently has the expertise and capacity to assess the methodology of studies.

Transparency in real-world evidence

ISPOR continued to show leadership on the issue of transparency and accountability in RWE, with a number of sessions centred on these questions.[11–13] Unlike RCTs, which require registration and approval before the first patient can be enrolled, RWE studies have no natural barrier preventing 'pre-looks' before study registration. Therefore, **registration alone is a necessary but insufficient measure for preventing bias in study design and execution**.

In a presentation from ISPOR's RWE Transparency Collaborative, 50% of session attendees were unaware that they could pre-register the protocol for RWE studies.[13] **Pre-registration is not yet a formal requirement from a regulatory perspective**, but Dr Marc Berger (ISPOR, US) argued that this will be an important step towards making hypothesis evaluating treatment effect (HETE) studies fit for regulatory purposes.[11]

Artificial intelligence-based technologies for real-world decision making

A spotlight session examined the regulatory and access issues for digital health technologies (DHTs) that use artificial intelligence (AI) and machine learning (ML) to analyse RWD for decision making in healthcare (see examples in **Figure 4**).[14]

Dr Páll Jónsson (NICE Science Policy and Research, UK) gave a regulatory perspective, noting that AI is often a black box. **Current assessment frameworks may not be fit for purpose for evaluating these technologies**, particularly for AI using adaptive algorithms (i.e. technologies that 'learn' from their own mistakes and successes in clinical practice), because the effectiveness and cost effectiveness may change over time in an opaque and unpredictable way. Hidde Hovenkemp (Pacmed, the Netherlands) noted that the FDA is ahead of the European Union on the regulatory side, highlighting the recent publication of a discussion paper on a regulatory framework for adaptive algorithms.[15]

Although regulatory and access frameworks will take some time to catch up with technological advancements, Dr Jónsson presented a number of concepts that can be used to evaluate health-related AI/ML technologies.[16] The key concept is whether the output of an algorithm is interpretable by clinicians and patients; **the anticipated role in the clinical decision pathway and the algorithm's role in a 'learning health system' should be considered upfront**. Effective communication with patients and the public is also fundamental, with Care.data and DeepMind presented as examples where communication has gone awry and led to a serious loss of trust in these technologies.

A further issue touched on by a number of speakers was the discrimination that can arise from inscrutable AI models trained using RWD. Dr Kurt Christensen (Brigham and Women's Hospital and Harvard Medical School, Genomes2People Research Program, US) presented genomic medicine as a case study: the abundance of structured data in genomics is ideal for capitalising on ML, but 90–95% of currently available data is from Europeans. Algorithms are therefore often very effective for Caucasians but notably less accurate for other ethnic groups. In light of this, use of these technologies can be restricted to patients similar to those in the training dataset to maximise accuracy; however, this will lead to self-perpetuating inequity in access. Mr Hovenkamp challenged researchers to **spend time and resources on tackling issues with bias in data**.

Figure 4: Case studies: AI and ML in clinical practice

\+ AI and a clinician together have an error rate of 0.5% for **image recognition to detect cancer metastasis** in lymph nodes, better than a clinician alone (error rate 3.5%)[17]

\+ When **screening for gestational diabetes** using an AI-based app in a low resource setting, the area under the curve for a random forest algorithm was 75%, better than 62% for a clinician using fasting glucose without an algorithm[17]

— On the other hand, for **predicting patients at high risk of opioid use disorders** to improve coordination of their care, logistic regression performed as well as the best ML method (neural network). This highlights that AI and ML should not be seen as the be-all and end-all; traditional statistical methods will often perform just as well[18]

ISPOR collaborates closely with the International Society for Pharmacoepidemiology (ISPE) to support good practices in RWE, with a number of joint task forces on methodology and reporting. To learn from the perspectives of both organisations, Amy Buchanan-Hughes (Consultant – Real-World Evidence Lead) will also be attending ISPE's annual conference (ICPE) in Philadelphia from August 24–28 2019, for which the theme is 'Using Real-World Data and Designs to Optimize Decisions'.

If you or your colleagues will be attending, or if you would like a copy of Costello Medical's complimentary post-conference report from ICPE, please contact Amy at amy.buchanan-hughes@costellomedical.com.

References

1. Issue Panel IP16: Real Option Value for Drugs: Is It Really an Option? ISPOR Annual Conference. New Orleans, LA, US, 2019.
2. Issue Panel IP11: MCDA or Weighted CEA Based on the QALY? Which is the Future for HTA Decision Making? ISPOR Annual Conference. New Orleans, LA, US, 2019.
3. Phelps, C. et al. *Approaches to Aggregation and Decision Making – A Health Economics Approach: An ISPOR Special Task Force Report*. Value in Health, 2018. 21(2): p. 146–154.
4. Issue Panel IP26: Could Formal HTA Be the Solution to High Healthcare Costs in the USA? ISPOR Annual Conference. New Orleans, LA, US, 2019.
5. Issue Panel IP10: The Rise of ICER Means the Loss of Choice: True, False or Uncertain? ISPOR Annual Conference. New Orleans, LA, US, 2019.
6. Workshop W8: Assessing the Value of Rare Disease Treatments: Global Lessons from Recent Case Studies. ISPOR Annual Conference. New Orleans, LA, US, 2019.
7. Issue Panel IP18: Gazing into the HEOR Crystal Ball: What Might be the Future Directions for HEOR in the 2020s? ISPOR Annual Conference. New Orleans, LA, US, 2019.
8. First Plenary Session: The Dawn of Disruption in the Health Sector: Will Innovative Technologies Require Innovative Ways of Thinking? ISPOR Annual Conference. New Orleans, LA, US, 2019.
9. Issue Panel IP20: How is the "Regulatory-Grade" Criterion Defined and What Does it Take for RWE to Meet It? ISPOR Annual Conference. New Orleans, LA, US, 2019.
10. Educational Symposium: 21st Century FDA - Exploring the Rise of Real-World Evidence ISPOR Annual Conference. New Orleans, LA, US, 2019.
11. Issue Panel IP13: To Register or Not to Register (The Protocol). That is the Question in Observational and Big Data Studies, Economic Models, and Cost-Effectiveness Analysis. ISPOR Annual Conference. New Orleans, LA, US, 2019.
12. Issue Panel IP21: Replicable and Robust Database Evidence: What Does it Look Like? ISPOR Annual Conference. New Orleans, LA, US, 2019.
13. ISPOR Real-World Evidence Transparency Collaborative - The Case for Study Registration. ISPOR Annual Conference. New Orleans, LA, US, 2019.
14. Spotlight Session SP1: Global Developments in Artificial Intelligence and Machine Learning in Health Care. ISPOR Annual Conference. New Orleans, LA, US, 2019.
15. U.S. FDA. *Proposed Regulatory Framework for Modifications to Artificial Intelligence/Machine Learning (AI/ML)-Based Software as a Medical Device (SaMD)*. 2 April 2019 [cited 24 June 2019]; Available from: https://www.fda.gov/media/122535/download.
16. Phelps, C. et al. *Machine Learning and AI Research for Patient Benefit: 20 Critical Questions on Transparency, Replicability, Ethics and Effectiveness*. arXiv:1812.10404 [cs.CY].
17. Podium Presentation AI1: An Innovative Artificial Intelligence Application in Disease Screening: An Opportunity to Improve Maternal Healthcare in an Underdeveloped Rural Area. ISPOR Annual Conference. New Orleans, LA, US, 2019.
18. Podium Presentation AI4: Economic Impact Analysis and Predictive Modeling Identifying Risk Factors for Opioid Use Disorder in Medicaid Managed Care Populations. ISPOR Annual Conference. New Orleans, LA, US, 2019.

Further Information

If you would like any further information on the themes or research presented above, please do not hesitate to contact Matt Griffiths, Head of HTA and Health Economics at matt.griffiths@costellomedical.com. Many of the presentations from the conference can be found on the ISPOR website.

About Costello Medical

Costello Medical provides scientific support to the healthcare industry in the analysis, interpretation and communication of clinical and health economic data. Due to growing demand across an increasing range of service offerings and geographies, Costello Medical has grown organically since its foundation in 2008 to a team of over 130 based in Cambridge, London, Manchester and Singapore, with new offices opening in the US and China in 2019.

Alongside our evolving technical and creative capabilities, we remain committed to our core values of high-quality scientific work coupled with exceptional customer service at competitive and transparent prices. Our talented team has experience with a variety of leading pharmaceutical and device companies across an extensive range of therapy areas and geographies, including Europe, Asia Pacific and North America. In addition to our provision of services broadly across the pharmaceutical industry, we also have dedicated teams with specific areas of expertise, for example medical devices and rare diseases, and can provide the full range of our services for customers specific to these areas.

For more information on our services, please visit our website at www.costellomedical.com.

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