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Review of ISPOR 16th Annual International Meeting 2011



Costello Medical Consulting attended the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 16th International Meeting in Baltimore, USA from 23rd to 25th May 2011.

The meeting was entitled “Health Care Reform and Comparative Effectiveness Research – Where Have We Been and Where Are We Going?”. A short summary of some of the most interesting and relevant themes from the congress are presented below.

Themes at ISPOR International Meeting 2011

Health Care Reform

Numerous speakers at the conference discussed the implications of the recent move towards health care reform in the US, as well as the major changes proposed in the British and German healthcare systems.

United States

- Health care reform in the US is still in a state of flux, which has resulted in much confusion and divided opinion. The main controversial issue is the Individual Mandate, which imposes the regulation that every citizen must purchase healthcare insurance. It is unclear whether the healthcare reform bill could still be enacted if this clause was to be removed.
- Opportunities for greater collaboration between US organisations (such as the proposed parallel review by the FDA and the Centers for Medicare and Medicaid Services [CMS]) and for robust research (such as that being conducted by the Patient-Centered Outcomes Research Institute [PCORI]) have been hailed as the potential successes of healthcare reform in the US.

Europe

- The UK and Germany are abolishing free pricing, meaning that the US will be the only country left with free pricing still in place.
- Following recent government plans, which are still under consultation, Value Based Pricing (VBP) will be introduced in the UK in 2014. The government states that the aim of VBP is to promote the development of innovation in pharmaceutical treatments, as well as the greater recognition of interventions that have been developed for indications with a high unmet need. It is unclear exactly how these measures will be brought into play, and the details of the new system are still a matter for debate.

- In Germany, the AMNOG law came into force on January 1st 2011, which ended the free pricing arrangement for innovative drugs. Manufacturers must now submit a cost-benefit dossier parallel to market introduction in order to obtain full reimbursement of the drug in the first year.
- These changes are expected to have a significant impact across multiple markets as the UK and Germany are used as reference countries for much of Europe in terms of drug pricing.

Comparative Effectiveness Research (CER)

The environment in which CER is being conducted is rapidly changing, both in terms of what is wanted from CER and the techniques and data available to put it into practice.

Goals of CER

- Several presentations highlighted the need for greater collection of patient reported outcome (PRO) data, and suggestions were made on how to communicate such data more effectively to stakeholders in order to enhance the interpretation of such information.
- The use of evidence hierarchies (with randomised controlled trials [RCTs] being the “gold standard” of evidence collection) was discussed. It was suggested that it would be appropriate to move towards the use of evidence that is “fit for purpose” rather than simply using a hierarchy. This view has merit, as some types of data, such as safety data and sub-group analyses, can be more convincing and easier to collect with observational studies than with RCTs.
- The ISPOR Good Research Practices Taskforce highlighted the usefulness of prospective observational studies in answering CER policy questions, and provided draft recommendations on the credible design of, and reporting of data from, such studies.

New Techniques

- New indirect comparison techniques are being promoted that take into account placebo response to ensure fairer comparison between treatment groups.
- Modelling is starting to play a larger role in CER. In collaboration with the Society for Medical Decision Making, ISPOR has formed a Modelling Taskforce that has developed a series of reports on good research practices for the development and reporting of models.

New Data Sources

- With the development of the Agency for Healthcare Research and Quality (AHRQ) and PCORI in the US, the availability of new data sources is broadening the possibilities for CER. For example, the Healthcare Cost and Utilization Project (HCUP) is a new family of retrospective healthcare databases maintained by AHRQ (<http://www.hcup-us.ahrq.gov/overview.jsp>) and the CMS are now making some Medicare claims data freely available to the public (http://www.cms.gov/BSAPUFS/01_Overview.asp).
- The use of social networking sites and electronic data capture methods to gather comparative information about therapies in the real world are gaining in popularity.

In addition to identifying these broad themes during the congress, our delegates undertook a more detailed study of the data display in selected therapeutic areas. In the remainder of this report, you will find a selection of their analysis of the key cost and outcomes data that was presented at the meeting.

Patient Access Schemes

The following posters were identified which primarily discussed the usage and perception of patient access schemes, all of which are written and sponsored by consultancy companies:

Loveman et al. PHP101¹: This study examined the future outlook for Value Based Pricing (VBP) and Patient Access Schemes (PAS) in achieving affordable budget impact and ensuring access to innovative medicines. Forty telephone interviews with payers from the UK, the US and Taiwan (representing government agencies, HTA groups and insurers) were conducted, where interviewees were asked about their perceptions of the VBP agenda being introduced in the UK and the link to PAS policies. Based on the outcomes of the interviews, the authors suggest that:

- If UK payers have difficulty in determining the level of 'value' in some cases, PAS could be a method used to determine the level of value through monitoring outcomes.
- PAS are predicted to rise in the US, and the

future evolution of the US market toward stronger governmental involvement could accelerate the uptake of PAS.

- The Netherlands and Germany health systems show early signs of risk sharing schemes and look at National Institute for Health and Clinical Excellence (NICE) models as a guide.
- Issues surrounding implementation and administrative costs need to be addressed to incentivise innovation and reduce the administrative burden of such schemes.

Anastasaki et al. PHP30²: This study considered how the perception of pricing schemes varies across Europe, and how this leads to disparities in their uptake by payers. The research assessed the attractiveness of the performance versus cost-based pricing schemes.

- PAS can be categorised according to the type of uncertainty they are addressing (clinical efficacy or budget impact) and can either fix or cap the cost of treatment.
- The authors conclude that the heterogeneity of Europe requires a flexible approach, and that although schemes can reduce uncertainties associated with therapy outcomes and budgetary expenditures, payers cannot always be convinced to accept the risks.
- The overall trend across Europe is towards simplicity in PAS, where simple discounts or paybacks are utilised instead of performance-based schemes that are associated with administrative costs and a need for infrastructure that is not currently available.

Timm et al. PHP43³: Costello Medical's own research has shown that PAS have become increasingly more common in submissions to NICE. Concerns, however, have been raised over the increasing complexity of PAS proposed, and the suitability of some of these schemes as the UK shifts towards value based pricing.

- In 2010, 22% of technology appraisals included a PAS, and in the first 4 months of 2011, 44% included a PAS.
- Despite the inclusion of a PAS, 3 submissions in 2010, and 2 so far in 2011 have received a negative appraisal, most often because the proposed ICER failed to fall under the NICE willingness-to-pay threshold; in previous years, all therapies with a PAS included in the submission were given a positive recommendation.
- The negative appraisals given to NICE submissions, despite the inclusion of PAS, highlight how manufacturers must ensure that these schemes are sufficiently easy to implement and enhance cost-effectiveness to a level deemed acceptable by NICE, in order to influence appraisal decisions.

Ophthalmology

Thirteen posters were identified as being related to the area of ophthalmology. The majority of these posters were sponsored by industry; only 2, both on glaucoma, were sponsored by universities. Of the companies that sponsored the rest of the research, Allergan, Pfizer and Novartis funded the majority (Figure 1). Pfizer funded all the research on dry eye syndrome. The most frequently researched disease areas within ophthalmology at ISPOR were dry eye and glaucoma (Figure 2).

Figure 1: Distribution by company of industry-sponsored ophthalmology research

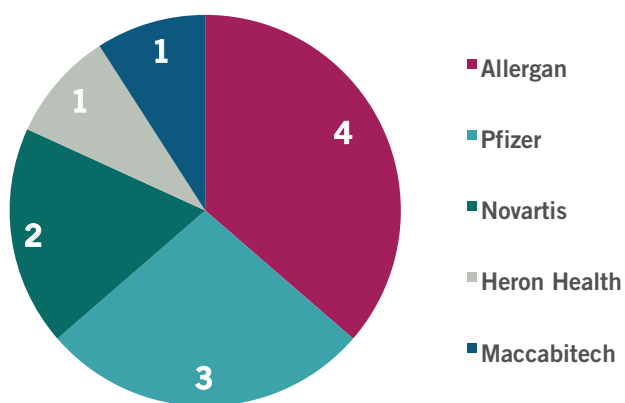
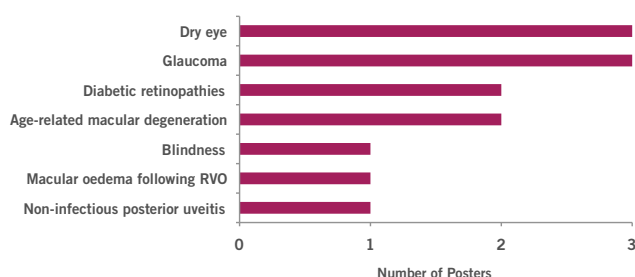


Figure 2: The number of posters presented in each disease area



Macular Oedema (MO) Secondary to Retinal Vein Occlusion (RVO)

A cost-utility analysis, funded by Allergan, of Ozurdex intravitreal implant in the treatment of MO secondary to RVO in the US was presented.⁴ Efficacy data was taken from the GENEVA trials,⁵ and a Markov transition model was used where the health states represented different visual acuity levels. The utility values associated with each state for both the best and worse seeing eye were derived from unpublished Visual Function Questionnaire-Utility Index (VFQ-UI) data from the GENEVA trials.^{6,7} Central RVO (CRVO) and branch RVO (BRVO) subgroups were modelled separately. All subgroups were only compared to observation, despite the fact that grid laser photocoagulation is the standard treatment for BRVO.

Ozurdex was found to be cost-effective compared to observation, with ICERs of \$20,597 and \$23,416 per QALY gained for CRVO and BRVO, respectively.

Age-Related Macular Degeneration (AMD)

Novartis sponsored a cost-utility analysis of ranibizumab in wet-AMD in the Belgian setting, which was based on real-world data captured in the HELIOS study.⁸ It was found that ranibizumab is highly cost-effective compared to best supportive care and even dominant compared to photodynamic therapy. However, the limitation of a lack of direct comparator arm in the HELIOS study was raised.

Diabetic Macular Oedema

Novartis Canada funded an economic evaluation of ranibizumab for the treatment of diabetic MO in the Canadian setting.⁹ The structure of the model was identical to that of the model submitted to NICE in the UK. The base case result showed that ranibizumab monotherapy and ranibizumab in combination with laser were cost-effective options compared to laser alone in Canada (ICERs of \$39,619 and \$50,488, respectively). The results were most sensitive to changes in efficacy.

A systematic review sponsored by Allergan was carried out to identify economic evaluations of screenings and treatments for diabetic retinopathy (DR) and diabetic macular oedema (DMO).¹⁰ The main conclusions were that:

- Screening for DR/DMO in type I diabetes is generally found to be cost-effective, but cost-effectiveness of screening in type II diabetes depends on the particular patient subgroup.
- There are several studies that assess the cost-effectiveness of laser therapy for DR/DMO, but published economic evaluations of novel pharmacotherapies do not yet exist.

Cost Associated with Vision Loss and Blindness

Allergan Singapore sponsored research into the direct medical costs of vision loss and blindness in Taiwan, using the national insurance database as the source of information.¹¹ As in Europe and America, vision loss was found to be associated with considerable medical costs and these costs increased as vision worsened. Blindness incurred the greatest costs, which were around NT\$ 75,500 (adjusted mean excess cost compared to control).

Rheumatoid Arthritis

Our searches identified 32 posters that were of interest in the field of Rheumatoid Arthritis (RA). Most of the posters presenting data on RA (75%) had some industry involvement, as shown in Figure 3.

The types of posters displayed at the conference can be grouped into a few main categories, as shown in Figure 4. Most of the data presented related to the dosing and administration of RA treatments, although a number of posters discussing costs and work-productivity were also presented. Posters falling into the “Other” category included a discussion on the importance of flares, and a validation of treat-to-target (T2T) in golimumab patients.^{12,13}

Figure 3: An overview of the types of authors presenting posters on RA

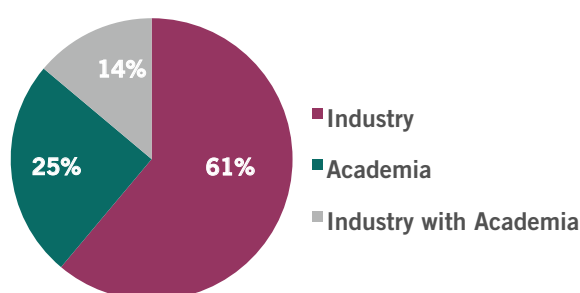
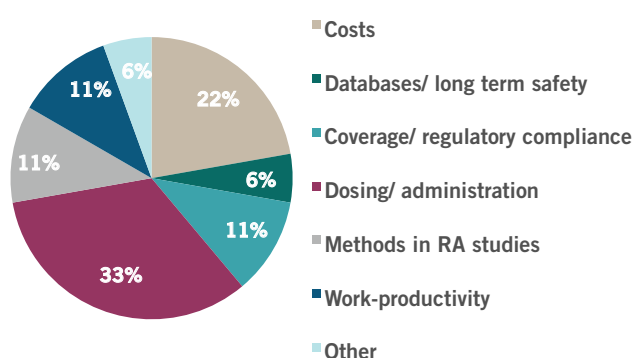


Figure 4: Main categories of the posters presented on RA



Employment and Work Productivity

Employment and work productivity was an important theme in the literature, with many companies seeking to display their treatment's effect on the ability to work effectively despite RA.

- Two Centocor posters provided interesting background data on the burden of RA on work productivity. One of these suggested that individuals with RA had the second highest direct health care costs of the 6 conditions tested (RA, asthma, coronary artery disease/congestive heart failure, diabetes, hypertension and chronic obstructive pulmonary disease).¹⁴ The RA population also had the highest proportion of individuals with >5 illness days per year.

Another Centocor paper suggested that higher out-of-pocket payments for American RA patients had a negative effect on their work productivity.¹⁵

- An Amgen poster, displaying the results of the Observation of Productivity in Employed patients with Rheumatoid Arthritis (OPERA) trial, noted that etanercept could have a significant impact on work impairment, absenteeism and presenteeism in the real-world setting as early as 1 month following treatment initiation, which could continue until month 6.¹⁶
- Similar data were presented by Centocor to support golimumab.¹⁷ They calculated Employment Adjusted Life-Years (EALYs) from the GO-FORWARD study. The percentage of patients who were unemployable at the start of the trial but employable at week 24 was significantly higher for the golimumab+MTX group than placebo+MTX (33% vs 15%, $p < 0.05$). EALYs from age 50 to 60 were expected to be higher for both males and females in the golimumab+MTX group compared to placebo+MTX, although no indication of significance was provided to enable judgement regarding this result.

Cost Analyses

A total of 8 posters investigated the costs of RA treatments.

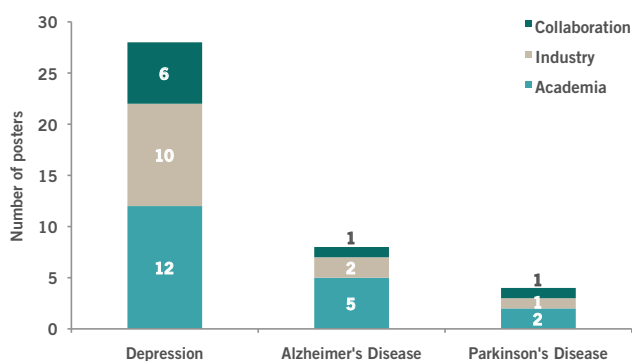
Notably, 2 cost-effectiveness studies (sponsored jointly by academia and BMS) found abatacept to be the most cost-effective solution in both Peru and Venezuela.^{18,19} On the other hand, an independent academic study in the Colombian setting found that etanercept was a more cost-effective option.²⁰

Data were presented by Centocor in regard to the costs associated with golimumab therapy. One study provided evidence that prior biologic experience was likely to increase the baseline cost of an RA patient on golimumab in the US setting.²¹ A second study suggested that, in the specialty pharmacy provider setting, golimumab utilization may be similar for patients regardless of their prior biologic use.²²

Neurological Disorders

We identified 27 posters on depression, 8 posters on Alzheimer's Disease (AD) and 4 posters on Parkinson's Disease (PD), the funding sources of these posters is shown in Figure 5 below.

Figure 5: Funding sources for the posters presented on Depression, AD and PD



Depression

A total of 27 studies were related to the treatment of major depressive disorder (MDD). Over half of this research was funded by industry or was a collaboration between industry and academia. Eli Lilly was the most common contributor with 4 posters, 3 of which related to the cost of duloxetine treatment.

Cost Studies

Three studies were conducted by Eli Lilly that related to the cost of duloxetine treatment for MDD:

- PMH26²³: This study used the Thomson Reuters MarketScan Commercial Claims and Encounters database to examine the relationship between average daily dose of duloxetine, medication adherence and health care costs. Those patients taking >60mg duloxetine on average per day were found to have more pain related comorbidities, a higher chance of bipolar disorder and dysthymic disorder, and were more likely to use pain and psychiatric medications than patients on an average daily dose of 60mg; they also had significantly higher total health care costs ($p < 0.05$). Patients on low dose duloxetine (≤ 30 mg) were less likely to adhere to treatment.
- PMH31²⁴: The study was a trajectory analysis of the health care costs for patients treated with high doses of duloxetine. Using retrospective data from the MarketScan database the authors showed that health care costs increased prior to the initiation of therapy, after which the costs decreased due to reduced inpatient care costs; high dose duloxetine was found to be cost neutral due to these reduced costs.
- PMH32²⁵ was a comparison of duloxetine with generic selective serotonin reuptake inhibitors (SSRIs) using the administrative claims data over 10 years in patients from 55 self-insured US companies. Previous research has shown that patients starting on duloxetine had more severe prior diagnoses and more complex treatment histories than patients starting other antidepressants.²⁶ This study found that duloxetine

users had similar medical costs but higher prescription drug costs compared to patients using generic SSRIs for second-line treatment.

- A study sponsored by Pfizer examined the difference in daily average consumption and costs of serotonin-norepinephrine reuptake inhibitors (SNRIs) and SSRIs.²⁷ It was found that the average daily cost of escitalopram was lower than those for desvenlafaxine, venlafaxine and duloxetine, and that the median duration of persistence on index drug was significantly longer for desvenlafaxine ($p < 0.001$).

A study by the University of Cincinnati showed that venlafaxine and duloxetine are responsible for over 90% of the market share for SNRIs based on a review of the Medicaid and Medicare databases.²⁸ In 2009, there were 2.2 million prescriptions for SNRIs in the Medicaid population, which represented 20% of the total reimbursement for antidepressant drugs that year.

PMH28,²⁹ sponsored by Takeda Pharmaceuticals, used the MarketScan database to examine the health care costs and utilisation in newly diagnosed depression patients. They identified a 2.7-fold increase in costs for depression patients compared to non-depression comparator control patients, with incremental costs of \$6,960 compared to the non-depressed cohort ($p < 0.001$). Healthcare utilization was significantly increased for depressed patients in all areas, including in- and out-patient care, pharmacy and laboratory costs.

Several other studies examined the costs and cost-effectiveness of MDD treatment in other markets:

- Two studies conducted by ANOVA presented economic evaluations of desvenlafaxine from a Brazilian public hospital and a public general hospital care provider perspective.^{30,31} Desvenlafaxine was found to be cost-saving compared to escitalopram and duloxetine in inpatients treated for MDD from both perspectives, due to its lower price and lower dropout rates.
- The National Evidence-based Health Care Collaborating Agency (NECA) conducted a cost-effectiveness analysis of antidepressant therapies from the Korean perspective.³² The SSRIs were found to be cost effective compared to TCAs and new antidepressants, which is reflective of their recommended use as the first-line medication for MDD.

Patient Burden

Several industry sponsored studies examined the patient burden of depression, including work productivity, quality of life (QoL) and family functioning outcomes.

- One study, sponsored by Lundbeck and Takeda, examined the association between work productivity and severity of depression using the Work Productivity and Activity Impairment (WPAI) and Health and Work Performance (HPQ) questionnaires completed online by patients.³³

There was shown to be a progressive worsening in work productivity with increasing severity of depression.

- A second Lundbeck sponsored study aimed to develop and test the Depression and Family Functioning Scale (DFFS) for use in clinical trials.³⁴ The DFFS evaluates the impact of depression from both the patient and partner's perspectives, and has the potential to be a valuable patient reported outcome (PRO) tool for more comprehensive evaluation in future clinical trials.
- A study sponsored by AstraZeneca compared the QoL, productivity loss and resource use of patients with and without depression and/or sleep difficulties.³⁵ The authors found that sleep difficulties were highly prevalent among depressed patients, and co-occurrence was associated with a lower QoL, increased productivity losses and greater health care resource use.

Alzheimer's Disease

A total of 8 posters were identified which were related to Alzheimer's disease (AD). The majority of the studies were from academia (5/8) with one poster each sponsored by Novartis, Pfizer and UBC.

Two industry sponsored studies assessed the health care utilisation and costs among AD patients:

- A Novartis study assessed whether costs and health care utilisation differed among AD patients with and without dysphagia.³⁶ A retrospective cross-sectional analysis of two MarketScan databases showed significantly higher health care costs for patients with dysphagia, and lower rates of cholinesterase inhibitor use compared to nondysphagic patients.
- A Pfizer sponsored study used Medi-Cal claims data to assess the incremental costs associated with AD stratified by type of service used and source of payment.³⁷ Costs were found to increase monotonically over time in all scenarios.

Parkinson's Disease

Four studies directly relating to Parkinson's disease (PD) were identified in the data display, including two sponsored by Teva Neuroscience:

- PND5 gave an assessment of PD progression rates by stage of disease, using the five state Hoehn & Yahr scale, based on a systematic literature review and meta-analysis.³⁸ Using the progression rates calculated, the authors concluded that these could be used to develop an internally valid PD progression model.
- PND37 is a report of the outcomes from the BRAVURA randomised, open-label trial, which was designed to investigate order effects

associated with administration of the Unified Parkinson's Disease Rating Scale (UPDRS) motor examination.³⁹ The SPES/SCOPA motor clinical examination was used alongside the UPDRS, and showed good psychometrics and evidence of convergent validity with the UPDRS. The findings were consistent with previous publications, and add to the validity of this new instrument.

A cost-utility comparison between ropinirole and levodopa/carbidopa was conducted in PND24 over a 5-year time frame from the patient's perspective using a decision analysis model.⁴⁰ Even though the cost of treatment increased with ropinirole the drug was associated with higher QALY values and fewer incidences of side effects. Therefore ropinirole was a cost-effective treatment in this model, with an ICER of £9,870 compared to levodopa/carbidopa. The authors noted that a Markov model approach would have been preferred, but the lack of availability of health state transition probabilities meant that this was not feasible.

Generalised Anxiety Disorder (GAD)

Three posters were presented on Generalised Anxiety Disorder (GAD), one of which was sponsored by Pfizer.

- Kavati et al.^{41,42} presented two case-control studies that looked into the health care resource utilisation, direct medical expenditures, and the indirect costs, for adult women with anxiety disorders in the US in 2006 using the medical expenditures panel survey.
 - The adjusted annual mean incremental total expenditure associated with anxiety disorders was \$2,143.16 per adult woman, making the estimated national annual direct cost of illness for adult women \$26.52 billion.
 - Anxiety disorders increased the missed number of work days by a factor 1.12. The present value of future productivity due to premature deaths was estimated at \$461 million, and the annual total indirect cost of illness associated with adult women was \$8.59 billion.
- In a study sponsored by Pfizer, Berger et al. investigated the clinical and economic consequences of long-term benzodiazepine use in GAD patients through a retrospective database analysis.⁴³ The study concluded that long-term benzodiazepine use was associated with increases in health care resource utilisation and costs. The costs of benzodiazepine-related care increased significantly in patients aged ≥ 50 years, but not in those younger than 50.

Neuropathic Pain

Six posters were presented concerning Neuropathic Pain (NP): one on pain management in general and five on Diabetic Peripheral Neuropathic Pain (DPNP). These posters included two studies sponsored by Pfizer:

- Ko et al.⁴⁴ investigated patient-reported outcomes associated with painful diabetic peripheral neuropathy, and found that pain substantially interfered with general activity, mood, walking, normal work, relationships, sleep and enjoyment of life. DPNP patients also experienced greater sleep problems compared with non-DPNP patients.
- Udall et al.⁴⁵ investigated the health care resource utilisation and costs in diabetic peripheral neuropathy patients treated with pregabalin or gabapentin. A retrospective database analysis was used to compare the 12 months before and 12 months after each patient's index date, meaning the date of the first claim for pregabalin or gabapentin.
 - A significantly greater increase was found in DPNP-related outpatient visits for gabapentin versus pregabalin cohorts, but no such difference was observed for inpatient visits.
 - A significantly greater increase in prescription costs was found for pregabalin compared to gabapentin, as would be expected from the availability of generic gabapentin.
 - The pre- to post-index increase in overall health care costs was \$3,081 (from \$21,673 to \$24,754) for pregabalin patients and \$4,683 (from \$23,155 to \$27,838) for gabapentin patients.

rivaroxaban for the prevention of pulmonary embolism is US\$75 more expensive than dabigatran and \$160 more expensive than enoxaparin.

- For total knee replacement, the use of rivaroxaban for the prevention of one case of deep vein thrombosis is US\$3,050 cheaper than dabigatran and \$2,855 cheaper than enoxaparin.
- For total knee replacement, the use of rivaroxaban for the prevention of one case of pulmonary embolism is US\$158 cheaper than dabigatran and \$48 cheaper than enoxaparin.

Gastrointestinal Disorders

GERD or Related Indications

Five posters were identified that considered the HR-QoL of patients with GERD symptoms, and examined the resource utilisation/economic burden of GERD.

- Data from Kantar Health's 2010 National Health and Wellness Survey of US adults on the outcome variable of SF-12v2 mental and physical component summary and SF-6D health utility scores were analysed.⁴⁸ The analysis of 75,000 respondents included 710 diurnal, 1,493 nocturnal and 4,204 diurnal-and-nocturnal GERD symptom patients. Respondents with both diurnal-and-nocturnal GERD suffered significantly poorer HRQoL than those with no GERD, or only diurnal or nocturnal GERD ($p < 0.001$). This could highlight an unmet need for this patient group.
- A retrospective database (large US health plan) analysis compared health care utilisation between patients who switched from a branded Proton Pump Inhibitor (PPI) to a generic PPI and vice versa.⁴⁹ Although outpatient visit rates were slightly lower for patients who switched from a branded to a generic PPI, there were no significant differences in other health care utilizations such as office visits, emergency room visits, and inpatient admissions.
- In a collaborative study by Astrazeneca and an academic group, a meta-analysis of 5 cluster European RCTs comparing a new structured treatment pathway (STP) to usual care (UC) in patients with GERD assessed the potential benefit for healthcare providers of implementing the STP.⁵⁰ For patients in the STP group, GerdQ scores (of frequency and impact of symptoms) improved significantly more during therapy than the UC group, and patients in the STP group had a 22% reduction in healthcare utilisation costs.

Two of the identified studies were sponsored by Eisai:

- The prevalence of refractory GERD was estimated, along with associated direct medical costs using real-world data.⁵¹ Data from Thomson Reuters MarketScan Commercial Database and Medicare

Venous Thromboembolism

Seven posters were presented concerning Venous Thromboembolism (VTE) including two posters presenting decision tree models developed by the Russian Society for Pharmacoeconomics and Outcomes Research.

- Using decision tree models, two studies by Pavel et al. evaluated the cost-effectiveness of rivaroxaban versus dabigatran and enoxaparin for the prophylaxis of VTE in patients undergoing elective total hip replacement (THR) and total knee replacement (TKR) respectively.^{46,47} Interestingly, the study looked at the costs of prevention of deep vein thrombosis separately to those of prevention of pulmonary embolism.
 - For total hip replacement, the use of rivaroxaban for the prevention of deep vein thrombosis is US\$139 cheaper than dabigatran and \$365 cheaper than enoxaparin.
 - For total hip replacement, the use of

Supplemental Database were analysed to find that compared to treatment-responsive GERD patients, treatment-refractory GERD patients had significantly ($p < 0.01$) higher overall (\$18,008 vs. \$11,004), GERD-related (\$2,022 vs. \$1,172), and GI-related (\$2,736 vs. \$707) costs. Total direct medical costs in the overall GERD population totalled \$13,237 and comprised of inpatient costs (\$3,149), emergency room costs (\$298), outpatient service costs (\$6,699) and pharmacy costs (\$3,091).

- This retrospective analysis of a population of commercially insured Americans identified five subgroups of GERD patients who differ substantially with respect to other symptoms, treatment patterns and healthcare expenditures: (A) GERD with no other conditions or symptoms of interest, (B) GERD plus respiratory symptoms, (C) GERD plus Barrett's oesophagus, (D) GERD plus oesophageal stricture and (E) GERD plus iron deficiency anaemia.⁵²
 - Patients in group C-E were significantly older than those in groups A or B. Medical care for GI and other symptoms were fairly common in all GERD patients; however those in groups C-E tended to have higher rates compared to A.
 - Similarly, groups C-E tended to have higher rates of resource utilisation for most procedures than group A.
 - Group A patients incurred approximately \$4,195 per patient in all cause expenditure over a six month period, with \$615 of these being GERD-related. In comparison, patients in other groups averaged between \$5,390 and \$11,340 per patient in all cause, and \$625 and \$1,714 in GERD-related expenditures in the same time period (both $p < 0.0001$ vs. group A).

IBS and Constipation

Two posters considered the symptoms and outcome measures used to evaluate IBS (and IBS-constipation) patients:

- A study sponsored by Forest Laboratories assessed the symptoms reported by patients with IBS constipation (IBS-C) in 2 Phase III clinical trials through the use of exploratory open ended questions.⁵³ The study concluded that symptoms most frequently spontaneously reported by IBS-C patients in focus groups are generally consistent with those reported in the open-ended questions of the clinical trials evaluated.
- Hsu et al.⁵⁴ presented a preliminary study that used a qualitative interview approach of 29 adult Taiwanese IBS patients to explore the impacts of IBS on patients' QoL. Recurrent abdominal pain and discomfort were the most disturbing symptoms reported, and the frequent bowel movements reduced patient's willingness to participate in social activities and affected personal relationships.

Two posters considered the costs of chronic constipation (CC) and IBS and their treatment:

- A systematic review of the economic and QoL burden of CC and IBS, sponsored by Forest Laboratories, included 35 articles and abstracts from a range of countries, with the majority from the US and European countries.⁵⁵ From a US perspective:
 - The costs of IBS and CC varied widely, as did the proportion of the overall cost that was attributed to outpatient costs, inpatient costs and pharmacy costs.
- Méndez et al.⁵⁶ used a Markov model to determine the cost-effectiveness of treatment with otilonium bromide (OB) compared with pinaverium bromide (PB) and hyoscine butylbromide (HB) in the treatment of abdominal pain in patients with IBS from an institutional perspective at the Social Security Mexican Institute. Greatest effectiveness in terms of clinical improvement was shown by patients treated with OB (76%) followed by those of PB (72%) and HB (66%). OB was found to be the dominant therapy. Acceptability curves showed OB as the most cost-effective therapy in 100% of cases independentl of IMSS willingness to pay.

IBD (including, CD and UC)

Two posters sponsored by Centocor Ortho Biotech were presented that considered the health burden posed by IBD, as well as the costs and association of out-of-pocket healthcare costs with productivity:

- The health risks, lost productivity and total direct costs among individuals with IBD were compared with the 5 most prevalent chronic conditions of asthma, coronary artery disease/congestive heart failure (CAD/CHF), diabetes, hypertension and chronic obstructive pulmonary disease (COPD).⁵⁷
 - Annual health risk assessment (HRA) profiles and direct healthcare costs for employees, retirees and their adult dependents at a large self-insured employer were evaluated.
 - Individuals with IBD were found to have higher direct costs compared with individuals with hypertension, CAD/CHF and lower costs than asthma, diabetes and COPD.
 - A higher proportion of individuals with IBD had >5 illness days per year compared with hypertension, CAD/CHF and diabetes, similar or fewer illness days were reported as compared with asthma and COPD.
- The relationship between out-of-pocket (OOP) healthcare costs and productivity of IBD patients was explored using an internet-based, cross-sectional survey in Q1 2009.⁵⁸ Higher monthly OOP costs were associated with higher work impairment and lower productivity.

Hepatitis C

Seven posters considering the hepatitis C infection (HCV) were identified, four of which were sponsored by Tibotec/Janssen Pharmaceuticals and/or Vertex Pharmaceuticals Incorporated. Some of the posters considered the prevalence of HCV and the characteristics, resource utilisation and treatment costs associated with HCV patients:

- A systematic review sponsored by BMS identified and extracted prevalence estimates of HCV infection in Canada and Latin America.⁵⁹ Estimates of prevalence were identified in the literature for Canada, Chile, Mexico and Brazil, and varied from 0.8% to 3.6%. Even assuming a conservative 1% overall prevalence rate for Canada and Latin America, the number of HCV infected persons is projected to be more than 6 million persons. Despite a forecasted decline in HCV prevalence by 14% in Canada over the next 30 years, the HCV-related costs are expected to rise by over 25% due to the shift of individuals towards the later, more costly stages of the disease.
- A case-matched analysis of the Florida Medicaid database, sponsored by Vertex Pharmaceuticals, for the time period 1998-2008 reported that compared with control HCV patients with no ALD, HCV patients with ALD were associated with greater all-cause inpatient resource use and approximately three times greater mean all cause per-patient-per-month costs.⁶⁰
- A retrospective analysis found that current treatments for HCV cost \$22,726 per year in drug therapy, which was 16 times the cost of non-treated HCV infected employees.⁶¹ However, the higher costs associated with HCV treatments in the doctor's office were offset by lower costs from hospitalisations and the use of outpatient clinics.
- A second model suggested that entecavir's economic value was marginally (\$4.9) greater than that of tenofovir when a 30 year time horizon and a treatment duration of 5 years were considered.
- The study by Rely et al. used a lifetime Markov model to estimate the long-term costs and effectiveness of entecavir compared with lamivudine and adefovir in treating chronic HBeAg-positive infection.⁶⁴ This model suggested that in the Mexican setting, the use of entecavir instead of lamivudine and adefovir was likely to be cost-saving, and this was supported by conservative assumptions and sensitivity analyses.
- Total health care costs per patient were \$23,520 for entecavir, \$24,907 for lamivudine and \$24,385 for adefovir.
- Pharmacotherapy costs per patient were \$10,515 for entecavir, \$9,724 for lamivudine and \$9,870 for adefovir.
- Total costs per patient were \$597 and \$220 lower per patient in the entecavir group compared to lamivudine and adefovir, respectively.
- The incremental cost-effectiveness ratios for entecavir versus lamivudine and adefovir were \$2,065 and \$898 per quality-adjusted life year (QALY), respectively.

Hepatitis B

Five posters, including 2 cost-effectiveness analyses, were presented concerning Hepatitis B (HBV):

- Vorobyev et al. PGI13⁶² and Pavel et al. PGI14⁶³ presented two studies sponsored by BMS. Using Markov models, these studies examined the perceived value assessment of entecavir versus no treatment and versus tenofovir (respectively) in chronic HBV patients in the Russian health care system.
 - Compared with no treatment, entecavir slows disease progression and results in histological improvement, which reduces costs to the health care system. Furthermore, the cost of therapy is fully outweighed by the economic benefits of treatment.
- One analysis of data from a US population found a significant association between obesity and many major chronic conditions such as diabetes, hypertension and dyslipidemia.⁶⁵ This finding was corroborated by a survey of US commercial claims databases, which additionally found a high prevalence of chronic back pain in obese patients.⁶⁶
- Furthermore, an analysis of a commercial claims database found that as the number of comorbidities rises, obesity is associated with greater healthcare costs.⁶⁷ A cross-sectional study also found that the presence of chronic comorbidities was the main predictive factor for high healthcare expenditure associated with obesity.⁶⁸

Obesity and Bariatric Surgery

Four posters reported on the comorbidities associated with obesity, all of which indicated that the burden of obesity is great.

- Three posters were also identified which specifically related to bariatric surgery, of which two received funding from Ethicon Endo-Surgery. One poster looked at predictive factors for efficacy of bariatric surgery and the other modelled the long-term outcomes of such surgery.
- The retrospective study of electronic medical records in the US reported a distribution of BMI loss that was much greater than seen in previous prospective studies.⁶⁹ The main predictive factor

for bariatric surgery success was pre-operative BMI; those patients with a pre-operative BMI of less than 30 did not experience substantial weight loss on average.

- A discrete event simulation of long-term bariatric surgery outcomes was set in Mexico and found that bariatric surgery achieved a return of investment after approximately 7 years.⁷⁰
- A poster on bariatric surgery from academia reported the development and validation of a bariatric-specific quality of life tool called Bariatric and Obesity Surgery Survey.⁷¹ The authors claimed that the tool could provide a clinically relevant and useful measure of HRQoL in patients undergoing bariatric surgery.

Further Assistance

Please do not hesitate to contact us if you would like any further information on the themes or research presented above. If you would like to receive a complimentary in-depth review of the data display from a future ISPOR event in a therapeutic area of particular interest to you, please send us a request.

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