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It is with pleasure that I have been invited to write the present editorial for all those who read this journal, and in particular for all the European industrial pharmacists whom our association represents. I will, therefore, try to present the European Industrial Pharmacists Group’s point of view as regards the industrial pharmacist profession and its global dimension.

Pharmacists, including all those who perform a leading role inside the pharmaceutical industry, are required to have the preparation, experience and ethical nature, such as to be able to safeguard both the quality and the safety of the medicine for the good of the main stakeholders, represented not only by the patient, who should be the main focus of our daily efforts, but also by the regulatory authorities, by the industry, and by all of those who play a major part inside the pharmaceutical process. In this context, one cannot but mention the recent timely efforts made at community level to protect particular aspects in the traceability and distribution of medicines, coinciding with the recent issuing of guidelines on the good distribution practices and directives related to issues of falsified medicines; suffice it to mention the recent developments concerning the unique identifier, parallel importation, the qualified person declaration for the importation of active ingredients from non-EU countries and the online marketing of medicines. These efforts reveal a constantly improving vigilance for patients and the safeguarding of their health, expressed through increased pressure on commercial channels, on traceability and on the conditions of preparation and conservation of medicines and their precursors – an increasing European awareness that requires the main players, namely, those who operate in the pharmaceutical workplace, to possess an ever-increasing ethical responsibility and professional capability, such as is revealed in the recent issue of Annex 16 concerning the global responsibility of qualified persons. It is evident that these individuals are called upon to assume an increasingly international role, and the ability to adequately supervise the entire distribution chain up to the final client.

Accordingly, the European role and identity are increasingly becoming consolidated in the awareness that the whole of Europe has to safeguard the medicine’s quality and the patient’s health within a supranational dimension. Therefore, the European Dimension is the will and consciousness requested of the whole pharmaceutical community so that medicines and the entire system surrounding them would be characterised by an aura of quality, reliability and effectiveness, guaranteed by a system designed to function as a single entity. Consequently, the initiative of those who deem it preferable to stay out of the European environment is surprising and astonishing. Furthermore, in this complex and articulate context, where Europe is called upon to play an increasingly leading role in defining a unique pharmaceutical system, it is appropriate to ask what is needed in order to give the industrial pharmacist a univocal and distinctive connotation, as evidenced by recent initiatives, such as the recognition of the professional title in the different nations of the community in order to avoid the relegation of our role only to a national level.

EIPG, celebrating this year the 50th anniversary of its foundation, has firmly believed in this environment from its earliest days and, since then, has ever more done its utmost to promote and support the role of industrial pharmacists in Europe by means of initiatives that range from the issuing of deontological codes to the organisation of events aimed at the professional growth, from the support to students to an active role in their formation, not to mention the growing contribution to the development and refining of directives that have an important impact on medicinals. These activities find their inception in the underlying principle that EIPG represents a category of professionals who are aware of their role and knowledge in this field.

Thus, the European Dimension is a way of thinking and of facing these issues that have characterised EIPG and its members from the outset, but that is also today a growing part of its consciousness. We all have to be aware that the quality and competitiveness of Europe are imbued with the ethics and the knowledge of its professionals and that our commitment and daily contribution to the system are essential for the growth and stability of the country. Much has been done but much still remains to be done and our contribution is fundamental. I, therefore, invite all readers to actively participate in our growth as a professional and competent voice in the European Dimension, in the world of medicines.

Maurizio Battistini
Vice President European Affairs
ANTIBIOTIC RESISTANCE IN FUTURE DRUGS: EUCAST IS VITAL IN CREATING DEFINITIONS FOR A GLOBAL CONSensus

by Gunnar Kahlmeter

The World Health Organization states that we are in “a race against time to develop new antibiotics”¹. There are very few antibiotics in drug development. Is this because we have run out of ideas or because return on investment is considered poor? Or is it the speed with which bacteria develop new resistance which dampens the enthusiasm of anyone. This, coupled with the global spread of resistant bacteria between countries, means we now have a situation that demands immediate and decisive actions from governments. Over the last three decades, no new antibiotic classes were discovered. New members in already known groups of antimicrobials have been developed and some of these have been combined with beta-lactamase inhibitors. Mostly, microorganisms are not impressed.

Central to on-going global efforts to tackle antimicrobial resistance is the increasingly successful international standardisation of the definition of resistance. Resistance is “the likelihood of failure of therapy with a specific agent for a specific organism at one or several alternative dosages”² and it is related to a trait inherent in the microorganism. Resistance may be intrinsic, i.e. expected because something is present or lacking which makes successful therapy highly unlikely, or acquired, i.e unexpected in that the microorganism has acquired a new trait which in this particular microorganism from now on obviates the success of therapy.

In some cases, clinical resistance can be predicted from the presence or absence of a specific resistance gene or mechanism. In most cases, however, resistance needs to be defined in relation to a concentration of the antimicrobial agent that will fail to inhibit the growth of the microorganism. The lowest concentration needed to inhibit the growth of the organism is called the minimum inhibitory concentration (MIC). The concentration, which can distinguish between therapeutic success and failure, is called a clinical breakpoint and it is expressed as therapeutic success “is likely if the MIC of the organism is less than or equal to the breakpoint” and vice versa, “not likely if the MIC of the organism is higher than the breakpoint concentration”.

The decision on the clinical breakpoint is influenced by a number of facts, such as possible variations in the dosing and administration form of the agent, the pharmacokinetics of the agent, pharmacodynamics of the agent in different organisms, known resistance mechanisms, some of which may be inducible, and, most importantly, known facts about clinical effect in target infectious diseases. A typical breakpoint is ≤4 S ≤1 and R > 4 mg/L ³, which should be interpreted as an organism of a defined species with an MIC less than or equal to 1 is to be categorised as ‘susceptible’ (possible to treat with agreed standard dosing of the agent in question), whereas an organism with an MIC above 4 is to be categorised ‘resistant’ (not possible to treat even with the highest possible dose) and everything in-between is categorised as ‘intermediate’ (treatable given an increase in dosage)³.

As new resistance mechanisms develop, dosing schemes are developed, infections or bacteria other than those originally evaluated are to be included, and there is a need to review and sometimes revise these breakpoints.

Over the past 15 years, the European community of microbiologists and infectious disease specialists have established common breakpoints for Europe. Until very recently, there was no international consensus on breakpoints in Europe. At least seven different breakpoint systems were in use. Although an increasing number of countries adopt the European Committee on Antimicrobial Susceptibility Testing (EUCAST) recommendations, there are still many laboratories which utilise other systems, most often the US system through the Clinical Laboratory Standards Institute (CLSI). On a practical level, this means antimicrobial agents may have different breakpoints in different countries and thus, the same microorganism may be susceptible in one country and resistant in another. If we are going to tackle the problem of antibiotic

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Professor Gunnar Kahlmeter is former Communications Officer and Past President of ESCMID and Clinical Data Coordinator and Past Chairman of EUCAST. He is Head of the Department of Clinical Microbiology at Kronoberg and Blekinge County, and Head of the EUCAST Development Laboratory, Växjö, Sweden. He is also advisor and member of several national and international committees. His research interests include antimicrobial resistance, antimicrobial resistance surveillance, antimicrobial susceptibility testing and diagnostics in clinical microbiology.
resistance, we need to compare it like-for-like on a global scale. This is the remit of EUCAST.

Since the 1970s, breakpoint committees such as EUCAST have determined the breakpoints for phenotypic antimicrobial susceptibility testing as part of regulatory processes for the approval of new drugs. The European Medicines Agency (EMA) and EUCAST drew up a standard operating procedure (SOP) regarding the role of EUCAST in the decision of antimicrobial susceptibility testing breakpoints as part of the regulatory licensing process. The SOP was introduced as part of the Centralised Procedure for the assessment and approval of new drugs in the European Union. EUCAST deals with breakpoints and technical aspects of phenotypic in vitro antimicrobial susceptibility testing and functions as the breakpoint committee of the EMA.

EUCAST consists of a dedicated group of scientists, mostly from the field of clinical microbiology, with long traditions of developing methods and breakpoints within the field of susceptibility testing of bacteria and fungi. EUCAST consists of a general committee with representatives from all countries with an interest to follow EUCAST guidelines. The EUCAST steering committee, with representatives from the General Committee and experts in the field, prepares all decisions and consults with the General Committee, the EMA, the European Centre for Disease Prevention and Control (ECDC) and the world at large in an open consultation process. EUCAST subcommittees deal with specific areas, such as fungi, anaerobic bacteria, mycobacteria, detection of specific resistance mechanisms, etc. It is funded by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and is contracted for services with the ECDC.

In 2008, only 20–30% of European nations had adopted the EUCAST guidelines. Since then, this has increased to 90% in 2015, with several non-European countries following suit. These include nations as far reaching as Australia, New Zealand, South Africa and Morocco. Adopting EUCAST guidelines and methods is facilitated by the website at www.eucast.org and the fact that important documents are translated into many languages, including Turkish, Chinese and Russian. The website is openly available and free of charge and has more than 50,000 monthly visits.

EUCAST has now developed breakpoints for existing agents, and has shown for almost 10 years that the process for addressing new agents works. Together with the EMA, EUCAST has determined breakpoints for approximately 10 new agents and is currently processing several other compounds. It is essential that companies in the process of developing new agents seek contact with EUCAST early in the development cycle to obtain advice on the procedure. We can also help pave the way for the development of antimicrobial susceptibility testing material needed for susceptibility testing of the new agent.

Despite the recent success of EUCAST, there are still undecided countries. In many countries, laboratories make individual decisions, and when this is the case it is not unusual for countries to end up with the unfortunate situation of having more than one standard. This is detrimental to both patient care and on-going programmes of resistance surveillance. In the UK, the British Society for Antimicrobial Chemotherapy (BSAC) recently recommended UK laboratories to adopt EUCAST guidelines and informed laboratories that the BSAC recommended method will not be updated after the end of 2015. In the USA, there are two sets of breakpoints, those decided by the Food and Drug Administration as part of the registration process and those recommended by the CLSI for which there are also disk diffusion guidelines and zone diameter breakpoints. To complicate matters further, a group of US scientists now work as an integral part of EUCAST.

To ESCMID, antimicrobial resistance in all its forms and implications is of prime concern and importance. So is cooperation over borders – national borders, borders between the professional and governmental organisations, between profession and industry, and between clinical microbiologists and infectious disease specialists. EUCAST is a good example of successful cooperation in all respects. ECCMID, the yearly ESCMID congress, attracting more than 10,000 researchers and clinicians, will be held in Vienna, Austria, in April 2017. It will gather colleagues from all over the world, working in hospitals, laboratories, public health, basic research and pharmaceutical and diagnostic industry. EUCAST will be central to many of these and to help keep the community informed we will have the annual EUCAST 4-hour workshop.

Everyone agrees that international unity would be beneficial to all. Performing everyday susceptibility testing, making efforts to combat antimicrobial resistance and the dissemination of resistant organisms, and developing new agents and new diagnostics – all would benefit from having a uniform definition of breakpoints for use in phenotypic susceptibility testing.

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PRODUCTION PROCESSES IN THE PHARMACEUTICAL INDUSTRY

by Miguel Escudero

A great source of worry in industrialised societies is disease or health problems caused by taking medicines that are of poor quality, or are subject to a health alert. Society expects that manufacturers, distributors and employees should be in control of, and take responsibility for, the entire production process; all the way from sourcing raw materials up to delivering the product to the end consumer. People also expect that all necessary precautions are taken to ensure the product is fit for consumption. This is the first major challenge faced by any pharmaceutical company wishing to ensure its continued survival.

Logically, the product’s final cost will be related as much to the production system as to the gamut of security measures and protocols set up to ensure the quality of both the process and the product. A few years ago, pharmaceutical profit margins were higher. However, after continuous reductions in the cost of medicines as valued by the government, pharmaceutical companies now face a second challenge. They have to reduce costs by optimising and improving their production process, avoiding large production losses (usage, output and production speed), and monitoring their overall equipment effectiveness (OEE).

Worrying about dealing with the first challenge, ensuring product quality, is the same for pharmaceutical companies as it is for any other big business, long supply chain, or even government. Feeling threatened by possible scandals concerning quality, they organise themselves (or make laws in the case of a government) to ensure that production processes and distribution are kept under control. In the case of any control variable falling outside security margins, sufficient location protocols are established, and the failed product is withdrawn from the marketplace. Oversight in this area can be catastrophic. Well-known companies and popular governments can collapse overnight. Nowadays, people know a lot about negligence, and pay attention to comments in the press or from the competition (e.g. improper handling of the product), all of which affect a company’s stability. Dealing with the second challenge is perhaps even more worrying, given that every company is trying to maximise profits. In this case, the real focus is on reducing costs, as it is very difficult to have an effect on other variables.

How are pharmaceutical companies in particular (and others like them, e.g. cosmetic, nutrition, chemical or food companies) dealing with the challenges listed above? In this article we will focus solely on providing an overview of these two challenges, which require special attention.

In order to deal with the first challenge, pharmaceutical companies in particular have historically tended to focus on solving the problem of improved quality by using an approach, which we will call “transactional”, to ensure the quality of both product and process. This means that companies introduce monitoring and ensure the security of those accessing any application master update are at the top of the list. This is especially true of production specifications and formula, their variants, versions, and movement of materials; monitoring the product by its state and batch, assigning approved batches to orders, and the availability of every batch according to preferential use-by dates, expiry dates, retest dates, etc. All of these checks must be carried out in accordance with the various good manufacturing practices, good laboratory practices, good distribution practices, International Organization for Standardization regulations, hazard analysis and critical control points, and many other regulations, while ensuring compatibility with the US Food and Drug Administration.

Ensuring product quality means that both the raw, semi-finished and end product need to be subject to alerts, which launch monitoring processes to activate inspections of the product’s physical characteristics and its production process. Among a product’s physical characteristics are inherent variables (microbiology, density, pH, etc.), which will have to be checked at different times depending on the values attributed to them. If these values fall within control margins, then the frequency of the checks may be different than if they fell outside confidence intervals.

Sometimes we know that if a product variable falls outside its range, it may be due to the influence of other independent variables. If we adjust the second variable, the first may then correct itself, due to the interdependence of many variables. It is important to ensure that exogenous constants during manufacture are stable in order to ensure a product’s homogeneity. We can conclude that
monitoring and ensuring quality, together with detailed analysis of results with deviation metrics, cause and root analysis, and Gaussian standard deviation, etc., help to keep manufacturing processes on track, and indeed optimise them.

To overcome the second challenge, businesses are changing the philosophy of manufacturing by making the entire organisation learn more about lean manufacturing theories. The company tries to raise awareness of the fact that each individual worker is responsible for manufacturing and quality. To increase productivity, it is essential to record and be aware of production line losses due to lack of usage (length of time the team is available against total availability), lack of output (quantity of acceptable product produced against total quantity produced), and lack of speed (real production speed against nominal speed). These three values are summed up in the OEE.

The variables mentioned above must be recorded, and the values and causes of each loss (and subsequent reduction in efficiency) must be monitored. Action can only be taken by measuring and visualising the losses linked to each cause (using Pareto charts), and by knowing in advance the impact that correcting each cause will have on the increase in overall production line efficiency.

This process is ongoing within the framework of continuous improvement. This means looking for reasons for loss of usage, profit or speed, and acting on them, and then measuring the correction’s impact in order to pave the way for new improvements.

The goal is to increase productivity with the resources available. In other words, minimising the resources needed for an already established production process. By delving deeper into these philosophies, product unit costs can be reduced. This is the end goal in beating company margins when it is not possible to have an effect on other economic variables, such as volume or end price.

Overcoming the aforementioned challenges will allow a company to significantly improve its position in relation to the competition. It will be able to improve the monitoring and security of its processes, which ensures cost reduction, protects the brand, and minimises the risks that affect the company's very survival, using technology that is well known, freely available, and tried-and-tested.

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Ensuring long-term success for pharmaceutical businesses depends on being able to develop predictive tools to support the safe and effective development of new medicines and their delivery to market. Shortening the journey from development to market offers a significant competitive advantage by reducing costs and increasing the chance of being first to market. Computer-based tools are growing in use across the sector using in silico, or computer-based, models that enhance the understanding of underlying biological and biochemical mechanisms\textsuperscript{1–3}, medical translation\textsuperscript{4,5} and the toxicological risk of active ingredients\textsuperscript{6,7}. Such in silico modelling can help to improve speed and efficiency in the pharmaceutical industry, but is often confounded by a lack of confidence in the models themselves.

Jon Timmis is Chief Executive Officer, Co-founder and a Director of SimOmics. He is also Professor of Intelligent and Adaptive Systems, and Head of the Department of Electronics at the University of York. His interests are in modelling and simulation and the engineering of fault tolerant systems. He was a Royal Academy of Engineering Enterprise Fellow and a previous holder of a Royal Society-Wolfson Research Merit Award.

Mark Coles is Chief Scientific Officer, Co-founder and a Director of SimOmics. He is a Senior Lecturer in Immunology in the Centre for Immunology and Infection. His interests are in integrating experimental and computational approaches to biological problems and the application of quantitative systems pharmacology to developing treatments for autoimmunity and cancer. He is the policy officer for the British Society of Immunology forum.

Jason Snape is Principal Environmental Scientist, AstraZeneca. For the past 20 years, he has been investigating the fate and behaviour of chemicals and pharmaceuticals in the environment and the environmental dimension of antimicrobial resistance. He currently manages AstraZeneca’s environmental research programme and chairs the EFPIA, Medicines for Europe and AESGP trade association group on ERA.

Stewart Owen is Senior Environmental Toxicologist, AstraZeneca. He is a fish physiologist investigating the impact of medicinal products on fish with particular focus on read across between human and non-target species. He also supports the development of animal alternative models and assays including in vitro assays to determine gill cell uptake and liver metabolism in fish.

Lina Gunnarsson is a post-doctoral fellow at the Department of Biosciences, University of Exeter. Her research investigates effects and risks of pharmaceuticals in the environment with particular focus on development of predictive approaches. She is currently working in an AstraZeneca-funded project called Towards Greener Drugs and she is also involved in an EU project (iPiE) on intelligent assessment of pharmaceuticals in the environment.

Alistair Boxall is Professor of Environmental Science, University of York. For the past 17 years, he has been researching the environmental fate, effects and risks of pharmaceuticals in the environment and has published extensively on this topic. He is past chair of the SETAC Pharmaceutical Advisory Group and Academic Co-ordinator of the 10.3M Euro iPiE project on intelligent assessment of pharmaceuticals in the environment.

Modelling and simulation technology has the potential to rapidly predict the outcomes of complex phenomena, without the cost of real-world experimental testing of each combination of variables, and without the practical and regulatory obstacles to such testing. With the widespread availability of information technology hardware capable of running remarkably sophisticated simulations, a large user base might be expected, but many potential users lack confidence in working with the technology and rationalising the data produced. The processes and assumptions that underpin computational simulations can be impenetrable to those not directly involved in their construction.

In recent years, the value of mathematical and computational models has been widely demonstrated and advances in computer-based modelling now make even more things possible, from looking at localised, spatial effects to wider systemic reactions in the host and potential environmental impact of active pharmaceutical ingredients (APIs). Using such models, novel drug regimes have the potential to be evaluated before being tested on animals and help support the translation of such regimes to support clinical trial design for humans.

However, there remains a fundamental lack of confidence in the models that will be used to help inform decisions, forming a barrier to wider uptake of this technology.

SimOmics, a spin out from the University of York, supported by The Royal Academy of Engineering Enterprise Hub has developed unique tools and methods that address this fundamental lack of confidence in the models, paving the way for a greatly expanded user base to harness powerful simulation technology.

SimOmics’ argumentation tool, ArtooPro\textsuperscript{8} provides a software framework for the construction of logical arguments to support evidenced-based decision making when using simulations. Users can build and manipulate graphical structures, comprising text-
containing nodes and arrows, in a step-by-step rationalisation of model construction. The syntax of ArtooPro derives from Goal Structuring Notation (GSN), which is used in safety-critical engineering. Structures can be exported as images and shared with others. SimOmics are exploiting this technology as part of a new project backed by the UK’s innovation agency, Innovate UK, and sponsored by NC3Rs.

In collaboration with AstraZeneca, the University of York and the University of Exeter, they will develop a ‘virtual fish ecotoxicology laboratory’ (VFETL) to assess the environmental impacts of drugs in the early phases of the development process.

The tool will also be invaluable in assessing the many pharmaceuticals that are currently in use (legacy APIs) that pre-dated the current regulatory requirements for environmental risk assessment (ERA). Current data for environmental testing suggests that >90% of APIs pose low or insignificant environmental risk through normal patient use, so the challenge is to target the 10% of concern. VFETL will dramatically reduce both the cost of ERAs and the need for animal testing.

All new APIs must undergo an ERA before being authorised. Currently, tens of thousands of fish are used worldwide as part of API ERAs. Development of predictive in silico models already has the potential to significantly reduce animal use (3Rs) and reduce research and development costs around the ERA of pharmaceuticals. These models, when combined with recently developed in vitro bioassays, can be used to determine up-front risk.

At the moment, there is a lack of evidence-based in silico approaches that are able to predict the movement of an API from the patient to aquatic systems and the subsequent impact on ecosystems. According to the Home Office\(^9\), 4.12 million scientific procedures involving animals were carried out in Great Britain in 2013 with fish, accounting for 12% (507,400) of them. Of all 2013 scientific procedures involving animals, 9% (375,000) were for toxicology studies and most of these (234,800) were for pharmaceuticals. Of all toxicology procedures undertaken in Great Britain in 2013 that involved animals, fish accounted for 11% (42,500), see Figure 1.

Work in a VFETL is aimed at developing an evidence-based integrated system for characterising the risk of APIs to fish species, thereby highlighting optimum testing strategies for APIs in development and ‘legacy’ APIs. The approach will be holistic, characterising the movement of an API from the patient, through the wastewater and river systems, into fish tissues and predicting the apical and non-apical effects on individuals and populations. By understanding the pathway from patient to effect, it will be possible to develop an optimum experimental testing strategy for an API.

The VFETL project aims to advance the rate of development and commercialisation of non-animal technologies and testing systems that better predict human and animal responses to, and the environmental effects of, chemicals and new molecular entities, including human and veterinary APIs, on ecosystems. While the focus will be on APIs, it is expected that the system will be applicable to other bio-active molecules, such as pesticides, biocides and consumer

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**Figure 1: Procedures using mice, rats and fish, 1995 - 2013. Reproduced from [9]**
products, e.g. printing inks and detergents. The aim of the VFETEL project is not purely to replace animal models with equivalent in silico and in vitro models; rather, it is to produce better systems that more accurately predict efficacy, safety and environmental effects and to refine the planning/execution of in vivo studies, thus reducing the overall number of tests needed in fish.

In particular, environmental impacts are of greatest concern with drugs that target key signalling pathways shared between fish and humans. The VFETEL project has the potential to benefit the natural environment by helping to anticipate and plan for overcoming harmful effects before discharge of drugs and their metabolites into the natural environment. It is expected that by applying the tool to the 1500 or so APIs that are currently in use, many of which little is known about, it should be possible to identify compounds that may be causing harm. By identifying these, it should be possible to identify mitigation strategies which could lead to longer-term improvements in the quality of the environment. The tools will help to focus ERA testing strategies earlier and flag possible cross-species/environment concerns earlier.

A recently published European Medicines Agency concept paper outlines the scope of proposed ERA guideline revision[10]. The VFETL could help inform two aspects of this report, specifically the use of known pharmacodynamic and pharmacokinetic properties in the development of ERA testing strategies, and evidence-based approaches that improve the use of existing fish ecotoxicology data to avoid unnecessary repetition of fish studies.

Evidence-based mathematical and computational approaches being developed as part of the VFETL have the potential to add massive value to the drug development and therapeutic pipeline by significantly reducing the number of unnecessary animal experiments, accelerating the transition to human clinical trials and providing a greater understanding of the environmental impact of drug development.

It is vital that we inspire greater confidence in mathematical and computational approaches, and new tools need to be developed to drive that confidence. The development of the VFETL will help provide new tools and greater confidence in evidence-based computational approaches.

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CASE STUDY: REMOTE BLOOD GLUCOSE PROFILING IN DIABETES – STREAMLINING THE CLINICAL TRIAL PROCESS FOR DIABETES TRIALS

by Kai Langel

eClinicalHealth Ltd has developed a new way of capturing blood glucose measurements directly from patients using Clinpal™, a novel patient-centric platform and a 3G-enabled glucose meter. The technology and the process has been proven in an entirely remote clinical trial. The solution is well suited for traditionally conducted trials, especially in late phase with large numbers of participants. The main advantages of the solution are that blood glucose measurements are transmitted automatically, providing real-time availability of data; there is increased compliance through automatic ‘coaching’ by the meter itself; and it is scalable, cost-efficient and achieves excellent patient satisfaction.

Kai Langel has been a pioneer in patient-facing systems for clinical trials since 2000. Through his involvement in technical, operational and scientific roles, he has gained an in-depth understanding of all aspects of the patient journey in clinical trials from recruitment and engagement through data capture. He is actively involved in providing guidance to eClinicalHealth’s customers on how to best operationalise new and innovative methods to make it easier and more efficient for sites and patients to participate in clinical trials. Kai is a respected leader in the industry and frequently speaks at industry conferences. He has authored several articles targeting eClinical working practices and lessons learned.

Current challenges
The current process for capturing blood glucose measurements in clinical trials is far from optimal. Many studies still rely on paper logs, with more advanced ones utilising two separate devices: a smartphone provided to the patient to use as an eDiary and a Bluetooth-enabled glucose meter that they use for measurements.

It is well known that paper entries suffer from serious, undetected compliance issues where patients do not make measurements and entries at the correct time. It is also impossible to provide sufficient evidence to satisfy the US Food and Drug Administration’s requirement that the data was captured according to the study protocol. Electronic diaries solve this problem, but can be difficult for patients to use and require two separate devices to be used and connected together. This leads to compliance issues and increased burden on the patients, and delays in data availability to the site and the sponsor. Electronic diary devices are also expensive to set up and maintain.

Another important challenge in diabetes clinical trials is the tracking of hypoglycaemic events and information surrounding them. While the events themselves can be detected and counted, even based on analysing paper diary data, it is impossible to capture information surrounding the events in a systematic and reliable manner.

Introducing the smart glucose profiling solution
The eClinicalHealth solution utilises a combination of seamlessly integrated technologies. The blood glucose data is captured using a single, intelligent and connected device “Mendor Smart”, provided by Mendor Oy (Figure 1). This meter not only captures the glucose measurements but also actively guides patients to perform the measurements at the correct time according to the defined protocol. Measurements are automatically transferred into eClinicalHealth’s Clinpal™ platform in real time, without requiring any action from the patient. The smart system allows the patients to personalise their daily routines within the Clinpal™ system, which then feeds this information back to the smart meter to remind the patients at the correct time points: before going to bed, just after waking up, after breakfast and before and 2 hours after the patient-defined main meal of the day. This makes the process more adapted to a patient’s personal lifestyle.

A logbook view (Figure 2) is available for the site and the patient in Clinpal™. This view helps patients manage their own compliance and make any necessary adjustments to their daily meal routines. Changes in daily routines will be automatically adjusted also in the Smart device, and the reminder schedule in the device is adjusted appropriately. The same view is also available for the sites/clinical research associates for efficient, remote patient compliance monitoring.
The system supports 5- or 7-point self-monitoring of blood glucose profiles as well as custom profiles as required by the protocol. The system also supports a novel, more flexible profiling protocol, which allows the patients to choose days that are representative in their normal life and complete readings over a longer period of time. Measurements can be spread out over several days, giving a better overview when compared to a single day with several measurements.

Once enough successful pair readings have been captured, the system provides a complete glucose profiling report (see Figure 3). The system is very easy for patients to use and in a fully electronic study the glucose meters and accessories can be supplied directly to the patients. Patients can complete the device registrations (Figure 4), test readings and the actual profiling (Figure 5) independently, with the overall end-to-end lifecycle supported using the Clinpal™ system.

**Tracking hypoglycaemic events**

The glucose measurements from the patient’s device are available in the Clinpal™ system in near real-time. This allows the system to start an automated workflow in response to hypoglycaemic values immediately and trigger a diary form to be completed by the patient. The patient receives a notification, requesting them to complete the diary with more details about the event. This method then allows the timely capture of other important factors, such as their symptoms, diet, insulin use, exercise and any other factors immediately surrounding the event. The Clinpal™ solution allows the timely capture of this information, supplemented by an automatic and reliable audit trail.

**The Verkko remote clinical trial**

This solution was tested in a clinical trial that was conducted completely remotely using the online Clinpal™ system. One coordinating study site was involved and the participants did not need to make any physical site visits. Participants were recruited through social media and after automated pre-qualification, were referred to the study site for final online review and approval (see Table 1).

Once accepted into the study, the participants were asked to read the patient information materials and electronically sign the electronic informed consent form through the Clinpal™ task management (Figure 6).

**Table 1: Participant statistics**

- 74 registered candidates recruited via a paid Facebook campaign; 60 of the 74 registrations were enrolled in the study (81% conversion rate)
- 51 participants started profiling
- 46 participants completed profiling successfully (9% drop-out rate)
- Average age of completers: 56 years old
- Average time spent in the study per patient: 8 hours
After the investigator provided their counter-signature, the Smart device and other study supplies were sent directly to the address given by the participant. Participants then picked up their devices from the post office where they also identified themselves. The Clinpal™ system then guided the participant through registering their device in the system and performing a test reading. After this, the Smart device guided the participant through the rest of the profiling using a novel profiling process that gave the participants the opportunity to conduct the profiling over several days and also leaving out days/situations that were not representative of their usual routines. At the end of the trial, participants returned their devices and completed a satisfaction survey.

Results from the Verkko trial were compared with a sister trial, which was conducted earlier using a similar protocol, but using a more traditional site-based process and conventional blood glucose meters.

The feedback from the participants is very encouraging and most patients found the study very modern and convenient to participate in. Their compliance with the structured glucose profiling was impressive and most participants seemed to have understood the study protocol very well based on the digital materials provided and the guidance from Clinpal™. Participants were clearly very engaged with the study and had high expectations for responsiveness from the site, sometimes expecting near instant responses to messages and support requests (Table 2).

From the perspective of the study site, the ability to remotely monitor and manage patients was noted as an especially valuable feature.

New technologies are being developed at rapidly increasing velocity and many industries are being transformed by this “technology tsunami”. Clinical research, however, is highly regulated and conservative and technology adoption remains a challenge. It is not enough to develop technology solutions, but they also must be proven before they will be operationalised in studies. This article has highlighted not only how powerful new technologies can be combined to provide an efficient solution, but has also demonstrated innovative methodologies that involve patients and study sites in testing the solution in the field. Hopefully, this pioneering work will aid the clinical research industry in accelerating the adoption of technologies that make research activities more efficient and patient friendly.

eClinicalHealth are the developers of the solution and the team includes experts in clinical trial innovation, data management as well as leading specialists in diabetes. We will work together with you to customise the solution in order to optimise it for the needs of each study protocol. Visit us at www.clinpal.com or contact Suzie Harvey (sharvey@eclinicalhealth.com) for further information.
**BIODICAL PRODUCTS REGULATION – ‘CLEANING’ UP THE MARKETPLACE**

by John Chewins

Applying to all biocidal products, EU Regulation 528/2012 Biocidal Products Regulation (BPR) came into force in September 2013. The regulation is designed to control the selling or ‘placing on the market’ of biocidal products. It involves the analysis of a biocidal product’s performance (efficacy), toxicity, environmental fate and risk during use. This paper aims to summarise some of the key points raised when sourcing BPR-approved products.

Authorisation as an ‘Active’
The BPR is a two-step process. Firstly, biocidal active ingredients must be authorised as ‘Actives’. An important factor in BPR product/‘Active’ assessment is the manner in which a biocidal product is intended to be used. The biocidal product/‘Active’ must be authorised for use in accordance with specific categories – called Product Types (PTs). There are 22 different PTs. These range from PT1 ‘Human Hygiene’ through to PT22 ‘Embalm ing fluids’. To be marketed for a certain application, biocidal products must be authorised for use within a specific PT. For example, hydrogen peroxide vapour (HPV) use within an animal research facility would require PT3 ‘Veterinary’ authorisation. If a biocidal product is authorised solely for use in PT1 ‘Human hygiene’ applications, it cannot be used as a disinfectant for hospital surfaces, which requires a PT2 ‘Public Area’ authorisation. Biocidal products are likely to possess authorisations for a number of PTs (or use areas). Users should always ensure that a disinfectant product or system is authorised for their specific intended use.

Proving performance (efficacy)
Next is the second step. Once an ‘Active’ has been authorised, manufacturers of biocidal products/systems using or containing that ‘Active’ are required to submit a technical dossier to a European Competent Authority (CA) by a specified deadline. This technical dossier is to include evidence for supporting the use, risk, toxicity and efficacy claims and must also indicate the process parameters used to support such claims – including, where applicable, the application equipment used and contact times. In other words, compliance with the BPR requires that both the biocide (in this case the hydrogen peroxide aqueous solution) and the equipment (in this case the vapour generator or nebulising/aerosolising machine) are tested together to support any efficacy claims. In the case of hydrogen peroxide, the deadline for technical dossier submission is February 2017. If a manufacturer of a biocidal product/system does not submit their dossier by the specified deadline, it is considered an unauthorised biocidal product/system and it shall be illegal to market that product/system.

The role of Article 95 in the BPR
In September 2015, Article 95 of the BPR came into force. Article 95 states that a supplier of any ‘Active’ intended for use within a biocidal product/system must be registered under the BPR process. The supplier of the ‘Active’ must be present on a list called ‘The Article 95 List’. Producers of disinfectant products/systems may only use ‘Actives’ sourced from suppliers who are compliant with Article 95 (i.e. they are on the list) and may only market their product for a specific use if that use or PT is associated with the ‘Active’ on the Article 95 list. Products marketed as disinfectants/biocides utilising biocidal ‘Actives’ from a non-Article 95-compliant source are illegal.

In practice, a number of hydrogen peroxide-based decontamination systems are able to utilise hydrogen peroxide sourced from a number of different manufacturers/sources. An example of a commonly used supply is Merck’s industrial hydrogen peroxide. Here, this manufacturer places its industrial hydrogen peroxide on the market for use as an industrial product – with no intention for it to be used as part of a biocidal process. If a user chooses to use such hydrogen peroxide for a disinfection purpose then the product is considered to be a biocide, and as the active does not come from an Article 95-compliant source, it is an illegal use. Companies using industrial hydrogen peroxides as biocides should review their regulatory position and assess the risks to their business operations. Users should also be aware that a biocidal product claiming to be compliant with the BPR, based on the fact that their biocidal product contains an ‘Active’ from an Article 95-compliant supplier, may not necessarily remain compliant with...
the BPR in the future. Compliance with Article 95 is only a first step on the path to a product/system that is in full compliance with the BPR. Biocidal products (using their delivery system) must also undergo authorisation by one or more European CAs, which involves assessment of use, risk, toxicity and efficacy. For manufacturers of decontamination systems that deliver biocides via an airborne route (such as HPV/fogging systems), regulators require the submission of efficacy data produced using the standard NF T 72-281 (2014).

Figure 1: Impact of the BPR on hydrogen peroxide automated airborne disinfection systems.

Airborne disinfection systems - efficacy requirements and the role of standard NF T 72-281 (2014)

Bio-decontamination systems that distribute a biocide via an automated spray, mist, fog, vapour, etc. are considered ‘airborne automated disinfection systems’. Here the biocidal product/‘Active’ (i.e. in the case of hydrogen peroxide-based systems, the hydrogen peroxide liquid) must be tested in combination with its application device/system. The European Chemicals Agency has produced a detailed guidance document on the efficacy assessment requirements for biocidal products, particularly in PTs 1–5. Airborne disinfection systems, such as Bioquell’s, must be tested against NF T 72-281 (2014) in accordance with the PT use scenarios claimed by the biocidal product.

NF T 72-281 is a challenging test against a wide range of microbiological organisms including bacteria, viruses, fungi, yeasts, spores, mycobacteria and bacteriophages, with soiling conditions relevant to the claimed use scenario.

For example, a hydrogen peroxide-based system intended to be used in a hospital without any qualifications, must pass the ‘Human Health’ section of the test, which stipulates the following.

- 5-log reduction of the specified bacterial strains (such as Pseudomonas aeruginosa)
- 4-log reduction of yeasts and fungi
- 3-log reduction of spores
- 4-log reduction of viruses
- 4-log reduction of Mycobacterium

The NF T 72-281 test methodology attempts to assess real-world application of the biocide via its associated delivery system or generator. The organisms are dried onto stainless steel tokens, which are located on the opposite side of the room to the generator/equipment, facing away from it. The biocidal liquid must be tested in combination with the specified manufacturer’s generator. The dose of hydrogen peroxide, and its contact time required to achieve the stipulated reductions, should be described.
NF T 72-281 is being used as the basis for a new European standard method for all airborne disinfection systems – this is why NF T 72-281 is being used as the standardised test for product/system registration under the BPR.

For hydrogen peroxide, the entry date onto the Union list of approved substances of the BPR is 1 February 2017.

Implications for purchasers of airborne disinfection systems

To best future-proof processes and procedures, users of all airborne disinfection systems and facilities looking to purchase such systems should question manufacturers as to whether their systems have been tested to and passed NF T 72-281 (2014). If the NF T 72-281 (2014) test has been passed, users should request the following information.

1. The concentration of the biocide used in the test (often given as a percentage), e.g. Bioquell uses 35% hydrogen peroxide.
2. The contact time used to kill the organisms specified (usually given in hours and minutes).
3. The organisms killed (i.e. Aspergillus brasiliensis).
4. The level of kill achieved (i.e. > log 5 reduction).

These figures can then be compared with other suppliers who have also passed the NF T 72-281 (2014) test. All airborne disinfection system suppliers should be working to provide a validated and approved biocidal product under the BPR over the next few months. If suppliers are planning to meet the regulations by providing a ‘new’ biocidal product to replace an existing product, or supply a new product derived from a biocidal ‘Active’ sourced from a new supplier, then biocidal/bio-decontamination processes currently conducted by users may need to be revalidated. Should a new biocidal product be ‘introduced’ as a ‘replacement’ just as the new regulations come into force in 2017, there could easily be a bottleneck delay in the user business as all the relevant standard operating procedures may need to be rewritten en masse. To avoid such issues and to build a system that will be futureproofed in 18 months’ time, come and talk to Bioquell. If you have any questions or would like to discuss the implications of the BPR with one of our experts in this area, feel free to drop Bioquell a note or call one of our global offices.

References


For hydrogen peroxide, the entry date onto the Union list of approved substances of the BPR is 1 February 2017.

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The current review period has seen a number of changes in the regulation of medicines and regulatory guidance in the EU, International markets and the USA

USA
Food and Drug Administration (FDA) approves a second biosimilar
The FDA has approved Inflectra (infliximab-dyyb) for multiple indications. It is biosimilar to Janssen Biotech, Inc.’s Remicade (infliximab), which was originally licensed in 1998. This second biosimilar will be marketed in the USA by Pfizer.

Recommendations to reduce the risk for Zika virus transmission in USA via blood, cells and tissues
The FDA has issued a new guidance recommending the deferral of individuals from donating blood if they have been to areas with active Zika virus transmission, potentially have been exposed to the virus, or have had a confirmed Zika virus infection. Separate guidance deals with transmission risk of Zika virus from human cells, tissues, and cellular and tissue-based products from both living and deceased donors.

Data Integrity and Compliance with CGMP
The FDA has increasingly observed current good manufacturing practice (CGMP) violations involving data integrity during inspections. Ensuring data integrity is an important component of industry’s responsibility to ensure the safety, efficacy, and quality of drugs. Such CGMP violations have led to numerous regulatory actions, including warning letters, import alerts and consent decrees. This draft guidance contains a set of Q&As and clarifies the FDA’s requirements/the role of data integrity in CGMP.

Comparability Protocols for Human Drugs and Biologics
This guidance provides recommendations to holders of applications for human drugs and biologics on implementing a chemistry, manufacturing and controls post-approval change through the use of a comparability protocol. It replaces previous draft guidance and encourages applicants to employ the following.
- Effective use of knowledge and understanding of the product and manufacturing process.
- A robust control strategy.
- Risk management activities over a product’s lifecycle.
- An effective pharmaceutical quality system.

Europe
European Formulary for paediatric medicines: rules and criteria approved
The European Committee on Pharmaceuticals and Pharmaceutical Care adopted the detailed framework of a project for a European Paediatric Formulary. The future online publication will give hospital and retail pharmacies all over Europe access to a formulary for the preparation of unlicensed formulations of paediatric medicines. The formulary will contain a compilation of appropriate formulations, in case no appropriate licensed product is available.

Potential presence of mutagenic alkyl sulfonates in active substances
The last of five general methods, elaborated by the European Pharmacopoeia’s Mesilate Working Party, were implemented on 1 April 2016. In addition, the European Pharmacopoeia Commission had also decided to revise the production sections of the monographs for mesilate-, besilate- or tosilate salts of active substances to inform users of the risk related to the potential presence of such mutagenic impurities.

Revised European Pharmacopoeia General Chapter on Raman Spectroscopy
This revised chapter applies from 1 April 2016. Raman spectroscopy has, in recent years, received more and more attention for pharmaceutical applications. It is used regularly for the identification and characterisation of material. Newer Raman technologies are available and existing ones have been developed further. Hand-held instruments are now available which are suitable for identification purposes. Raman spectroscopy is increasingly used for Process Analytical Technology or for chemical imaging applications.

Medicines and Healthcare Products Regulatory Agency (MHRA)

Delegated Regulation 2016/161 (Applicability to UK)
This Delegated Regulation supplements the Falsified Medicines Directive and introduces two mandatory safety features that will allow medicines to be verified and authenticated.
- A unique identifier (a 2D data matrix code and human readable information) to be placed on medical products that can be scanned at fixed points along the supply chain.
- Tamper evident features on the pack.

These safety features on the packaging of medicines which fall within the remit of the Delegated Regulation must be applied in the UK no later than 9 February 2019.

Improvements to the change of ownership application (COA) process for medicines marketing authorisations
The MHRA aims to grant all COAs within 42 days. The application form now has advice to help fill in the COA form and a revised list of supporting documentation. If there
are no outstanding issues, the COA can be granted within 30 days.

**International**

China (State Food and Drug Administration) requires generics to obtain brand name drug quality
Pharmaceutical companies must make sure the quality and efficacy of their drugs are on par with brand name drugs. This strengthens the previous 2013 requirements for bioequivalence. It now requires bioequivalence to be determined against the brand name version, or should this no longer be available then against an imported, internationally recognised generic version.

For further information on these and other topics, we suggest you refer to the websites of relevant regulatory bodies and to current and past editions of “GMP Review News” published by Euromed Communications. To subscribe to this monthly news service contact info@euromedcommunications.com

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Please contact the Managing Editor, Sue Briggs (suze.briggs@sky.com) for further information or submissions.
The clean and the dirty

Cleaning
Medicine makers revere high-level guides, such as in good manufacturing practice. In turn, those spawn – personalised for their facility – more specific and focused standard operating procedures. One important compulsion is cleaning. Dirt, according to the anthropologist Mary Douglas, is matter out of place. Gardeners uproot weeds lest they grow rampant. But gardeners nurture desired plants: the result is a cultured pure crop. Matter (particularly the active ingredient) that is required in one pharmaceutical product pollutes another; witness obsessing about cross-contamination risks, testing and validation of cleaning procedures. The culture or cell line “seeding” a bioengineered batch must be pristinely pure.

Ed Kanegsberg, physicist, offers a mastery overview of cleaning physics. His perspectives on capitalising on energy transfer, such as heat or mechanical vibration (think ultrasonic sound bath, ultraviolet lamps, microwaves), phase change (freezing off chewing gum; only its therapeutic variants are legal in Singapore), rubbing (“elbow grease” or machine) and the value of the “gecko feet” of microfiber cloth, riveted me. Arguably, his perspective overlaps with chemistry. Choose a suitable polar or non-polar material (broadly, like dissolves like), surfactants and solvents and study Teas and Hansen diagrams.

Crescendo
Pharmaceutical obsession for cleanliness perhaps roars to a crescendo during aseptic production. Such rituals! Such energy used in forcing through fine filters, spraying 70% isopropanol, cleaning and scrubbing, guarding over sacred aseptic spaces and ceremonies, hammering in of attitudes during training! The result is guarded spaces that make most operating theatres look like lavatories. Of course, operating theatres have advantages. The odd microorganism – (living) matter in the wrong place – may well be destroyed by the patient’s natural defences; if those fail, the pharmaceutical industry offers assorted antibiotics, one of which generally works (at present). But reflect that what is “clean” in one industry is “dirty” in another. Witness that water for injection used in the pharmaceutical industry would be filthy, applying standards used in the silicon chips industry.

Cygrus C. M. Moody has built upon Douglas’s perspective and studied “dirt” or impurities in materials science laboratories. Obviously, medicine makers try hard to avoid contaminating samples for laboratory analysis. But Moody uses perspectives on the clean and the dirty that chime with industrial pharmacy. For example, particles must be of the required particle size; in some formulations, activity (and if too high, toxicity) increases as particle size reduces.

Power
Longer term, medicine makers are fighting a losing battle, for the purest of products will decompose into matter that should not be there; the Arrhenius equation may quantify this; it prophesies the medicine’s fate. Decomposition is one reason to give expiry dates. If they are to be believed, one day a batch is acceptable and the next it is not. I suggest that not science but culture and taboo rule in that situation. Those “in the know” appreciate that, empirically, little has changed. But the whole force of society, of sovereign nation states and their combined power (such as the European Union) obliterates that logic. That might is the combined power of concerned citizens, including patients and their pressure groups, healers, regulators, journalists and judges. Another player in this “game” is the British parliament. There, politicians parley and do not fight; famously, ruling party and opposition are separated by an empty divide the width of two sword lunges. Yet other hired players have stern privileged faces: the citizens such as the police authorised to use force (including lethal).

You too have privileges. You are trusted to be carers making effective safe medicines that penetrate patients’ bodies – with meticulous cleanliness. Remember that if anybody criticises your domestic washing up.

Malcolm E Brown
The annual General Assembly of EIPG was held this year in Paris on 4–5 June. The meeting celebrated the 50th anniversary of EIPG and President Jean-Pierre Paccioni and his team had worked hard to make it a memorable occasion.

The new President of EIPG is Professor Claude Farrugia, President of the Malta Qualified Persons Association, who has been EIPG Vice-President of Communications since 2008.

Brigitte Saunier, member of Section B, Ordre des Pharmaciens of France was elected as EIPG Treasurer.

Bureau members reported on their activities during the year and a range of “Hot Topics” was presented by each National Delegate. The annual reports of Member Associations can be found on the EIPG website under “About EIPG/Member States”

EIPG Awards were presented to Past-Presidents of EIPG and for outstanding service, to Par Tellner, European Federation of Pharmaceutical industries and Association (EFPIA), a past EIPG Vice-President of Education and Careers during his time as the delegate for the Swedish Pharmaceutical Association.

Luigi Martini and Jane Nicholson from the British Royal Pharmaceutical Society and Professor Rigamonti, AFI (Italian Association of Pharmaceutical Industry) were made Fellows of EIPG, the latter having his award presented to him at the AFI Symposium in Rimini.

The President’s award was given to Roberto Frontini (Past-President of the European Association of Hospital Pharmacists (EAHP) and Pascal Teinturier (Section B Ordre des Pharmaciens France).

As a token of his many years of work on behalf of EIPG as both President and Treasurer, Jean-Pierre Paccioni was presented with an engraved Murano glass pestle and mortar.

A Scientific Symposium was held at the Ordre on Friday 3 June entitled “How Medicines have changed over the past 50 years; what developments for the future?”. The Moderator was Professor Jayne Lawrence, Kings College London and Chief Scientist for the Royal Pharmaceutical Society. Speakers included Professor Francois Chast, Head Pharmacist Hospital Hotel-Dieu, Cochin Hospital who described Medicines evolution over 50 years and Professor Luigi Martini, Roche Innovation and Kings College London who talked about Personalised medicines and the role of pharmacy. Frederic Bassi, President of the Industrial Section, Ordre des Pharmaciens, explained the Role and duties of the Pharmacien Responsable and Philippe Coatanea’s presentation was made by Ivo Bastos, Alliance Healthcare and described the Evolution of wholesale distribution: what’s next?

Professor Claude Farrugia, EIPG Vice-President Communications concluded with the EIPG vision of the future. The speakers’ slides will soon be available in the Media Section of the EIPG website.

The Symposium was followed by a presentation from Olivier Porte on the Pharmaceutical Dossier; a system initiated 11 years ago and run by Winpharma for adverse drug reaction reporting. In 2011, the French National Drugs Agency (AMSM) approved the system for batch recalls involving 23,000 pharmacies in France, each of which must confirm receipt of every recall message. The system is now capable of advising on drug shortages and is connected to 100,000 physicians and 5000 pharmacists working in hospital. By the end of this year, more than 50% of community pharmacists in France will be using the system for information on drug shortages.

Working Group on the Unique Identifier and Quality Systems in the Pharmaceutical Supply Chain

The group discussed background documentation issued in recent months on the implementation of the unique identifier and the medicines verification system in Europe. The ramifications of the Delegated Act on quality systems throughout the pharmaceutical supply chain were analysed in detail. Concerns were expressed that industrial pharmacist organisations, at both a European and national level, should be guaranteed to be consulted, in order to ensure timely and appropriate input from organisations representing the professionals who would be responsible for operation of the system throughout the pharmaceutical supply chain. Delegates were, therefore, advised...
to start preparing, to get involved and to participate in the consultation.

**Working group on what will be the job of the industrial pharmacist in 10 years time and what will be his/her educational and professional needs?**

Career pathways, the key skills needed for students in the evolving pharmaceutical industry and whether pharmacy is “fit for purpose” as a profession to serve industry were discussed. The evolution of new products means that the education of the pharmacist needs to move from chemical science to molecular biology. Whilst the scientific basis of the pharmacy course is fundamental, industrial pharmacists need some commercial, operational and project management skills. Information technology skills and statistics are required, especially for pharmacists working with medical devices. There needs to be student engagement with industry and industrial pharmacists should provide lectures to pharmacy students.

Members of national associations should be actively involved with their schools of pharmacy and provide lectures and advice about industry. EIPG needs to work closely with the European Association of Faculties of Pharmacy (EAFP) and the European Pharmacy Students’ Association (EPSA) and promote industrial courses and careers. EIPG should assist with the development of competencies in business and in jobs such as those in regulatory affairs, pharmacovigilance, market access, quality assurance and for the qualified person. In countries where a new pharmacy curriculum is proposed, the local Member Association should contact EIPG for support.

**EPSA Annual Reception March 2016**

Following a presentation of EPSA’s current activities, the main topic of the day was “Will reducing prices of medicines ensure sustainability of healthcare systems in Europe?” A debate was organised with a group of experts:

- Menno Arnout, Director of Association Internationale de la Mutualité
- Yannis Nastis: Policy Coordinator, Access to Medicines from European Public Health Alliance
- Elisabeth Kuiper: Director of European Affairs, EFPIA
- Jurate Svarcaite: Secretary General from Pharmaceutical Group of the European Union
- Elke Grooten: Director of Public Affairs, Sandoz Europe

The audience included about 100 pharmacy students and this controversial topic was discussed in a cordial atmosphere. The following are some key reflections.

- Costs linked to research and development must be more transparent.
- Access to medicines is becoming a big social and human issue.
- Pharmacists play a key role in ensuring sustainability of the healthcare system.
- Pharmacists can help to improve treatment compliance. The price of the carton of tablets can be reduced but not the price of the resources linked to the services.
- The access to patients has doubled whilst having no increase in the healthcare budget.

The conclusion of the meeting was that there is no black and white answer to the question posed. However, future pharmacists will be key actors in ensuring access to medicinal products and sustainability of the healthcare system.

Thomas Lion
VAPI/UPIP

**Other news**

Claude Farrugia represented Jean-Pierre Faccioni at the EAHP Annual Congress, where he met the President and other members of the Board and Executive Team to discuss matters of mutual concern. Jane Nicholson attended a wrap up meeting on Phar-In, the European Commission-funded project which has produced a series of e-learning courses on biotechnology.

Anni Svala, EIPG Vice-President Education and Training, attended the EPSA Annual Congress and reviewed various student projects with their Executive. Thomas Lion, VAPI/UPIP (the Belgian National Association) attended the EPSA Annual Reception at the European Parliament. A summary of his report is shown below.

Jane Nicholson
Executive Director
jane@nicholj.plus.com

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**JULY**

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<tr>
<th>Date/Time</th>
<th>Location</th>
<th>Event Description</th>
<th>Website Link</th>
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<tbody>
<tr>
<td>4–6 October 2016</td>
<td>Barcelona, Spain</td>
<td>CPhl Worldwide</td>
<td><a href="http://www.cphi.com">www.cphi.com</a></td>
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<tr>
<td>17–18 October</td>
<td>Huntington Beach, CA, USA</td>
<td>2016 FDA Universe of Pre-filled Syringes and Injection Devices</td>
<td><a href="http://www.pda.org">www.pda.org</a></td>
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<tr>
<td>18–20 October</td>
<td>Berlin, Germany</td>
<td>Global Pharmaceutical Regulatory Affairs Summit</td>
<td><a href="http://www.informa-ls.com">www.informa-ls.com</a></td>
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<tr>
<td>24–26 October</td>
<td>Arlington, VA, USA</td>
<td>11th Annual PDA Global Conference on Pharmaceutical Microbiology</td>
<td><a href="http://www.pda.org">www.pda.org</a></td>
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<tr>
<td>25–26 October</td>
<td>Berlin, Germany</td>
<td>Visual Inspection Forum</td>
<td><a href="http://www.pda.org">www.pda.org</a></td>
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<tr>
<td>26–27 October</td>
<td>Cambridge, UK</td>
<td>BioData World Congress 2016</td>
<td><a href="http://www.healthnetworkcommunications.com">www.healthnetworkcommunications.com</a></td>
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<tr>
<td>3–4 November</td>
<td>Washington, DC, USA</td>
<td>2016 PDA Outsourcing/CMO Conference</td>
<td><a href="http://www.pda.org">www.pda.org</a></td>
</tr>
<tr>
<td>7–9 November</td>
<td>Istanbul, Turkey</td>
<td>2nd International Conference and Expo on Drug Discovery and Designing</td>
<td><a href="http://drug-discovery.pharmaceuticalconferences.com/">http://drug-discovery.pharmaceuticalconferences.com/</a></td>
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<tr>
<td>7–9 November</td>
<td>Istanbul, Turkey</td>
<td>2nd International Conference and Expo on Parenterals and Injectables</td>
<td><a href="http://parenterals-injectables.pharmaceuticalconferences.com/">http://parenterals-injectables.pharmaceuticalconferences.com/</a></td>
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<tr>
<td>15–16 November</td>
<td>Washington, DC, USA</td>
<td>Outsourcing &amp; Contract Manufacturing</td>
<td><a href="http://www.pda.org">www.pda.org</a></td>
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