



TACKLING ANTIBIOTIC RESISTANCE: COMMUNITY INTERVENTIONS

Following the WHO direction on 'One Health', this year pharmacists at the Fédération Internationale Pharmaceutique (International Pharmaceutical Federation, FIP) came together in Glasgow to hear from the Global Respiratory Infection Partnership (GRIP) on how pharmacy can play a frontline role in reducing the inappropriate use of antibiotics

Antimicrobial resistance (AMR) has been described as the quintessential One Health issue because it can be transferred between and within humans, animals and the environment, said Prof Sabiha Essack, South African Research Chair in Antibiotic Resistance and One Health, and Professor in Pharmaceutical Sciences at the University of KwaZulu-Natal, South Africa, opening the symposium.

Despite AMR being recognised as a significant health issue, it is very difficult to accurately assess the scale of the global problem. There are very few robust representative national studies on AMR and even well-resourced, developed countries cannot attest to the robustness of their surveillance data, said Prof Essack. Without this surveillance data little is known about the nature and extent of mortality due to drug-resistant infectious disease and this creates a vicious cycle.

| THE GLOBAL CHALLENGE

Prof Essack presented data on the impact of AMR. The O'Neil report, commissioned by the UK Government and published in May 2016, concluded that if nothing is done, by 2050 there will be 10 million deaths attributed to AMR. This would cost the world US\$10 million; a modelling exercise by the World Bank predicted that global GDP would be reduced by 1.1% in a low AMR scenario and by almost 4% in a high AMR scenario.

Due to the scale of the potential impact, AMR is receiving unprecedented political attention across the globe. The pinnacle of the political commitment was when AMR was addressed at the UN General Assembly in September 2016.

The UN political declaration strongly endorses the Global Action Plan that was formulated by the tripartite alliance of the World Health Organisation (WHO), the Food and Agricultural Organisation of the United Nations (FAO) and the World Organisation for Animal Health (OIE).

“ AMR has the ability to severely and adversely affect progress towards sustainable development goals on health, agriculture, animals, environment and food security, as well as having indirect effects on poverty and on other areas

Prof Sabiha Essack

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In terms of the WHO approach, Prof Essack outlined the five principles underlining the Global Action Plan on AMR:

1. Whole-of-society engagement
2. Prevention first
3. Access not excess
4. Sustainability
5. Incremental targets for implementation

These are supported by five strategic objectives:

1. Improve awareness and understanding of AMR
2. Strengthen knowledge through surveillance and research
3. Reduce the incidence of infection through effective hygiene and infection prevention and control (IPC)
4. Optimise the use of antimicrobial medicines in human and animal health
5. Ensure sustainable investment through research & development

To support each of these strategic objectives, the WHO has been doing a tremendous amount in terms of guidelines and implementation.

Alongside World Antibiotic Awareness Week, the WHO Competency Framework on the education and training of healthcare workers has just been completed. Furthermore, the Global Antimicrobial Surveillance Systems and the Global Programme for the Surveillance of Antimicrobial Consumption provide different ways to monitor consumption. In addition, the IPC section of WHO is working to develop core infection control programs, while the WHO list of essential medicines was updated in 2017 to include a section dedicated to AMR, flagging which antibiotics should be made available and which require monitoring in order to measure any increase in resistance.

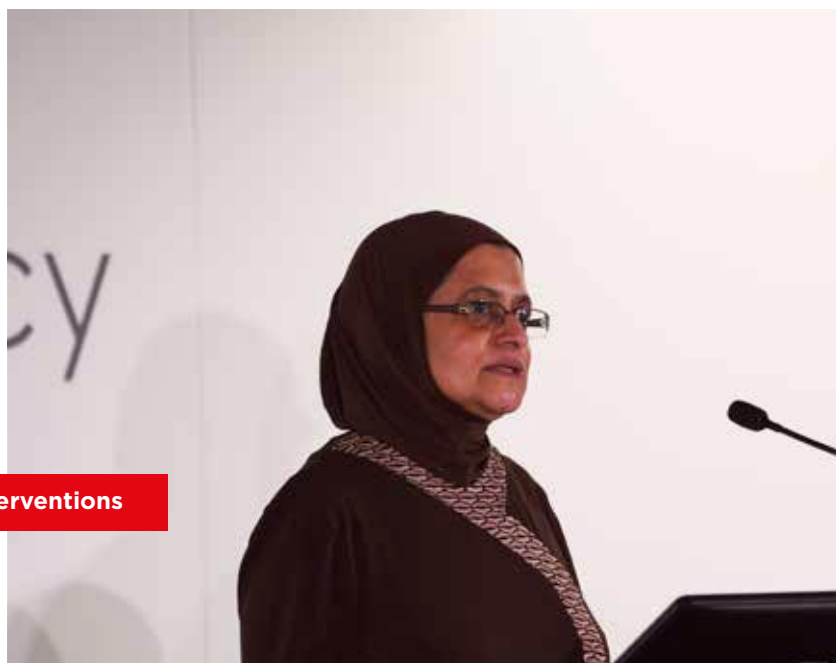
The FAO is another key member of the tripartite alliance. It has its own action plan on AMR that focuses on:

1. Improving awareness on AMR and related threats
2. Developing capacity for surveillance and monitoring of AMR and antimicrobial use (AMU) in food & agriculture
3. Strengthening governance related to AMU and AMR in food and agriculture
4. Promoting good practices in food and agricultural systems and the prudent use of antimicrobials

The third member of the alliance is the World Organisation for Animal Health (OIE) who have a strategy on AMR and the prudent use of antimicrobials in animals. OIE monitor the consumption of use stratified by terrestrial, aquatic food and wild animals every year, using information provided by individual countries. This increases awareness and understanding, strengthens the knowledge base for surveillance and research, encourages the implementation of international standards and supports good governance and capacity building.

After the UN political declaration, the Inter-Agency Coordinating Group (IACG) on AMR was formed. The purpose of this group is to coordinate all actions taken at global and regional levels and give guidance on how to address AMR comprehensively. Currently the IACG is addressing AMR through 14 content areas consolidated into three groups that are intended to reduce the need for and unintentional exposure to antimicrobials, to optimise the use of medicines, and to invest in innovation supply and access.

AMR is “a tragedy of the commons”. This is where individuals and groups act in self-interest to the detriment of the best interests of the whole of society by depleting a common resource, in this case antimicrobials. Antibiotic conservation requires coordinated, multi-pronged, multi-stakeholder, multidisciplinary partnerships underpinned by national and international policies that suspend sectoral interests for public good. This requires a One Health approach and the conscious decision to be unbiased and do the best that you can to conserve antibiotics for future generations.



| PREVENTION IS KEY

The challenge of addressing AMR through effective prevention can be addressed in two ways, said Prof Kozlov, Chief Specialist to the Ministry of Health for the Russian Federation on Clinical Microbiology and Antimicrobial Resistance, and Head of the WHO Collaborating Centre for Capacity Building on Antimicrobial Resistance Surveillance and Research.

AMR can be addressed firstly through the development of new entities, for example new vaccines, new antimicrobials, alternative therapies such as antibodies and potentially bacteriophages. Secondly, AMR can be addressed through the development methods for AMR detection including genetics, genomics, proteomics and other digital sciences.

The role of vaccines in the prevention of disease is well understood, but Prof Kozlov advised that we also need to look at vaccines as a substantial and evidence-based tool to curb AMR. The use of a particular vaccine against a bacterial infection will lead to protection from this infection, thus reducing the need to use antimicrobials, and consequently reducing the potential for AMR. However, it is also important to understand that near universal vaccination creates herd immunity that can protect the community from the spread of resistant infections.

“What is often underestimated from the perspective of AMR is that even the use of vaccines, developed against viral diseases, can actually protect from super-infections, thus reducing the need for antimicrobials and again

reducing the risk of AMR,” he said. “Therefore vaccines are a key component in the fight against AMR both directly and indirectly.”

Although the ability to use vaccines for the prevention of AMR currently only exists for a small subset of bacterial and viral pathogens, Prof Kozlov expressed certainty that in the next couple of decades we will see new vaccines not only targeting the classical bacterial pathogens but also targeting multidrug resistant bacteria.

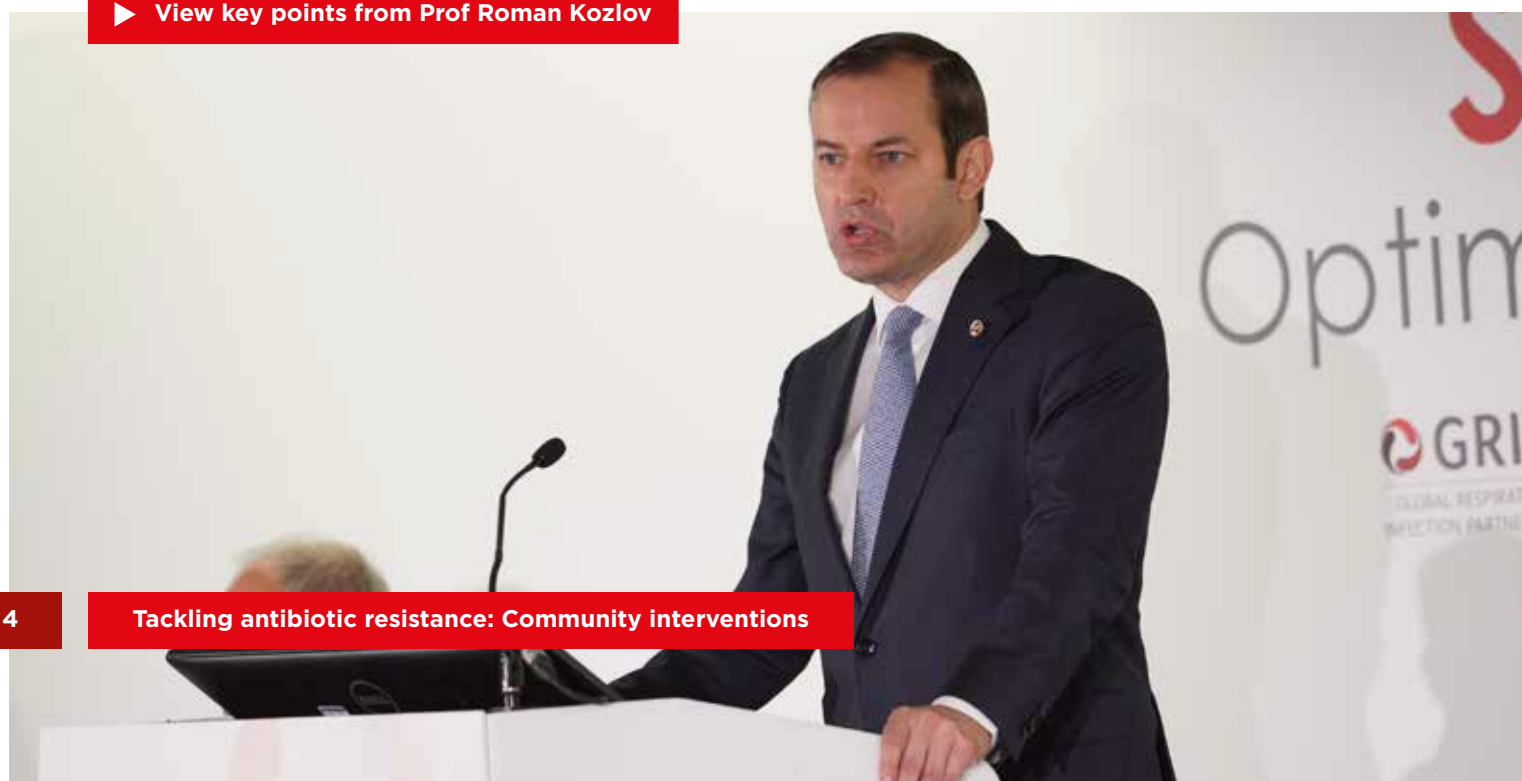
“ We still have quite a road ahead of us, but we feel quite strongly that vaccines can be a key component in the fight against antimicrobial resistance

Prof Roman Kozlov

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To exemplify the contribution of vaccination, Prof Kozlov described the use of pneumococcal conjugated vaccines and the *Haemophilus influenzae* type B (Hib) vaccine. “The use of pneumococcal vaccines led not only to a reduction in both invasive and non-invasive pneumococcal infections, but also correlated directly with the reduction in AMRs,” he said. “Likewise, the introduction of Hib conjugated vaccines led to the virtual elimination of invasive Hib infections and crucially also the elimination of resistant Hib infections that were common in the 1980s.”

▶ [View key points from Prof Roman Kozlov](#)



▶ View key points from Prof Antonio Carlos Pignatari



In the containment of antimicrobial resistant infections good hygiene, sanitation and handwashing cannot be overlooked, said Prof Antonio Carlos Pignatari, Professor of Infectious Diseases and Director of the Special Clinical Microbiology Laboratory of the Division of Infectious Diseases, Federal University of São Paulo, Brazil.

Good hygiene is essential for infection control in the community and hospital settings for decreasing the transmission rates of pathogens including multidrug resistant bacteria between people and patients. Many respiratory viral and bacterial infections are transmitted via contact, droplets or aerosols. Therefore, the use of surgical masks if a patient presents symptoms of respiratory tract infection (RTI) and avoiding physical contact is recommended. However, it is difficult to implement the routine use of masks in the community, whereas at the hospital this can work very well.

Correct handwashing with water and soap is very effective in the prevention of transmission from person to person, particularly for gastrointestinal infections and also community acquired RTIs. The importance of handwashing is underlined by initiatives from both the WHO and the Global Hygiene Council who have worked to convey the information that if you wash your hands, you can save lives.

Good hygiene can contribute to the prevention of infections, particularly for children and in developing countries with poor sanitation. CleanHandsNet, from the WHO, is a campaign-led informal network working to embed hand hygiene promotional campaigns across the globe. Currently, there are 48 participating countries and Prof Pignatari stressed the importance of additional countries joining and broadening the CleanHandsNet network.

Changing gears, Prof Pignatari also highlighted the impact broad-spectrum antibiotics have on the gut microbiome. Scientific research has shown that broad-spectrum antibiotics will indiscriminately kill both the “good” and “bad” bacteria living in the gut and that the use of just one antibiotic will likely permanently alter the microbiome. If the majority of gut microflora are wiped out through the use of an antibiotic, this can create perfect conditions for some particularly nasty bacteria such as *Clostridium difficile* to proliferate. Colonisation with *C. difficile* is not typically a problem, however the overgrowth of this bacteria in the absence of other gut microflora can cause them to produce cytopathic toxins and may lead to severe complications such as toxic megacolon. These complications are largely preventable through the appropriate use of antibiotics.

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▶ View key points from Prof Alike Van Der Velden



POLICY INTERVENTIONS: CASE STUDY FROM THE NETHERLANDS

Since 1900, the combination of water chlorination and the introduction of both antibiotics and vaccinations have dramatically decreased the number of deaths from infectious diseases, thereby also increasing life expectancy, said Prof Alike van der Velden, Assistant Professor, University Medical Center Utrecht, Netherlands.

However, as Fleming acknowledged in his Nobel Prize acceptance speech: “The time may come when penicillin can be bought by anyone in the shops. There is the danger that the ignorant man may easily under-dose, making microbes resistant.” Fleming was proven correct. Of the antibiotics introduced after 1970, the first resistant bacteria were found within months of their introduction.

Displaying EU data on the yearly defined daily dose per 1000 inhabitants per day in 2002, Prof van der Velden showed that France ranks highest and the Netherlands lowest for antibiotic usage. The same trend in antibiotic use across the EU is still observed in recent surveillance data and directly correlates with the level of AMR found in these countries.

Despite the comparatively low use of antibiotics in the Netherlands, there is still considerable room for improvement. Analysis of recent data from nearly 3,000 patient consultations with primary care physicians revealed that the majority of patients did not receive an antibiotic prescription. However, of the patients who did receive an antibiotic, it appeared that 46% of these prescriptions were not according to the treatment guidelines.

A more in-depth analysis of these consultations revealed that over-prescription was highest for patients presenting with sore throat and lower RTI, particularly when the GP thought that the patient wanted an antibiotic.

Prof van der Velden focused on the policy change needed by local professional organisations and national governments. In the Netherlands, the establishment of Hospital A-Teams have helped optimise antibiotic policy in secondary care. Composed of at least one internist infectious disease specialist, a medical microbiologist, a hospital pharmacist and a specialized nurse, the team collaborates with the Infection Prevention and Control teams and the Antibiotic Surveillance team and are compensated through financial and/or time for the extra work they do for the hospital. Their specific tasks include ensuring last line antibiotics are restricted to specific patients in the hospital, monitoring guideline compliance, initiating projects towards better antibiotic policy, training hospital staff and personnel, processing ideas that come back from personnel and facilitating the tracking of AMR and antibiotic usage data. A year after their establishment, it was shown that appropriate antibiotic use increased from 46% to 77%.

Clear and regularly updated primary care guidelines, developed and endorsed by the Dutch College of General Practitioners, also enhance prudent use of antibiotics.

To date, a trial endorsing these guidelines and providing specialized prescribing feedback, showed overall antibiotic use had decreased by 7.6% in the practices that participated. Furthermore, prescriptions for patients with RTI also became more targeted, and both over-prescription and under-prescription decreased.

INSPIRING PATIENTS TO USE ANTIBIOTICS APPROPRIATELY

In the USA and much of Europe, around 60% of patients who go to see their doctor with a sore throat will leave with a prescription for antibiotics, despite the fact that it has been known for a long time that antibiotics are generally ineffective for sore throats, said Dr Martin Duerden, Clinical Adviser on prescribing to the UK Royal College of General Practitioners and Honorary Senior Research Fellow at Bangor University, UK.

To put the problem in context, a Cochrane review showed that 21 patients would need to be treated with an antibiotic for one patient to get some small benefit. The same Cochrane review estimated that it would take 4,000 courses of antibiotics to prevent one serious health complication, said Dr Duerden, whereas there is a lot of evidence that shows many symptomatic treatments are efficient and effective methods to help ease the pain of sore throat.

Sociological research shows that when the doctor-patient relationship is examined, people are rarely asked what they wanted to get from visiting their doctor, nor what they think of their antibiotic treatment. This research has shown that patients want more information than “it’s just a virus”, creating a mismatch between what the healthcare professional thinks the patient is after, and what the patient truly wants. Dr Duerden explained that we need to build a system that helps overcome this mismatch. Part of this comes from the physician asking some simple questions such as, “How can I help you? What is it that you think I should be able to give you? What are your expectations?” It is clear that patients are better satisfied if they are assessed carefully and given a good explanation.



[▶ View key points from Dr Martin Duerden](#)

The way to overcome this is to train and educate both the healthcare professional and the patient. This is particularly important in order to overcome some common misconceptions that exist particularly around how long symptoms last. If both the healthcare professional and the patient believe that the symptoms should be over more quickly than they actually are, it is easy to see why patients may get anxious about why they have persisted.

However, Dr Duerden cautioned that alongside this advice, it is important to recognise that there will be some patients who could potentially come to harm and that there are patients at increased risk of complications such as elderly patients or very young children. Therefore it is important for physicians to be very clear what the red flag symptoms might be and how to use the appropriate scoring system to ensure that patients are recommended the correct course of treatment.

Reflecting on how to best implement behaviour change in patients, Dr Duerden emphasised a key opportunity is to work with patients at a very young age to help children understand that antibiotics are only used when they are absolutely necessary. If this can be done successfully, this will pave the way towards changing the perceptions that patients have on how RTI symptoms should be treated.

LEADING PHARMACY CHANGE

The pharmacy is where people come for information and advice, and is where they get prescription and non-prescription therapies, said Mr John Bell, Principal Advisor to the Pharmaceutical Society of Australia Pharmacy Self Care Programme and Practitioner/Teacher in Primary Health Care at the Graduate School of Health, University of Technology Sydney.

However, there is increasing awareness of antibiotic stewardship in the community: in general, people do appear to have a greater awareness of AMR. They have often heard about “good” and “bad” bacteria and are aware of the importance of maintaining a healthy microbiome. Yet when it comes to the individual, people will tend to regard their need for antibiotics as more important than anyone else, said Mr Bell.

“Patients want antibiotics due to a variety of misconceptions. They think they’re cost effective, believe that they’re going to work quickly to help them recover fast from cold and flu and think they will reduce risk of serious illness”

Mr John Bell

There are many potential impediments that explain why pharmacists are often unable to effectively convey the importance of appropriate antibiotic use to patients. It may be that the pharmacist doesn’t have sufficient understanding of RTIs. They may be unwilling to go against the doctors’ recommendations and may not believe that it is appropriate to disagree with what the doctor has decided. There may be financial disincentives where pharmacists believe they can better sustain their businesses by dispensing prescriptions rather than providing more appropriate recommendations. They may feel that they are not getting sufficient advice or

support from the local, national or international organisations. This is all compounded by the fact that, just like medical practitioners and other healthcare professionals, they feel they do not have the time to spend an extra minute or two talking with each patient.

There are several reasons why patients continue to believe that they need antibiotics. In a 2014 survey on behalf of the Longitude Prize, it was found that one in two (49%) of GPs prescribe antibiotics once a week or more without knowing whether they are medically necessary, and 44% of GPs have prescribed antibiotics just to get a patient to leave the surgery. There is the unnecessary post-dating of prescriptions, and the promotion of non-prescription products as containing antibacterials and/or antiseptic ingredients.

In order to turn these challenges into opportunities, it is important to ensure pharmacists are trained in antibiotic stewardship and are aware of AMR. There are potential financial advantages for both patients and pharmacists in using treatments other than an antibiotic.

Pharmacists need to make sure they provide patients with realistic expectations about the duration and severity of symptoms. Pharmacists can recommend evidence-based products to treat the most problematic and

most troublesome symptoms, whilst allowing for personal preferences. Sore throat is often the most prominent first symptom that occurs with an upper respiratory tract infection, so it is important to treat the inflammation associated with this symptom.

▶ [View key points from Mr John Bell](#)





▶ View key points from Dr Doug Burgoyne

EFFECTIVE INTERVENTIONS: RESULTS FROM MARKET RESEARCH CONDUCTED ACROSS 13 COUNTRIES

Pharmacy is usually the first place people go for help when they have a cold, sore throat, or other viral symptoms, therefore the pharmacy team has a unique opportunity to educate customers and treat patients with effective therapies, whether they are prescription or non-prescription, said Dr Doug Burgoyne, Principal at Cooperative Benefits Group LLC, Salt Lake City, Utah, USA.

The same research revealed that not only do people come and ask pharmacists for guidance related to sore throat, but they also trust them. Most of the respondents (76%) valued the advice from a pharmacist or pharmacy assistant, while 72% said they believed that the pharmacist can advise whether they need to go the doctor. This data shows that pharmacists are in really quite a unique position at the forefront of the healthcare field, where patients will come for advice and will trust the information they receive.

“ As you think about your practice as you return home, please think about how you can influence your patients to use non-prescription, non-antibiotic alternatives for cold and flu, scratchy throat and other viral symptoms ”

Dr Doug Burgoyne

With their capability, opportunity and motivation, community pharmacists are perfectly placed as antibiotic stewards to lead the quest to contain the threat of AMR. With appropriate training and use of available resources, the whole pharmacy team can play an active role, said Dr Burgoyne. It is important that community pharmacists help patients understand when antibiotics are required and reduce the use of antibiotics available over the counter. By treating the symptoms, patients will feel better

Evidence to support this comes from a recent survey that asked people from over 13 different countries where they go for advice on their sore throat. One third (33%) of the respondents consulted with their pharmacist, while 9% consulted a pharmacy assistant or a pharmacy technician. This puts the pharmacy team ahead of the physician, ahead of friends and family, and even online searches for symptoms.

and be able to go back to work, or school, and may also save money, as non-prescription products are often much less expensive than prescription antibiotics, said Dr Burgoyne.

MANAGING PATIENT EXPECTATIONS

Antibiotic consumption varies between countries, but antibiotic prescriptions seem to be more or less stable in the EU, even despite recent flu epidemics, said Dr Attila Altiner, General Practitioner and Head of the Department of General Practice at Rostock University, Germany.

Patients with sore throat look for advice rather than antibiotics when visiting their doctor. A recent survey revealed that 90% of patients consult a doctor for an explanation of possible treatment, while 87% consult a doctor to determine how serious the problem is. However it is extremely important that a thorough explanation is given rather than the physician simply dismissing the problem as “it’s just a virus”. In order to convey a meaningful message physicians should focus discussions on the expected duration of symptoms, the natural course of the disease, and the very low risk that could it become dangerous.

There are three concepts that appear to help reduce unnecessary prescriptions in the GP office. The first is prescribing feedback. “This works almost as a form of peer pressure, as physicians observe that their peers are prescribing fewer antibiotics than themselves, instead they advise symptomatic relief and their patients are satisfied,” said Dr Altiner.

The second is point-of-care testing. Although point-of-care tests are not included in many guidelines, they can be very helpful but need to be used in combination with a thorough assessment of symptoms. However the third and most promising concept is to improve communication between the healthcare provider and the patient. “Shared decision making means the patient becomes a partner alongside the physician. The physician provides key information and offers a process of joint decision making to identify a decision that provides satisfaction for the doctor, pharmacist, and patient.”

Dr Altiner concluded that physicians and pharmacists need to educate their patients and each other. This communication process can be summarised into a very simple three-step approach. The first step is to address patients’ concerns, be sympathetic, and take their complaints seriously. The second is to be vigilant. Mostly these symptoms are harmless, but patients should be advised that if their symptoms continue to worsen they should return for a second visit. Thirdly, the physician should counsel on effective self-management and advise on evidence-based treatments that will help relieve the symptoms.





▶ [View key points from Dr Aurelio Sessa](#)



LEADING PRESCRIBER CHANGE: CASE STUDY FROM ITALY

RTIs are very common in the community and the risk of inappropriate antibiotic usage is very high, said Dr Aurelio Sessa, General Practitioner and Professor of Family Medicine at Insubria University, Varese, Italy. According to the latest European Centre for Disease Prevention and Control report, all prescribers are implicated in addressing the overuse of antibiotics and the risk of AMR both in the hospital and community setting.

A recent customer survey showed some 34% of people took an oral antibiotic in the last 12 months within Italy, although there is a geographical split with higher prescription and consumption of antibiotics in the Mediterranean region and less usage in the north. The majority of antibiotics are prescribed in the primary care setting.

Doctors' and patients' beliefs and attitudes influence the level of prescriptions, said Dr Sessa. From a physician's perspective, sometimes there is uncertainty surrounding the diagnosis. Often, time allowed for consultations is too short to give sufficient explanation to the patient. Sometimes

doctors are reluctant to deny the patient an antibiotic, as this may impair the doctor-patient relationship. From a patient's perspective, there is often insufficient health literacy. Patients may have had previous success with an antibiotic therapy and believe that a new respiratory infection can be treated with another antibiotic. Sometimes the patient may have some residual antibiotic pills from a previous prescription at home, or will go to a pharmacy that dispenses antibiotics without need for prescription.

Dr Sessa shared the results of a case study where the GRIP materials were used in an Italian GP surgery. Over a period of three months, the toolkit was used with 185 individual patients resulting in a reduction in the number of antibiotic prescriptions compared to when the toolkit wasn't used. This shows the value of using toolkits to assist in giving explanations to patients, particularly when the doctor has the perception that the patient wants an antibiotic for their sore throat. Dr Sessa cautioned that every time a doctor prescribes an antibiotic, they must pause to ask if it is truly the correct decision.

| CALL TO ACTION

The solution to the AMR issue has to come through multi-stakeholder coordination as outlined by the five key aspects of the GRIP Pentagonal Framework for Change:

The scale of the AMR issue varies significantly between countries and requires

| POLICY interventions that are endorsed by local governments and clinical communities of practice

| PATIENT education is key to drive behavioural change and empower patients in self-management through appropriate symptomatic relief



Vaccines, hygiene and sanitation are important tools in the **| PREVENTION** and spread of infections

| PRESCRIBERS have an array of tools to manage patients' expectations on how to build and maintain an effective dialogue with patients

| PHARMACISTS can play a pivotal role in preventing AMR through the rational use of antibiotics by acting as community antibiotic educators providing advice on symptomatic management and guidance on when to consult a doctor

Antibiotic conservation requires coordinated, multi-pronged, multi-stakeholder, multi-disciplinary partnerships underpinned by national and international policies that suspend sectoral interests for public good.



COUNTRY PERSPECTIVES

Opening with an overview on developments over the past year, Mr Adrian Shephard from RB highlighted three recent activities that indicate progress towards tackling the issue of AMR:

1. In May new guidance on the treatment of Acute Sore Throat was published by NICE in the UK. This guidance specifically encouraged GPs to stop the routine dispensing of antibiotics and reserve these drugs for patients whose symptoms indicate they will truly benefit
2. On a Global scale, the WHO and their partners such as the World Organisation for Animal Health (OIE) have united under the One Health approach to take collective action to minimize the emergence and spread of AMR by promoting the prudent and responsible use of antimicrobial agents
3. The five pillars set out in the Global Action Plan to address AMR are being translated into National Action Plans (NAPs) in different countries across the world.

“ The major battleground in the community continues to be the inappropriate prescribing of antibiotics for self-limiting respiratory tract infections

Mr Adrian Shephard

Mr Shephard reflected that the increase in the number of countries who have now published NAPs to counter inappropriate antibiotic use is remarkable. There was a huge surge in 2017 that continued into early 2018. We now see the majority of the countries have a NAP and within those plans there are commonalities around the five pillars from the WHO



Italy

Aurelio Sessa

High levels of antibiotic consumption remains an issue in Italy, said Dr Sessa. A report published in July this year indicated a slight but continuous decrease in the use of antibiotics. However, there are important regional differences with markedly higher antibiotic consumption in southern Italy.

“ The objective of the Italian National Plan against AMR is a 10% reduction in the use of antibiotics in the community, a 5% reduction in hospital patients, and a 30% reduction in animals in the space of three years

Dr Aurelio Sessa

In November 2017, a prominent financial newspaper in Italy published a booklet about AMR, titled “An Ongoing Emergency”, which explained the relevance of the problem to the public and also the associated economic burden. It was made available to all medical doctors, dentists, veterinarians, pharmacists and biologists.

In addition, Italy continues to run an AMR awareness campaign every October that involves a huge diversity of media channels. This includes all principle newspapers in Italy, radio and cinema advertisements, so-called “dynamic” advertising on buses, a toll-free number for people and HCPs, and a plethora of educational posters and leaflets displayed inside GP and hospital waiting rooms.

In summary, Dr Sessa concluded that Italy is fully engaged in the fight against AMR and is committed to reduce antibiotic consumption to avoid overuse.



Netherlands

Alike Van Der Velden

Dr van der Velden began the Netherlands, update with a quote from Edith Schippers, the previous Dutch Minister of Health, who has made combating AMR one of her main goals. A couple of years ago Ms Schippers announced a plan to decrease unnecessary antibiotic use in the Netherlands by 50%. This announcement helped raise AMR awareness in the Netherlands and initiated a programme to address the inappropriate use of antibiotics. The strategy included facilitating and organising antibiotic surveillance and stewardship, not only in primary care, but also in secondary care and in long-term care facilities, which are often forgotten in context of antibiotic overuse.

“ The new indication-linked quality indicators, together with the education provided were greatly appreciated by GPs

Dr Alike van der Velden

In the pilot for primary care, the systematic surveillance of antibiotic use was initiated, beginning with new quality indicators, explained Dr van der Velden. Previously, antibiotic use was measured as the number and type of antibiotics per practice. This lacked the indication for prescribing, making it difficult to interpret whether usage was appropriate. The new quality indicators were presented to GPs during educational meetings, during which guidelines, new scientific insight and patient/ doctor communication were also discussed.

Subsequently, tools were developed that nowadays allow the collection of information from practices' electronic medical records in a standardized manner, to enable transparent and uniform calculation of the outcomes of the quality indicators. Dr van der Velden also recently obtained further funding to start training regional teams, support practices collect the outcomes for the indicators and provide further education. The next steps are to roll this out in two of the 12 large regions of the Netherlands. This represents the first step towards the national implementation of these processes to gather this information from the GP system, calculate the outcomes and provide education on a regular basis.



United Kingdom

Martin Duerden

There is a great deal of work being done in the UK around AMR and the correct use of antibiotics, said Dr Duerden. Dame Sally Davies, the Chief Medical Officer for England, has taken a national lead across the UK on this topic and it has become her priority to address the problem. In addition, Public Health England have done a considerable amount of work on the issue and there are also frequent articles in the press criticizing doctors for being too liberal with the use of antibiotics.

Dr Duerden cautioned that although there is a focus on addressing AMR in the UK, this is made difficult by the already high GP workload and the scarcity of available resources for general practice. This is further compounded not only by the potential of Brexit negatively affecting pharmacy supplies, but also by signs that the antibiotic development pipeline is not as robust as people think it might be.

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In September, NICE published draft guidance on the use of antibiotics for acute cough. Fundamentally

this guidance indicated that doctors should recommend, where possible, non-drug treatments to patients who present with a cough. This guidance included recommendations such as the use of honey, herbal remedies such as pelargonium and cough medicines containing the antitussive dextromethorphan. NICE also published draft guidance on the use of antibiotics for sore throat. This guidance uses clinical assessment criteria to decide whether the patients are likely to benefit from antibiotics or not, based on the probability of them having *Streptococcus*. In addition, the guidance contains useful information on self-management and refers to evidence that medicated lozenges can help reduce pain.

Beyond the guideline update, there has been increased surveillance on the usage of antibiotics. Dr Duerden confessed that while previously sceptical, that there is increasing evidence of a change in clinical practice. Whether looking at the overall volume of prescribing or the prescription of items such as co-amoxiclav, cephalosporins and quinolones in relation to other antibiotics, Dr Duerden concluded there is now data that strongly suggest a reduction in the overall usage of antibiotics in the UK.



Australia

John Bell

Over the last five years, the lead organisation in Australia, NPS MedicineWise, has had a remit to address antimicrobial stewardship, said Mr Bell. To date, the NPS has focused on health professional education, especially with regards RTIs, urinary tract infections, and skin and soft tissue infections. Last year at the annual conference of the Pharmaceutical Society, there was particular focus on antimicrobial stewardship. In addition, the Chief Medical Officer, John Turnage, also discussed the appropriate length of courses for antibacterial therapy and concluded that despite recent news, it seems that most consumers believe that you must finish the course of antibiotics.

Every year during the cold and flu season, NPS MedicineWise in conjunction with the medical practitioner and pharmacy groups, have campaigns aimed at consumers in workplaces, schools and childcare centres. Mr Bell explained that despite World Antibiotic Awareness Week (WAAW) not occurring at the most appropriate time in the southern hemisphere, they continue to run on-going campaigns to coincide with this global initiative.

“ We have seen some benefits insofar as how the campaign has gone over the last five years, but there is certainly still a long way to go

Mr John Bell

The results of this five-year campaign have been encouraging, but not fantastic, concluded Mr Bell. There has been an increase in the consumer perception of what antibiotics do from 53% to over 70%. However, most parents believe upper respiratory tract symptoms in children should last no longer than one week and if they do, then you should start antibiotics. With regards to the number of antibiotic prescriptions, a recent publication showed a 14% total reduction in the number of dispensed antibiotics during the time period from 2004 through 2014/15.



South Africa

Sabiha Essack

South Africa was amongst the first countries in Africa to develop a National Action Plan, this is called the National Antimicrobial Resistance Strategy Framework, said Prof Essack. This plan was recently updated, and the new 2017-2024 action plan now includes a strong One Health component.

Part of the implementation strategy is a stewardship guideline. Regional training centres have been established where people from provincial hospitals are trained on how to implement an antimicrobial stewardship programme. There are pockets of excellence in various provinces throughout the country, such as the Western Cape, said Prof Essack.

South Africa has also adopted the Antibiotic Guardian initiative from the UK and will be implementing pledges in time for WAAW this year. In addition, they will soon be publishing the first surveillance report, demonstrating that it is possible to take data from both the public and private sectors in South Africa and publish as one consolidated report.

From a regional perspective, Prof Essack explained that the Africa Centres for Disease Control and Prevention (CDC) has published its own AMR framework. The Regional Action Plan brought together the Africa CDC, the regional Food and Agricultural Organisation of the United Nations (FAO) office, the regional World Organisation for Animal Health (OIE) office, the WHO, React Africa, the African Ecumenical Pharmaceutical Network and several others such as the African Society of Laboratory Medicine. This Regional Action Plan is currently in an intense phase of consultation and is expected to reach consensus soon.

One of the challenges Africa faces is that a number of different organizations are working in the same countries, trying to address the same issues necessitating review and rationalization of efforts. Therefore, Prof Essack emphasized the importance of each agency finding its own niche to avoid duplicating activities.

On a Global level, Prof Essack described how she has been working with the WHO on education and awareness. A competency framework for nurses, doctors, pharmacists and laboratory technicians has been developed. A stewardship toolkit adapted specifically for low and middle income countries is also in development with the aim of piloting this in a couple of countries that were also involved in the development of the National Action Plan.



Russia

Roman Kozlov

On 25th September 2017, the Russian National Action Plan was established in two parts that cover the time periods from 2017-2020 and from 2020-2030, Prof Kozlov explained. This plan describes seven major pillars that include the development of professional education and emphasise the importance of collaboration.

Consequently Russia is in the early stages of implementation and one of the first tasks to draw up a roadmap for the roll-out of this new initiative. This is a very poignant moment, as it will be the first time when different constituencies such as the Minister of Health and the Minister of Agriculture within the Russian Confederation will need to work together.

Regarding international collaboration, Russia is continuing to assist Russian-speaking colleagues within the former USSR as part of their mandate. Russia also has a good, long-term relationship with the UK. For example there is a joint exhibition between the Wellcome Trust and the Natural History Museum of Moscow on microbial life to raise public awareness.

“ One of the specific parts in which we achieved probably the biggest success is actually professional education, because it’s a separate entity within the initial action plan, and we are in the late stages of approval from the professional standard of medical microbiology ”

Prof Roman Kozlov

To complement the efforts to improve professional education, Russia has also initiated mass media campaigns. This was prompted by recent outbreaks of infections such as measles, which attracted substantial attention towards the role of antimicrobials and therefore provided the opportunity to work with Russian newspapers in order to educate consumers on AMR.

Prof Kozlov concluded that the major focus for Russia over the next few years will be to communicate the action plan and implement it effectively to achieve the maximum benefit possible within the timeframe.



USA

Doug Burgoyne

Dr Burgoyne explained how the CDC increased funding for AMR for two years in a row. In 2016 \$160 million was dedicated to AMR, \$163 million in 2017, and there are hopes this trend will continue into 2018.

The majority of this funding is distributed to individual states to run their own AMR campaigns such as educational programs for school children and billboard advertisements. In addition, there are regular articles in national newspapers such as the Wall Street Journal and the New York Times, talking about resistance and the need to appropriately use antibiotics.

“ The news reports are warning everybody, including consumers, but physicians are still caving to their patients and giving them the antibiotic when they ask for it ”

Dr Doug Burgoyne

Despite these initiatives, there is still a significant amount of pressure on physicians to prescribe antibiotics. Some of this pressure comes from the need to generate high patient satisfaction scores in order to receive maximum reimbursement from health plans and achieve bonus. Not only do consultations take longer when explaining the reasons for not prescribing an antibiotic but also often the patient leaves dissatisfied. This provides an incentive to capitulate to patient demands even if this means overprescribing antibiotics.

Dr Burgoyne explained that from a pharmacist perspective in the US there isn't a great deal of time spent educating patients about appropriate use of antibiotics. This is likely because pharmacies are extremely busy, often filling 600-700 prescriptions per day. Therefore, if a prescription comes in for an antibiotic, it often gets filled with no discussion nor comment from the pharmacist.

Dr Burgoyne concluded that this may be a learning that the US could take from the GRIP initiative and re-engage with pharmacists to educate them about the impact that inappropriate antibiotic use has on AMR.



Ireland

Laura Noonan

The situation in Ireland is very similar to the UK in terms of the pressure on GPs, the increased patient demand for consultations and the requirement to fit more patient appointments into the day, stated Dr Noonan. However, the Out of Hours structure in Ireland is very different and sees all patients from 6pm to 8am on weekdays and at weekends. There was a directive issued earlier this year, advising doctors to prescribe antibiotics for any patient who had either already recently seen their GP, or who seemed to be particularly adamant for an antibiotic prescription. The motivation for this was to increase patient satisfaction and reduce litigation. Expressing frustration, Dr Noonan explained that this is likely to negatively affect the relationship between the patient and their regular doctor and increase the overall number of antibiotic prescriptions.

There has been a dramatic increase in the number of consultations over the last two to three years, largely because all children under the age of six are now seen for free. Consequently, this has also increased the usage of antibiotics in that age group. These changes in practice are surprising, given that Ireland already has an AMR Stewardship program. The website antibioticprescribing.ie gives guidelines for the correct treatment of

specific bacterial infections that doctors are supposed to reference before they prescribe an antibiotic.

From a patient perspective, the patient website undertheweather.ie provides advice on how to manage self-limiting conditions including RTI and provides patients with realistic expectations of symptom duration. Efforts to educate patients on how to use antibiotics continue and is accompanied by advice on medical tourism to dissuade patients from buying antibiotics abroad at a discounted price and bringing them home for later use.

“ Despite having an AMR programme in operation in Ireland, there was a directive issued in one of the largest out of hours co-ops that essentially said in order to increase patient satisfaction and reduce complaints, we would recommend that all doctors prescribe antibiotics for patients who have already been seen by their own doctor ”

Dr Laura Noonan



Brazil

Antonio Carlos Pignatari

In 2010 the National Health Surveillance Agency in Brazil introduced a new regulation to prevent the sale of antibiotics to patients that lack a prescription. Since this change there has been some data to indicate a decrease in antibiotic use by as much as 70%, however Prof Pignatari emphasized the need for better data in order to draw firm conclusions.

Currently the majority of official government programmes in Brazil are focused on preventing hospital-acquired infections rather than providing advice on the use of antibiotics in the community setting. This is to tackle the relatively high levels of nosocomial infections by resistant bacteria in Latin American countries compared to Europe and the US. Consequently, stewardship programmes exist predominantly for hospitals rather than the community. In Brazil it is common for the patient to go the emergency room (ER) rather than the GP for an initial consultation. Therefore there is particular effort to educate ER doctors and hospital pharmacists to lower the rate of antibiotic prescriptions.

“ Most of the effort from the official government programs is for hospitals, not for the community - specifically to tackle nosocomial infections

Prof Antonio Carlos Pignatari

The data on antibiotic use in Brazil is also affected by the current economic climate. The use of antibiotics in the community may well decrease due to lack of affordability rather an increase in education. As a consequence of the economic crisis, some patients are switching from a private healthcare provider to use the public system. The situation is further compounded by a lack of availability for some of the cheaper antibiotics due to some pharmaceutical companies preferring to produce only the very expensive antibiotics.

Prof Pignatari concluded that there needs to be further emphasis on education primarily through hospital pharmacists, as this is the main source of antibiotic prescriptions.



Germany

Attila Altiner

Currently around 45% of all encounters between a patient with a RTI and a physician result in an antibiotic prescription. Although this is a 10% reduction in antibiotic prescribing compared to previous years, the prescription of broad-spectrum antibiotics remains far too high.

The German National Action Plan is called the Deutsche Antibiotika Resistenzstrategie (DART) initiative and continues to gain momentum. As an example, Dr Altiner explained they are currently in the middle of one of the largest educational programmes for physicians in ambulatory care. This involves more than 2,500 practices and covers almost half of Germany. In addition, over 2,500 practices recently completed an online educational programme that focused on doctor-patient communication.

Another program gaining momentum is the discussion on health literacy. Dr Altiner reflected that changes in prescribing behaviours are not entirely due to improvements in HCP education, but also due to a generation shift in GPs in Germany that results in a different prescription style and a change in patient demands.

Dr Altiner concluded by reflecting that one of the big challenges in Germany is the difficulty in obtaining timely prescribing data. Ideally prescribers should be provided with almost immediate prescription feedback, however there remain many barriers to achieving this in Germany.

“ The German national plan to reduce antibiotic or to improve antibiotic use is gaining momentum. We’ve never seen as many projects on antibiotic use and prescribing as today

Dr Attila Altiner

GUEST SPEAKERS



Mexico

Sergio Caretta

Antibiotic resistance is no longer a threat, it is a clear and present danger requiring concerted actions at a global level. However, Dr Caretta explained that the level of danger varies by geography due to rates of resistance and main causative agents differing between countries. In industrialised countries the primary issue is AMR in hospitals, whereas in less developed countries such as Mexico, the main problem is in community acquired infections.

Giving some context on Mexico, Dr Caretta described it as a middle-income country with a fairly good human development index and representing a significant economy in Latin America. However Mexico has grave challenges regarding social mobility and corruption, with more than 53 million people living in poverty with no access to healthcare systems or education. This presents a difficult environment to develop strategies to address AMR.

One of the main milestones in regulating antibiotic prescriptions in Mexico was the implementation of a policy to prevent pharmacists providing antibiotics to patients without a prescription. In Latin America, Chile was the first country to implement this policy in 1999. In 2005, Colombia partially followed suit by regulating the OTC sales of antibiotics but only in the capital city. Initially the Mexican government was hesitant to initiate a similar policy due to economic reasons. However, after a particularly bad H1N1 influenza epidemic and associated mortality there was an upsurge in pressure to implement new policies.

Consequently in 2010, a policy was implemented that enforced the prohibition of antibiotic sales without prescription. This policy introduced punitive measures against pharmacies and drugstores that sold antibiotics without a prescription and meant they could face losing their business licence. Five years later, a study showed a 34% decrease in the use of antibiotics in private practice in Mexico.

“ Antibiotic resistance is no longer a threat, it is a clear and present danger

Dr Sergio Caretta

However, the situation in Mexico presents many additional challenges to tackling AMR. In addition to inadequate infrastructure and overcrowding in cities, Mexico has a fragmented healthcare system. There is a private healthcare system, a public healthcare system and a parallel healthcare system. The parallel system is made by businessmen who buy pharmacies and hire general practitioners to write scripts for people that cannot pay for medical attention. In these facilities, the prescription of antibiotics is often inappropriate, and driven by patient desires instead of physician knowledge and advice.

In order to implement successful policies in Mexico it is important to understand both health and socioeconomic issues. It is also important to work with all stakeholders not only the GPs and specialists, but also with the public. Dr Caretta concluded that the combination of policy change and education initiatives can result in a significant reduction in the inappropriate use of antibiotics as long as HCPs are also given appropriate training and resources to convince patients that they don't necessarily need antibiotics.

Dr Sergio Caretta





Thailand

Wirat Tongrod

Thailand is a country of over 60 million people where antibiotic use accounts for approximately 20% of total drug use and antibiotic usage continues to increase each year. Dr Tongrod explained this is because antibiotics continue to be freely available for purchase at the pharmacy without a prescription. Recent publications have further emphasized AMR as a major and urgent health problem in Thailand both in terms of patient mortality and cost to the healthcare system.

In 2008, the Thai FDA initiated the Antibiotic Smart Use (ASU) program with support from the WHO. This programme focused on three common ailments; sore throat, acute diarrhoea and simple wounds, and provided tools to educate both prescribers and patients. After two years, hospitals had reduced antibiotic use by almost 30%. This program has been publically endorsed by the Prime Minister of Thailand who is visible on poster campaigns with the quote, "I don't want to see Thai people ill and dying from irrational drug use".

The National Action Plan to combat AMR runs from 2017 to 2021 and details six key strategies to achieve a distinct set of goals:

- | **50%** reduction in AMR morbidity
- | **20%** reduction in antimicrobial consumption in humans
- | **20%** increase in public awareness on AMR, and antimicrobial use
- | **30%** reduction of antimicrobial use in animals

“ Antibiotic use in Thailand accounts for about 20% of all the drugs in Thailand. Their use is also increasing and if you ever go to Thailand you can buy antibiotics from the pharmacy without a prescription

Dr Wirat Tongrod



Dr Wirat Tongrod

In Thailand, most pharmacies will provide a mirror and flashlight to enable patients to examine their sore throat themselves. This provides the pharmacist with an opportunity to explain that there is no need to use antibiotics for viral infections. Whilst working for the Faculty of Pharmaceutical Sciences at Huachiew Chalermprakiat University (HCU), Dr Tongrod developed the HCU Sore Throat application. This is a self-diagnosis tool that enables the patient to take a photo of their sore throat, assess a symptom checklist that uses the McIsaac sore and read a leaflet providing advice on whether they need an antibiotic. This tool won several awards including from the Ministry of Public Health. Based on this success, Dr Tongrod has developed a second version of this application that includes a video about self-diagnosis for sore throat and provides information on symptomatic relief.

With regards to future plans, the action plan for ASU includes the development of guidelines for pharmacy, development of a self-screening card, and the launch an education programme together with the Pharmaceutical Association of Thailand. Dr Tongrod concluded by confirming that they will continue to develop the HCU Sore Throat Application for use by patients to help differentiate between viral and bacterial infections to avoid the inappropriate use antibiotics.



APPENDIX

GRIP MEMBERS

NAME	ROLE	COUNTRY
Dr Attila Altiner	General Practitioner Head of the Department of General Practice at Rostock University	Germany
Mr John Bell	Principal Advisor to the Pharmaceutical Society of Australia Pharmacy Self Care Programme Practitioner/Teacher in Primary Health Care at the Graduate School of Health, University of Technology Sydney	Australia
Dr Doug Burgoyne	Principal at Cooperative Benefits Group LLC, Salt Lake City, Utah	USA
Dr Martin Duerden	Adviser to the UK Royal College of GPs and NICE Honorary Senior Research Fellow, Bangor University Medical Adviser for the Diploma in Therapeutics, Cardiff University	UK
Prof. Sabiha Essack	South African Research Chair in Antibiotic Resistance and One Health Professor in Pharmaceutical Sciences, University of KwaZulu-Natal	South Africa
Prof. Roman Kozlov	Rector at Smolensk State Medical University Chief Specialist to the Ministry of Health for the Russian Federation on Clinical Microbiology and Antimicrobial Resistance Head of the WHO Collaborating Centre for Capacity Building on Antimicrobial Resistance Surveillance and Research	Russia
Dr Laura Noonan	General Practitioner Continuous medical education tutor with the College of General Practitioners in Ireland and Director of Establishing GPs	Ireland
Prof. Antonio Carlos Pignatari	Professor of Infectious Diseases Director of the Special Clinical Microbiology Laboratory of the Division of Infectious Diseases, Federal University of São Paulo	Brazil
Dr Aurelio Sessa	General Practitioner Professor of Family Medicine at Insubria University, Varese	Italy
Dr Alike van der Velden	Assistant Professor, University Medical Center Utrecht	Netherlands
Dr Sergio Caretta	Director of the centre for Respiratory Disease of Mexico City Vice President of the Mexican Society of Otolaryngology	Mexico
Dr Wirat Tongrod	Lecturer at the Faculty of Pharmaceutical Sciences, Huachiew Chalermprakiat University Vice President at The Community Pharmacists Group, The Pharmaceutical Association of Thailand	Thailand