

2006-2010



MRSA-world-map on a petri-dish.

REPORT TO SIDA ON ACTIVITIES JULY 2006 – DECEMBER 2010

Taking shape from a meeting in May 2004 and funded by Sida from July 2006, ReAct has rapidly made its mark on the global landscape of combating antibiotic resistance. This report covers activities and outputs during the second half of 2010, as well as providing a short summary of project progress since the start of the funding period in 2006.

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Acronyms

AB	Antibiotics
ABR	Antibiotic resistance
AMR	Antimicrobial resistance
ANVISA	The National Health Surveillance Agency
CES	The Higher Education Council
CONESUP	The National Council of Higher Education
CONESUP	The National Council of Higher Education
CSO	Civil Society Organisations
DMDC	Drug System Monitoring and Development Program
ECDC	European Centre for Disease Prevention and Control
EMA	European Medicals Agency
EPN	Ecumenical Pharmaceutical Network
ESBL	Extended Spectrum Betalactamase
EU	European Union
FDA	Food and Drug Agency
HAI	Health Action International
ICIUM	International Conferences on Improving Use of Medicines
IIMAR	The Indian Initiative for the Management of Antibiotic Resistance
INDEPTH	The International Network for the Demographic Evaluation of Populations and Their Health in Developing Countries
ISPE	International society for pharmacoepidemiology
LMIC	Low and Middle Income Countries
LOI	Letter of Intent
MoPH	Ministry of Public Health
MoU	Memorandum of Understanding
MSF	Medicins sans Frontierers
MSH	Management Science for health
NGO	Non Governmental Organisations
PAHO	Pan American Health Organisation
R&D	Research and Development
RLA	ReAct Latin America
RUM	Rational Use of Medicines
SEA	South East Asia
SPC	Social Pharmacy Research Unit
SSA	Sub Saharan Africa
TATFAR	Trans Atlantic Task Force on Antimicrobial Resistance
UMC	Uppsala Monitoring Centre
US	United States
USAID	United States Agency for International Development
WAPS	World Alliance for Patient Safety
WHA	World Health Assembly
WHO	World Health Organisation
WPRO	World Health Organisation Western Pacific Region

Report to Sida on activities July – December 2010

Introduction

React's vision is that current and future generations should have access to effective treatment of bacterial infections as part of their right to health.

Taking shape from a meeting in May 2004¹ and funded by Sida from July 2006, ReAct has rapidly made its mark on the global landscape of combating antibiotic resistance. ReAct links diverse groups around the world in action to tackle the rapidly growing public health threat of antibiotic resistance (ABR). The profound changes sought by ReAct are found to be most likely to occur through an interaction between social movements engaging civil society, community and consumer organisations, health policy reformers and those individuals, networks or institutions that generate and analyse health-related knowledge. ReAct set out to catalyse and co-ordinate action in ways most likely to make these changes.

This report covers activities and outputs during the second half of 2010, as well as providing a short summary of project progress since the start of the funding period in 2006.

Other ReAct funders and co-funding by ReAct partners

ReAct's major funding comes from Sida, but intense work to expand the funding base have been successful as the organisation is currently receiving smaller funds for specific projects or positions from Uppsala University, the Swedish Ministry of Social Affairs and AFA Insurance. ReAct is also working to approach several of the larger, international donors with specific funding proposals, aiming to expand its funding base further. The regional partners of ReAct have engaged several boundary partners in confounding and in-kind contributions to ReAct activities.

During 2010, there has also been in-kind contributions from the University of Chulalongkorn, which has allocated some human resources and office space for ReAct work in South East Asia. Since ReAct began active campaigning in Southeast Asia (SEA) in 2007, a number of ReAct's SEA partners have contributed various resources to the joint projects and activities. The Drug System Monitoring and Development Program (DMDC), jointly with the Social Pharmacy Research Unit (SPC), Chulalongkorn University, Bangkok, Thailand, have co-funded several ReAct meetings since 2007. In addition, DMDC-SPC has provided office space for ReAct's intern in Chulalongkorn University 2010. The FDA Thailand as well as the Health System Research Institute, both organizations within the MoPH and also ReAct's partners, have contributed staff time for ReAct-SEA activities in 2010. ReAct's partner in Malaysia, the Department of Social and Administrative Pharmacy, Universiti Sains has also contributed staff time and resources to the joint project with ReAct on Survey on Teaching of Courses Related to Antibiotic Resistance in South East Asian Medical and Pharmacy Schools.

¹ The global threat of antibiotic resistance: Moving towards Concerted Action
Summary report of a multidisciplinary meeting, The Dag Hammarskjöld foundation, Uppsala, Sweden, 5–7 May 2004

ReAct Latin America has raised internal and external support to ReAct activities:

PAHO, the Pan American Health Organisation, the University of Cuenca, the National Council of Higher Education (CONESUP), the National Health Surveillance Agency (ANVISA) Brazil, the National University of Colombia and Javeriana University, Bogotá – Colombia and the ministry of Public Health of Ecuador have contributed in various ways to ReAct Latin America projects by providing human resources, support for travel and publications.

In Africa the key ReAct partner, EPN, Ecumenical Pharmaceutical Network, has obtained funds from USAID, MSH (Management Science for health) and Difaem (a German Medical Institute) for workshops and staff time that directly feed into ReAct/EPN activities.

After agreement with Sida, the interest income of received funding for the period 2006-2010 has been utilized for:

- Support to the WHO for publication of the Global Work Plan on Antimicrobial resistance. ReAct coordinated the writing of two chapters in this publication that will be printed internally at the WHO in Geneva and will be launched at the World Health Day April 7, 2011.
- Preparatory activities for ICIUM 2011 in relation to the theme "Exploring Ways to Preserve Future Novel Antibiotics–A Global Systems Perspective"
- Development of a new ReAct website that was launched on 8 March 2011.

For more information on these projects see the information under each objective.

Summary of project achievements

ReAct has during the past five years evolved to a well recognized international network with several partners. ReAct is putting antibiotic resistance on the global health agenda by using both the bottom up approach, informing and engaging civil society, health and grass root movements and top down by making stakeholders at all levels aware of the urgency of the situation. ReAct is today an established and respected organization, often consulted as expert advisors and coordinators by governments and organizations like the EU, WHO, PAHO, EMA, ECDC. One important objective for ReAct's involvement in European processes is to highlight the global perspective, constantly raising that any attempt to address and manage antibiotic resistance at the international level not only considers wealthy countries, but also populations in low-and middle income countries where the burden of antibiotic resistance is greatest..

Some of ReAct's main achievements for the contract period:

- Worked to raise the policy profile of antibiotic resistance among developing countries by holding regional dialogues on this issue in Africa, Asia and Latin America and launching a web portal on antibiotic resistance portal on SciDev.Net, a science and development gateway mostly reaching those in the developing world;

- Provided leadership on both the Antimicrobial R&D and Rational Use working groups of the WHO / World Alliance for Patient Safety’s process to develop a strategy for tackling antimicrobial resistance;
- Partnered with EPN and HAI to advocate for the Rational Use of Medicines Resolution at WHA in 2007 and mobilize support among NGO and Country delegations using AB and ABR as key illustrations of the priority for action on this issue;
- Developed a number of new ways of communicating ABR and experimenting with new products; initiated a potentially powerful process with scientists and artists to spin off new types of communication uncovering a different paradigm in the relationship between microbes, processes of human infection, antibiotics and resistance;
- Partnered with the Ecumenical Pharmaceutical Network (EPN) in launching the “Fight AMR: Save Medicines for Our Children” campaign at the 2009 World Health Assembly, efforts building on the USAID-ReAct-EPN co-sponsored workshop on antibiotic resistance in Moshi, Tanzania in 2008;
- Seeded a vibrant grassroots Latin American network centred at the University of Cuenca Medical School in Ecuador, whose partnership with the Pan-American Health Organization is developing a graduate-level curriculum for healthcare providers on antibiotic resistance building on the Cuenca Declaration Call to Action on ABR following RLA/ PAHO/ ReAct co-sponsored Workshop and Open Conference bringing representatives from multi-sectoral organisations and networks from 22 countries mostly in Latin America;
- ReAct has catalysed a broad discussion on how to address the need for new antibiotics onto the global agenda, most specifically in the European Union, and has acted as advisors in a number of related processes, most notably the transatlantic task force (TATFAR) on antimicrobial resistance. ReAct has been a strong advocate for a new business model where the private and public sectors cooperate and where issues of affordability and access are taken into account.

Degree of achievement of ReAct LFA indicators 2006-2010

Objective	Indicator	Achievement	Comments
1. Removal of critical evidence gaps	Burden of resistance data generated	Partly achieved	Several policy statements; government involvement; strong commitment of academia, NGOs etc
	WHO and others to adopt model for burden of resistance	Partly achieved	WHO involved through World Alliance for Patient Safety; EU burden assessment made;

INDEPTH			
2. Removal of barriers to innovation of antibiotics and diagnostics	Priority in ongoing initiatives	Achieved	Meetings and interaction with several organisations; EU-US Task Force and Swedish EU Presidency Conference, Uppsala conference 2010
3. Advocacy for better access to and use of abs for those in need	Relevant info on root causes of poor access ...	Mainly achieved under other objectives	
4. Promote global consensus for a new paradigm on antibiotic use	Increase in references to paradigm shift	Achieved	
	Change in public image of ABR	Achieved but with geographical limitations	Europe, North America and ReAct hub countries have witnessed a major change
	People and institutions changing action and approaches	Partly achieved	
5. Increased awareness of ABR as global public health threat	Number of unique website visitors	Achieved	
	Extent of dissemination of media products, info packages	Partly achieved	
	Pilot study of benchmarking tool published	Not achieved by ReAct	Achieved by ECDC as agreed with ReAct
	Regional meetings held; partner activities, target country activity	Achieved	

Joint activities to
support country,
regional activity

Achieved

OBJECTIVE 1: IDENTIFY AND FACILITATE REMOVAL OF CRITICAL EVIDENCE GAPS THAT BLOCK ACTION TO CONTAIN ANTIBIOTIC RESISTANCE

Lack of data on the burden that antibiotic resistance (ABR) poses on society, especially in low-resource settings was one of the most important obstacles to concerted action against ABR identified during the ReAct start-up meeting in September 2005. The global trend is clear – antibiotic resistance is increasing in clinically important bacteria in health-care facilities and in the community. Despite this, no global initiative captures the magnitude or trends of antibiotic resistance, neither of the economical or health related burden it puts on individuals, health care systems or the wider society. Efforts to improve surveillance with a special focus on low and middle income countries (LMIC) settings and in particular in Sub-Saharan Africa (SSA) where data are still scanty but alarming reports are beginning to come out is especially important. Although resistance trends in resource-poor countries are largely under-studied, the information available clearly indicates that resistance to the inexpensive, older antimicrobials have reached unacceptable levels in the most common pathogens.

Availability of data describing the magnitude and burden of public health threats has for other areas such as HIV/AIDS and malaria proven to be essential in motivating change and enable prioritization of the issue among policymakers, donors, health care professionals and the public. This information is also vital to inform strategic decisions on the management of antibiotic resistance in different contexts and to guide prioritization of investments in new health technologies such as new antibiotics, vaccines and diagnostic tools. The development of a global surveillance system for antibiotic resistance, antibiotic use and the burden of resistance has become increasingly called for, and ReAct has since its start been actively involved in supporting this process at several levels.

SHORT SUMMARY OF ACTIVITIES JUNE 2006-JUNE 2010 (for detailed activities and outputs, please refer to earlier reports)

Under Objective 1, ReAct has worked with various partners to promote the development of a global surveillance system for antibiotic resistance, antibiotic use and the burden of resistance. ReAct has also focused on dissemination of available information and visualising existing evidence on the impact of antibiotic resistance.

In order to explore available knowledge and scientific evidence related to bacterial resistance, ReAct organized a 3 day expert workshop in co-operation with the European Commission DG Research in 2006. The workshop confirmed the lack of data on the burden of antimicrobial resistance, especially from LMIC. The workshop, together with prior work at the start up meetings resulted in several important outputs of significant importance for the prioritization of work during the following years:

- An extensive network of international scientific expertise was formed that has provided extremely valuable during the following years. Several of the key experts from this network is now participating in processes aiming to better measure ABR burden or improve ABR

surveillance both within and outside the ReAct network. By bringing together diverse actors at global and regional levels in a series of meetings in Latin America, Africa, South-East Asia and India, knowledge about what data that are available regionally, and further understanding the magnitude of the burden in health and economical terms has also increased and helped ReAct to further prioritize its activities. These processes have also mobilized global and regional experts to start discussing and measuring the health and economic burden of ABR and develop new methodology for it.

- The need for an systematic overview of published scientific evidence, identified at the Brussels workshop resulted in a number of fact sheets on the burden of antibiotic resistance, as well as numerous scientific articles and presentations.
- The Brussels workshop also identified major, critical knowledge gaps on burden of antibiotic resistance. To address some of these gaps, a number of pilot studies have been commissioned by ReAct, and through collaboration with Karolinska Institutet ReAct is linked into research activities mainly in Asia.
- The workshop in Brussels resulted in a call for research proposal on this theme within the 7th Research Framework of EU². ReAct initiated and organised a consortium lead by well renowned scientists that applied for funding (mid 2007). Although the proposal received high scores, it was not funded. Discussions are presently ongoing with the WHO and their organisations and networks to find options for alternative options to fund and implement the research proposal or part thereof.

Seminar presentations and panel discussions on new ways to estimate the burden of antibiotic resistance have been held in collaboration with a number of organisations, among them the International society for pharmacoepidemiology (ISPE), Uppsala Monitoring Centre (UMC) , Medicins sans Frontieres (MSF), International Rescue Committee and INDEPTH. The aim of this interaction was two-fold; firstly to introduce the problem on the agenda of the organisations and second to explore new ways and methodology to measure the consequences and burden of antibiotic resistance. While ReAct's role has been mainly consultative and collaborations are still in early phase with in contacts with MSF, UMC, ISPE, the partnership with INDEPTH has been consolidated during the past years and is now showing promising openings to future collaboration. The long-term goal of this collaborative effort is to stimulate and support the development of effective surveillance systems in areas of the world where there is currently no or weak longitudinal data on antibiotic resistance levels and consumption patterns. ReAct will provide linkages with other networks and provide necessary technical support to INDEPTH.

² __International Initiative for Identifying the Impact of Antimicrobial Resistance, Project acronym: HECTOR (Health and Economic Costs in Times of Resistance)

ACTIVITIES AND OUTPUTS July – Dec 2010

INDEPTH A letter of intent was developed at an INDEPTH workshop that was held at Manhica Health Research Center in Mozambique in October 2010³. A funding proposal is now being finalized for submission to primarily the Wellcome Trust. The proposal concerns the establishment of surveillance activities at selected INDEPTH Health and Demographic Surveillance Sites to capture antibiotic resistance and use in low-income settings in Asia and sub-Saharan Africa. The LOI is now being commented on by the INDEPTH Scientific Advisory Committee before submission to international funding agencies. The work to develop a full proposal has also started.



Figure 1. Participants at the INDEPTH work-shop in Cox-Bazaar Bangladesh May 9-10 2010.

Other research activities

As part of ReAct Latin America's activities a study to determine the rate of ESBL producing Enterobacteriaceae in faecal flora of newborns and to study the risk factors associated with colonization has been carried out in a neonatal intensive care unit at a tertiary hospital in Cuenca, Ecuador. The results are still being analysed and collated. The project also included capacity building and exchange between Sweden and Ecuador.

An intervention study partially supported by ReAct is being carried out in Vietnam regarding use of antibiotics in acute respiratory infection and reproductive tract infections.

CONFERENCE: THE GLOBAL NEED FOR NEW ANTIBIOTICS – MOVING TOWARD CONCERTED ACTION, UPPSALA SEPTEMBER 2010

At this conference (for details please see under Objective 2), which focused primarily on mechanisms to stimulate innovation of new antibiotic drugs, there was also significant work and discussion on how to establish a global network for surveillance of antibiotic resistance, which is a requirement to inform needs-driven research and development (R&D). One of the conference working groups dealt specifically with this topic and the recommendations will constitute a chapter in the full conference report (to be published in April 2011).

³ Protocol to measure the prevalence and disease burden of antibiotic resistant infections in low- and middle-income countries; Development of a consistent surveillance framework for antibiotic use and antibiotic resistant infections in Demographic Surveillance Centres in sub-Saharan Africa and Asia (INDEPTH).

ReAct Facts on Childhood Pneumonia. A factsheet on the burden of childhood pneumonia and the related burden of antibiotic resistance was produced and launched at the ReAct website at the World Pneumonia Day in November 2011.

TARGET FULFILMENT AND PERCEIVED IMPACT

The anticipated results stated in the original project plan aimed at making key stakeholders, including international donors in the health area, aware of the consequences of resistance and best options to improve the situation in different contexts. ReAct was proposing to initiate activities to arrange a workshop to analyse what is currently known on the burden of resistance, and to identify critical gaps in research; initiate a process with other partners such as WHO, for development of a model to estimate the burden of antibiotic resistance and initiate processes to identify and remove other critical evidence gaps, such as factors influencing rational use (facilitators and barriers) of antibiotics in different contexts.

During the project period, a solid network of well-renowned scientist has been created that is today working on developing models to estimate the burden of antibiotic resistance both in collaboration with ReAct or through other sources. ReAct has also been successful in placing the issue among a number of key health organisations such as the INDEPTH Network, Medecins sans Frontières with great potential to create greater leverage and wider uptake and action to limit and manage ABR.

OBJECTIVE 2: DEVELOP STRATEGIC OPTIONS TO REMOVE BARRIERS TO INNOVATION OF NEW ANTIBIOTICS AND DIAGNOSTICS

It is becoming increasingly evident that drug development is not adequately addressing the problem posed by the increased frequency of antibiotic resistance among common bacteria, and we are facing a paradoxical situation with increased levels of resistant bacteria along with a downward trend in antibiotic development. The need to reverse this situation is of extreme urgency, since it takes at least a decade to bring a new drug to the market

ReAct has been working towards identifying gaps between increasing prevalence of multidrug-resistant bacteria and the lack of novel antibiotics. ReAct has also been focusing on identifying and removal of obstacles to innovation of new antibiotics, examining existing incentives and finding new ways of ensuring rational use of these drugs to prolong their life span. One of the main guiding principles for ReAct's involvement in these processes is to ensure the global perspective, safeguarding that the benefits of any new pharmaceutical or diagnostic tool reaches not only the populations of wealthy countries, but also populations in low- and middle income countries where the burden of bacterial infections and antibiotic resistance is greatest.

SHORT SUMMARY OF ACTIVITIES June 2006-June 2010 (for detailed activities and outputs, please refer to earlier reports)

In 2007 ReAct initiated discussions with the European Medicines Agency (EMA) and the European Centre for Disease Prevention and Control (ECDC) on the need to document the gap between the frequencies of multidrug-resistant bacterial infections and the practically non-existent R&D pipeline of new antibiotics. A ReAct- EMA-ECDC joint working group was established in 2008 to conduct research that would allow determination of reasonable predictions of the extent of this gap in the coming years. ReAct played a substantial role in the development of the scientific methodology for the study and performed part of the actual R&D pipeline analysis. The results, published in the report *The Bacterial Challenge – Time to ReAct* in 2009 revealed a significant gap in the research pipeline with only a few agents mostly in early phase of development and primarily developed against bacteria for which treatment options are already available.

The report have been to be crucial in motivating and stimulating further processes and have been highly cited by both the scientific community and the policy sector, and have stimulated buy-in from the supranational policy sector including European Union and the US. The results from the report formed the base of the invitational expert conference *Innovative Incentives for Effective Antibacterials*⁴ hosted by the Swedish Presidency of the European Union in September 2009. The conference brought together a unique mix of representatives from science, health care, policy and industry, and ReAct representatives were among the key speakers of the conference. The objective

⁴ http://www.se2009.eu/polopoly_fs/1.25861!menu/standard/file/Antibacterials5.pdf

was to explore ways of creating incentives for the development of new drugs, including changes in regulatory mechanisms and use of innovative financial instruments.

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The Global Need for Effective Antibiotics - Conference in Uppsala, September 6-8, 2010

To capitalize on the momentum created by the initiatives during the Swedish EU presidency 2009 and the ReAct/ECDC/EMA report, the Swedish Government asked ReAct to convene a follow-up meeting in 2010 to discuss the issues related to new antibacterial drugs in greater depth. The follow-up conference ***The Global Need for Effective Antibiotics*** was arranged by ReAct/Uppsala University in September 2010, and included nearly 200 scientific and policy experts, pharmaceutical industry representatives as well as civil society organizations working in areas related to health and access to medicines. Preparatory work for the conference also spurred the development of frameworks and models to advance policy strategies to enable innovation for novel antibacterial. These efforts uncovered significant pre-clinical scientific bottlenecks, unfavourable risk-return prospects as compared to other therapeutic areas, and broken incentive and reimbursement signals as problems in the traditional pharmaceutical R&D model. It also identified the untapped potential of new ways to repurpose existing drugs, the need for complementary diagnostics and vaccines to promote conservation, and the lack of a global R&D agenda informed by the burden of disease.

The conference established new relationships with governments, funders, civil society groups, and potential partners for ReAct and affirmed ReAct's growing influence in catalyzing a global response to antibiotic resistance. We helped communicate with and engaged a number of stakeholder groups, many of whom with no previous ties to the antibiotic resistance community, such as product development partnerships and civil society representatives.



Figure 2. Group picture from the ReAct hosted innovation conference in Uppsala Sept. 2010.

WORKSHOP REPORTS TO BE PUBLISHED IN *DRUG RESISTANCE UPDATES (APRIL 2011)*:

Fighting Bacterial Infections – Future Treatment Options

Jenny Fernebro

Critical shortage of new antibiotics in development against multidrug-resistant bacteria – time to react is now!

Laura Freire-Moran, Bo Aronsson, Chris Manz, Inge C. Gyssens, Anthony So, Dominique L. Monnet, Otto Cars and the ECDC-EMA Working Group.

Conserving antibiotics for the future: New ways to use old and new drugs from a pharmacokinetic and pharmacodynamic perspective.

Johan W. Mouton, Paul Ambrose, Rafael Canton, George L. Drusano, Stephan Harbarth, Alasdair MacGowan, Ursula Theuretzbacher and John Turnidge

Diagnostics as essential tools for containing antibacterial resistance

Iruka N Okeke , Rosanna W Peeling , Herman Goossens , Raymond Auckenthaler , Stuart S Olmsted , Jean-François de Lavison , Barbara L Zimmer , Mark D Perkins , and Katarina Nordqvist

Towards New Business Models for R&D for Novel Antibiotics

A.D. So , N. Gupta , S.K. Brahmachari , I. Chopra , B. Munos , C. Nathan , K. Outtersson , J.P. Paccaud , D.J. Payne , R.W. Peeling , M. Spigelman , J. Weigelt

A framework for global surveillance of antibiotic resistance

Hajo Grundmann, Dominique L. Monnet, Keith P. Klugman, Timothy Walsh, Pilar Ramon-Pardo, Betuel Sigauque Wasif Khan, Ramanan Laxminarayan, Andreas Heddini, and John Stelling

The role of the pharmaceutical industry in meeting the public health threat of antibacterial resistance

Richard Bergström

The Global Need for Effective Antibiotics - A Summary of Plenary Presentations

Gunnar Alvan, Charlotta Edlund, Andreas Heddini

The Global Need for Effective Antibiotics – Moving Towards Concerted Action

Otto Cars, Anna Hedin, Andreas Heddini

The Swedish Government has commissioned ReAct to follow up and expand upon the efforts from 2009 and 2010⁵. The main focus for 2011 will be to: arrange policy seminars in Brussels, coordinate activities in the European Parliament, organize side events in relation to ICIUM 2011 and act as expert advisors on antibiotic resistance under the memorandum of understanding on healthcare between India and Sweden, specifically by coordinating and moderating a meeting between Swedish and Indian scientist and policy makers.

⁵ S2011/1040/FS 1:6

TARGET FULFILMENT AND PERCEIVED IMPACT

The impact in this area has been pronounced. ReAct has managed to initiate a high-level process to look closer at potential options for re-vitalised efforts on how to develop novel classes of antibiotics. This has prompted strong buy-in from major international pharmaceutical companies, academia, NGOs, CSOs, the EU Commission and the Swedish government. There is now direction and a stage for continued dialogue and development of concrete proposals.

OBJECTIVE 3: ADVOCATE FOR BETTER ACCESS TO AND USE OF EFFECTIVE AND AFFORDABLE ANTIBIOTICS FOR THOSE IN NEED

Although in many parts of the world antibiotics are easily accessible and overused; the poorer segment of the population often has limited access to essential and effective drugs. Weak health systems and unstable central drug distribution systems are contributing to shortage of essential antibiotics. Increasing resistance levels also results in older, cheaper antibiotics losing their efficacy, while newer and significantly more expensive drugs are unavailable due to high costs. Restricted access to antibiotics does not only have direct consequences for the individual, antibiotic shortage might also promote under dosing, substitution to available but unsuitable drugs, procurement from inappropriate sources and drug counterfeiting. Antimicrobial drug policies, essential decision-support tools in the battle against resistance, are impossible to develop or to implement without an ensured supply of a reasonable range of drugs.

SHORT SUMMARY OF ACTIVITIES June 2006-June 2010 (for detailed activities and outputs, please refer to earlier reports)

Ensuring access to effective antibiotics is a core concept in ReAct's work, explicitly stated in ReAct's vision *"Current and future generations should have access to effective prevention and treatment of bacterial infections as part of their right to health."*

Development and spread of antibiotic resistance and its consequences to access to effective antibiotics, especially in low-resource settings have proven to be a useful example in the work towards rational use of medicines (RUM):

- ReAct played an important role in the preparatory work to support the passing of the Rational Use of Medicines resolution (WHA 60:16) at the World Health Assembly 2007. By preparing an analysis on options for ensuring a report back on the previous WHO resolution on antimicrobial resistance (WHA 58:27) and for advancing this issue through the anticipated debate over the draft RUM resolution at the WHO Executive Board meeting, ReAct highlighted ABR as an important example of the consequences of poor access to medicines. With the objective to provide CSO representatives and WHA delegates with arguments why the RUM resolution should be adopted, ReAct also participated actively in CSO seminars prior to WHA as well as jointly hosting a WHO/NGO briefing seminar during the Assembly *"Saving lives, saving money: achieving rational use of medicines in health care services"*.
- ReAct has partnered with organizations with large experience in working with rational use of medicine issues (RUM) in resource constrained settings, in order to incorporate antibacterial resistance on their agenda. These include, the Ecumenical Pharmaceutical Network (EPN), WHO, the Indian Initiative for the Management of Antibiotic Resistance (IIMAR) and Universities and Ministry of Health in China. As data on antibiotic access and consumption are scarce, a number of initiatives in order to better describe and understand situation has been initiated. Data has proven to be useful for ReAct's advocacy work, but also by the partner organizations to better

understand and prioritize the issue among themselves.



Figure 3. ReAct at a meeting with the Ministry of Health in China April 2009.

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- Through collaboration with research groups at Karolinska Institutet, ReAct access activities have been linked into projects funded from other sources like European Commission, Swedish Research Council and Sida U-forsk. This includes studies on antibiotic use mainly in Vietnam, India and China. A number of smaller studies have also been performed by ReAct and network partners in order to better understand how antibiotic pricing affects access of antibiotics to the poorer segment of the population in Pakistan, monitoring access to antibiotics through faith – based health care services in SSA and exploratory work on global industry-standard statistics on antibiotic retail sales volume.
- Access to antibiotics and antibiotic use has been incorporated as a research area in the INDEPTH collaboration described under Objective 1.
- Availability of antibiotics in faith-based health-care services has been studied in collaboration with the Ecumenical Pharmaceutical Network, for details see under Objective 5.
- Advocating for increased access of newer antibiotics and ensuring a global focus including the disease and resistance profile of LMIC, developing and ensuring pricing mechanisms and distribution systems to safeguard equal access of new antibiotics have been addressed under objective 2: Develop strategic options to remove barriers to innovation and diagnostics.

TARGET FULFILMENT AND PERCEIVED IMPACT

In the original project plan, the primary goal for this objective was to work towards making key stakeholders aware of the consequences of poor access and best options to improve the situation in different contexts. ReAct has started to work with a number of strong civil society organizations with extensive experience in working with access and intellectual property issues. By providing a platform for discussion and sharing experience with these partners, ReAct strives to promote a broader representation of stakeholders including the non-governmental community in ongoing and future policy processes, a process that will be increasingly important in the future work on antibacterial innovation.

However, it has become clear that the issue of access to effective antibiotics encompasses a wide range of aspects cutting through R&D priorities and pricing mechanisms for new antibiotics, general health care accessibility and acceptability, availability of local bacterial resistance data to guide. As lack of access to antibiotics is a sign of a wider problem in health care delivery and effectiveness, ReAct's experience during the project period has shown that access to effective antibiotics is better addressed in a wider context than as a separate, isolated vertical objective as was originally planned. ReAct's has tried to promote work with access issues together with work towards rational use of medicines and other health care equity issues. This experience is reflected in the new project plan for 2011-2014 where it has been access is integrated in all thematic areas, and not as a separate theme.

OBJECTIVE 4: PROMOTE GLOBAL CONSENSUS FOR A NEW PARADIGM ON THE USE OF ANTIBIOTICS

Of the millions of bacterial species only a handful are known to be pathogenic, but it is this latter aspect that dominates public and even medical perception of microbes. Understanding the importance of microorganisms is crucial to the forging of a new paradigm, which seeks to move away from a prejudiced and negative perception of bacteria to a more normal and ecological one. Microorganisms together form around 80 percent of the planet's total biomass and from photosynthesis to nitrogen fixation, play a critical role in the survival of all forms of life on Earth.

The ubiquitous presence of antibiotics has upset the delicate balance of microorganisms in the environment. As antibiotics have become more widely used, resistant strains of both harmful and harmless bacteria are replacing antibiotic susceptible bacteria. Furthermore, antibiotic resistant organisms that develop in animals, fruits, or vegetables can be passed to humans through the food chain and environment. All of these factors have had the effect of changing the balance between antibiotic susceptible and the antibiotic resistant bacteria in our ecosystem, locally and globally.

There is a genuine need for new patterns of thoughts and practices and a need to address the ABR problem in a more holistic way. A public debate on the need for a paradigm change in dealing with antibiotic resistance and related problems is urgently needed. One clue to a possible shift in the current ways of thinking on antibiotic resistance issues is to thoroughly examine and support the slowly growing understanding among health professionals, activists and consumers that the root causes of the loss of effectiveness of antibiotics are not only medical, but also social, ecological, economic and political.

One effective way of communicating a more holistic and ecological perspective to large audiences is through works of art and popular culture that reinterpret concepts of science and provoke rethinking of long-held beliefs about medicine, infection and treatments. Collaboration between scientists, artists and social activists can help coin the new metaphors needed to uncover and promote the new paradigm that is emerging in this context.

SHORT SUMMARY OF ACTIVITIES June 2006-June 2010 (for detailed activities and outputs, please refer to earlier reports)

Through seminars, workshops and a variety of communication products ReAct has managed to reach a broad number of groups, including policy makers, NGOs, consumers and school children, presenting a wide holistic perspective of bacteria, antibiotics and antibacterial resistance. During several larger international fora, including the What Next forum arranged by the Dag Hammarskjöld Foundation in 2006 and the Tällberg Forum in 2007, ReAct has arranged workshops exploring and re-examining of our scientific assumptions about the fundamental relationships, both beneficial and harmful, between humans, microbes, infection, medicines and lifestyle. This has resulted in a number of communication products distributed through the network, including the booklet *Cure with Care* which is currently available in English, Spanish and Chinese. A video titled 'Antibiotic Resistance for Idiots', satirising the war metaphor used in medicine, is also available on YouTube and has been widely watched by audiences around the world.

Through the work of ReAct Latin America and their concept of ecosystem health, a number of activities and additional communication material in both printed and electronic form have been developed, many of those during the workshop and seminar on *Containing antibacterial resistance – reflecting, sharing and harmonising* held in Cuenca, Ecuador in 2008 (for details, see earlier reports and a summary under objective 5).

The ReAct-sponsored dialogue “Microbes and Metaphors: Re-imaging bacteria, infection and the body” in Wee Jasper, Australia in December 2008 sought to develop ways to redefine public perception of microbes and their dynamic relationship to other species. With input from scientists, artists and social activists the dialogue set the stage for deepening ties between the artistic and scientific communities as well as civil society to shift the public’s understanding of bacteria, and for crafting policy which emphasizes a cooperative approach to preventive healthcare that does not escalate bacterial resistance. Among other themes, the ReAct-supported website; Microbiana.com showcases several initiatives that tie science and art together in this area that are underway. A detailed report⁶ based on the presentations made at the Wee Jasper workshop has also been compiled for distribution to key agencies and individuals who can help take this concept to a much wider audience.

This work has been supplemented and expanded by members of ReAct’s South East Asian network. The Thai artist who participated in the Wee Jasper Dialogue worked with the coordinator of the Thai ABR process to develop a project with 20 pharmacists who were taught the principles and techniques of drawing and painting and assisted to develop a visual concept of their chosen themes on human-microbe- environment relationships. A series of very interesting paintings resulted. There will be a travelling exhibition of these works as part of the wider creative health promotion campaign on ABR in Thailand.

Preparatory work has also been undertaken to develop a cartoon animation series: “Who Killed Antibiotics?” in collaboration with broadcasters in South East Asia. The series, in an entertaining yet credible way, explores the various factors that have gone into making antibiotics ineffective. Currently a full-fledged proposal, including a sample animation, a website and comic book are ready to send to potential supporters and funders of the entire cartoon series. Another communication product under production is a book for children on microbes.

ACTIVITIES AND OUTPUTS July – Dec 2010

Preparation of report based on the workshop titled “Microbes and Metaphors: Re-imaging bacteria, infection and the body”. Due to the extensive use of images and artistic work in the report there was a need to seek official permission from the copyright holders and this task has been completed. The report, now finalized, will be printed by March 2011.

⁶ Microbes and Metaphors Re-imaging bacteria, infection and the body: A dialogue between scientists and artists, 5-9 December 2008 at Wee Jasper, Australia

The 'Who Killed Antibiotics?'⁷ proposal was fully developed including production of a 45 second animation trailer, a comic book and a website (whokilledantibiotics.org). Sample scripts for the first two episodes of the proposed 12 part series were also written and have been posted on the website for potential funders and supporters of the project to see. Currently a list of organisations, which can be approached for support, is being drawn up.

Regular updating of the Microbiana website was undertaken, with emphasis on building up databases under different categories such as 'resistance, research, policy and action'.

In a special trip to the United States ReAct, in November 2010, visited and interviewed well-known microbiologists in top universities such as Yale, Wisconsin and Stanford to understand what is happening in the frontiers of basic research in the context of antibiotic resistance. The interviews will be published on the Microbiana website but also disseminated widely through other means to help change public and even professional perception of microbial life and antibiotic resistance. Among other things, an important finding of the interviews is an alarming gap between emerging knowledge in microbiology and clinical practice in the world of medicine.

TARGET FULFILMENT AND PERCEIVED IMPACT

Anticipated result and activities

The rationale behind including this objective on the ReAct agenda was to broaden the understanding of the complexities of the problem of antibiotic resistance, with the aim to initiate changes towards a more holistic approach on antibiotic resistance by policy makers, health professionals and consumers/communities. In long term, a new paradigm on the use of antibiotics should replace the current.

While some of the results anticipated as part of this objective are hard to measure and require long follow-up time some impacts of the new approach are already becoming apparent. The Microbes and Metaphors project for example has also already resulted in the creation of a nascent network of artists, microbiologists and social activists who are in tune with the idea of uncovering a new paradigm on antibiotic resistance. This network will be consolidated in the coming year and wherever possible the new platform used to communicate to even wider audiences.

The new communication products developed by ReAct as part of the Microbes and Metaphors initiative including microbiana.org website, the Who Killed Antibiotics? animation series and the children's book on microbes will also help bring greater awareness of the holistic perspective on antibiotic resistance. The ReAct network includes a number of organisations well positioned to take on this challenge, not at least ReAct Latinoamerica which has incorporated the holistic rhetoric in many of their activities as well as developed a wide selection of communication products to support this. This has also been the case in Thailand, where ReAct's partner, the national Antibiotic Smart Use campaign employs this concept in their significant, nation-wide communication efforts targeting pharmacists and the public.

⁷ <http://www.whokilledantibiotics.org/>

In South East Asia the 'ABR Champions-Twin City' initiative, see objective V, even at its early stages, has created a lot of enthusiasm and motivation among municipality officials, health professionals, and civil society activists. The initiative has the potential to take complex concepts involved in understanding the paradigm shift to large popular audiences in a very effective manner.

OBJECTIVE 5: INCREASE AWARENESS OF ANTIBIOTIC RESISTANCE AS A THREAT TO GLOBAL HEALTH AND ENGAGE KEY STAKEHOLDERS TO TAKE ACTION

With the objectives to leverage increased awareness of antibiotic resistance and engagement of key stakeholders, ReAct has since its start been involved in several policy processes on national, regional and international level. Work is taken place in multiple areas: in the networks, through NGOs; academia; WHO and other stakeholders. ReAct's way of working, being a broker of access to expertise and a partner that complements and not duplicates the efforts of others has already resulted in a wide range of international institutions, organizations and other health and social actors with an interest, expertise and/or concern about antibacterial resistance now active in the network.

ReAct also strives to establish cross-regional platforms for sharing and learning. Work includes strategic advocacy material such as debate articles and scientific reviews, as well as adaptation of various materials for a wide audience of professionals, students and community members.

SHORT SUMMARY OF ACTIVITIES June 2006-June 2010 (for detailed activities and outputs, please refer to earlier reports)

International processes

ReAct has been a strong advocator for WHO to restore their work on antibiotic resistance, and has been instrumental in several processes within and in collaboration with WHO on both central and regional levels. During the second part of 2008 these efforts has resulted in a coalition of internal WHO programmes and external partners to address antimicrobial resistance and to develop a new work plan on ABR for WHO. ReAct was actively involved in the stewardship of this, co-chairing two working groups on rational antibiotic use and innovation of new antibacterial drugs. ReAct was responsible for drafting two background papers, focusing on enabling antibacterial innovation to combat antimicrobial resistance and on access to antibiotics, rational antibiotic use and regulatory mechanisms to address the problem of ABR. The document was planned to serve as background for the development of the new WHO Action Plan on Antimicrobial Resistance. Unfortunately, the WHO initiative came to a grinding halt during the autumn of 2009, when it became clear that the WHO coordinating programme World Alliance for Patient Safety (WAPS) was not going to continue in its current form.

ACTIVITIES AND OUTPUTS July – Dec 2010

New momentum has emerged within WHO as the upcoming World Health Day 2011 will focus on antimicrobial resistance. ReAct has been invited in several discussions and meetings planning for this event. A key standpoint from ReAct has been to highlight antibacterial resistance in common bacterial diseases such as pneumonia and neonatal sepsis, and not only focusing on resistance issues related to HIV/AIDS, malaria and tuberculosis.

- WHO GLOBAL ACTION PLAN ON ANTIMICROBIAL RESISTANCE ReAct has secured funds to WHO in order to support the publishing of the new ABR work plan developed under the WHO/WPS collaboration. The report has now been finally edited and the publication of the book will be announced by WHO during the World Health Day 2011. and published in the fall of 2011.

Preparatory activities have been undertaken for ICIUM 2011. In conjunction with the ICIUM conference, ReAct will organize a satellite meeting entitled “Exploring Ways to Preserve Future Novel Antibiotics – A Global Systems Perspective”. Around 20 international experts from academia, NGOs, policy makers, pharmaceutical industry, as well as representatives from regulatory agencies have been invited. The results of the meeting will be carried over to a plenary session on the same topic at the ICIUM and into a position paper. This meeting is strategically linked to ReAct’s work to stimulate innovation of new antibiotics, since efforts to preserve – through e.g. controlled distribution and regulation – antibiotics, must start now in order to prevent that any forthcoming products are squandered. Needless to say this discussion is also imperative for how to best preserve existing antibiotics as well.

Regional processes

Regionally ReAct has been influential as a facilitator in processes in Africa, in supporting and creating several networks in Asia (including South-East Asia, China and India) and the creation of ReAct Latinoamérica (RLA).

LATIN AMERICA

A regional coordination hub for the ReAct Latin American (RLA) network is located in Cuenca, Ecuador which has arranged a number of activities and activated the issue within a large network of existing networks on the Latin American continent. The RLA secretariat is hosted within the Faculty of Medical Sciences at the University of Cuenca, Ecuador and the present Dean of the Faculty is the coordinator of RLA. He is also coordinator of the People Health Movement in Latin America, an internationally renowned expert on Child to Child methodologies, and active in many other networks in Latin America including the network of Medical Faculties, the social determinants of health including poverty, inequity, environmental change and the conditions of indigenous peoples in the region. Hence there has been a significant achievement to analyze and communicate the issue of ABR in wider contexts. This has resulted in a strong articulation of the underlying determinants of ABR through malnutrition, lack of access to health care and environmental contamination of water and other basic needs. An early step was to formulate many of the underlying factors as well as the immediate causes of ABR into a substantial agenda for an international expert workshop followed by an open conference in June 2008. The international expert workshop of 75 people from 22 countries and the open conference of more than 1000 participants resulted in The Cuenca Declaration⁸, calling for a concerted action against antibiotic resistance. This provided the basis of an agenda for action for RLA based on research, training and edu-communication. An agreement to collaborate with the Pan-American Health Organisation (PAHO) was signed shortly after this conference. Through collaboration with PAHO, many local, provincial and national organizations in Ecuador and a number of organizations in other Latin American countries ReAct Latin America has developed a substantial

⁸ <http://www.reactgroup.org/who-we-are/organisation/regional-nodes/react-latin-america.html>

research and training program targeting medical students and practising primary health care physicians through a number of educational activities. A number of short courses on antibiotic use and resistance have been held. During the past year, a major initiative in collaboration with the Faculty of Medical Sciences of the University of Cuenca, Ecuador, PAHO and a number of Latin American and global Universities is being developed. This is a “Postgraduate Program for Research and Training on Comprehensive Primary Health Care, Prevalent Infectious Diseases and Antibiotic Resistance in the Community”. The course is planned to first be piloted and evaluated in Ecuador and then offered online in Spanish-speaking Latin America in conjunction with PAHO and its e-platform. The course outline is unique as it aims at improving primary health care capacity to deal with the most prevalent bacterial problems combined with profound knowledge in rational use of antibiotics and antibiotic resistance. The course is aiming to evolve as a third stage to have a global reach in collaboration with other universities around the world and adapted for different contexts.



Figure 4. One of the meetings where the post graduate program was developed, took place in January in Cuenca, and was attended by representatives from ReAct Latin America and the Faculty of Medical Sciences of the University of Cuenca, ReAct Global, Pan American Health Organization, National University of Colombia, National Health Surveillance Agency of Brazil and other organizations.

ACTIVITIES AND OUTPUTS July – Dec 2010

Development of a Postgraduate Program for Research and Training on Comprehensive Primary Health Care, Prevalent Infectious Diseases and Antibiotic Resistance in the Community⁹. Work is well underway to identify teachers and teaching material for the upcoming course start. In parallel, the political approval process of the training program has been monitored at the Postgraduate Centre and Higher Education Council. The process is suspended, due to modification of the Law on Higher Education in Ecuador, and the disintegration of the National Council of Higher Education (CONESUP) to be replaced by the Higher Education Council (CES) in 2011. The Latin American team is following this process closely. At present, the course, originally planned as a three stage course moving from Diploma to Specialist to Masters qualifications will be begun as the introductory phase at Certificate level while the formal administrative structures and operational processes in relation the new law are sorted out. Capacity building of local Faculty will also be undertaken in 21011. The start is still planned for autumn 2011.

The RLA team has also actively participated in several scientific seminars and meetings in Latin America, as well as several events organized by civil society organizations. It has an active and highly creative program in popular education and a focus on child to child work supported by school teachers and a number of schools in the province of Azuay. The work has developed to a point where a major international child to child program could be developed in the next 12 -18 months.

ASIA.

In Asia, ReAct has worked through governmental, academic and CSO contacts and has been influential in several of the Swedish political delegations to both China and India during the past years, and has also had close contacts at ministerial levels in Thailand and Malaysia through other initiatives.

ReAct's engagement with ABR-related organizations and individuals in SEA dates back to 2006 as part of ReAct's global networking activities. In 2007 a formal ReAct project was initiated in Southeast Asia to identify key stakeholders in the region, the ABR issues, opportunities and challenges for ReAct's engagement in the region with the aim of building an ongoing campaign. In March 2008, a ReAct meeting was convened in Bangkok, between the ReAct Secretariat and potential partners from Thailand and Malaysia, to further deliberate the strategies. The regional networking was further consolidated in 2009 to include ABR partners from other SEA countries viz. Indonesia, Philippines, Lao PDR, Singapore and Vietnam. Then, in March 2010, in another ReAct-sponsored meeting in Bangkok, partners from five countries in SEA, with input from Indonesia who could not attend, and representation from WPRO, met to discuss the growing prevalence of ABR in the region and actions required to address it as well as further steps to consolidate the ReAct-SEA network. A number of

⁹ Internation research and training program in human resources for Comprehensive Primary Health Care with emphasis on prevalent infectious diseases and antimicrobial resistance , executive summary

promising initiatives in the region were presented. A statement¹⁰ signed by all attendees and their organizations set out the problem and a proposed agenda for regional cooperation action resulted. The statement and meeting recommendations were submitted to the WHO-SEARO meeting held soon after to discuss and plan a WHO AMR campaign in Southeast Asia. The ReAct-SEA work plan for the last years have been aimed at expanding and strengthening the network of organizations and individuals in the region working on ABR issues, catalyzing cross-learning between countries on successful practical initiatives, with a longer-term end of developing and establishing regional and national policy platforms on ABR. An active agenda for cross- learning, action research on curriculum change in medical and pharmacy schools in the region, a research agenda for the region, dynamic public health promotion on the issue and fundraising has been set out for 2011 including further collaboration between ReAct partners in SEA and WHO-SEARO and over time WHO_WPRO. The next phase will deepen the work to mobilize and create the environment for national policy action in the countries concerned and a more formal regional action agenda.

ACTIVITIES AND OUTPUTS July – Dec 2010

The processes and activities for this period were aimed at strengthening the regional network by connecting up individuals and organizations in SEA countries committed to the ABR issue. As a process outcome, this is positive to date. The networking processes and activities were also as much global as regional with SEA partners identifying with the global ReAct platform and strategy. We have also seen a strengthening of links between the ReAct-SEA network and other global/regional networks working on ABR/AMR issues in the region.

A survey¹¹ of undergraduate health related education programmes in the region with a view of revising them to improve student's skills in rational prescribing and dispensing of antibiotics was performed. Seed-funded by ReAct, and after online consultations among SEA ReAct Partners, the survey was initiated and led by ReAct's main partner in Malaysia, the Department of Social and Administrative pharmacy of Universiti Sains Malaysia, Penang. The survey will provide important information on identifying areas suitable for intervention among medical and pharmaceutical students.

Chulalongkorn University, Thailand, which already has a Memorandum of Understanding (MoU) with Uppsala University, and which houses one of ReAct's main Thai partners (Drug System Monitoring and Development Program) is in discussion with ReAct to add a research collaboration on ABR issues to the current MoU. Similarly, ReAct's main partner in Malaysia, the Department of Social and Administrative Pharmacy, Universiti Sains Malaysia is pursuing a research MoU with ReAct-Uppsala University.

Follow-up action was taken to step up on the twin-city project between Chiang Mai, Thailand and Uppsala, Sweden to cooperate on municipality ABR initiatives to promote safe use of antibiotics and reduce antibiotic resistance. A meeting in August 2010 between members of the ReAct Secretariat

¹⁰ <http://www.reactgroup.org/who-we-are/organisation/regional-nodes/react-south-east-asia.html>

¹¹ Project report-A survey on the teaching of rational use of antibiotics among South East Asian medical and pharmacy schools, Dr Mohamed Azmi Ahmad Hassali

and the Mayor of Chiang Mai agreed on a number of specific measures to take forward the twin-city project.

India. ReAct has supported the Indian Initiative for the Management of Antibiotic Resistance (IIMAR), which is a network based in Mumbai operating all over India, carrying out campaigns of hygiene, infectious disease prevention and rational use of antibiotics. IIMAR has engaged both the medical profession and involved the general public through work in communities and information campaigns. Moreover, ReAct has catalysed bilateral cooperation between Sweden and India focusing on antibiotic resistance.

China. In China ReAct has also catalysed contacts between Swedish and Chinese actors that have led to a plan of action that among other things entails substantial cooperation in the field of antibiotic resistance. The PoA was signed by the Swedish and Chinese Ministers of Health in October 2011.



Figure 5. Participants at the The South East Asia Regional Meeting: Cooperative Campaign for Antibiotic Resistance Control in Bangkok, March 11 – 12 2010.

AFRICA. In Africa, ReAct develops and builds on the current exploratory work where multiple regional entry points are being mapped with local situation analyses. A global campaign “Fight AMR – Save medicines for our children” is conducted by a partnership between ReAct and the Ecumenical Pharmaceutical Network (EPN). The campaign intended to stimulate both global and local actors to take concrete action to address antimicrobial resistance. It requested all to play a role in supporting and promoting rational use of medicines and other interventions that can be used to contain the development of resistance and save medicines for future generations. The campaign was launched at the World Health Assembly in Geneva in May 2009. The launch included a ReAct/EPN briefing session targeting WHA delegates and WHO Officials, and was accompanied by events in a number of places

around the world (for instance in India, Moldova, Togo, Tanzania and Malawi). These activities were carried out by EPN member organizations and targeted governments, health workers, kindergarten and school children as well as the general public. Three workshops have been conducted with support and participation of ReAct representatives and a wide range of campaign material has been developed and distributed through the EPN network.

In addition to collaboration with the NGO community and civil society, ReAct has been taking the first contacts and assessing the feasibility of arranging a series of sub-regional or pan-African meetings targeting high-level policymakers and political representatives in order to high-light antibiotic resistance issues in an African context. However it is also recognized that such an approach needs to be sustained by a strong mobilisation of many networks working on issues that ABR is relevant to. For this reason ReAct is working to facilitate the involvement of a wider group of networks and organizations within Africa, or with an African focus.

In partnership with the Ministry of Health in Ghana, ReAct has initiated a process to support the development of a national policy for the management of antibiotic resistance in Ghana. A workshop with broad participation has been held and an action plan for 2011 is under development.

ACTIVITIES AND OUTPUTS July – Dec 2010

Several local EPN partner organisations, mainly in SSA are now actively working on ABR issues within their own organisations, with some minimal input from ReAct. The EPN Secretariat, with support from ReAct, sought to move the efforts of faith based organizations on advocacy and containment of antimicrobial resistance in the network to a higher level. Therefore, a call for expression of interest was sent out inviting network members to bid for implementation of capacity building, advocacy and containment interventions, in areas focusing on capacity building courses on rational management and use of antibiotics; implementation of hospital based infection control interventions and hospital antibiotic use and AMR perceptions studies.

Supported by ReAct, a number of activities were carried out by EPN network members in Uganda, Moldova, India, DR Congo, Rwanda and Cameroon. These included training, development of IEC materials, experience sharing, sensitization workshops and media campaigns/public advocacy with the intention of achieving the stated objectives amongst the participants in these activities. The implementing partners were Joint Medical Store (Uganda), CoRSUM (Moldova), Department of Pharmacy, Annamalai University (India), Christian Medical Institute/ Bon Berger Hospital (DR Congo), BUFMAR (Rwanda) and Cameroon Baptist Convention Health Board and OCASC (Cameroon). A total of 527 participants were directly involved in these activities. Outputs included training courses, situation analyses and development of educational material.

With the objective to generate information on the perceptions and attitudes of hospital staff on antimicrobial resistance, an AMR perception antibiotic use and studies were carried out in Sierra Leone, Nigeria and Zimbabwe. A total of 86 health professionals from 29 hospitals were interviewed. The EPN secretariat is currently analyzing the results that will provide better knowledge on local situations and aid future planning of information and educational interventions.

Towards a national policy platform for the management of antibiotic resistance in Ghana. Building on experiences in other countries, this project seeks to engage several constituents so as to support a national coordinating group to develop a national policy for the management of antibiotic resistance in Ghana. Much is known regarding the necessary policy options required to curb antibiotic resistance (ABR), but less about how suggested counter measures are achieved. This project focuses on and seeks to steward this process. Ghana is a country suitable for piloting such a project since it has availability of local surveillance data, suitable related initiatives currently ongoing in the health system that offer entry points for ABR, political stability and a dedicated group of individuals representing different concerned constituents in the Ghanaian health system willing to take the issue further.

Since there are similar ongoing processes in other parts of the world, e.g. in Europe, South-East Asia and Latin America, organizations and individuals from these regions will be invited to share best practices, experiences focusing on the key elements of starting and sustaining processes that have led to change. Specifically, exchange with Thailand will be built in. The project activities towards developing and implementing a policy are proposed to be carried out in Ghana, but with the long-term aim of broadening the participation and engagement to other countries in the region through a process of sharing and cross-learning.



Figure 6. ReAct and EPN participants at workshop on antimicrobial resistance in Nairobi, May 5-7 2010

Information activities

Building on the previous work, ReAct has continued to develop a system that regularly and systematically scan media and the scientific literature in areas related to antibiotics use and global health. Special emphasis remains on dissemination of the outputs within the network and strengthen

links to media representatives in order to increase media focus on issues related to antibiotic resistance. The main information vehicle for ReAct is the website www.reactgroup.org.

ACTIVITIES AND OUTPUTS July – Dec 2010

A new ReAct website. During the autumn, work has been done to redesign the website to make it more dynamic and user-friendly. A completely new website was launched in March 2011. In parallel to the new website, a range of new information has been developed and will be ready during first part of 2011.

Information material:

- The *ReAct Quarterly* electronic newsletter, containing scientific updates on antibiotic resistance, updates on ReAct activities and an editorial column. The ReAct newsletter today has around one thousand (and increasing) number of readers, from a wide range of backgrounds and regions.
- Resistance in the News. A weekly selection of articles and news with relevance to antibiotic resistance and antibiotic use that have been published in various internet media and on-line scientific journals, distributed through the website and the ReAct newsletter mailing list.
- ReActiva, a regional targeted newsletter in Spanish distributed to 1300 readers containing updating about the activities of ReAct and RLA.

Scientific articles:

- Diaz Högberg L, Hedding A, Cars O. The global need for effective antibiotics: challenges and recent advances. Trends Pharmacol Sci. 2010 Nov.
- So A, Furlong M, Hedding A. and antibiotic resistance. BMJ. 2010 Sep
- Hedding A. Taking action on antibiotic resistance. Public Service Review. European Science & Technology issue 09. 2010

TARGET FULFILMENT AND PERCEIVED IMPACT

Here, ReAct has made significant contributions in creating awareness and stimulating other actors to move. ReAct has taken advantage of ongoing processes such as e.g. the health sector reform plans that are being implemented in many countries in South-East Asia. This has opened windows of opportunity as e.g. a new pharmaceutical policy in Thailand also opens for specific discussions around antibiotics etc.

ReAct's partnership with WHO has also been fruitful and antibiotic resistance is now more prominently featured on the agenda as could be seen on this year's World Health Day that focused on antimicrobial resistance. Here, working together with the Swedish Department of Social Affairs has been a positive factor.

Similarly, work in Latin America has greatly increased the visibility and understanding of ABR and the coordinator of ReAct Latin America, Professor Arturo Quizhpe-Peralta has worked closely with PAHO Ecuador in the planning and execution of activities in relation with the World Health Day.

Further, it is worth noting how ReAct's different areas of work has synergized such that activities undertaken in the area of innovation and development of new antibiotics has greatly increased the general awareness and interest in ABR at several different levels.

REFLECTIONS ON ReAct AS AN INTERNATIONAL NETWORK 2006-2010

From the outset, ReAct has been a rather diverse network in terms of geographical presence, competencies and backgrounds of key staff and also in terms of management structure. When reading the report “*Developing Successful Global Health Alliances*”¹ commissioned by the Bill and Melinda Gates Foundation and produced by McKinsey & Co, one is stuck by the fact that ReAct doesn’t really fit into any of the categories described. However, when looking back on the past years, this somewhat unconventional structure has proven both successful and resource-efficient. Although the lack of one clear overarching theme can sometimes be a drawback, it has mostly been advantageous to maintain the broad agenda as ReAct’s main role is the one of instigator and catalyst and not the executor.

ReAct has a broad range of expertise in the network and works by addressing academia, policy makers and civil society, community and consumer-groups to fulfil its role as a catalyst and agent for change. ReAct works in a broad manner comprising several of the areas concerned by antibiotic resistance and strives to bring about action and change, but always rests evidence formulation on a sound scientific basis. The changes sought by ReAct involve both “top-down” approaches such as new policies, legislation and guidelines, and also work with grass-root organisations to raise awareness and stimulate civil society movements. ReAct is a network of networks and as such has wide reach and can influence numerous other actors.

The original vision and mission statement remain valid and unchanged. ReAct aims to address processes by linking policy makers not only with research evidence but also with grass root movements and consumer organizations in order to not only propose *what* should be done but also *how* it should be done.

Management issues

Three principal areas need to be addressed and supported by the management structure:

- Planning and execution of projects
- Network information exchange
- Capturing results

During 2011 ReAct will seek to refine and clarify roles, responsibilities and decision-making processes for all members of the network. A more project-based model is proposed where resources are allocated to projects that are planned to run over a defined period of time. Each project will have a coordinator/team leader who carries the overall responsibility for that project, and a project team with clearly defined roles. The Uppsala coordinating office currently serves as the lead partner in the alliance and since the major financial contributions are managed through this body so does the ultimate decision making regarding funding allocation. Thus, currently the final decision making rests with the Executive Director. However, in reality the decision making process takes place in the International Secretariat where the core members of the ReAct network jointly prioritize and develop projects. In addition the Senior External Advisors provide overall strategic guidance for the network.

It is expected that this structure should offer a valuable platform for network strategic planning and decision making also in the future even in a situation where core members with separate funding participate. In such a situation, the final decision making power lies with the grant holder, but the international secretariat will add value by linking to the wider network partners and by bringing in multidisciplinary expertise.

Governance

Since the inception of ReAct, it has been proposed that a Strategic Advisory Board should be appointed to provide strategic direction and advice in decision making. However, as ReAct currently is a project within Uppsala University, such a board would not carry formal, legal authority or responsibility, but would serve as an advisory group. In addition, the management and costs of a formal advisory board must be balanced against benefits and at the moment ReAct is probably not in need of such a “heavy” formal governance structure. Instead two senior external advisors have been appointed to provide independent advice on overall strategic direction and management. The external advisors participate in the annual secretariat meetings and review reports and strategic plans.

Lessons learned

Window of opportunity

Careful planning of activities are vital for success but in the policy arena where ReAct is striving to accomplish change, it is also a requirement that external factors, some of them beyond the influence of ReAct, are aligned, such as the social, political and economic situation. “Golden” windows of opportunities often appear suddenly within unexpected regions social /political environments and work-areas. Thus it has proven difficult to undertake exact long-term planning.

- ReAct needs to retain some degree of flexibility in the overall project plan and budget to be able to pursue opportunities in a dynamic and rapidly changing environment.

Minimize over-committing

As mentioned above, the dynamic political environment has implied that ReAct has sometimes engaged in too many projects in parallel and as a consequence has had too little time to follow-up and harvest promising project ideas.

- In the future, a better balance should be sought and ReAct must actively decline from engaging in some projects, albeit exciting and promising.

Expand activities in sub-Saharan Africa

As a consequence of ReAct’s strategy to piggy-back on ongoing policy processes, the number of strategic opportunities has been lower in sub-Saharan Africa where health systems are generally weaker and where health agendas limited by small budgets for health and health research.

- ReAct will seek to change this shortcoming of the first project period and has started stronger cooperation on the policy level, most notably with the MoH of Ghana.

Uppsala University as the base of the Secretariat

The base at Uppsala University provides a degree of credibility and offers a coherent structure plus a significant amount of co-funding, at the same time allowing a high degree of autonomy. There is no reason to consider changing this organizational link, although discussions about the pros and cons have been held intensely during that last year. The losses in autonomy are currently outweighed by gains in credibility and administrative and communicational support.

Branding and evidence base

ReAct has never aimed to become a “brand” organisation in the sense of strongly promoting that partners adopt and use ReAct’s name and logo. But in some cases the partner organisations desire to use the ReAct logo, have implied potential benefits and drawbacks that have been discussed internally. The branding of partners allows ReAct to reinforce its message and enhances its possibility to be perceived and acts as a global key player within the field, but branding also has implications for managing and ensuring that messages produced in ReAct’s name reflect the values of the network.

- Carefully chosen partners have ensured that credibility is rarely or never an issue but as more and more partners and individuals come on board, ReAct is aiming to create a resource centre with evidence base checked material and tools to be made available at the new website. Through a more decentralised structure with regional coordinators and advisors that participate in monthly phone calls and yearly physical secretariat meetings the network management team has increased oversight of what is communicated in the name of ReAct.

Communication strategy

Communications represent an integral part of all ReAct’s work, making it somewhat difficult to draw up strict boundaries between communications and other activities. However, the communication efforts for future years will primarily aim to generally support the attainment of ReAct’s objectives. This work will include a number of measures, e.g.:

- Advocacy efforts to influence policymakers and other key stakeholders, help maintain political momentum;
- Initiation and sustaining of debates;
- Media operations and advocacy outreach efforts to raise awareness amongst key target groups as well as the general public in affected countries;
- Bringing out and clarifying the practical (clinical, political etc.) implications of scientific findings to relevant recipients, and thereby help “getting research into policy and practice”;
- Bringing out the needs on the ground and helping to formulate more relevant questions for basic and operational research;

- Strengthening of internal communication procedures.

Revise and continuously review the M&E framework

ReAct strives to stimulate action and uptake by others by being active in many different foras and in media . To a large extent ReAct's deliverables are "soft" and process rather than product oriented and it is difficult to measure the real impact from the massive amount of workshops and meetings organised at regional and local level and that may come to fruition years later and lead to engagement at the individual level. ReAct's M&E framework during the first programme period was formulated out of the first LFA exercise. Setting up modalities for monitoring and evaluation of a novel organization in a highly complex terrain is far from easy, and the previous indicators could be said to have been working surprisingly well. In the external review of 2010, more developed modalities for monitoring and for evaluation were proposed.

- ReAct will in the coming project period improve the M&E framework by basing it on both a regular LFA and elements of outcome mapping².

Fund raising

The perhaps most important lesson learned is that ReAct needs to work in a much more strategic and active way to mobilize sufficient funding. This will also entail significant efforts to broaden the funding base. ReAct is depending largely on one funder – Sida – who provides core support. Additional funding has come from Uppsala University, the Swedish Ministry for Social Affairs, AFA Insurance, and through in-kind contributions from network partners. This has created a rather fragile and vulnerable situation that needs to change in order for ReAct to enter into the next phase of development.

- While the focus of this fund raising strategy is to obtain direct funding, i.e. support to ReAct's core network partners (International Secretariat), indirect support of ReAct activities directed to the extended network partners is also an objective that needs to be included. Here ReAct can leverage funding for activities that are in line with ReAct's goals and objectives, but that may not be carried out by ReAct's core network partners, thereby creating an added effect.

¹ <http://www.gatesfoundation.org/global-health/Documents/GlobalHealthAlliances.pdf>

² http://www.idrc.ca/en/ev-26586-201-1-DO_TOPIC.html