ESAC – European Surveillance of Antimicrobial Consumption

Interim Management Report 2010-2011

Grant Agreement 2007/001
Specific Agreement ECD.2187

- Table of Contents -

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND RELATED PROJECTS

ABS International	Antibiotic Strategies International
AB	Antibiotic
AC	Ambulatory Care
AMU	Antimicrobial Use
ATC	Anatomical Therapeutic Chemical
BAPCOC	Belgian Antibiotic Policy Coordination Committee
BURDEN	Burden of Resistance and Disease in European Nations
CHAMP	Changing behaviour of Health care professionals and the general public towards a More Prudent use of antimicrobial agents
DDD	Defined Daily Dose
DID	Defined Daily Doses per 1000 inhabitants per day
DPP	DDD per package
DRG	Disease related groups
EARSS	European Antimicrobial Resistance Surveillance System
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
EEA	European Economic Area
EFTA	European Free Trade Association
ESAC	European Surveillance of Antimicrobial Consumption
ESCMID	European Society of Clinical Microbiology and Infectious Diseases
ESF	European Science Foundation
EuroDURG	European Drug Utilisation Research Group
GP	General Practioner
GRACE	Genomics to combat Resistance against Antibiotics in Community-acquired LRTI in Europe
GRIN	General Practice Respiratory Infections Network
HC	Hospital Care
ICD	International Statistical Classification of Diseases and Related Health Problems
ICPC	International Classification of Primary Care
IPH	Institute of Public Health Brussels
IPSE	Improving Patient Safety in Europe
LNR	Lead National Representative
LTC	Long Term Care Facility
MOSAR	Mastering Hospital Antimicrobial Resistance and its spread into the community
MS	Member State
MT	Management Team
NH	Nursing Homes
NN	National Network
NR	National Representative
PID	Packages per 1000 inhabitants per day
PPS	Point Prevalence Survey
RoA	Route of Administration
SAR	Self-Medication with Antibiotics and Resistance Levels in Europe
TB	Tuberculosis
TC	Total Care
WHO	World Health Organisation

SUMMARY INTERIM MANAGEMENT REPORT 2011

ESAC (European Surveillance of Antimicrobial Consumption) is an international network of national surveillance systems, collecting comparable and reliable antibiotic use data granted by ECDC (European Centre for Disease Prevention and Control; Grant Agreement GRANT/2007/001, Specific Agreement ECD.1018).

ESAC aims to maintain a continuous, comprehensive and comparable (using ATC/DDD classification) database on antimicrobial consumption for all EU Member States, EU candidate countries and European Economic Area – European Free Trade Association (EEA–EFTA) countries, ensuring high standards of data collection, collation and validation (using national registers) in a timely fashion. ESAC aims to improve and expand the scope of the database on consumption data in consultation with ECDC. Additionally, the project aims to deepen the knowledge of antibiotic consumption by focusing on specific consumption groups and/or patterns in collaboration with those countries where the appropriate data are available.

The overall aim of the project is to consolidate the continuous collection of comprehensive antimicrobial consumption data, from ambulatory and hospital care, from the 27 EU Member States, 3 EEA/EFTA countries (Iceland, Norway and Switzerland), 3 candidate countries (Croatia, Former Yugoslavian Republic of Macedonia and Turkey) and 2 other countries (Russian Federation and Israel).

Delivery by the countries of the 2009 data has started in September 2010. Data is currently being analysed and will be made available in the ESAC Yearbook 2009.

The ESAC interim management report 2010-2011 provides an overview of the aims and objectives as well as the methodology used in ESAC, including the previously developed Collect Manager and Dataset Manager for the collection of the core data. The updated ESAC Network is presented, including the Management Team, the National Networks, Scientific Advisory Board and Audit Committee. Also the preparation of the ECDC HUB visit which was held in February is highlighted.

The dissemination activities, such as papers published in peer reviewed journals, abstracts accepted for presentation, the updated ESAC website and the latest editions of the newsletter are discussed in detail.

The interim management report 2010-2011 contains a summary of the latest results and status of the Ambulatory Care, Hospital Care, Nursing Homes and the Socio-economics subprojects. The data availability for protocol A & B for Ambulatory Care, the list of Hospital Care countries that participated in the PPS 2009 and the LS 2009, the list of nursing homes participating in the first and second PPS 2009, and the inventory of socio-economic determinants are presented in Annexes I, II, III, and IV respectively.

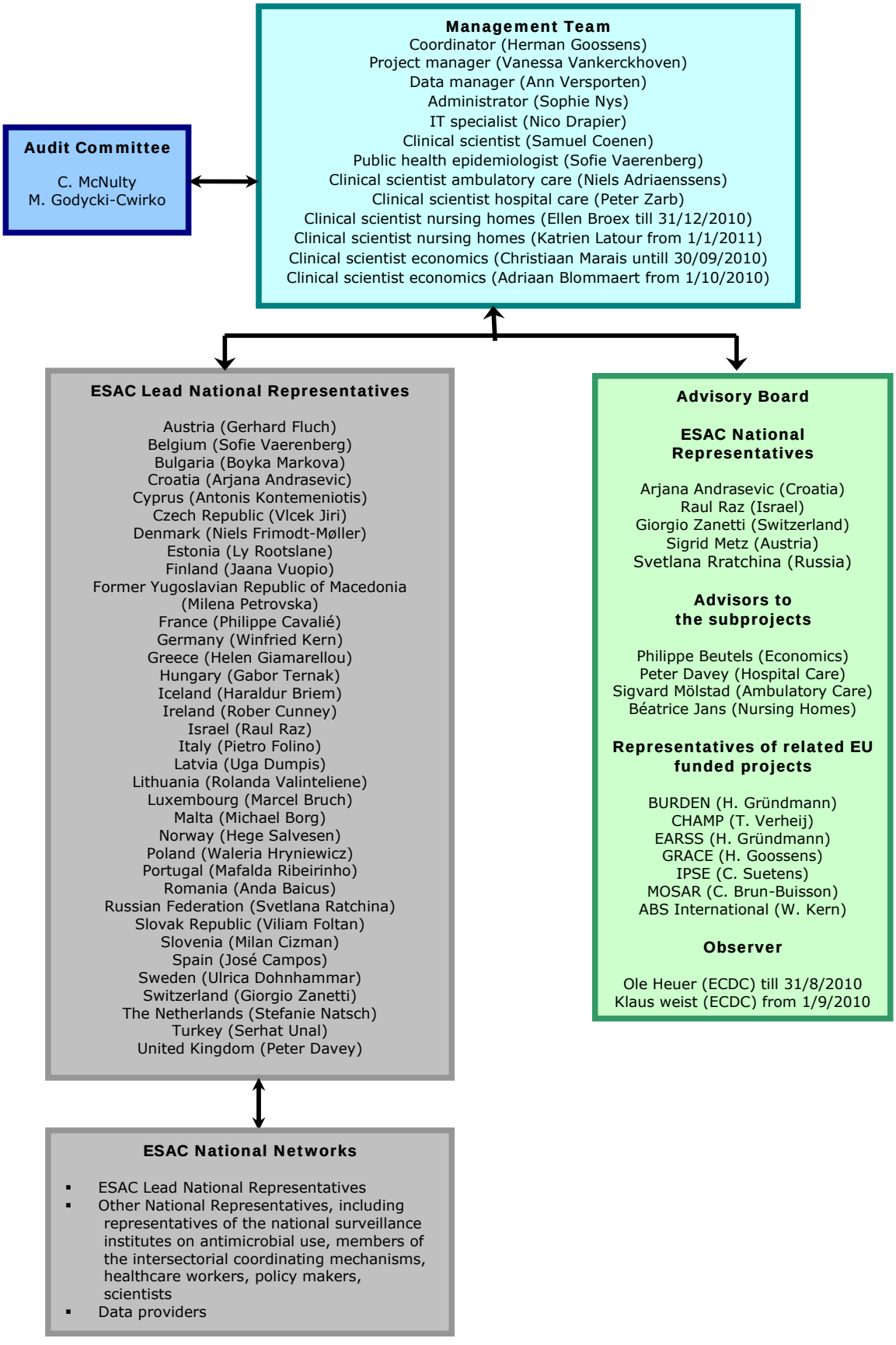
An overview of the manpower which was needed to execute all activities performed during the first half of the fourth year is provided.

In the list of deliverables and the list of milestones it is clearly marked which DLs and MSs have been met. Also, the minutes of the ESAC management team meetings are presented.

Finally, the abstracts of the papers and those accepted for oral and poster presentation have also been listed in Annexes V, VI, and VII, respectively. In Annex VII the latest editions of the ESAC newsletter are presented.

1. ESTABLISHMENT OF THE ESAC NETWORK

ESAC Organisation chart anno 2011



A multidisciplinary Management Team (MT) was established at the University of Antwerp, Belgium, but also has members in Brussels, the UK and Slovenia. The MT consists of a project coordinator, a project manager, a communication manager, an administrator, a public health epidemiologist, a clinical scientist, and thus combines expertises such as in information technology, data management, microbiology, infectious diseases, epidemiology, ambulatory care medicine, hospital care medicine, pharmacology, and health economics. The MT ensures day-to-day management and monitoring of the network activities.Each of the participating was asked to establish their own National Network (NN) consisting of a Lead National Representative (LNR) who coordinates the NN, other National Representatives and Data providers and importantly relevant experts in the field of antimicrobial consumption.
An Advisory Board was established which (i) provides scientific support to the MT and (ii) liaises with ECDC as well as EU funded projects on antimicrobial use and resistance. Next to an Advisory Board, an Audit Committee was established which monitors the progress of the project and helps resolve problems.

ESAC Management Team

FUNCTION	NAME	E-MAIL
Project Coordinator	Herman Goossens	herman.goossens@uza.be
Project Manager	Vanessa Vankerckhoven	vanessa.vankerckhoven@ua.ac.be
Data Manager	Ann Versporten	ann.versporten@ua.ac.be
Administrator	Sophie Nys	sophie.nys@ua.ac.be
IT specialist	Nico Drapier	nico.drapier@ua.ac.be
Clinical Scientist	Samuel Coenen	samuel.coenen@ua.ac.be
Public Health Epidemiologist	Sofie Vaerenberg[a]	sofie.vaerenberg@wiv-isp.be
Clinical scientist Ambulatory Care	Niels Adriaenssens	niels.adriaenssens@ua.ac.be
Clinical scientist Hospital Care	Peter Zarb[b]	peter.zarb@ua.ac.be
Clinical scientist Nursing Homes	Ellen Broex[a] (till31/12/2010)	ellen.broex@wiv-isp.be
Clinical scientist Nursing Homes	Katrien Latour (from 1/1/2011)	katrien.latour@wiv-isp.be
Clinical scientist Socio-Economics	Christiaan Marais (till 30/9/2010)	christiaan.marais@ua.ac.be
Clinical scientist Socio-Economics	Adriaan Blommaert (from 1/10/2010)	adriaan.blommaert@ua.ac.be

ADDRESSES:
ESAC – Laboratory of Microbiology, University of Antwerp, Universiteitsplein 1, B-2610 Wilrijk-Antwerpen, Belgium / Phone +32-3-265 27 50 – Fax +32-3-265 27 52
[a]Scientific Institute of Public Health, Brussels, Belgium.
[b]Mater Dei Hospital, Infection control Unit, Malta.

ESAC National Networks

Austria			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Helmut Mittermayer (†July 6, 2010) Replaced by Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Gerhard.fluch@elisabethinen.or.at
Other representative	Sigrid Metz (maternity leave as of April 2010) Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Sigrid.metz@elisabethinen.or.at Gerhard.fluch@elisabethinen.or.at
National Representative Ambulatory Care	Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Gerhard.fluch@elisabethinen.or.at
	Sigrid Metz (maternity leave as of April 2010) Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Sigrid.metz@elisabethinen.or.at Gerhard.fluch@elisabethinen.or.at
National Representative Hospital Care	Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Gerhard.fluch@elisabethinen.or.at
	Sigrid Metz (maternity leave as of April 2010) Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Sigrid.metz@elisabethinen.or.at Gerhard.fluch@elisabethinen.or.at
National Representative Economics	Sigrid Metz (maternity leave as of April 2010) Gerhard Fluch	Institute for Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz	Sigrid.metz@elisabethinen.or.at Gerhard.fluch@elisabethinen.or.at
Belgium			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Sofie Vaerenberg	Scientific Institute of Public Health	sofie.varenberg@wiv-isp.be
Other representatives	Herman Goossens	University of Antwerp	herman.goossens@uza.be
	Béatrice Jans	Scientific Institute of Public Health	beatrice.jans@wiv-isp.be
	Marc Struelens	Université libre de Bruxelles	marc.struelens@ulb.ac.be
	Samuel Coenen	University of Antwerp	samuel.coenen@ua.ac.be
	An De Sutter	Ghent University Hospital Department of General Practice and Primary Health Care	an.desutter@ugent.be
National Representative Ambulatory Care	Samuel Coenen	University of Antwerp	samuel.coenen@ua.ac.be
	An De Sutter	Ghent University Hospital Department of General Practice and Primary Health Care	an.desutter@ugent.be
National Representative	Herman Goossens	University of Antwerp	herman.goossens@uza.be

Hospital Care	Hilde Jansens	University Hospital Antwerp	Hilde.Jansens@uza.be
National Representative Nursing Homes	Béatrice Jans	Scientific Institute of Public Health	Beatrice.jans@wiv-isp.be
National Representative Economics	Sofie Vaerenberg	Scientific Institute of Public Health	Sofie.vaerenberg@wiv-isp.be
Bulgaria			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Boyka Markova	University Multipurpose Hospital for Active Treatment "Aleksandrovska"	boyka_markova@yahoo.com
National Representative Hospital Care	Boyka Markova	University Multipurpose Hospital for Active Treatment "Aleksandrovska"	boyka_markova@yahoo.com
National Representative Nursing Homes	Violeta Voynova	National Centre of Infectious and Parasitic Diseases, Sofia	villievoynova@ncipd.netbg.com
National Representative Economics	Boyka Markova	University Multipurpose Hospital for Active Treatment "Aleksandrovska"	boyka_markova@yahoo.com
Cyprus			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Antonis Kontemeniotis	Direrctor of the Departement of Clinical Pharmacy in Pharmaceutical Services of the Ministry of Health of Cyprus	akontemeniotis@phs.moh.gov.cy
Other representative	Christiana Hatzioannou	Departement of Clinical Pharmacy in Pharmaceutical Services of the Ministry of Health of Cyprus	ckontemeniotou@phs.moh.gov.cy
National Representative Hospital Care	Antonis Kontemeniotis	Direrctor of the Departement of Clinical Pharmacy in Pharmaceutical Services of the Ministry of Health of Cyprus	akontemeniotis@phs.moh.gov.cy
	Kontemeniotou Christiana	Departement of Clinical Pharmacy in Pharmaceutical Services of the Ministry of Health of Cyprus	ckontemeniotou@phs.moh.gov.cy
Croatia			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Arjana Tambic Andrasevic	University Hospital for Infectious Diseases Zagreb	arjana.tambic@bfm.hr / arjana.andrasevic@zg.t-com.hr
Other representative	Igor Francetic	Clinical Hospital Center Zagreb	igor.francetic@inet.hr
National Representative Hospital Care	Arjana Tambic Andrasevic	University Hospital for Infectious Diseases Zagreb	arjana.tambic@bfm.hr / arjana.andrasevic@zg.htnet.hr

National Representative Nursing Homes	Ana Budimir	Faculty Of Pharmacy And Biochemistry, University Of Zagreb	abudimir@kbc-zagreb.hr / abudimir@hi.t-com.hr
National Representative Economics	Vlasta Dečković-Vukres	Croatian Public Health Institute	v.deckovic-vukres@hzjz.hr
Czech Republic			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Vlcek Jiri	Faculty of Pharmacy, Charles University	vlcek@faf.cuni.cz
Other representatives	Zemkova Marcela	Faculty of Pharmacy, Charles University	Marcela.zemkova@faf.cuni.cz
	Matoulkova Petra	Faculty of Pharmacy, Charles University	Petra.matoulkova@faf.cuni.cz
National Representative Ambulatory Care	Vlcek Jiri	Faculty of Pharmacy, Charles University	vlcek@faf.cuni.cz
National Representative Hospital Care	Vlcek Jiri	Faculty of Pharmacy, Charles University	vlcek@faf.cuni.cz
	Petra Matoulkova	Faculty of Pharmacy, Charles University	Petra.matoulkova@faf.cuni.cz
National Representative Nursing Homes	Petra Matoulkova	Faculty of Pharmacy, Charles University	Petra.matoulkova@faf.cuni.cz
Denmark			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Niels Frimodt-Møller	Statens Serum Institut, National Center for Antimicrobials and Infection Control	nfm@ssi.dk
Other representative	Jan Poulsen	Danish Medicines Agency, Pharmacoeconomic Division	jpo@dkma.dk
National Representative Ambulatory Care	Ulrich Stab Jensen	Statens Serum Institut, National Center for Antimicrobials and Infection Control	uje@ssi.dk
National Representative Hospital Care	Niels Frimodt-Møller	Statens Serum Institut, National Center for Antimicrobials and Infection Control	nfm@ssi.dk
National Representative Nursing Homes	Christian Stab Jensen	Statens Serum Institut, National Center for Antimicrobials and Infection Control	csj@ssi.dk
Estonia			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Ly Rootslane	State Agency of Medicines Bureau of Drug Statistics	Ly.rootslane@sam.ee
National Representative Hospital Care	Piret Mitt	Department of Infection Control, Tartu University Hospital	Piret.Mitt@kliinikum.ee

Finland			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Jaana Vuopio	National Institute of Health	Jaana.vuopio@thl.fi
Other representative	Pirkko Paakkari	National Agency for Medicines	pirkko.paakkari@nam.fi
National Representative Ambulatory Care	Outi Lyytikainen	National Public Health Institute	outi.lyytikainen@ktl.fi
	Jaana Martikainen	Head of Drug Research, National Insurance Institution.	Jaana.martikainen@kela.fi
National Representative Hospital Care	Nina Elomaa	Vaasa Central Hospital	Nina.Elomaa@vshp.fi
National Representative Nursing Homes	Maija Rummukainen	Jyväskylä Central Hospital	Maija-Liisa.Rummukainen@ksshp.fi
Former Yugoslavian Republic of Macedonia			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Milena Petrovska	Microbiology and Parasitology Medical Faculty	milena.petrovska@microbiology.com.mk
France			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Philippe Cavalié	Direction de l'Evaluation de la Publicité et des Produits Cosmétiques et Biocides Agence Française de sécurité sanitaire des produits de santé	philippe.cavalie@afssaps.sante.fr
Other Representative	Didier Guillemot	Unité des agents antibactériens, Institut Pasteur	guillemo@pasteur.fr
National Representative Ambulatory Care	Philippe Cavalié	Direction de l'Evaluation de la Publicité et des Produits Cosmétiques et Biocides Agence Française de sécurité sanitaire des produits de santé	philippe.cavalie@afssaps.sante.fr
National Representative Hospital Care	Xavier Bertrand	CHU Besancon	xavier.bertrand@univ-fcomte.fr
	Isabelle Patry	CHU Besancon	Ipatry@chu-besancon.fr
National Representative Nursing Homes	Gaetan Gavazzi	Centre Hospitalier Universitaire A. Michallon	GGavazzi@chu-grenoble.fr
National Representative Economics	Philippe Cavalié	Direction de l'Evaluation de la Publicité et des Produits Cosmétiques et Biocides Agence Française de sécurité sanitaire des produits de santé	philippe.cavalie@afssaps.sante.fr

Germany			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Winfried V. Kern	Freiburg University Hospital Abteilung Medizin, Infektiologie	kern@if-freiburg.de
Other Representative	Helmut Schröder	Wissenschaftliches Institut der AOK (WidO)	helmut.schroeder@wido.bv.aok.de
National Representative Ambulatory Care	Helmut Schröder	Wissenschaftliches Institut der AOK (WidO)	helmut.schroeder@wido.bv.aok.de
National Representative Hospital Care	Katja de With	Infektiologie/Med. Klinik II Universitätsklinikum Freiburg	deWith@if-freiburg.de
National Representative Nursing Homes	Nicoletta Wischnewski	Robert Koch Institut	WischnewskiN@rki.de
National Representative Economics	Katja de With	Infektiologie/Med. Klinik II Universitätsklinikum Freiburg	deWith@if-freiburg.de
Greece			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Helen Giamarellou	4th Department of Internal Medicine of Athens Medical School, University General Hospital ATTIKON	hgiama@ath.forthnet.gr
Other Representative	Anastasia Antoniadou	4th Department of Internal Medicine of Athens Medical School, University General Hospital ATTIKON	ananto@med.uoa.gr
National Representative Hospital Care	Anastasia Antoniadou	4th Department of Internal Medicine of Athens Medical School, University General Hospital ATTIKON	ananto@med.uoa.gr
Hungary			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Gabor Ternak	Univ. of Pecs, Institute of Infectiology, Disaster-medicine and Oxyology	ternak@t-online.hu / gabor.ternak@aok.pte.hu
Other representatives	Ria Benko	Colleges of Clinical Pharmacy Department, University of Szeged, Clinical Pharmacy, Department	benko@clph.szote.u-szeged.hu
	Maria Matuz	Colleges of Clinical Pharmacy Department, University of Szeged, Clinical Pharmacy, Department	matuz@clph.szote.u-szeged.hu
	Edit Hajdú	University of Szeged,	hajdu@mlab.szote.u-szeged.hu

		Faculty of Medicine, Institute of Clinical Microbiology	
National Representative Ambulatory Care	Gabor Ternak	Univ. of Pecs, Institute of Infectiology, Disaster-medicine and Oxyology	ternak@t-online.hu / gabor.ternak@aok.pte.hu
National Representative Hospital Care	Gabor Ternak	Univ. of Pecs, Institute of Infectiology, Disaster-medicine and Oxyology	ternak@t-online.hu / gabor.ternak@aok.pte.hu
National Representative Nursing Homes	Karolina Borocz	National Centre for Epidemiology,. Budapest	boroczk@oek.antsz.hu
Iceland			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Haraldur Briem	Directorate of Health	hbriem@landlaeknir.is
Ireland			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Robert Cunney	Sta National Disease Surveillance Centre	robert.cunney@hse.ie
Other Representative	Ajay Oza	Sta National Disease Surveillance Centre	Ajay.oza@hse.ie
National Representative Hospital Care	Robert Cunney	Sta National Disease Surveillance Centre	robert.cunney@hse.ie
National Representative Nursing Homes	Robert Cunney	Sta National Disease Surveillance Centre	robert.cunney@hse.ie
Israel			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Raul Raz	Clalit Health Services Infectious Diseases Unit	Raz_r@clalit.org.il
National Representatives Ambulatory Care	Raul Raz	Clalit Health Services Infectious Diseases Unit	Raz_r@clalit.org.il
	Hana Edelstein	Clalit Health Services Infectious Diseases Unit	Hana_e@clalit.org.il
National Representative Economics	Raul Raz	Clalit Health Services Infectious Diseases Unit	Raz_r@clalit.org.il
Italy			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Pietro Folino Gallo	Agenzia Italiana del Farmaco Ufficio Centro Studi	p.folino@aifa.gov.it
Other representatives	Annalisa Pantosti	Dipartimento Malattie Infettive, Parassitarie e Immunomediate Istituto Superiore di Sanità	annalisa.pantosti@iss.it
	Maria Grazia Pompa	Ufficio V Direzione Generale Prevenzione Sanitaria Ministero della Salute	m.pompa@sanita.it
	Maria Luisa Moro	Area di Programma Rischio Infettivo Agenzia Sanitaria	mlmoro@regione.emilia-romagna.it

		Regionale	
	Giuseppe Cornaglia	Facoltà di Medicina e Chirurgia Istituto Microbiologia Università di Verona	giuseppe.cornaglia@univr.it
National Representative Ambulatory Care	Roberto Raschetti	Centro Nazionale di Epidemiologia, Sorveglianza e Promozione della Salute Istituto Superiore di Sanità	roberto.raschetti@iss.it
National Representative Hospital Care	Silvio Brusaferro	Department of Experimental and Clinical Pathology and Medicine, School of Medicine, University of Udine	brusaferro.silvio@aoud.sanita.fvg.it
National Representative Nursing Homes	Maria Luisa Moro	Area di Programma Rischio Infettivo Agenzia Sanitaria Regionale	mlmoro@regione.emilia-romagna.it
National Representative Economics	Pietro Folino Gallo	Agenzia Italiana del Farmaco Ufficio Centro Studi	p.folino@aifa.gov.it
Latvia			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Uga Dumpis	P.Stradins University	ugadumpis@stradini.lv
Other Representative	Sandra Edite Berzina	P.Stradins University	
National Representative Ambulatory Care	Uga Dumpis	P.Stradins University	ugadumpis@stradini.lv
National Representative Hospital Care	Uga Dumpis	P.Stradins University	ugadumpis@stradini.lv
	Elina Pujate	P.Stradins University	elina.pujate@stradini.lv
National Representative Nursing Homes	Elina Pujate	P.Stradins University	elina.pujate@stradini.lv
Lithuania			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Rolanda Valinteliene	Institute of Hygiene	rolanda.valinteliene@hi.lt
National Representative Hospital Care	Asta Palekauskaite	Institute of Hygiene	asta@hi.lt
National Representative Nursing Homes	Rolanda Valinteliene	Institute of Hygiene	rolanda.valinteliene@hi.lt
Luxembourg			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Bruch Marcel	Direction de la Santé	Marcel.Bruch@ms.etat.lu
Other representative	Hemmer Robert	Centre Hospitalier de Luxembourg	Hemmer.Robert@chl.lu
National Representative Ambulatory Care	Bruch Marcel	Direction de la Santé	Marcel.Bruch@ms.etat.lu
National Representative	Bruch Marcel	Direction de la Santé	Marcel.Bruch@ms.etat.lu

Hospital Care			
National Representative Economics	Bruch Marcel	Direction de la Santé	Marcel.Bruch@ms.etat.lu
Malta			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Michael Borg	Mater Dei Hospital Infection Control Unit	michael.a.borg@gov.mt
Other representative	Peter Zarb	Mater Dei Hospital Infection Control Unit	peter.zarb@gov.mt
National Representative Hospital Care	Peter Zarb	Mater Dei Hospital Infection Control Unit	Peter.zarb@gov.mt
National Representative Nursing Homes	Peter Zarb	Mater Dei Hospital Infection Control Unit	Peter.zarb@gov.mt
Norway			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Hege Salvesen Blix	Norwegian Institute of Public Health	hegesbl@ulrik.uio.no / Hege.Salvesen.Blix@fhi.no
National Representative Hospital Care	Jon Birger Haug	Aker University Hospital	Jonbirger.haug@akersykehus.no
National Representative Nursing Homes	Hanne-Merete Eriksen	Norwegian Institute of Public Health	hanne.merete.eriksen@fhi.no
National Representative Economics	Hege Salvesen Blix	Norwegian Institute of Public Health	Hege.Salvesen.Blix@fhi.no
Poland			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Waleria Hryniewicz	National Medicines Institute	waleria@cls.edu.pl
Other representative	Paweł Grzesiowski	National Medicines Institute	paolo@cls.edu.pl
National Representative Ambulatory Care	Anna Olczak-Pieńkowska	National Medicines Institute	aniaolczak@cls.edu.pl
National Representative Hospital Care	Janina Pawlowksa Adriana Chromy	University's Children Hospital of Cracow.	aptekausd@wp.pl
Portugal			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Mafalda Ribeirinho	Instituto Nacional da Farmacia e do Medicamento (INFARMED), OMPS – Observatório do Medicamento e Produtos de Saúde	Mafalda.ribeirinho@infarmed.pt
Other representative	Luis Caldeira	Instituto Nacional da Farmacia e do Medicamento (INFARMED), OMPS – Observatório do Medicamento e Produtos de Saúde	luis.caldeira@infarmed.pt
National Representative Hospital Care	Mafalda Ribeirinho	Instituto Nacional da Farmacia e do Medicamento	Mafalda.ribeirinho@infarmed.pt

		(INFARMED), OMPS – Observatório do Medicamento e Produtos de Saúde	
National Representative Economics	Mafalda Ribeirinho	Instituto Nacional da Farmacia e do Medicamento (INFARMED), OMPS – Observatório do Medicamento e Produtos de Saúde	Mafalda.ribeirinho@infarmed.pt
Romania			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Băicuş Anda	Director, National Institute of Research Development for Microbiology and Immunology	abaicus@cantacuzino.ro
Other representative	Mircea Ioan Popa	"Carol Davila" University of Medicine and Pharmacy, Bucharest	mircea.popa@pmu-wb-gf.ro
Russian Federation			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Svetlana Ratchina	Department of Clinical Pharmacology, Smolensk State Medical Academy	svetlana.ratchina@antibiotic.ru
Other representative	Roman Kozlov	Institute of Antimicrobial Chemotherapy, Smolensk State Medical Academy	roman@antibiotic.ru
Data management	Alexander Fokin	Department of Clinical Pharmacology, Smolensk State Medical Academy	Alex.Fokin@antibiotic.ru
	Roman Pavlukov	Institute of Antimicrobial Chemotherapy, Smolensk State Medical Academy	Roman.Pavlukov@antibiotic.ru
National Representative Economics	Svetlana Ratchina	Department of Clinical Pharmacology, Smolensk State Medical Academy	svetlana.ratchina@antibiotic.ru
Slovakia			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Viliam Foltan	Comenius University, Faculty of Pharmacy,	foltan@fpharm.uniba.sk
Other representative	Adela Lagin	Comenius University, Faculty of Pharmacy,	lagin@fpharm.uniba.sk
National Representative Nursing Homes	Maria Stefkovicova	State Institute of Health, Hospital Trencin	stefkovicova@stonline.sk
Slovenia			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Milan Čižman	University Medical Centre, Department of Infectious Diseases	milan.cizman@mf.uni-lj.si
National Representative	Milan Čižman	University Medical Centre, Department of	milan.cizman@mf.uni-lj.si

Ambulatory Care		Infectious Diseases	
National Representative Hospital Care	Milan Čižman	University Medical Centre, Department of Infectious Diseases	milan.cizman@mf.uni-lj.si
National Representative Nursing Homes	Tatjana Lejko	Head of Infection Control Service at University Medical Centre Ljubljana	tatjana.lejko@kclj.si-subproject
National Representative Economics	Milan Čižman	University Medical Centre, Department of Infectious Diseases	milan.cizman@mf.uni-lj.si
Spain			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	José Campos	Centro Nacional de Microbiología, Instituto de Salud Carlos III.	jcampos@isciii.es
Other representatives	Francisco de Abajo	División de Farmacoepidemiología y Farmacovigilancia	fabajo@agemed.es
	Edurne Lazaro	Agencia Española de Medicamentos y PS	elazaro@agemed.es
	Juan Luis Moreno	Direccion General de Farmacia	jmorenog@msps.es
	Jesús Oteo	Centro Nacional de Microbiología, Instituto de Salud Carlos III	jesus.oteo@isciii.es
National Representative Hospital Care	Mercedes Sora	Servicio de Farmacia, Hospital de Bellvitge, Barcelona	msora@bellvitgehospital.cat
Sweden			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Ulrica Dohnhammar	Strama	Ulrica.dohnhammar@strama.se
Other representatives	Otto Cars	Strama	Otto.cars@strama.se
	Gunilla Stridh	Strama	Gunilla.stridh@strama.se
National Representative Ambulatory Care	Gunilla Stridh	Strama	Gunilla.stridh@strama.se
	Sigvard Mölstad	Research and Development in Primary Care, Jönköping.	Sigvard.Molstad@lj.se
National Representative Hospital Care	Mats Erntell	Infection disease control Halland	mats.erntell@lthalland.se
National Representative Nursing Homes	Lars Kärvestedt	Stockholms Sjukhem	Lars.karvestedt@stockholmssjukhem.se
National Representative Economics	Ulrica Dohnhammar	Strama	Ulrica.dohnhammar@strama.se
Switzerland			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Giorgio Zanetti	Service de Médicine Préventive Hospitalière, Lausanne University Hospital	Giorgio.Zanetti@chuv.ch
Other representative	Christian Ruef	Division of Infectious Diseases and Hospital Epidemiology University Hospital of	christian.ruef@usz.ch

		Zürich	
	Giuliano Masiero	Institute of Microeconomics and Public Economics University of Lugano	Giuliano.masiero@lu.unisi.ch
	Catherine Plüss-Suard	Pharmacy Lausanne University Hospital	Catherine.pluss@chuv.ch
	Kathrin Muehlemann	Institut fur Infectionskrankeiten, Universitat Ben	Kathrin.muehlemann@ifik.unibe.ch
National Representative Ambulatory Care	Giorgio Zanetti	Service de Médicine Préventive Hospitalière, Lausanne University Hospital	Giorgio.Zanetti@chuv.ch
National Representative Hospital Care	Giorgio Zanetti	Service de Médicine Préventive Hospitalière, Lausanne University Hospital	Giorgio.Zanetti@chuv.ch
National Representative Economics	Giorgio Zanetti	Service de Médicine Préventive Hospitalière, Lausanne University Hospital	Giorgio.Zanetti@chuv.ch
The Netherlands			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Stephanie Natsch	Radboud University Nijmegen	s.natsch@akf.umcn.nl
National Representative Ambulatory Care	Theo Verheij	Julius Centre for Health and Primary care	t.j.m.verheij@umcutrecht.nl
	Paul van der Linden	Tergooiziekenhuizen	p.vanderlinden@tergooiziekenhuizen.nl
National Representative Hospital Care	Stephanie Natsch	Radboud University Nijmegen	s.natsch@akf.umcn.nl
National Representative Nursing Homes	Marie-José Veldman	RIVM-centrum	Marie-jose.veldman@rivm.nl
Turkey			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Serhat Unal	Haceteppe University, Department of Medicine, School of Medicine	sunal@hacettepe.edu.tr
Other representative	Deniz Gür	Haceteppe University	dgur@hacettepe.edu.tr
National Representative Hospital Care	Serhat Unal	Haceteppe University	sunal@hacettepe.edu.tr
	Yesim Cetinkaya Sardan	Haceteppe University	ycetinka@hacettepe.edu.tr
UK			
Function	**Name(s)**	**Affiliation**	**E-mail**
Lead National Representative	Peter Davey	University of Dundee	p.g.davey@chs.dundee.ac.uk
Other representatives	Tracey Guise	British Society for Antimicrobial Chemotherapy	Tguise@bsac.org.uk
	Hayley Wickens	UK Clinical Pharmacy Association Infection	Hayley.wickens@imperial.nhs.uk
	Jonathan	Department of	jonathan.cooke@smuht.nwest.nhs.uk

	Cooke	Health's Advisory Committee on AMR & HAI	
	Maggie Heginbothom	Welsh Antimicrobial Research Programme: Surveillance Unit	Maggie.Heginbothom@nphs.wales.nhs.uk
	Hugh Webb	Northern Ireland Antimicrobial Resistance Action Plan	Hugh.Webb@bll.n-i.nhs.uk
	Jacqueline Sneddon	Scottish Antimicrobial Pharmacists	Jacqueline.sneddon@nhs.uk
National Representative Ambulatory Care	Peter Davey (UK)	University of Dundee	p.g.davey@chs.dundee.ac.uk
	Sally Wellsteed	Department of Health, England	Sally.Wellsteed@doh.gsi.gov.uk
	Tracey Guise	British Society for Antimicrobial Chemotherapy	Tguise@bsac.org.uk
	Hugh Webb (Northern Ireland)	Northern Ireland Antimicrobial Resistance Action Plan	Hugh.Webb@bll.n-i.nhs.uk
	Margaret Heginbothom (Wales)	Welsh Antimicrobial Research Programme: Surveillance Unit	Margaret.Heginbothom@nphs.wales.nhs.uk
	William Malcolm	NHS National Services Scotland	
	Jonathan Cooke (England)	Department of Health's Advisory Committee on AMR & HAI	jonathan.cooke@smuht.nwest.nhs.uk
	Peter Davey (UK)	University of Dundee	p.g.davey@chs.dundee.ac.uk
National Representative Hospital Care	Hugh Webb (Northern Ireland)	Northern Ireland Antimicrobial Resistance Action Plan	Hugh.Webb@bll.n-i.nhs.uk
	Margaret Heginbothom (Wales)	Welsh Antimicrobial Research Programme: Surveillance Unit	Margaret.Heginbothom@nphs.wales.nhs.uk
	William Malcolm	NHS National Services Scotland	
	Jacqueline Sneddon	Scottish Antimicrobial Pharmacists	Jacqueline.sneddon@nhs.uk
	Conor Jamieson (England)	Antimicrobial Therapy, Sandwell and West Birmingham NHS Trust	Conor.Jamieson@heartofengland.nhs.uk
	Hayley Wickens	UK Clinical Pharmacy Association Infection	Hayley.wickens@imperial.nhs.uk
National Representative Nursing Homes	Peter Davey (Scotland)	University of Dundee	p.g.davey@chs.dundee.ac.uk
National Representative Economics	Peter Davey	University of Dundee	p.g.davey@chs.dundee.ac.uk

ESAC Advisory Board Members

Name	Affiliation	On behalf of	Country
Arjana Tambic Andrasevic	University Hospital for Infectious Diseases, Zagreb	Lead National Representative	Croatia
Raul Raz	Infectious Diseases Unit, Afula	Lead National Representative	Israel
Giorgio Zanetti	Service de Médicine Préventive Hospitalière, Lausanne University Hospital	Lead National Representative	Switzerland
Sigrid Metz (maternity leave)	Elisabethinen Hospital Linz	Other Representative	Austria
Svetlana Ratchina	Smolensk State Medical Academy	Lead National Representative	Russia
Philippe Beutels	University of Antwerp	Scientific advisor of the Economics subproject	Belgium
Peter Davey	University of Dundee	Scientific advisor of the Hospital Care subproject	UK
Sigvard Mölstad	University of Linköping	Scientific advisor of the Ambulatory Care subproject	Sweden
Béatrice Jans	Institute of Public Health	Scientific advisor of the Nursing Home subproject	Belgium
Hajo Gründmann	RIVM	BURDEN/EARSS	The Netherlands
Theo Verheij	University of Utrecht	CHAMP	The Netherlands
Herman Goossens	University of Antwerp	GRACE	Belgium
Christian Brun-Buisson	Université Paris Val de Marne	MOSAR	France
Winfried V. Kern	Freiburg University Hospital Abteilung Medizin, Infektiologie	ABS International	Germany
Carl Suetens	ECDC	IPSE	Sweden
Klaus Weist	ECDC	ECDC	Sweden

ESAC Audit Committee Members

Name	Affiliation	Country
Cliodna McNulty	Gloucestershire Royal Hospital	UK
Maciek Godycki-Cwirko	Medical University of Lodz	Poland

2. OBJECTIVES AND METHODOLOGICAL APPROACH

Aims and Objectives

The overall aim of the project is to consolidate the continuous collection of comprehensive antimicrobial consumption data, from ambulatory and hospital care, from the 27 Member States, 3 EEA/EFTA, 3 candidate countries (Croatia, Former Yugoslavian Republic of Macedonia and Turkey) and 2 other countries (Russian Federation and Israel). The project aims to provide the community with timely information, on antimicrobial consumption. The European database is used to develop (i) health indicators of antimicrobial use. and (ii) evidence-based guidelines and educational tools to manage the risk of infections and antimicrobial resistance. The project provides regular feed-back to the relevant authorities of the participating countries.

Additionally, the project aims deepen the knowledge of antibiotic consumption by focusing on specific consumption groups and/or patterns in collaboration with those countries where the appropriate data are available. For hospital care, data will be collected for individual hospitals with a linkage of the consumption to the DRG (Disease Related Groups). For ambulatory care, detailed data will be collected on the consumption in specific age and sex categories, specific prescriber groups, specific high consumers groups and for specific indications (in collaboration with existing networks of sentinel practices). For nursing homes, detailed information will be collected on the frequency, indications, characteristics and seasonal variations of antibiotic prescriptions, as well as on the institutional determinants of antibiotic use. Additionally, the effects of socio-economic determinants on antimicrobial consumption of European countries will be explored, and regional variation within a particular country will be studied, by means of econometric models.

Data collection protocol version 2010

Scope of the 2009 data collection:

1. The 2009 data on antibiotic use, for ambulatory care (AC) and hospital care (HC) settings, has to be done according the **ATC/DDD classification, 2010 version**.
2. **ESAC aims to collect the core data at the product level**, expressed in number of packages (= using template 1). Therefore, ESAC needs 1) a "*valid national historical exhaustive* register file" including the available antibiotics at product level; 2) a consumption file including the number of packages consumed for each product (by product ID number) and 3) a population file whereby the population covers the dataset. Alternatively, if participating countries are not able to deliver data at product level due to objective constraints, data on volume of antibiotic consumption for 2009 should be collected at the ATC5 level whereby also the Route of Administration (RoA) have to be provided (= using template 2). As the number of antibiotics with multiple DDDs for an "Oral" and "Parenteral" is increasing over the time, use data for all ATC codes should be split up according to the route of administration.
3. The 2009 data will include **sub-national data**. ESAC uses the three-level hierarchical **NUTS classification** which follows existing administrative borders[1]. This classification should **preferably be used** for data collection. Depending on the availability of the data, the participating countries can deliver data at NUTS 1 (covers between 3 and 7 million inhabitants), NUTS 2 (covers between 800000 and 3 million inhabitants) or NUTS 3 (covers between 150000 and 80000 inhabitants) level or alternatively at the country level. Only the finest available level of data should be included. When another classification is used, please provide us the necessary information.
4. The **antimicrobials to be collected** are:
    1. antibacterials for systemic use (ATC therapeutic subgroup J01),
    2. antimycotics for systemic use (ATC therapeutic subgroup J02),

[1] http://ec.europa.eu/eurostat/ramon/nuts/splash_regions.html

3. antifungals for systemic use (ATC chemical subgroup D01BA),
4. drugs for treatment of tuberculosis (ATC pharmacological subgroup J04A),
5. antivirals for systemic use (ATC therapeutic subgroup J05),
6. oral and rectal nitroimidazole derivates as antiprotozoals use (ATC chemical subgroup P01AB),
7. oral vancomycin as intestinal antiinfectives use (ATC chemical substance A07AA09) for the ambulatory and/or the hospital care sector or total care sector.

5. **Information on prices at product level** (template 1).
6. **Denominator data**:

The participating countries have to provide the population data covering the consumption datasets, so that the population data are collected at the same level as the consumption data. If you collect consumption data at the NUTS 3 level, you need to provide the population also at this level.

ESAC uses for the denominator the WHO mid-year population for the population at national level except in some participating countries where it is not applicable or justified[2].

Important notes on the ATC/DDD classification, 2010 version:

- ATC updates (see also added excel file : ESAC_ATC_list_2009.xlsx)

J01DD17	cefcapene
J01DE03	cefozopran
J01DH05	biapenem
J01DI01	ceftobiprole medocaril
J01EA03	iclaprim
J01XA04	dalbavancin
J01XA05	oritavancin
J01XX10	bacitracin
J05AR07	stavudine, lamivudine and nevirapine
J05AX10	maribavir

- DDD updates

ATC code	ATC level name	New DDD		Route of Administration
A06AH01	methylnaltrexone bromide	6	mg	P
A07AA05	polymyxin B	3	MU	O
A10BX08	mitiglinide	30	mg	O
B01AC22	prasugrel	10	mg	O
B01AE07	dabigatran etexilate	0.22	g	O
B01AX06	rivaroxaban	10	mg	O
B02BX04	romiplostim	30	mcg	P
C01EB19	icatibant	30	mg	P
D11AX19	alitretinoin	20	mg	O
G04BX14	dapoxetine	30	mg	O
J01DC07	cefotiam	1.2	g	O
J01DD17	cefcapene	0.45	g	O
J01DE03	cefozopran	4	g	P
J01DH04	doripenem	1.5	g	P

[2] http://data.euro.who.int/hfadb/

ATC code	ATC level name	New DDD		Route of Administration
J01DH05	biapenem	1.2	g	P
J02AX05	micafungin	0.1	g	P
J05AG04	etravirine	0.4	g	O

Reference: http://www.whocc.no/atc_ddd_index/updates_included_in_the_atc_ddd_/

- Attention: Also include antifungals for systemic use (D01B):
  - D01BA01 griseofulvine
  - D01BA02 terbinafine
- Attention for the DDD's on combined products : list included in annex
- Attention:
  - vancomycine!
    - J01XA01 : route administration=P
    - A07AA09 : route administration=O
  - Metronidazole!
    - J01XD01: route administration=P
    - P01AB01: route administration=O and R

ESAC Templates for data collection:

Please note that every type of data (register, consumption data, population data) has to be delivered using its respective excel template. Other excel files than the template will not be accepted.

If you choose **template 1**, you should deliver 3 files:

1. a valid national exhaustive *register file* including the available antibiotics at product level
2. *template 1 version of the consumption file* including the number of packages consumed at product level (by product ID number)
3. a *population file*

Alternatively, if you choose **template 2**, you should deliver 2 files:

1. *template 2 version of the consumption file* including data expressed in DDDs at ATC5 substance level + the route of administration
2. a *population file*

Parameters for the antibiotic register file: data at product level = Template 1

- Country: use ISO code
- See: http://www.iso.org/iso/english_country_names_and_code_elements
- Year of data collection
- Medicinal Product Package Code Value: the Medicinal Product Package Code Value (MPPCV) has to be a unique identifier of the medicinal product package (MPP). Because it is a key value in many tables it has to be stable in time, so MPP's that are no longer available on the market or that are no longer registered still can be identified for historical purposes (like prescription history).
- Label: Medicinal Product Package Label e.g.: Lanoxin compr 60 X 0,125 mg
- Size of the package: Content Quantity (e.g.: 60)
- Unit measurement of the size of the package: National Content Unit (e.g.: pcs, mg,...)
- Form: Galenic form (eg. Capsules, Solution, Injection)
- Route of administration: O, P, R, I for Oral, Parenteral, Rectal, Inhalation

- Strength: Quantity of the ingredient in each unit. In case of multi-ingredient Medicinal products this field has to contain the ingredient strength in which the DDD is expressed. E.g.: Amoxicillin/Clavulanic acid combinations: Strength expresses the strength of the amoxicillin. Other examples :
    - if J01DH51 (imipenem and enzyme inhibitor) : refer only to imipenem
    - if J01CR05 (piperacillin and enzyme inhibitor) : refer only to piperacillin
    - if J01CR02 (amoxicillin and enzyme inhibitor) : refer only to amoxicillin
- Strengths of parenteral fluids are expressed as the content of 1 ampulla or 1 perfusion package. Conversely, strengths of syrups are expressed as the content of 1 measure of sirup, this can be 5 ml, 2 ml...
- Unit measurement of strength: units of strength (mg, g, IU, UD, MU)
- WHO ATC Code at substance level (ATC5) + see remarks above.
- Salt: for methenamin, the associated salt (hippurate or mandelate) should be specified. For erythromycin, if the associated salt is ethylsuccinate and the galenic form is tablet, ethylsuccinate has to be specified, in all other cases (even ethylsuccinate and any other form than tablet), the salt should be left empty.
- Coding of Ethylsuccinate, mandelate and hippurate respectively as ESUC, MAND, HIPP.
- DPP: defined daily doses per package.
- Ingredient name: In case of multi-ingredient Medicinal products this field has to contain the ingredient in which the DDD is expressed.
- Product name: Medicinal Product name e.g.: LANOXIN, LANITOP
- National DDD when the WHO DDD does not exist or specific DDDs are used at the national level.
- Unit measurement of the National DDD (mg, g, IU, MU, …)
- Content of the package: i.e. the total amount of the first ingredient in the medicinal product package
- Unit measurement of the package content
- Basic ingredient quantity: (INBASQ: e.g. 200 mg/10 ml), used for describing concentration of fluids. It is very important to fill this field properly. To obtain good results one must apply the following rules for syrups/suspensions and ampullae/perfusion fluids: In syrups and solutions INBASQ describes the basic strength unit. Concerning perfusion fluids or ampullae this value is always 1 because the strength has to be expressed per amp or per perfusion package (see Strength rules)
- Unit measurement of the Basic ingredient quantity

Price information which should be added to the "register file" is described below. Please note that providing price data is voluntary as the data may not be available for your country in detail as requested here. We would ideally want price information to be provided for hospital and non-hospital based pharmacies separately, but prices can also be provided for only hospital or non-hospital pharmacies if both are not available.

1. **Ex-factory price:** The total payment received by the pharmaceutical company for providing one package of the medication. This excludes distribution costs and the markup charged by the pharmacy for dispensing the medication. This can be provided in separate columns for hospital and / or ambulatory care pharmacies. If these prices differ between pharmacies, please provide the weighted average cost per package with the weight being consumption. For example, if the price is €10 at pharmacy A and €25 at pharmacy B with pharmacy A dispensing 10 packages and pharmacy B dispensing 20 packages, the weighted price is 10/(10+20)*€10 + 20/(10+20)*€25 = €20.
2. **Ex-pharmacy price:** The total payment received by an average non-hospital-based pharmacy for providing one package of the medication. This is equivalent to the price tag on the package at the pharmacy. This can be provided in separate columns for hospital and / or ambulatory care pharmacies. Please use the same methodology described for ex-factory prices if the price differs by pharmacy.
3. **Wholesale price:** The price per package for drugs that are distributed from

pharmaceutical companies by wholesalers to pharmacies. This price will be between ex-factory and ax-pharmacy price. This can be provided in separate columns for hospital and / or ambulatory care pharmacies. Please use the same methodology described for ex-factory prices if the price differs by pharmacy.

4. **Out of pocket price:** The total amount faced by an average patient for purchasing a package of the medication at a pharmacy. This amount should not include the amount reimbursed by the national health insurance, but may include the amount covered by private insurers. This can be provided in separate columns for hospital and / or ambulatory care pharmacies. Please use the same methodology described for ex-factory prices if the price differs by pharmacy.
5. **Other**: Any other price per package not covered by the four price definitions described above. This can be provided in separate columns for hospital and / or ambulatory care pharmacies. Please use the same methodology described for ex-factory prices if the price differs by pharmacy.

Parameters for the consumption data: Template 1

- Country: ISO code
- Year of data collection
- Sub-area level: NUTS Level (0=country, 1=NUTS1, 2=NUTS2, 3=NUTS3, 99=other classification)
- Sub-area identifier: when the sub-area level is 0 (country level), the ISO Country code has to used. For the other sub-area levels, the NUTS code has to be used or the other classification.
- Sector: AC (ambulatory care) / HC (hospital care) / TC (total care)
- Periodicity: Q (quarterly for AC / TC), Y (annually for HC (+quarterly if available))
- Medicinal Product Package Code Value: Same code as the MPPCV in the register.
- Volume: number of packages per medicinal product (used in a given period, sub-area and sector) for the four quarters or the complete year.

Parameters for the consumption data: template 2

- Country: ISO code
- Year of data collection
- Sub-area level: NUTS Level (0=country, 1=NUTS1, 2=NUTS2, 3=NUTS3, 99=other classification)
- Sub-area identifier: when the sub-area level is 0 (country level), the ISO Country code has to be used. For the other sub-area levels, the NUTS code has to be used or the other classification.
- Sector: AC (ambulatory care) / HC (hospital care) / TC (total care)
- Periodicity: Q (quarterly for AC / TC), Y (annually for HC (+quarterly if available))
- WHO ATC code at substance level (ATC5)
- WHO ATC name at substance level (ATC5)
- Route of administration: O, P, R, I (Oral, Parenteral, Rectal, Inhalation) or X when the route of administration is not available
- Salt
- Volume: number of DDDs (WHO ATC/DDD version 2010) for the corresponding substance (used in a given period , sub-area, sector, route of administration and salt) for the four quarters or the complete year.

Parameters for the population data: Template 1 and 2

- Country : ISO code
- Year of data collection
- Sub-area level: NUTS Level (0=country, 1=NUTS1, 2=NUTS2, 3=NUTS3, 99=other classification)
- Sub-area identifier: when the sub-area level is 0 (country level), the ISO Country code has

to used. For the other sub-area levels, the NUTS code has to be used or the other classification.

- Population covering the consumption data.

Annex : List of DDD's combined products

Reference : http://www.whocc.no/ddd/list_of_ddds_combined_products/

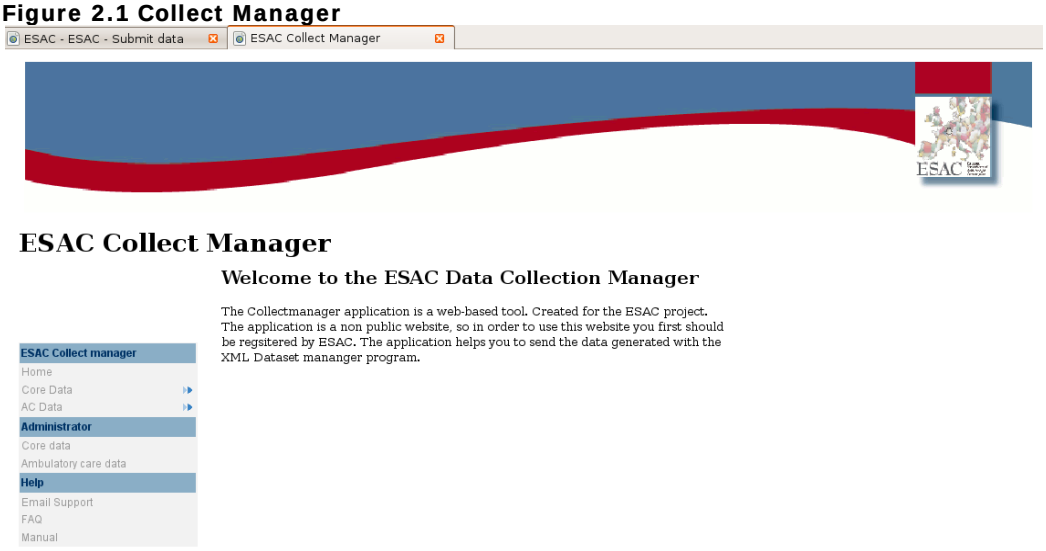
J01AA20	Deteclo	Tab	Tetracycline 115.4 mg/Chlortetracycline 115.4 mg/ Demeclocycline 69.2 mg	2 UD (=2 tab)
J01CA20	Miraxid	Tab	Pivampicillin 0.25 g/Pivmecillinam 0.2 g	3 UD (=3 tab)
J01CA20	Miraxid mite	Tab	Pivampicillin 0.125 g/Pivmecillinam 0.1 g	6 UD (=6 tab)
J01CE30	Bicillin C-R, Bicillin A-P, Bicillin	Powder for inj	Comb. of Benzylpenicillin/Procain-benzylpenicillin/ Benzathine benzylpenicillin	3.6 g expressed as benzylpenicillin
J01CR50	Ampiclox	Tab	Ampicillin 0.25 g/Cloxacillin 0.25 g	4 UD (=4 tab)
J01CR50	Ampoxium	Powder for inj	Ampicillin 0.66 g/Oxacillin 0.33 g	2 UD (= 2 g)
J01CR50	Ampoxium	Caps	Ampicillin 0.125g/Oxacillin 0.125 g	8 UD (= 8 caps)
J01CR50	Co-fluampicil	Tab	Ampicillin 0.25 g/Flucloxacillin 0.25 g	4 UD (=4 tab)
J01EC20	Trisulfamid	Tab	Sulfacarbamide 0.167 g/Sulfadiazine 0.167 g/ Sulfadimidine 0.167 g	4 UD (=4 tab)
J01EE01	Bactrim, Eusaprim, Trimetoprim-sulfa	Inf.conc	Sulfamethoxazole 80 mg/Trimethoprim 16 mg	20 UD (=20 ml)
J01EE01	Bactrim, Eusaprim, Trimetoprim-sulfa	Mixt	Sulfamethoxazole 0.2 g/Trimethoprim 40 mg	8 UD (= 40 ml)
J01EE01	Bactrim, Eusaprim Trimetoprim-sulfa	Tab	Sulfamethoxazole 0.4 g /Trimethoprim 80 mg	4 UD (=4 tab)
J01EE02	Triglobe, Trimin Sulfa	Mixt	Sulfadiazine 0.205 g/Trimethoprim 45 mg	4 UD (=20 ml)
J01EE02	Triglobe, Trimin Sulfa	Tab	Sulfadiazine 0.41 g/Trimethoprim 90 mg	2 UD (=2 tab)
J01EE03	Lidaprim	Tab	Sulfametrole 0.8 g/Trimethoprim 0.16 g	2 UD (=2 tab)
J01EE03	Lidaprim	Powder for inj	Sulfametrole 0.8 g/ Trimethoprim 0.16 g per vial	2 UD (defined as 2 vials)
J01EE06	Sterinor	Tab	Sulfadiazin 0.25 g/Tetroxoprim 0.1 g	2 UD (=2 tab)
J01EE07	Berlocombin	Tab	Sulfamerazin 0.12 g/Trimethoprim 80 mg	4 UD (=4 tab)
J04AM02	Rifinah	Tab	Rifampicin 0.3 g/Isoniazid 0.15 g	2 UD (=2 tab)
J04AM02	Rifinah	Tab	Rifampicin 0.15 g/Isoniazid 0.1 g	4 UD (=4 tab)

J04AM02	Rimactazid	Tab	Rifampicin 0.15 g/Isoniazid 75 mg	4 UD (=4 tab)
J04AM05	Rifater	Tab	Rifampicin 0.12 g/Isoniazid 50 mg/ Pyrazinamide 0.3 g	6 UD (=6 tab)
J04AM05	Rimcure	Tab	Rifampicin 0.15 g/Isoniazid 75 mg/ Pyrazinamide 0.4 g	4 UD (=4 tab)
J04AM06	Rimstar	Tab	Rifampicin 0.15 g/Ethambutol 0.275 g/ Isoniazid 75 mg/Pyrazinamide 0.4 g	4 UD (=4 tab)
J05AR01	Combivir	Tab	Lamivudine 0.15 g/Zidovudine 0.3 g	2 UD (=2 tab)
J05AR02	Kivexa	Tab	Abacavir 0.6 g/Lamivudine 0.3 g	1 UD (=1 tab)
J05AR03	Truvada	Tab	Emtricitabine 0.2 g/ Tenofovir disoproxil 0.245 g	1 UD (=1 tab)
J05AR04	Trizivir	Tab	Zidovudine 0.3 g/Lamivudine 0.15 g/ Abacavir 0.3 g	2 UD (=2 tab)
J05AR06	Atripla	Tab	Emtricitabine 0.2 g/Tenofovir disoproxil 0.245 g/ Efavirenz 0.6 g	1 UD (=1 tab)

Collect Manager and Dataset Manager

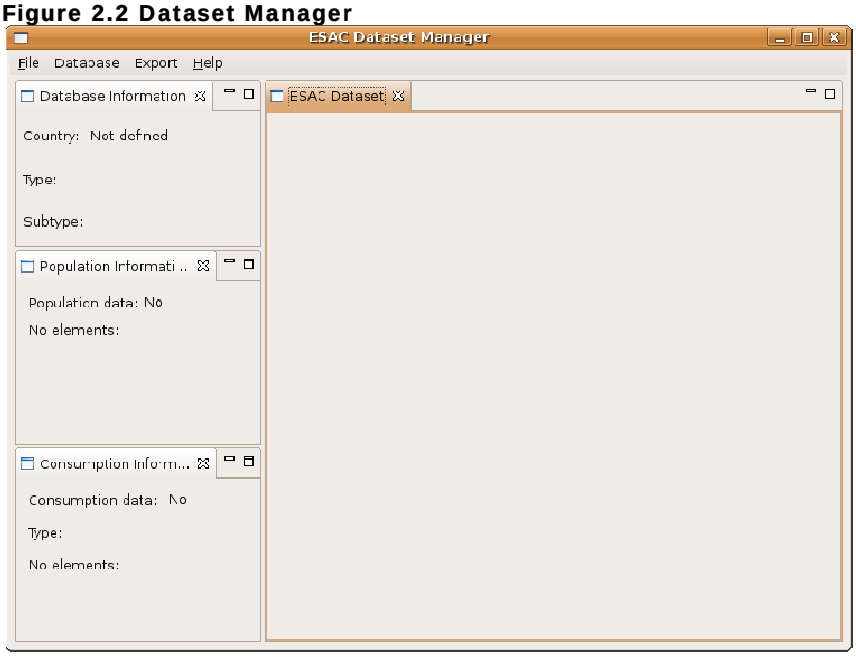
ESAC has changed its method of data submission to comply with ECDC surveillance systems requirements and to prepare the take-over by ECDC. ESAC has therefore developed two applications. A web application, Collect Manager (Figure 2.1) which allows the countries to submit their data for the core database and the AC database as well as to trace data exchange between the countries and the ESAC Management Team.

Figure 2.1 Collect Manager



A second application, the Dataset Manager (Figure 2.2) allows the translation of data in excel format to an xml format. Since the 2007 data, the collection process is subdivided in three steps. Firstly, the countries use an excel template provided by ESAC to fill the dataset. Secondly, countries translate the data in an xml format using the Dataset Manager that is also used as a first validation check of the data. Third and last, the countries send the generated xml file to the Management team using Collect Manager. The data but also general information on the data is automatically saved in a database ready for processing by the Management Team.

Figure 2.2 Dataset Manager



3. RESULTS OF THE 2009 DATA COLLECTION

In 2010, ESAC collected 2009 data on:

1. antibacterials for systemic use (ATC therapeutic subgroup J01),
2. antimycotics for systemic use (ATC therapeutic subgroup J02),
3. antifungals for systemic use (ATC chemical subgroup D01BA),
4. drugs for treatment of tuberculosis (ATC pharmacological subgroup J04A),
5. antivirals for systemic use (ATC therapeutic subgroup J05),
6. oral and rectal nitroimidazole derivates as antiprotozoals use (ATC chemical subgroup P01AB),
7. oral vancomycin as intestinal antiinfectives use (ATC chemical substance A07AA09) in the ambulatory and/or hospital care sector.

The 2009 data are currently being processed and analyzed and will be published in the ESAC Yearbook 2009 which should be available in May 2011.

4. PREPARATION OF ECDC HUB VISIT

On February 16 and 17, 2011 a very important meeting was held between ECDC and the ESAC MT in order to discuss and facilitate the ESAC take-over by ECDC. Decisions needed to be taken on what activities would be transferred to ECDC. ESAC will be tranferred to ECDC on June 30, 2011.

A preparatory half a day meeting was held by the entire ESAC Management Team to discuss the agenda proposed by ECDC and the presentations to be given in order to respond to the questions posed by ECDC (see 'Annex: Network Transition IT Checklist' below). Presenters were added to the agenda after which the final agenda was sent to Klaus Weist.

Final programme:

ESAC - ECDC Transition
Hub visit to University of Antwerp February' 2011

Aim of the visit: To have an overview of ESAC network activities and to introduce/discuss the transition plan with the ESAC Management Team

Wednesday 16 February 2011	Agenda items
9:00 – 12:30 incl. coffee break	**ESAC presentations* followed by short discussions/Q & A** 1. Introduction of ESAC MT and of ECDC group HERMAN 2. General presentation(s) of the ESAC network VANESSA 3. Core database ANN 4. Ambulatory care project SAMUEL AND NIELS 5. Hospital care project HERMAN 6. Economics project PHILIPPE 7. Nursing homes project BEA 8. ESAC-website (Interactive database – data submission tool) ARNO
12:30 – 14:00	Lunch break
14:00 – 15:30	**ECDC presentations followed by short discussions/Q & A** 1. Introduction to TESSy database and metadata (Per Rolfhamre) 2. Introduction to ECDC websites for surveillance networks (Boyana Todorova) 3. ECDC draft transition plan (Klaus Weist)
15:30 – 15:45	Coffee break
16:00 – 17:30	**Round table discussion** • First discussion on Draft Transition plan o ESAC Modules o Timeline, Meetings o Nomination of representatives o AOB • Conclusions o Finalisation of the transition plan o List of actions and next meting

*Favourably ESAC-presentations refer also to the day-to-day coordination of the network. (e.g. communication with gatekeepers, data calls, website management etc.)

Thursday 17 February 2011	Specific face-to-face sessions
Morning (9:00 to 12:00 suggested)	**1. ESAC data manager/developer – Tessy data manager/developer** Arno Mueller?, Ann Versporten? …….. Per Rolfhamre, Gaetan Goyodo Go through IT transition checklist (see annex) **2. ESAC website responsible person –ECDC web team ……** Boyana Todorova Examining web pages and identifying content to be transferred to the new DSN website

1 Annex: Network Transition IT Checklist

This checklist will be used to ensure a smooth IT transition. The list contains checks for IT related issues that need to be addressed both when transferring a network hub to ECDC and when outsourcing the activities. Some items may have already been addressed in previous visits, but they are left in for further discussion.

1.1 Data flow

Purpose: To understand the process of handling the information in the network, from the country sending the original data to it being stored in the database – validated and cleaned.

- How many countries are participating in the network?
  - How many countries are able to provide case based data vs. aggregated data?
  - Who submits data? National institute / Other EPI source / Laboratory / Other
- How is data sent from countries to the hub? E-mail, web interface or machine to machine interface?
- In what format are the data sent?
  - How well does countries comply with the format?
  - How is the completeness with mandatory fields?
- How much manual work is required to get the data into the database?
  - Is any manual/automatic conversion needed? Describe the steps, which tools are used etc.
  - What kind of data validation is performed? Automatically and/or manually. Estimate time per submission.
  - How is data cleaned?
  - Who does this? Is there any alternate?
- How do you treat aggregate data verses case based data?
  - If countries submit both aggregates and cases, do the numbers match?
- What information do you have on the data origin? Reporting country/region, surveillance system, case definitions or other.
- List all the databases containing data that the network has collected. Detail number of records and physical file size.
- List all the studies that the network has conducted.
- If several databases exist, then how are they linked?
  - Are there epidemiological data, laboratory data and clinical data available?
  - Other databases? What kind of data?
- If the network has a lab component, then how is the data collected from the laboratories?

1.2 Data output

Purpose: To understand the efforts needed when creating standard output (web, regular reports etc).

- Regular reports (annual, quarterly or weekly)
  - What kind of data is selected?
  - What kind of standard tables/graphs are used?
  - What kind of standard analysis is preformed?
  - Approval process? Member states or network members?
- Web interface (dynamic or static contents)
  - What information is available? Statically or dynamic.

    - Is there a restricted area?
    - Are there any written analyses presented?
    - Which selection criteria apply?
    - Which data source(s) is used?
    - What functionality is visible to the user?
    - Approval process? Member states?
    - Are there any server side logic?
    - What data is available to the public and what needs restricted access?
- Other reports (e.g. guidelines or procedures)
    - What type?
- What additional information do you use for the analysis? Denominators?
    - What sources of information do you use for this?
- What date do you use in analysis (date used for statistics)?
- Is historical data static or updated? Update frequency.

1.3 Files and documents

Purpose: To help in understanding the information processes in the network and also to better understand the contents of network output.

- Please provide any script (SQL, VBA or other) used to ease conversion, validation, import, export, analysis, reporting etc.
- Please provide any template used for internal/external documents, reports or other.

1.4 Network activity

Purpose: To better understand the requirements and implementation for future communication platforms.

- How do the network members communicate? Mail lists, distribution lists, discussion forums or bulletin boards.
    - Information flow? Through HUB or directly?
    - Common issues?
    - Who has access?
    - Level of access?
    - Is there any protocol for using the communication platform?

1.5 Technical information

Purpose: To get a better understanding of how the daily work in the network is supported by technical tools.

- Data transport specification(s).
- Environment information
    - Server hardware
    - Software
        - Web server
        - Database server
        - Data management
- Sample data (subset of the network database(s)).
    - Agreement on final data transfer. When? How?
    - Description of variables
- Has the network developed network specific software?
    - Implementation language
    - Code ownership
    - Source available?
    - Documentation/Specifications
    - Contact point
- Contact details for an IT contact point(s).
- List of deliverables

The final presentations were sent to ECDC after the meeting. Further input will be provided to ECDC by e-mail and telephone.

The minutes of this ECDC HUB will be provided by Klaus Weist and his team.

5. DISSEMINATION ACTIVITIES

Papers published in peer reviewed journals (see Annex V)

Adriaenssens N., Coenen S., Tonkin-Crine S., Verheij T.J.M., Little P., Goossens H. and the ESAC Ambulatory Care Subproject Group. European Surveillance of Antimicrobial Consumption (ESAC): disease-specific quality indicators for outpatient antibiotic prescribing. BMJ Qual Saf (Accepted)

Zarb P, Ansari F, Muller A, Vankerckhoven V, Davey PG, Goossens H. *Drug Utilization 75% (DU75%) in 17 European Hospitals (2000 - 2005): Results from the ESAC-2 Hospital Care Sub Project.* Curr Clin Pharmacol. 2011 Jan 11

Zarb P., Amadeo B., Muller A., Drapier N., Vankerckhoven V., Davey P., Goossens H., and on behalf of the ESAC-3 hospital care subproject group, *Identification of targets for quality improvement in antimicrobial prescribing: the web-based ESAC Point Prevalence Survey 2009.* J. Antimicrob. Chemother. 2011; 66: 443-449.

Aldeyab M., Kearney M., McElnay J., Magee F., Conlon G., Gill D., Davey P., Muller A., Goossens H., Scott M. *A point prevalence survey of antibiotic prescriptions: benchmaking and patterns of use.* In: British Journal of Clinical Pharmacology 2011 Feb;71(2):293-6. doi: 10.1111/j.1365-2125.2010.03840.x.

Ansari F., Molana H., Goossens H., Davey P., ESAC II Hospital Care study group. *Development of standardized methods for analysis of changes in antibacterial use in hospitals from 18 European countries: the European Surveillance of Antimicrobial Consumption (ESAC) longitudinal survey, 2000-06.* In: J Antimicrob Chemother 2010 Dec;65(12):2685-91. Epub 2010 Oct 25.

Amadeo B, Zarb P, Muller A, Drapier N, Vankerckhoven V, Rogues A-M, Davey P, Goossens H; on behalf of the ESAC III Hospital Care Subproject Group. *European Surveillance of Antimicrobial Consumption (ESAC) point prevalence survey 2008: paediatric antimicrobial prescribing in 32 hospitals in 21 countries.* J. Antimicrob. Chemother. 2010; Oct;65(10):2247-52. Epub 2010 Aug 16. doi: 10.1093/jac/dkq309.

Adriaenssens N, Coenen S, Muller A, Vankerckhoven V, Goossens H, on behalf of the ESAC Project Group. *European Surveillance of Antimicrobial Consumption (ESAC): Outpatient systemic antimycotic and antifungal use in Europe*. J. Antimicrob. Chemother. 2010; 65(4):769-74.

Coenen S, Adriaenssens N, Muller A, Vankerckhoven V, Goossens H, on behalf of the ESAC Project Group. *European Surveillance of Antimicrobial Consumption (ESAC): Gebruik van antischimmelpreparaten in de ambulante praktijk in Europa.* Huisarts Nu 2010;39(5):186-91.

Abstracts accepted for oral presentation (see Annex VI)

None during this reporting period.

Abstracts accepted for poster presentation (see Annex VII)

N. Adriaenssens, S. Coenen, S. Tonkin-Crine, T.J.M.Verheij, P. Little, H. Goossens and the ESAC Ambulatory Care Subproject Group. *European Surveillance of Antimicrobial Consumption (ESAC): disease-specific quality indicators for outpatient antibiotic prescribing.* 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011. (Oral presentation by N. Adriaenssens)

P. Beutels, C. Marais, N. Hens, A. Blommaert, J.A. Cortinas, S. Coenen, A. Muller, and H. Goossens. Identifying determinants of antibiotic use in Europe. 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011.

B. Jans, K. Latour, E. Broex, R. Stroobants, G. Gavazzi, A. Muller, V. Vankerckhoven, and H. Goossens. *Antimicrobial prescriptions in Belgian nursing homes: Results from the European Surveillance of Antimicrobial Consumption point prevalence survey in nursing homes.* European Union Geriatric Medecine Society, Dublin, 29 September-1 October 2010.

B. Jans, K. Latour, E. Broex, A. Muller, N. Drapier, V. Vankerckhoven, R. Stroobants, H. Goossens on behalf of the European Surveillance of Antimicrobial Consumption (ESAC) Nursing Home subproject group. *Antimicrobial consumption and stewardship in nursing homes in European regions.* 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011.

K. Latour, E. Broex, A. Muller, N. Drapier , V. Vankerckhoven, R. Stroobants, H. Goossens, B. Jans on behalf of the European Surveillance of Antimicrobial Consumption (ESAC) Nursing Home subproject group. *Antimicrobial prescribing for urinary tract infections in European nursing homes.* 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011.

A. Versporten, S. Coenen, N. Adriaenssens, H. Goossens, and the ESAC Ambulatory Care Project Group. *European Surveillance of Antimicrobial Consumption (ESAC): outpatient antibiotic use in children and teenagers in Europe.* 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011.

M. Rummukainen, O. Lyytikäinen, T. Kärki, M. Kanerva, M. Haapasaari, J. Ollgren, B. Jans, A. Muller, H. Goossens on behalf of the European Surveillance of Antimicrobial Consumption (ESAC) project group. *Repeated Point Prevalence Surveys on Antimicrobial Prescriptions in Finnish Nursing Homes, 2009-2010.* 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011.

Abstracts accepted for publication only (see Annex VII)

N. Adriaenssens, S. Coenen, A. Versporten, A. Muller, P. Zarb, H. Goossens, and the ESAC Project Group. *European Surveillance of Antimicrobial Consumption: trends in systemic azole consumption in hospital care in Europe.* 21st European Congress of Clinical Microbiology and Infectious Diseases, Milan, Italy, May 7-10, 2011. (Oral presentation by N. Adriaenssens)

Reports

P. Zarb, A. Muller, B. Amadeo and the ESAC management team: *Report on Point Prevalence Survey of antimicrobial prescribing in European hospitals*, 2009.

E. Broex, B. Jans, K. Latour, H. Goossens, and the ESAC management team. *Results from the national survey of the characteristics of nursing homes*. ISBN Number: 9789057283017 Deposit number: D/2010/12.293/14. IPH/Epi-report number: 2010-049, 2010.

B. Jans, K. Latour, E. Broex, H. Goossens, and the ESAC management team. *Report on point prevalence survey of antimicrobial prescription in European nursing homes*, 2009. ISBN Number: 9789057283031 Deposit number: D/2010/12.293/16. IPH/EPI-report number: 2010-052, 2010.

E. Broex, B. Jans, and K. Latour. *European Surveillance of Antimicrobial Consumption (ESAC) Report on point prevalence survey of antimicrobial consumption in European nursing homes. November 2009*. ESAC-3: Nursing home subproject group. ISBN Number:9789057283123 Deposit number D/2011/2505/01, IPH/EPI-report number: 2011-01.

B. Jans, K. Latour, and E. Broex. *Het antibioticumvoorschrift in Woonzorgcentra in België: resultaten van de ESAC Nursing Home studie: april 2009*. Deposit number: D/2010/2505/67, IPH/EPI-report number 2010-058.

B. Jans, K. Latour, and E. Broex. *La prescription d'antibiotiques en Maison de repos et de soins en Belgique: résultats de l'étude ESAC - Maisons de Repos, avril 2009*. Deposit number: D/2010/2505/68, IPH/EPI-report number 2010-059.

N. Adriaenssens, S. Coenen on behalf of the ESAC Management Team. *Disease-specific antibiotic prescribing quality indicators repor*t. 10 September 2010.

Website

The ESAC website is accessible through the following link: http://www.esac.ua.ac.be.

The ESAC website contains 4 parts:

- An area for general information on the ESAC project.
- An area for the dissemination of results and knowledge.
- A password-protected area.
- An area for the general public/press

Figure 4.1: Screenshot of the ESAC homepage

Since beginning 2009, the ESAC website has been revised and improved by our IT specialist, Nico Drapier. On the homepage important upcoming events are announced. Secondly, the pages for the general public/press are immediately shown. On the right-hand side different flags for each of the participating countries are shown, through which the pages for the general public can be consulted.

1. Area for general information on the ESAC project

Three headings:

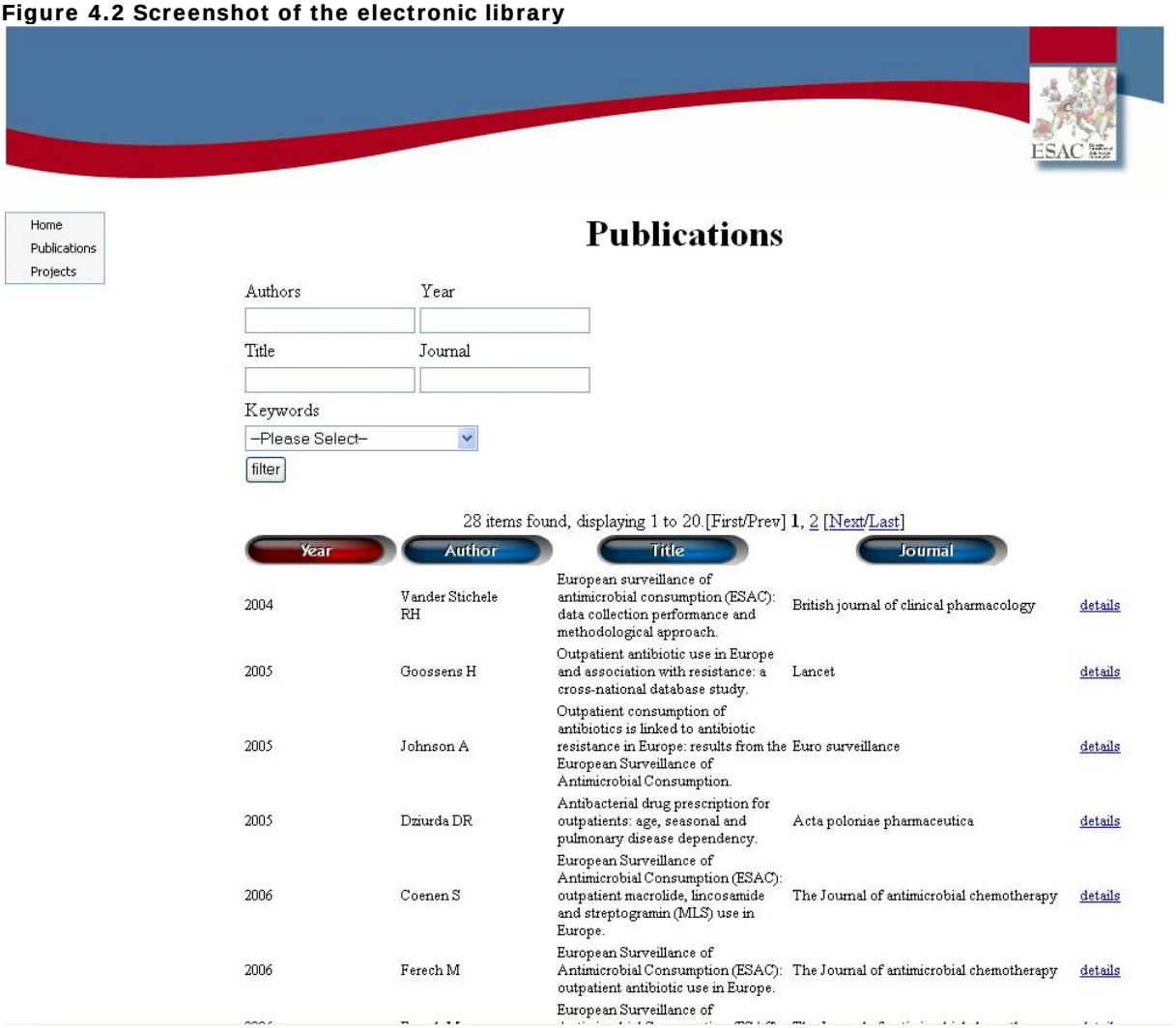
- About ESAC: this part contains information on ESAC-1, ESAC-2, ESAC-2.5 and ESAC-3. For the previous ESAC projects (1, 2 and 2.5) the final report can be downloaded from the website.
- Who is Who?: The ESAC Network is presented in an organization chart. The different subpages provide detailed information, including contact details of the members of the Management Team (MT), of the members of each of the participating National Networks, of the Audit Committee, and of the Scientific Advisory Board. For the latter two their specific tasks are also mentioned.
- Contact: contact details of the ESAC MT are provided here.

2. Area for the dissemination of results and knowledge

Five headings:

- Subprojects: Information on the 4 different subprojects as well as results can be found here.
- Data: Results on the 2006 data collection can be consulted here (static pages) as well the interactive database (see below). Results on the 2007 data will be uploaded as soon as available.
- Dissemination: These pages contain all scientific publications, including papers, abstracts, presentations and posters, by the ESAC MT. Also the ESAC Yearbooks and Newsletters can be found here. A more detailed overview of international publications and projects in relation to antimicrobial consumption, can be consulted through the E-library.
- E-library: The ESAC Electronic Library contains international publications and projects covering antimicrobial consumption (Fig. 4.2). Currently all publications by the ESAC MT are available. Interestingly, all National Networks can add relevant article and projects on the E-library. Please note that the library is not a subject of scientific review.
- Links: Links to related projects and institutions can be found here.

Figure 4.2 Screenshot of the electronic library



3. Password-protected area

- Each of the LNRs and the NRs of the different subprojects have received a login and a password.
- Under the heading minutes, the minutes and presentations of the different meetings, ie kick-off meeting, the second annual meeting, subprojects meetings and management team meetings can be consulted here. A different level is given depending on the position within the ESAC Network: the members of the management team have full access to the entire website, whereas the LNRs cannot access the minutes of the management team meetings.
- Under the heading Data, submit data was created for the data collection 2007 and 2008. Here the Collect Manager Application (See Objectives and Methodological Approach) and the Dataset Manager (See Objectives and Methodological Approach) can be found.

4. Area for the general public/press

Pages for the general public/press should be easy to understand for lay people. Each of the LNRs have been asked to check the translation of the currently existing English version in their native language and to provide a text on the comparison of antibiotic use in their country versus use in Europe. The pages can also be consulted by the press. The following information is provided on the pages: What is ESAC, Why ESAC, Who to contact in your country, What is

the antibiotic use in your country and in Europe, What are viruses and bacteria, What is resistance and useful links to relevant websites in your country. The new interface which was built by our IT specialist, Nico Drapier, in 2009 makes the pages more attractive for lay people and the press (Fig. 4.1). The website is continuously evaluated and SEO (search engine optimisation) using Google Analytics is being implemented for the entire website.

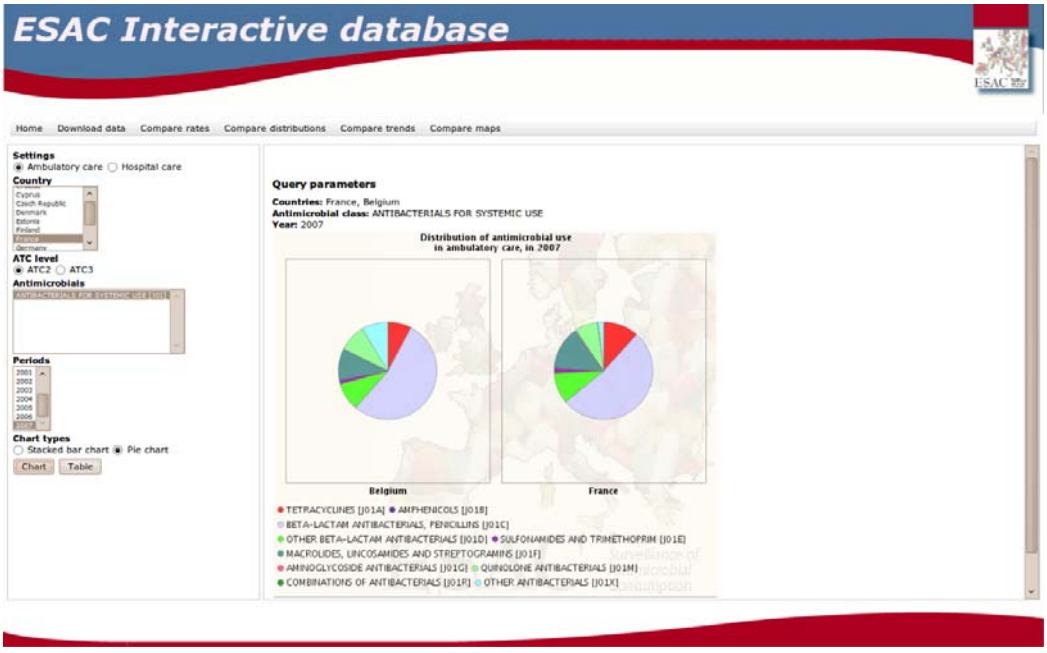
Interactive database

A new, easier to use interactive database containing ESAC data on antibiotics for the participating European countries has been released on our website. You can explore the database in 3 ways:

1. By comparing countries for one year
2. By comparing yearly trends for one country
3. By visualing maps of Europe

The interactive database was updated with 2008 data.

Figure 4.3 Screenshots of the ESAC interactive database



Newsletters (see Annex VIII)

The latest edition of the ESAC newsletter was published in February 2011.
In this edition, we presented the second Nursing Homes report. We gave an overview of abstract submissions for ECCMID (Milan, Italy 2011). We provided an obituary for Faranak Ansari to express our condoleances. We gave input on the ECDC HUB visit which took place in February 2011 and in line with previous editions, we presented 4 of the ESAC National Networks.
For the April 2011 edition we foresee a special edition of our ESAC Newsletter for the ECCMID conference, in which we highlighted the major results of the core data collection and the different ESAC subprojects.

A PDF version of all editions of the ESAC Newsletter can be downloaded from the ESAC website (http://www.esac.ua.ac.be).

6. IN-DEPTH ANALYSES

Ambulatory Care subproject

Ambulatory Care Scientific Advisor: *Sigvard Mölstad, SE; Samuel Coenen, BE*

Clinical Scientist Ambulatory Care: *Niels Adriaenssens, BE*

In ESAC-3 the Ambulatory Care Subproject aims to:

- collect national dispensing data linked to the patients' age and gender and the prescribers' speciality (protocol A)
- collect national or sample data of prescriptions by GPs linked to the patients' age and gender and to the indication (protocol B)
- collect recommendations from evidence-based clinical guidelines, including antibiotic guides, developed for and applicable to the participating countries (guideline protocol).
- validate further the available set of twelve indicators developed to assess the quality of antibiotic use in ambulatory care (quality indicators protocol)

Protocol A & B

Data for protocol A & B can be submitted online using ESAC Collect Manager.

Despite data collection according to protocol A was only optional, still 8 countries provided 2009 data in 2010. An abstract, based on protocol A data from 2007 and 2008, by Versporten et al. (European Surveillance of Antimicrobial Consumption (ESAC): outpatient antibiotic use in children and teenagers in Europe) was accepted for poster presentation at ECCMID 2011.

The data collection for protocol B remained difficult. Therefore, collaboration with APRES (The appropriateness of prescribing antibiotics in primary health care in Europe with respect to antibiotic resistance; www.nivel.eu/apres), was established. During the annual APRES meeting held in Utrecht 22nd and 23th February 2011, data requirements were discussed with all partners.

The data availability for protocol A & B can be found in Tables 6.1 and 6.2 (see also Annex I).

Table 6.1 Availability of data for protocol A

Country	2004	2005	2006	2007	2008	2009	Total
BE	1	1	1	1	1		5
DK		1	1	1	1	1	5
EE			1	1	1	1	4
FI		1			1	1	3
FR					1	1	2
IL		1			1	1	3
LU		1		1	1		3
NL	1	1	1	1	1	1	6
NO			1	1	1		3
SE	1	1	1	1			4
SI		1	1	1	1	1	5
WAL			1	1	1	1	4
Total	**3**	**8**	**8**	**9**	**11**	**8**	**47**

Table 6.2 Availability of data for protocol B

Country	2004	2005	2006	2007	2008	2009	Total
BE	1	1	1	1	1		5
SE					1		1
NL		1	1				2
Total	**1**	**2**	**2**	**1**	**2**		**8**

Guideline protocol

For guidelines on otitis media, sore throat, sinusitis and lower respiratory tract infections collaboration with CHAMP (Changing behaviour of Health care professionals And the general public towards a More Prudent use of anti-microbial agents; www.champ-antibiotics.org) has been very successful. For guidelines on urinary tract infections as well as on skin and soft tissue infection from ESAC countries, we had to rely on the ESAC National Networks (NN) and an update of previous ESAC guideline review work. In addition, also in the APRES project guideline collection will be deliverable and a collaboration has been esthablished to update the ESAC and CHAMP materials, including guidelines regarding to urinary tract infections.

Quality indicators protocol

All 21 (7x3) proposed disease-specific quality indicators for outpatient antibiotic prescribing seem to have face validity and to be potentially applicable. In line with the main objectives of antimicrobial use surveillance at the European level, this set of indicators could be used to better describe antibiotic use and assess the quality of national antibiotic prescribing patterns in ambulatory care.

An article discussing the disease-specific quality indicators for outpatient antibiotic prescribing has been accepted for publication in BMJ Quality & Safety. This work will also be presented at ECCMID 2011.

Hospital Care subproject

Hospital Care Scientific Advisor: *Peter Davey, UK*

Clinical Scientist Hospital Care: *Peter Zarb, MT*

Hospital Care support: *Brice Amadeo, FR*

Introduction

The Hospital care subproject had 2 main branches, the PPS and the LS. The PPS consisted of 2 surveys, one in 2008 and one in 2009 and has now been finalised. However, based upon demand another PPS in 2010 is available for hospitals wanting to carry out the PPS without any support from the University of Antwerp/ ESAC Management Team. The LS branch is still in the data collection stage. In fact a formal request to ECDC's EARS-Net has been submitted at the end of August 2010.

Hospital Care PPS 2008 and 2009

The ESAC Point Prevalence Survey (PPS) is the only European multicentre survey of antimicrobial prescriptions in hospitals. This survey has previously been successfully implemented in 20 hospitals during the 2006 PPS and in 50 hospitals in 2008. The aim of PPS-2009 was to perform a PPS in a larger sample of European hospitals compared to the previous 2 PPS. A total of 172 hospitals were included in the data analysis for the recent publication in JAC as the database was frozen on the 26th February 2010. However, 5 more hospitals validated their data at a later stage giving a total of 177 hospitals. Table 6.3 shows that though the number of countries was highest in 3008 the number of hospitals was by far greater in 2009. The 2009 survey remains the largest hospital PPS on antimicrobial use to date. In England and Scotland (from the United Kingdom), Ireland and Belgium, respective national antibiotic societies were very influential in increasing the participation for the 2009 point-prevalence-survey from these countries. Neither of these three surveys was intended for benchmarking at the national or European level as the sample of hospitals were never intended to be representative of the participating countries. Hopefully, the ECDC PPS on use and HAI in 2011/2 will include many more hospitals giving a European representative picture of both consumption and HAI.

Table 6.3: Summary of number of countries and hospitals participating in the Point Prevalence Surveys

Survey Year	2006	2008	2009
Countries	20	31	25
Hospitals	20	50	172
Of which 'Teaching'	13	33	76

Hospital Care LS 2009

The aims of LS 2009 were to: develop indicators to describe characteristics of antimicrobial consumption in hospitals; to identify clinical activity denominators for monitoring time trends in antimicrobial use; explore the relationship between antimicrobial consumption and hospital structure and; identify targets for interventions aimed at improving antimicrobial prescribing.

Setting

At least two hospitals should be selected from each country. These hospitals must be able to support both the LS and PPS components of the HC sub-project. The participating hospitals will collect retrospective data on antimicrobial use, on hospital structure and on activity indicators for the previous 4 years and fill a questionnaire on the characteristics of the institution for the last year. Separate data for general wards, ICU and paediatrics are asked where available.

Methodology
The study will focus on systemic antibacterials J01 and antimycotics J02, alimentary tract antimicrobials A07AA, and specific substances P01AB01, D01BA02, and J04AB02 according to the ATC classification by the WHO Collaborating Centre for Drug Statistics. This will be used as numerator data. The project will compare trends of antimicrobial use with and without adjustment for two denominators: bed days and admissions. Monthly data will be collected for 4 years starting from January 2005 to December 2008. Participants will submit their data (online) using an excel template from November until the end of December 2009. In practice this deadline had to be extended to June 2010 due to poor response.

Outcomes
DDD/100 bed-days and DDD/100 admissions will be the outcome indicators studied. The Length of Hospital Stay will be estimated based on the model used in the ESAC-2 HC subproject. Regression analysis of time series will be applied to crude consumption data, adjusted for clinical activity denominators, length of stay, and the hospital characteristics. Finally the established models should allow the possibility to: group the hospitals; predict hospital antimicrobial use; propose indicators for hospital antimicrobial use.

The list of countries that have participated in the LS 2009 can be consulted in Annex II.

ESAC-EARSS ecological survey
The aims of this novel survey to ESAC are to:

- analyse the relationship between antimicrobial use and resistance in hospitals at an ecological level
- identify common patterns of resistance for hospital policy makers
- identify patterns of use that determine specific resistances
- identify possible interventions to reduce antimicrobial resistance
- provide simple anonymous benchmarking at European level
- develop methods to analyse resistance data in relationship with antimicrobial use data
- roll out a method for collecting meaningful data on antibiotic use and resistance in European hospitals and; investigate the feasibility of collecting data about surveillance of *Clostridium difficile* infections.

All the hospitals participating in the ESAC LS survey were recruited for the ecological survey. However, various issued were identified in both EARSS (EARS-NET) resistance data as well as consumption data.

Consumption Data
The consumption data was collected using the ESAC LS protocol. The number of hospitals which submitted valid data was lower than the original maximum aimed for which included all hospitals that participated in the PPS-2008. In total 28 hospitals, from 19 countries, submitted some form of LS consumption data, 2 of which did not fill in the hospital questionnaire even after various reminders. Out of the remaining 26 hospitals, 2 submitted only yearly data, whilst the data had to be ideally monthly or at least quarterly. Another 2 hospitals only submitted data for 2008 and another 7 had some other issue for which the data could not be utilized, even after contacting the hospitals for clarifications. Thus the final number of hospitals which submitted valid data was 17. However, most of them were unable to submit the data exactly as requested, i.e., grouped at the monthly level by 'all hospital', 'paediatrics', 'intensive-care and 'general wards including medicine and surgery. Many hospitals submitted quarterly data, some of which, only at the hospital level. Furthermore, some hospitals could not provide the number of admissions for the study periods. In these cases one of the 2 denominators was therefore not available. The other 23 hospitals were unable, for some reason or another, to submit any LS data.

Resistance data

Since the resistance surveillance system moved from RIVM to ECDC all hospitals participating in both EARSS and ESAC from non-EU countries were lost for the ecological survey as the TESSy database of ECDC only recognizes EU member states. These included hospitals from Switzerland, Russia and Croatia and possibly also Israel and Turkey.

In addition, the number of invasive isolates: per hospital; per month; per species (*Enterococcus faecalis, E. faecium, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa and Staphylococcus aureus*) were very few and therefore it transpired to be difficult to analyze this data. In order to improve the analysis a request for the denominator data (i.e., the number of 'relevant samples' for culture and sensitivity including negatives and cultures of other organisms during the specific study period) was sent to ECDC in February 2011. It seems that not all laboratories provided such data and definitely not for all years of the study period.

The 28 hospitals that submitted some form of consumption data were contacted to confirm whether they participated in EARSS (EARS-Net). 17 replied with their respective EARSS hospital code. 3 never replied to our emails, 4 never participated in EARSS, 2 are not in EARS-Net (not EU MS) and 1 was not willing to share the resistance data. Thus data analysis for use and resistance will be only carried out on the 12 hospitals that submitted consumption data and have agreed to the use of their resistance data.

Data analysis

The data is currently being processed by a biostatistician in order to determine whether:

1. there is a better way to analyse trends in consumption compared to the methodology used during ESAC-II
2. it is statistically possible to have relevant outcomes with respect to an association between consumption and resistance. In these analyses specific drug-bug combinations will be assessed for association. However, it is more likely that only *Pseudomonas aeruginosa and Staphylococcus aureus* will be chosen as they are the hospital pathogens with 'higher numbers'. In fact EARSS (EARS-Net) also collects information for Streptococcus pneumoniae but this was omitted from the start for the ESAC-EARSS ecological survey as this is known to be almost exclusively a community acquired pathogen. To some extent, this could also be said for *E. coli* and possibly even *K. pneumoniae*.

Conclusion

It transpires that the ESAC point-prevalence survey was highly successful, being also adapted for both the ECDC HAI-use PPS and other European projects like ARPEC. In addition interest for the methodology, including the software has been shown from various parties outside Europe. On the contrary, the correlation of resistance and consumption data is the most tricky whilst the longitudinal survey is also useful in possibly identifying different trends depending on the types of denominator use. In the future other denominators to the current occupied-bed-days and admissions could be utilised.

Nursing Homes subproject

Nursing Homes Scientific Advisor: *Béatrice Jans, BE*

Clinical Scientist Nursing Homes: *Ellen Broex (until 31/12/2010), Katrien Latour (since 01/01/2011*

PPS-2, NOVEMBER 2009

Participation

In November 2009, a second ESAC NH PPS was organized together with the pilot PPS of the HALT project, i.e. a project on healthcare associated infections, AB-use (=ESAC-project), antimicrobial resistance and available infection control resources in European long-term care facilities (LTCFs).
Two new countries (Bulgaria and Hungary) joined the network (see Annex III). In total 266 nursing homes from 21 countries (UK = England and Northern Ireland) participated to the second ESAC NH PPS (see Annex III).

Number of residents with antimicrobial therapy and prevalence of AB use
Of the (conform rapport pps-2: 28569) eligible residents, 435 (5.01%) received an antimicrobial on the day of the survey. In total, 1,486 molecules were prescribed. Most residents (96,6%) used only one molecule.
The crude median prevalence of antimicrobial use reached 5% (range: 0 – 33.3%). In 9.8% of all participating NHs no antimicrobials were used.

Administration route
During this survey 90.3% of all treatments were administrated orally, 9.6% were for parenteral use (IM/IV) and 0.1% (n=2) was administrated rectally.

Place of prescription and type of prescriber
Like in the first PPS, antimicrobials were mainly prescribed in the nursing home (89.2%). Prescribing occurred in 7.7% of the cases in a hospital and 3.1% was prescribed elsewhere. The general practitioner was again the main prescriber (70.7%), followed by a specialist and another person in 24.6% and 4.7% of the cases, respectively.

Drug utilization
Antibacterials for systemic use (J01) represented the largest category (96.2%) among all prescribed substances in NHs (n=1,486). Antimycotics (J02) and tuberculostatics (J04) represented 1.6% and 0.3% of all prescribed molecules, respectively. These figures are very similar to those found in the first study.

J01 class: Antibacterials for systemic use
The largest groups among the prescribed J01 molecules occurred in the same order as during the first survey: *β-lactam penicillins* (J01C, n=412), *other antibacterials* (J01X, n=384), *quinolones* (J01M,n=229) and *other β-lactam antibacterials* (J01D, n=164).

Indications for antimicrobial therapy and type of treatment
Antimicrobials were primarily prescribed empirically (56.3%), followed by prophylactic (27.3%) and documented (16.4%) treatments. Urinary (49.5%) and respiratory (30.0%) tract infections were the main indications for prophylactic or therapeutic AB use. These results correspond to the finding of PPS1.

Discussion
The methodology remained more or less the same during both survey. The conclusions of the first study are confirmed by the findings of the PPS-2. The same great order of administrated J01 subclasses can be observed and urinary and respiratory tract infections remain the two most important indication for prophylactic or therapeutic AB use.

It can be concluded that the ESAC NH-subproject succeeded in creating a strong European network of NHs and standardised and feasible methodology to study antimicrobial use in these specific care settings.

Socio-Economics subproject

Socio-Economics Scientific Advisor: *Philippe Beutels, BE*

Clinical Scientist Socio-Economics: *Christiaan Marais, BE (until 30/09/2010), Adriaan Blommaert (since 01/10/2010)*

This is a small subproject that demands few additional data from participants. The mother list of determinants of use was shown at the Athens meeting to be extensive. Some previous analyses from the literature were reviewed, noting the differences in formulation of the regression models and the results obtained. Antibiotic consumption for the period 1999 - 2007 was extracted from the ESAC-3 dataset. The following table shows the available data per year.

Table 6.4: Overview available DDD data per year and per country

Abbr	Country	1999	2000	2001	2002	2003	2004	2005	2006	2007
AT	Austria	ok	ok	ok	ok	ok	ok	ok	ok	ok
BE	Belgium	ok	ok	ok	ok	ok	ok	ok	ok	ok
BG	Bulgaria	ok	ok	ok	ok	ok	ok	ok	ok	ok
CH	Switzerland	x	x	x	x	x	ok	x	x	x
CY	Cyprus	x	x	x	x	x	x	x	ok	ok
CZ	Czech Republic	ok	x	x	ok	ok	ok	ok	ok	ok
DE	Germany	ok	ok	ok	ok	ok	ok	ok	ok	x
DK	Denmark	ok	ok	ok	ok	ok	ok	ok	ok	ok
EE	Estonia	x	x	x	ok	ok	ok	ok	x	ok
ES	Spain	ok	ok	ok	ok	ok	ok	ok	ok	ok
FI	Finland	ok	ok	ok	ok	ok	ok	ok	ok	ok
FR	France	ok	ok	ok	ok	ok	ok	ok	ok	ok
GR	Greece	ok	ok	ok	ok	ok	ok	ok	ok	x
HR	Croatia	x	ok	ok	ok	ok	ok	ok	ok	ok
HU	Hungary	ok	ok	ok	ok	ok	ok	ok	ok	ok
IE	Ireland	ok	ok	ok	ok	ok	ok	ok	ok	ok
IL	Israel	x	x	x	ok	ok	ok	ok	ok	ok
IS	Iceland	ok	ok	ok	ok	ok	ok	ok	ok	x
IT	Italy	ok	ok	ok	ok	ok	ok	ok	ok	ok
LT	Lithuania	x	x	x	x	x	x	x	ok	x
LU	Luxembourg	ok	ok	ok	ok	ok	ok	ok	ok	ok
LV	Latvia	x	x	x	ok	ok	ok	ok	ok	ok
NL	Netherlands	ok	ok	ok	ok	ok	ok	ok	ok	ok
NO	Norway	x	x	ok	ok	ok	ok	ok	ok	ok
PL	Poland	ok	ok	ok	ok	x	ok	ok	x	x
PT	Portugal	ok	ok	ok	ok	ok	ok	ok	ok	ok
RU	Russian Federation	x	x	x	x	ok	ok	ok	ok	ok
SE	Sweden	ok	ok	ok	ok	ok	ok	ok	ok	ok
SI	Slovenia	ok	ok	ok	ok	ok	ok	ok	ok	ok
SK	Slovakia	ok	ok	ok	ok	ok	ok	ok	ok	ok
UK	United Kingdom	ok	ok	ok	ok	ok	ok	ok	x	x

x = no data
ok = data available

Data collection

The methods for the data analysis were developed by Philippe Beutels, Niel Hens, Christiaan Marais, Adriaan Blommaert and Jose Cortinas mainly through funding external to the ESAC project. In 2010 the database of determinants was updated for the last time.

The data collected up to June and the results of the analysis were presented on the 22nd of June 2009 at the AC/EC Subproject Meeting which was held in Antwerp. Philippe Beutels discussed the socio-economic determinants that were collected up to then and the rationale behind the study. Jose Cortinas shared results of the statistical analysis that was run on the dataset.

At the EC subproject meeting on June 22, 2009 it was also made clear to the LNRs that the existing dataset would be further expanded in terms of the number of potential determinants, and in the completeness of these determinants by country. Therefore following the subproject meeting, the new clinical scientist working on this subproject, Christiaan Marais, focused in the first place on these issues. Through more intensive use of global databases (including Eurostat, OECD, WHO) the database was extended to include more variables and reduce previously missing values. Amongst others, more expansive data on agricultural factors and bacterial resistance were added to the database. Following a pilot survey at the June 2009 meeting, a questionnaire was sent to the 35 ESAC LNRs to enquire about information which is not available from the data sources consulted. This questionnaire asked LNRs to answer questions relating to the following:

- Procedures for patients to consult with physicians
- Doctor remuneration
- Treatment guidelines
- Feedback on Antibiotic prescription
- Doctor – Pharmacist role
- Marketing restrictions

The LNR survey was sent out on the 7th of August 2009 and responses from 29 LNRs were received and the variables were added to the list of variables.

Data availability & analysis

Data was collected for 180 variables for the period 1999 – 2007 for the 35 ESAC countries. The data is not 100% available from the sources used in the data collection and therefore missing values have to be imputed. Missing values are imputed with a weighted average of the known values with the weight being determined by the distance in time between the known and unknown values. An error term will be added to the imputed values to capture the variability of each variable. Explanatory variables in the dataset for which a country has no information will not be imputed. A biclustering technique of the availability matrix will be used to chose an optimal set of rows and variables from the imputed database so that we have a subset of the database with 100% data availability.

The variables collected are summarized below by seven groups of variable types with information on the number of variables in each group and the data availability by group, before and after the imputation of missing values. The availability of data shown here are for the same country*year combinations as we have antibiotic consumption (see Table 6.5). A full inventory of the determinants used in the analysis is presented in Annex IV.

Table 6.5: Availability of variables by group, before and after imputation. The availability is calculated as an average of the availability between 1999 and 2007

Group	Number of variables	Availability before imputation	Availability after imputation
Agricultural factors	7	54.5%	92.1%
Burden of disease	35	80.7%	95.2%
Culture and perception of illness	26	42.4%	65.5%
Demographic factors	21	81.6%	96.8%
Education and knowledge about antibiotics	6	50.0%	93.2%
Healthcare system	73	71.7%	81.1%
Socioeconomic factors	12	59.3%	88.2%
Grand Total	180	68.2%	84.7%

The availability of data by country is shown below, before and after imputation of the missing values. The availability is only shown for country*year combinations where antibiotic consumption is known from the core ESAC database (see Table 6.6).

Table 6.6: Availability of variables by country, before and after imputation. The availability is calculated as an average of the availability between 1999 and 2007

Country	Availability before imputing	Availability after imputation
Austria	76.4%	92.1%
Belgium	61.2%	89.3%
Bulgaria	59.2%	77.4%
Croatia	55.6%	68.9%
Cyprus	34.7%	39.0%
Czech Republic	62.2%	79.7%
Denmark	74.7%	91.5%
Estonia	65.7%	79.1%
Finland	82.2%	97.2%
France	75.0%	92.1%
Germany	69.9%	85.3%
Greece	71.2%	84.2%
Hungary	72.2%	92.7%
Iceland	69.7%	81.4%
Ireland	72.6%	84.7%
Israel	47.4%	61.0%
Italy	71.5%	95.5%
Latvia	58.8%	71.8%
Lithuania	61.7%	74.0%
Luxembourg	66.5%	80.8%
Netherlands	78.8%	92.1%
Norway	76.3%	94.4%
Poland	56.0%	79.7%
Portugal	70.5%	88.7%
Russia	38.8%	49.7%
Slovakia	60.4%	78.5%
Slovenia	65.9%	82.5%
Spain	78.8%	99.4%
Sweden	78.3%	93.8%
Switzerland	71.1%	87.0%
United Kingdom	71.6%	85.9%

Data mining techniques (bagged regression trees and random forests) are used to indentify influential variables from the dataset. This technique was studied first to assess the influence of correlated covariates on the results. Based on this elaboration of methods, it was decided to use a backward selection approach on multiple random forests / bagged regression trees. The proposed methodology has been discussed with researchers that are currently exploring the effect of correlated variables on random forests and they have indicated that this methodology is a plausible approach.

The set of possibly important variables will then be entered with a forward selection scheme into a linear mixed model (LMM) with country as a random effect to determine a final set of important variables.

Preliminary results

The data mining techniques were applied to a biclustered subset of the database with optimal availability and also a subset of the database which contains all the variables that are 100% available. The results of this analysis were shared at the yearly ESAC meeting in Stockholm on the 27th of May 2010. A list of 37 potentially important variables which were identified in the data mining exercise was shared with the participants of the meeting. From the list of 37 variables, the following four variables were indicated as the most important variables in explaining antibiotic consumption with a LMM:

Significant variables	Beta	P-value
Death rate due to other acute respiratory infections	0.026817	0.0007
Most people can be trusted (1=Yes,2=No)	0.654451	0.0002
% of population aged 25 - 64 that attained upper secondary school	-0.005260	0.0007
Number of women per 100 men	-0.026136	0.0039

The fit of the LMM is not yet satisfactory and therefore the inclusion of a time effect into evolution of antibiotic consumption per country is currently being investigated. First attempts indicate that the women to men ratio may not be important in predicting antibiotic consumption, but the other three variables remain important.

The sources used in the database were validated after the May 2010 meeting which led to an increase in the availability of data. The availability of data shown in Table 6.7 and Table 6.8 are representative of the most current version of the dataset.

Multiple imputation generalized estimation equations with a backward selection procedure were applied to fit models to the most recent data using outpatient antibiotic use as dependent variable.

The following variables were found to be significant in the overall model: (1) % attaining upper secondary education, (2) population density, (3) death rate due to chronic liver disease, (4) existence of restrictions on pharmaceutical companies to pay physicians for attending conferences, (5) death rate due to respiratory disease, (6) existence of financial incentive for patients to register with one GP, (7) households' out of pocket payment on health as a % of total health expenditure, (8) density of GP practices, (9) Corruption Index score, (10) number of antibiotics available, (11) male life expectancy, (12) extent to which most people are trusted, (13) death rate due to ischaemic heart disease, (14) extent to which people respect authority, (15) private health expenditure as a % of health expenditure. In analyses focused on more developed countries (human development index >9.3), variables (1), (3), (5), (8), (9), (10), (11), (13), (14) above were no longer significant, but in addition to the others above, the following variables became significant in the final model: whether or not official guidelines for antibiotic prescribing are available for GPs and pulmonologists, death rate due to

AIDS and production of turkey. Note that some significant determinants may act as a surrogate for combinations of others. In different subgroups of antibiotics similar results were found.

Our analysis reveals that there are many significant determinants and that these vary according to the scope of analysis. At each level of analysis, some significant determinants are inherent to culture and populations, but others could be changed through governance.

The analysis will then also focus on the consumption of separate groups of antibiotics, and according to certain country groups. It is the intention to run the analysis also with the inclusion of resistance as covariate and with IMS data for consumption.

Penalized estimating equations, a data mining technique to determine relevant variables in longitudinal datasets is currently being investigated through simulation studies. If successful, this technique will be applied to the most recent database.

An email was sent to all LNRs after the Stockholm meeting in which they were asked to verify the information we have for the LNR survey. The LNRs were also asked to indicate which of the list of 37 potentially important variables they will be able to collect on a regional level. The LNRs of Croatia and Switzerland answered the question of the availability of regional data and it was indicated that Croatia can supply regional data and Switzerland cannot. No other LNRs gave an indication of the availability of regional data. The analysis of determinants at a regional level, will depend on the ability of LNRs to collect regional data which at the moment does not look feasible.

Analysis of cost of antibiotics

The difficulties with obtaining price information for antibiotics from IMS were discussed at the MT meeting on the 27th of November 2009. There it was decided that further efforts needed to be taken to obtain price information from other sources. Individual emails were sent to all LNR's on the 16th of December 2009 requesting the LNR's to indicate to which extent they will be able to provide data on the cost of antibiotics from local sources. LNR's were asked to indicate which of the following data they can provide:

- **EX-FACTORY PRICE:** The total payment received by the pharmaceutical company for providing one package of the medication. This excludes distribution costs and the markup charged by the pharmacy for dispensing the medication
- **EX-PHARMACY PRICE:** The total payment received by an average non-hospital-based pharmacy for providing one package of the medication.
- **OUT OF POCKET PRICE:** The total amount faced by an average patient for purchasing a package of the medication at a pharmacy. This amount should not include the amount reimbursed by the national health insurance, but may include the amount covered by private insurers .

We have received responses from 24 of the LNR's. Some LNRs indicated that wholesale prices are available. These prices are understood to be greater than ex-factory prices and less than ex-pharmacy prices. The data that have been collected up to August 2010 is described below.

Table 6.7: Price data collected

Country	Data available	Time period
Belgium	Ex-pharmacy	1999-2009
	Out of pocket	2001-2009
Bulgaria	Ex-factory	2005 - 2009
Croatia	Ex-factory	2009
	Out of pocket	
Denmark	Ex-pharmacy	2000-2009

Country	Data available	Time period
Estonia	Ex-pharmacy	2006-2009
	Wholesale price	2003-2009
France	Wholesale price	1999-2008
	Out of pocket prices	
	Ex-pharmacy	
Ireland	Ex-factory	2002-2008
	Ex-pharmacy	
	Out of pocket	
Malta	Wholesale price (Hospital)	2010
Norway	Wholesale prices	1999- 2009
	Out of pocket	
	Ex-pharmacy	
Portugal	Ex-pharmacy	2002 -2009
Slovakia	Ex-factory	1999; 2001; 2004 - 2010
	Ex-pharmacy	2001; 2004 -2010
	Out-of-pocket	1999; 2001; 2004 - 2010
Slovenia	Ex-pharmacy	2007 - 2010
	Ex-factory	
Spain	Ex-factory	2009-2010
	Ex-pharmacy	
Sweden	Ex-pharmacy	2006-2009
	Out-of-pocket	2006-2009
Switzerland	Ex-factory	2003-2009
	Ex-pharmacy	

The price analysis has started with the data that is shown in Table 6.7. We have received data for Israel which was requested from a health insurance company in Israel, but we need more clarity on what price types the data contains before we can use it.

7. MANPOWER FOR THE EXECUTION OF ACTIVITIES

Person	Position	Affiliation	Man/days	Activities	Total Cost
Herman Goossens	Project Coordinator	University of Antwerp	7	Overall coordination Liason with ECDC	3,605.14
Vanessa Vankerckhoven	Project Manager	University of Antwerp	4	Overall Management Liason with ECDC Communication Dissemination Financial Coordination	NA
Ann Versporten	Data Manager	University of Antwerp	97	Data Management core data & subproject PPS Support	23,824.14
Sophie Nys	Administrator	University of Antwerp	35	Finances Administration Minutes of Meetings Updates websites Organization of events	7,358.96
Nico Drapier	IT Specialist	University of Antwerp	21	Development web-PPS HC + NH Development Software core data collection Online report PPS Development e-library Improvement website IT support	10,500.00
Samuel Coenen	Clinical Scientist	University of Antwerp	20	Coordination AC subproject Set-up AC subproject Recruitment countries Analysis AC data	NA
Niels Adriaenssens	Clinical Scientist AC	University of Antwerp	59	Set-up AC subproject Recruitment countries Analysis AC data	16,256.38
Sofie Vaerenberg	Clinical Epidemiologist	Institute of Public Health	9	Support/supervisor HC subproject Support/supervisor NH subproject	2,266.47
Peter Zarb	Clinical Scientist HC	Mater Dei Hospital, Malta	16.5	PPS 2008 & 2009 Recruitment countries Analysis HC data Database HC	3,100.00
Béatrice Jans	Advisor NH	Institute of Public Health	13	Coordination NH subproject Set-up NH subproject Recruitment countries Analysis NH data	6,852.80
Ellen Broex	Clinical Scientist NH (till 31/12/10)	Institute of Public Health	41	Set-up NH subproject Recruitment countries Analysis NH data	5,142.63
Katrien Latour	Clinical Scientist NH (from 1/1/10)	Institute of Public Health	NA	Set-up NH subproject Recruitment countries Analysis NH data	NA (Payment as from 1/3/2011)
Philippe Beutels	Advisor EC	University of Antwerp	9	Coordination EC subproject Set-up EC subproject Recruitment countries	3,062.42
Christiaan Marais	Clinical Scientist EC (till 31/12/10)	University of Antwerp	36	Inventory of socio-economic determinants Analysis of EC data	17,583.57
Adriaan Blommaert	Clinical Scientist EC (from 1/10/10)	University of Antwerp	60	Inventory of socio-economic determinants Analysis of EC data	NA
Paul Van Royen	Supervisor	University of Antwerp	10	Supervision AC subproject	4,188.78

8. LIST OF DELIVERABLES YEAR 4

54	Report Advisory Board meeting 2009-2010	ESAC MT	month 36 → M46
55	Final Management Report 2010-2011	ESAC MT	month 36 → M46
56	Final ESAC 10 Years report + JAC supplement	ESAC MT	Month 46
57	Update Core database up to 2009	ESAC MT	Month 46
58	Tools for data submission	ESAC MT	Month 46
59	Country manuals: type of data available, problems, contact person, trouble shooting	ESAC MT	Month 46
60	Interactive database updated up to 2009	ESAC MT	Month 46
61	Procedures for migration core database to ECDC	ESAC MT + ECDC	Month 46
62	Template on feedback reports on antimicrobial use	ESAC MT	Month 46
~~64~~	~~Updated Detailed Ambulatory Care Database A (2009 data)~~	~~ESAC MT~~	~~Month 46~~
65	Updated Ambulatory Care Database B (2009 data)	ESAC MT	Month 46
66	Report on Protocol A data collection, incl SOPs	ESAC MT	Month 46
67	Report on Protocol B data collection, incl SOPs	ESAC MT	Month 46
68	Methods for Measuring Antimicrobial use in hospitals	ESAC MT	Month 46
69	Feed-back report on antimicrobial use in hospitals	ESAC MT	Month 46
70	Report on joint actions on AB policy and Infection Control in EU NHs/LTCFs	ESAC MT	Month 46
71	Report on availability of regional determinants in other EU countries	ESAC MT	Month 46
72	Report on price analysis in AC by country	ESAC MT	Month 46
73	Final Report on AC	ESAC MT	Month 46
74	Final Report on HC	ESAC MT	Month 46
75	Final Report on NH	ESAC MT	Month 46
76	Final Report on EC	ESAC MT	Month 46
77	Assist and advice ECDC in planning, conduct and completion of the transition of ESAC to ECDC	ESAC MT	Month 46
78	Provide advice ECDC on the integration of ESAC database functionalities in the ECDC database	ESAC MT	Month 46
79	Provide advice to ECDC and EMA regarding comparability of surveillance data on antimicrobial consumption	ESAC MT	Month 46

DLs which have been delivered are marked in blue.

9. LIST OF MILESTONES YEAR 4

49	EC Analysis of the within-country determinants	ESAC MT	month 26 →M36-44
50	Evaluation of the cost of antimicrobial consumption	ESAC MT	month 26 →M44
66	Collection of price information in AC by country	ESAC MT	Month 37
67	Analysis of price information in AC by country	ESAC MT	Month 40
68	Analysis of availability of regional data in other EU countries	ESAC MT	Month 40
69	Final meeting	ESAC MT	Month 45

MSs which have been achieved have been marked in blue.

10. MINUTES OF THE MEETINGS

Minutes of the Management Team Meetings (1/month)

Minutes ESAC-3 MT Meeting dd. 30/09/2010

Present: HG, AV, NA, SN, SC,CM
Conf.call: PZ, EB, BJ
Apologies: VVK, RS, AM
Minutes: SN

1. Review of the last meeting's minutes

1.1 Pending Action Item

PZ Finalize paper.
Inform if Brice is planning to work on paper Comparison AB use 3 age groups in elderly.
Contact EJPH about paper ESAC past, present and future.
Last try to submit paper on DU75
SC Add papers to and finalize the ESAC publication list.
HG Contact RS about 2 papers.
Contact Boudewijn Catry to ask him to organize the papers for NH.
BJ Send e-mail with request on writing papers on ESAC NH (after report PPS 1 is finished)
Send e-mail to participating NH to inform them that the web-based reports are online
Prepare report PPS2 (deadline: End of August 2010)
AM Implement ATC corrections into WebPPS software together with ND
Make WebPPS software available for hospitals and third parties (deadline October)
SN Send out HC PPS 2009
Send out NH PPS1 report
Send out NH characteristics report
Send out Newsletter August 2010.
Finalize the financial report.
RS Prepare 2 papers on NH PPS
ND Solve problems with e-lib ESAC website.

1.2 Review of the Minutes of previous MT meeting.

- PZ is working on his PPS2009 paper for JAC. HG also forwarded him an e-mail about a OIE paper. PZ is also interested.
- The web-based reports for the NH are still not online, ND is working on it.
- HG will contact RS about finalizing his work and the 2 papers that are in the pipeline.
- AV send a reminder for the collection of the core data and she received quite some answers.

2. Management

2.1 Training Ann V.:
No update.
2.2 ESAC management report Year 3
Ready and printed.
2.3 Newsletter Augustus 2010
Printed and ready to send out.
2.4 Publication list ESAC
Was discussed during the meeting, SC will make the update.

3. Finances

Financial report Year 3.
SN will finalize the financial report and send it to ECDC (deadline 17 Oct).

4. Core Activity

4.1 Update core data:
AV sent out a reminder for the data collection.
4.2 Collaboration with UHASSELT:
No update.

5. In-depth analysis.

5.1 Ambulatory Care.

- NA is working on the paper about Antivirals; he is still waiting for some feedback, then he will clean up the data. After that he will send it to Andus Nichols and to the LNR's, hopefully this will procure more data.

5.2 Hospital Care.

- LS2009 paper Oral/Parenteral trends: PZ is looking at actual consumption data.
- There will be a conference call next Monday to prepare the meeting in Stockholm about the EU PPS. Slides will be discussed.
- The presentations in Stockholm will be given by PZ, Yolanta and Carl. PZ wonders who will present the Questionnaire results, because most of them were directly send to AM.

5.3 Nursing Homes.

- BJ has a question about PPS 2: who is going to proceed the data from this PPS? HG replies that normally AM should do this, he will discuss this with AM.
- Again web based reports will be produced for the PPS2.
- HG urges BJ to make time to work on her papers. HG will also call Boudewijn (WIV) to ask if he can do something about the organization of the papers.

5.4 Socio-Economics

- CM wants to know if he can proceed with the IMS data that he received from AM. SC thinks that if it is the same data that was cleaned up by AM and sent to Girma and José at UHasselt, the data is probably fine and CM can work with it.
- Today is the last day of CM, he will continue to work till the end of the year to the economic subproject from South Africa.
- CM asks if it is useful to run analysis on the final list of AB subclasses and try to determine which determinants are significant in explaining AB consumption (JO1CA04 and JOCR02). CM will send them an e-mail to clarify this and HG and SC will give him their feedback.
- The results of the analysis will first be send out to verify before they will be put in any paper or report. HG is regularly in South Africa, he could meet with CM over there to discuss the results.

6. Upcoming meetings

Final annual meeting:

- The final meeting could be abroad if the cost is not higher than in Antwerp. SN will look at the possibilities.

7. AOM

List with items to discuss with AM on Monday:

- Put HG in cc when he sends out mails about EU PPS, because HG cannot follow what has been done.
- DU 90 paper
- Nursing homes PPS 2: who will proceeding the data?
- IMS data for CM: is it final?
- Implement ATC corrections into WebPPS software.
- Meeting Stockholm: who will present results of the questionnaire.

FOLLOWING MEETING: MONDAY 18/10 at 15H00 CET.

Minutes ESAC-3 MT Meeting dd. 18/10/2010

Present: HG, AV, NA, SN, SC,AM
Conf.call: PZ, EB, BJ
Apologies: VVK
Minutes: SN

1.Review of the last meeting's minutes

1.1 Pending Action Items

PZ Revise protocol ARPEC
SC Contact UHasselt about a new deadline.
Update the JAC supplements
BJ Send e-mail to participating NH to inform them that the web-based reports are online
Prepare report PPS2 (deadline: End of November 2010)
AM Make WebPPS software available for hospitals and third parties (deadline October)
Revise protocol ARPEC
Provide IMS data to AV
SN Send labels NN's NH to Béa.
RS Prepare 2 papers on NH PPS
ND Solve problems with e-lib ESAC website.
AV Send draft protocol ARPEC to PZ and AM

1.2 Review of the Minutes of previous MT meeting

- SC updated the publication list. The idea for the JAC paper is to include 2009 data. This means that we have to be very strict about the deadline for data collection towards the countries. Also UHasselt must be prepared to redo the analysis with the 2009 data for some countries. SC will contact UHasselt for a new deadline and he will update the JAC supplement.
- HG has a meeting with Rudi Stroobants on Friday. They will call Béa at the same time. The continuation of the 2 papers of Rudi will be discussed.
- HG called Boudewijn Catry about how to finalize the writing of the NH papers can be done. Afterwards Boudewijn talked about this with Béa.
- The web based NH reports are still not online. Last modification should be quickly resolved by ND.
- We have still some problems with the license to make the webPPS software available.

2 Management

2.1 APRES

Data collection for APRES will start at the end of this month. So far we only have data from Austria and Belgium.

2.2 ARPEC

The protocol was made by AV. Mike Sharland + 2 others revised it. AV received some good advice from them. At this stage we have a protocol with all our ideas.

PZ and AM will also send their comments. After that AV must incorporate all the comments in the final protocol.

Then she will discuss it with ND, because he has to write the software.

2.3 EU PPS

We concluded that we will not provide web based reports. On the other hand we will write an overall report, which will provide the feedback for the hospitals.

AM will start to work on the interim technical report this week.

3 Finances

3.1 Financial report Year 3.

SN sent the financial report ESAC-3/ Year3 (together with the management report) to ECDC.

Ole already confirmed that they received it.

4 Core Activity

4.1 Update core data:

22 countries already sent data. Reminders have been sent for the second time.

4.2 Collaboration with UHASSELT:

We have to contact them for the JAC paper.

5 In-depth analysis.

5.1 Ambulatory Care.

- No update

5.2 Hospital Care.

- AM received an e-mail from Mamoon Al Deyab, to inform us that his paper " A point prevalence survey of Antibiotic prescriptions: benchmarking and patterns of use." was accepted for publication in the British Journal of Clinical Pharmacology.
- PZ is working on the LS data; afterwards he will contact Dundee to see how they can help him.
- Papers Peter:
    1) PZ just received confirmation that 1 paper has been accepted by JAC: Title: Identification of targets for quality improvement in antimicrobial prescribing - The web-based ESAC Point Prevalence Survey 2009.
    Author(s): Zarb, Peter; Amadeo, Brice; Muller, Arno; Vankerckhoven, Vanessa; Drapier, Nico; Davey, Peter; Goossens, Herman

    2) Another paper has been submitted to - Current Clinical Pharmacology - CCP: Manuscript Title: : Drug Utilization 75% (DU75%) in 17 European Hospitals (2000 - 2005): Results from the ESAC-2 Hospital Care Sub Project. If this paper is not accepted it will have to be withdrawn and a new paper on DU75% for LS2009 will be prepared in the beginning of 2011. - Currently it is at the Chief editor to check the suitability of the manuscript for publication in the journal.

    3) A short paper (concise communication) will be prepared (possibly for EuroSurveillance) on antifungal use in European hospitals (based on ECCMID 2010 presentation).

    4) In January 2011 Brice & PZ will work on a paper based on HC-PPS2009 re antimicrobial use and dosing in 3 different age groups of elderly patients.

    5) In April 2011 PZ will submit a paper on Human use of antimicrobials to OIE Scientific and Technical Review, Vol. 31 (1), April 2012 (Herman was invited author but they accepted me as being the 1st author).

    6) On the 20-05-2010 we submitted a paper to a DG Sanco supplement in the EJPH. On the 30/09/2010 we sent a reminder and still we have received no acknowledgment (let alone acceptance or rejection).

    7) On the 26-09-2010 PZ sent feedback to Croatia (Arjana Tambic) about a paper they were working on dealing with PPS in their hospital. Herman and PZ should be listed as co-authors.

    8) Ole Heuer asked PZ during the meeting in Stockholm if he wants to write a paper about EARSS-ESAC. But PZ did not receive a formal e-mail about this request.

5.3 Nursing Homes.

- EB is working on the PPS2 report.
- Bea went to the meeting in Liverpool to present the HALT data and it was a big success. Everybody was enthusiastic.

5.4 Socio-Economics

- AM will provide the IMS data to AV

6 Upcoming meetings

6.1 Final annual meeting:

- SN started to look for a location for the final meeting. She asked for prices at several hotels in Riga and Madrid. So far she received some very interesting offers from Riga, also the flights to Riga are cheap. HG says that Riga is a nice city but that we should find out if the connection to Riga is not too difficult for all the participants. SN will check this with Travelclub.

6.2 ECCMID

- The deadline for the abstract submission is 21/12/2010. So far PZ will submit an abstract about EARSS & ESAC and NA about QI. AM could also submit an abstract, but by the time his contract with UA will be finished, we should see what we can do about this.

FOLLOWING MEETING: 25/11 at 14H00 CET.

Minutes ESAC-3 MT Meeting dd. 25/11/2010

Present: HG, AV, NA, SN, SC
Apologies: VVK, EB, PZ, BJ
Minutes: SN

1. Review of the last meeting's minutes

1.1 Pending Action Items

SC Update the JAC supplements
Brief AV about the APRES teleconference.
Organize a meeting about the JAC papers (AV+NA)
Organize a meeting with UHasselt about all the work that needs to be done in the near future.
BJ Send e-mail to participating NH to inform them that the web-based reports are online
Prepare report PPS2
AM Make WebPPS software available for hospitals and third parties (deadline October)
SN Check with PZ if he can come to Antwerp for the next MT meeting.
ND Solve problems with e-lib ESAC website.
HG Contact JAC editor.

1.2 Review of the Minutes of previous MT meeting.

- PZ revised the ARPEC protocol.
- SC contacted UHasselt about a new deadline for the JAC papers, because we would like to add all the 2009 core data. Niel Hens agreed about this and he said that it was no problem, because all the analyses that has been done so far are still useful.
- About JAC papers: 7 papers will be written by AV, NA and Girma (from UHASSELT), SC will revise them all. The deadline should be beginning of May 2011. The papers should be ready before the final ESAC meeting. We only have 3 months to write these papers so it is very urgent to organize a meeting between SC, AV and NA and start to discuss the Excel files that will be used for the Tables and figures in the papers. SC will coordinate this meeting.
  Also, we need to see who would qualify as guest editors. HG will also contact the editor of JAC to inform what is exactly required from a guest editor. SC proposes to think about Theo Verheij and Maciek as guest editors, as they were both involved in the ESAC project.
- AV received the IMS data from AM, but she also would like to have the raw material not only the cleaned database. Also SC indicates that there are some gaps in the IMS data, so it is very useful to go through this dataset with AM.
- ND confirms that the web based reports for the NH are online. There is only a small problem with 1 country, but ND will look at it today.
- RS finished his work for ESAC, he delivered 2 papers on NH, unfortunately, they were written in Dutch, which is not useful and it takes a lot of time and work to translate them.

2. Management

2.1 APRES
On Monday 6th of December, there will be a APRES teleconference meeting.
SC and HG need to be on a BAPCOC meeting at the same time, so they will not be able to join this teleconference. AV will represent them. SC will brief her. Basically, work package 3 will be on the agenda for this TC. There are still some problems with the UK, they need to do some programming and they have problems with it, so the UK is a bottle neck at this time.
2.2 ARPEC
The protocol is ready and ND start with programming. A first pilot will be held in the hospitals in January, then a second one in March and the final should ideally be in September.
2.3 EU PPS
AM did not have time to finish the interim technical report yet, but SN stated that it has to be finished this year.
2.4 PPS software license
It is a very difficult item. HG wants to discuss this with ND and VVK.
2.5 ESAC website
There was a meeting on Monday 22/11 to see how we can improve the ESAC website. A lot of proposals were discussed. The tasks were divided.

3. Finances

No updates

4. Core Activity

4.1 Update core data:

All core data was received. There still remains some small problems with the data from IT and SE. We will closure the submission for data in January.

4.2 Collaboration with UHASSELT:

It is very important that we discuss with UHasselt which are all the projects that are still in the pipeline. Because there is still a lot of work and it is important to know if UHasselt can handle all the work. SC will organize this.

5. In-depth analysis.

5.1 Ambulatory Care.

- Paper about QI is in review
- Paper about antivirals too.
- Should we also publish a JAC supplement about AC protocol A? HG says yes.

5.2 Hospital Care.

- No update

5.3 Nursing Homes.

- PPS-1 report Belgium almost complete
- PPS-2 report (Europe) first version ready, almost complete (Béa will check and Ellen will revise lay-out)
- Feedback PPS-1: awaiting reaction Nico, but as good as complete
- Articles Katrien and Ellen: almost ready for submission (awaiting last feedback

5.4 Socio-Economics

- HG met CM in South Africa. The work proceeds very well but there is still a lot of work to do.

6. Upcoming meetings

6.1 Final annual meeting:

- SN managed to reduce the cost for the room per night to 55€/per night.
- It was decided to proceed with the Tallink Hotel in Riga.

6.2 ECCMID

- The deadline for the abstract submission is 21/12/2010. SN already sent twice e-mails to WIV to ask them about their intention to submit abstracts. But she received no answer yet. NA will submit an abstract about QI, but he will not be able to go to Milan, because his wife is expected to deliver their second child around that time. SC will go.

FOLLOWING MEETING: MONDAY 13/12 at 13H00 CET.

Minutes ESAC-3 MT Meeting dd. 13/12/2010

Present: HG, AV, NA, SN, SC, AM
Conf. call: PZ, BJ, EB
Apologies: VVK
Minutes: SN

1. Review of the last meeting's minutes

1.1 **Pending Action Items**

SC Update the JAC supplements
AV Urge the last countries to validate their core data.
SN Send the program of meeting of Stockholm to MT.
HG Remind Carl Suetens about his e-mail about the abstracts for ECCMID.
Review PPS2 NH report.
Review article from Ellen and Katrien.

1.2 **Review of the Minutes of previous MT meeting**.

- On Tuesday 21st of December there will be a meeting between SC and the University of Hasselt about all the work that need to be done the following months.
- VVK is working on the license to make the PPS software available to other parties.
- PZ will come to Belgium from 11 to 14th of January.

2. Management

2.1 APRES

AV and SC have contacted the non-responding countries, there are still waiting for reaction.

2.2 ARPEC

Protocol is finished, ND is working on the software and the first pilot will be run in January.

2.3 JAC supplement

JAC Editor accepted supplement.
Guest editor will be selected among JAC Editorial Board.
JAC makes a additional charge of £6000 for the Editorial process, with invoicing on online publication of the Supplement. The time taken from receipt of the Supplement articles to their acceptance and handover for typesetting is likely to be about 10-12 weeks. This incorporates 4 weeks for the return of referee comments and 'revision' decisions on the articles, 4 weeks for the authors to revise and resubmit the articles and another 2-4 weeks for final revisions to be completed and accepted. Together with the Production time of 8-10 weeks, this indicates a likely time of 18 to 22 weeks in total from submission of articles to online publication!! In other words, we should submit asap and hope that JAC antedates the invoices (ESAC ends in June…). When the articles are ready,

we should send them to Colin Drummond and he will get them uploaded onto their online system for review.
HG says that we must decide what to do; we have budget for 1 supplement. We have a chance here to publish all our materials thanks to this supplement.
SC says that we have 8 titles in mind.
Unfortunately, there is no budget for NH JAC supplement.

3. Finances

No updates

4. Core Activity

4.1 Update core data:

There are 5 countries that didn't validate their data. HG asks AV to push those countries.
AV says that the collected data is not very different than last year.

4.2 Collaboration with UHASSELT:

There is a meeting planned next week between SC and UHasselt to discuss the future workload.

5. In-depth analysis.

5.1 Ambulatory Care.

- Paper about QI was in review and we received some comments back; very positive comments about the paper. Perhaps this paper will finally be accepted.
- The paper on antiviral is also going on.

5.2 Hospital Care.

- The LS2006 DU75% paper at Current Clinical Pharmacology is at the reviewers/referees for the second time round as it has been resubmitted with amendments in line with the referee's comments.
- The draft manuscript for the invited paper for DRUGS entitled European Surveillance of Antimicrobial Consumption (ESAC): Value of a Point-Prevalence Survey of Antimicrobial Use across Europe.' which has a deadline of 10-01-2011 is currently being reviewed by HG.
- The draft introduction and methodology for the EUPPS Eurosurveillance paper have been sent to HG who will review after Christmas. HG will also decide who shall be the contributing authors and their respective order.
- Report LS2009 AM and PZ will try to meet with UHasselt on the 11th or 12th January 2011.

5.3 Nursing Homes.

- PPS-2 report from EB is waiting for feedback (VVK and HG).
- The Belgian reports are ready and will be send out by Béa.
- ND still has some problems with the online feedback reports.
- By the end of the year the database of the PPS2 will be send to ND. At that time ND can look at it and make the feedback reports.
- The article of EB was sent to HG
- The article of KL was sent to HG
- These articles will also be send to the LNR's for feedback (HG suggests that we should give them 2 weeks to respond).
- Article from BJ is not progressing for the moment, due to the workload of Béa.
- EB will leaving the WIV institute per 1/1/2011. She will no longer work on ESAC from that date.
- BJ asks if Katrien Latour can take over the work from Ellen Broex in ESAC and also be paid by ESAC for 50%? HG says that we need to look at the contract and deliverables.

5.4 Socio-Economics

- HG met CM in South Africa. CM wants more information on combinations, HG will send it to him. Then CM will run all the analyses (or PB).

6. Upcoming meetings

6.1 Final annual meeting:

- The program must definitely be made during the next MT meeting.
- SN must send the agenda of the Stockholm meeting to MT.

6.2 ECCMID

- The deadline for the abstract submission is 21/12/2010. HG sent an e-mail to Carl Suetens about the number and the topic of abstracts. There is also the question of who is going to be first author. HG will remind Carl about this e-mail. This was HG suggestion:
  Arno will work on final database and prepare tables and figures of ECCMID abstracts and paper between Dec 13 and 17 (he will be in Antwerp). Hope Carl is available that week to run the analysis with Arno and prepare ECCMID abstracts. He suggests 4 abstracts: general abstract (infection+ABuse), AB use and risk factors, infectiosns, feasibilty

FOLLOWING MEETING: TUESDAY 11/1/2011 at 09H00 CET.

Minutes ESAC-3 MT Meeting dd. 11/1/2011

Present: HG, AV, NA, SN, SC, AM, PZ
Conf. call: BJ
Apologies: VVK

Minutes: SN

1. Review of the last meeting's minutes

1.1 Pending Action Items

ALL Think about the topics that you have in mind for the final meeting in RIGA.
SC Update the JAC supplements
AV Invite UZA for participation in pre-pilot from ARPEC
Call GR and RO to validate their core data.
SN Send bank documents to ARPEC
Send e-mail to BJ to think about the agenda for the final meeting.
HG Remind Carl Suetens about his e-mail about the abstracts for ECCMID.
Review article from Ellen and Katrien.
Invite Klaus Weist for the next MT meeting.

1.2 Review of the Minutes of previous MT meeting.

- There was a meeting between AV and NA about the update of the tables for the JAC papers.
- AV urged the last countries to validate their data (GR and RO are the last countries that still need to do the validation). AV will call them.
- Katrien Latour has 1 article submitted and 1 in process.

2. Management

2.1 APRES

Meeting in Utrecht will be 22 and 23 of February.
Samuel had contact with John, the agenda will be adjusted.
Concerning WP3; we have to look which countries still have problems to deliver their data (= HR, HU, UK).

2.2 ARPEC

SN takes care of transfer of bank documents before 31 of January (see mail mike)
Request to also include dose in antimicrobial list is not feasible, too many different parameters to be included, too much programming by Nico.
AV will contact UZA and ask to participate in the pre-pilot in February.
Samuel told us about the software Geoboa which could be explored for use for APRES and/or ARPEC. This software was presented on a ARPEC pre- kick off of meeting in 2009 (developed by Rotterdam university). This software would allow aggregation of data by the partners before sending standardized data to us. It is a way to overcome and deal with sensitive data.

2.3 Svetlana in SAB

We have to discuss the procedure to include Svetlana in SAB.

3. Finances

HG has a meeting with VVK on Monday 17/1/2011 to discuss the budget issues for everybody in every project + discuss budget for JAC papers + discuss EU PPS budget meant for IPH. (Boudewijn called for closing budget because Mat's work is done).

4. Core Activity

4.1 Update core data:

- Core data is ready, only GR + RO need to validate.
- Data base is made available for analysis and is put on the file server N.
- MT will send 2009 AC data by end of February, AV will include this when available.
- NA got answer from JAC about his antiviral paper; revision needs to be done. NA will work on it.

4.2 Collaboration with UHASSELT:

No update.

5. In-depth analysis.

5.1 Ambulatory Care.

- Quality indicators will be submitted soon, there are some late comments by Theo for this paper.
- Ann made an abstract using AC data among children for ECCMID.

5.2 Hospital Care.

- The LS data will be discussed with Niel Hens this afternoon.
- AM will make an agenda for the meeting of Thursday 13/1 with Carl Suetens and PZ and Bruno Coignard. Agenda: presenting data, report, papers, other meetings, IKPIK, deliverables, future of PPS, presenting PPS in the final ESAC meeting.

5.3 Nursing Homes.

- PPS-2 report from EB is ready, the last changes were made. BJ will made a few print versions in her institute to send to the LNRs, all the participating NHs will receive a electronically version. The Belgian NHs already received their version.
- Feedback reports from the second PPS need to be made.
- BJ will send the database to AM, he needs to have all the information about the NH that were not in the first PPS.
- BJ will start on a final report for ESAC-4.

- The article of BJ on determinants is ready, she sent it to Boudewijn Catry for review. After that BJ will send it to HG. She would also like Niel Hens to look at it, because she created a new model with variables.
- The article from EB is submitted, the one from Pamela as well to Journal of hospital infections.
- BJ also needs to make some time to make some articles (she also needs to finalize the ones from RS).

5.4 Socio-Economics

- PB submitted an abstract about the socio-economic subproject for ECCMID.

6. Upcoming meetings

6.1 Final annual meeting:

- Meeting on 19 & 20 of May 2011 in Riga, Latvia.
- The program must definitely be made during the next MT meeting.
- We must think to invite Matus, and also Svetlana if possible.

6.2 ECCMID

- The deadline for the cheap registration is 13/1/2011.

NEXT MEETING: WEDNESDAY 24/2 from 9H till 12H.

ANNEX I: AVAILABILITY OF DATA FOR PROTOCOL A & B

Availability of data for protocol A

Country	2004	2005	2006	2007	2008	2009	Total
BE	1	1	1	1	1		5
DK		1	1	1	1	1	5
EE			1	1	1	1	4
FI		1			1	1	3
FR					1	1	2
IL		1			1	1	3
LU		1		1	1		3
NL	1	1	1	1	1	1	6
NO			1	1	1		3
SE	1	1	1	1			4
SI		1	1	1	1	1	5
WAL			1	1	1	1	4
Total	**3**	**8**	**8**	**9**	**11**	**8**	**47**

Availability of data for protocol B

Country	2004	2005	2006	2007	2008	2009	Total
BE	1	1	1	1	1		5
SE					1		1
NL		1	1				2
Total	**1**	**2**	**2**	**1**	**2**		**8**

ANNEX II: LIST OF HOSPITAL CARE COUNTRIES PPS & LS 2009

List of participating countries and hospitals ESAC-HC LS2009

Country	Institution name	Utilisable consumption data		Utilisable Resistance data	
		No	**Yes**	No	**Yes**
Austria	**Elisabethinen Hospital**		**1**		**1**
Bulgaria	University Multipurpose Hospital for Active Treatment Aleksandrovska	1			1
Croatia*	University Hospital for Infectious Diseases	1			1
	LEFKOSIA GENERAL HOSPITAL		**1**		**1**
Cyprus	**LIMASSOL GENERAL HOSPITAL**		**1**		**1**
Czech Republic	Teaching hospital Hradec Kralove	1		1	
	Tartu University Hospital		**1**		**1**
Estonia	**West Tallinn Central Hospital**		**1**		**1**
Finland	vaasa central hospital	1			1
Germany	Universitätsklinik Freiburg		1	1	
Hungary	University Hospital Szeged	1			1
	Midland Regional Hospital Tullamore		**1**		**1**
Ireland	**Tallaght Hospital**		**1**		**1**
Italy	Azienda Sanitaria ULSS 18 Rovigo		1	1	
Latvia	Liepaja Regional hospital	1			1
Malta	**Mater Dei Hospital**		**1**		**1**
	Aker University Hospital		**1**		**1**
Norway	**Asker and Baerum Hospital**		**1**		**1**
	Hospital Infante D. Pedro E.P.E.	1		1	
Portugal	**S. Francisco Xavier Hospital**		**1**		**1**
	Samara Regional Hospital for War Veterans	1		1	
Russia*	Smolensk Regional Hospital	1		1	
Slovenia	University Medical Center		**1**	1	
Switzerland	Centre Hospitalier Universitaire Vaudois	1		1	
*	Hôpitaux Universitaires de Genève		**1**	1	
United Kingdom	**Conwy Denbighshire NHS Trust**		**1**		**1**
	Ninewells Hospital		**1**	1	
	University Hospital of Wales	1		1	
Grand Total		11	**17**	11	17

Countries marked with (*) are non EU MS. **The 12 hospitals in bold have valid consumption data and are EARS-Net registered.**

List of participating countries and hospitals in the various ESAC HC Subproject studies

Member State		ESAC-2	Point-Prevalence-Surveys		Longitudinal Survey
		2006	2008	2009	2009
Austria	AT	1	2	7	1
Belgium	BE	1	2	19	
Bulgaria	BG		1	1	1
Switzerland	CH		1	1	2
Cyprus	CY		2	2	2
Czech Republic	CZ	1	3	4	1
Germany	DE		1		1
Denmark	DK	1	1	2	
Estonia	EE	1	2	3	2
England*	EN	1	3	45	
Spain	ES		1	2	
Finland	FI	1	1		1
France	FR	1	1	3	
Greece (EL)	GR	1	1		
Croatia	HR	1	2	3	1
Hungary	HU		1	1	1
Ireland	IE		2	21	2
Israel	IL		1	1	
Italy	IT		3	2	1
Lithuania	LT	1	2		
Luxembourg	LU		1		
Latvia	LV	1	2	2	1
Malta	MT	1	1	1	1
Northern Ireland*	NI	1	1	4	
Netherlands	**NL**	1			
Norway	NO	1	2	2	2
Poland	**PL**	1			
Portugal	PT		2	2	2
Russian Fed.	RU		2	3	2
Scotland*	SC	1	2	31	1
Sweden	**SE**	1			
Slovenia	SI	1	1	5	1
Turkey	TR		1		
Wales*	WL		2	5	2

Note: The 4 UK administrations are listed separately and marked by an *;
The countries that did not participate in the last phase of ESAC Hospital Care Project are marked in **bold**.

ANNEX III: LIST OF NURSING HOMES COUNTRIES PPS1 & PPS2

Number of NHs for countries who delivered data for PPS-1 and PPS-2

COUNTRY	PPS-1 (April 2009) Nursing Homes (n)	PPS-2 (November 2009) Nursing Homes (n)
Belgium	116	103
Bulgaria	-	2
Croatia	5	5
Czech Republic	6	6
Denmark	5	5
Finland	8	8
France	29	8
Germany	8	5
Hungary	-	4
Ireland	18	11
Italy	30	28
Latvia	5	5
Lithuania	1	3
Malta	5	5
The Netherlands	4	4
Norway	5	5
Poland	5	8
Russian federation	4	3
Slovenia	6	6
Sweden	9	7
UK : England	5	5
UK : Northern Ireland	30	30
TOTAL	304	266

ANNEX IV: INVENTORY OF SOCIO-ECONOMIC DETERMINANTS

List of determinants of use of antibiotics selected for further analyses

This list departed from the determinants used in the following papers and documents, discussed at meetings of the EC subgroup in ESAC-2:

Harbarth S, and Monnet DL. Cultural and Socioeconomic Determinants of Antibiotic Use. In: Antibiotic Policies - Fighting Resistance (Eds Gould IM and van der Meer JWM), Springer US, 2007.

Masiero, G., Filippini, M., Ferech, M. and Goossens, H. (2007). 'Bacterial resistance and economic incentives: determinants of outpatient antibiotic consumption in Europe', ESAC-2 project.

Extensive list compiled during a "brainstorm" of a group of experts in Workshop 2: Determinants of Antibiotic Use in Primary Health Care at the European Conference on Antibiotic Use in Europe, Brussels, 15-17 November 2001, Updated (21/12/2003) and provided by Monnet DL (personal communication 2007).

All the determinants used by Harbarth & Monnet, or Masiero et al were retained in our list, but from the latter extensive list only a selection was made in order to avoid overlap between the determinants selected for analyses. The resulting list is shown below, using major headings inspired by those proposed by Harbarth & Monnet (2007).

Agricultural actors

- Production of poultry
- Production of chicken
- Production of pigs
- Production of turkey
- Consumption of seafood
- Consumption of meat
- Consumption of poultry

Burden of disease

- Unmet medical needs (% of population)
- All cause mortality (0-14 years)
- All cause mortality (15-29 years)
- All cause mortality (30-44 years)
- All cause mortality (45-59 years)
- All cause mortality (60-74 years)
- All cause mortality (>75 years)
- Probability of dying before age 5
- Death rate of Aids
- Death rate due to alcohol abuse
- Death rate due to cancer
- Death rate due to chronic diseases
- Death rate due to ischaemic heart disease
- Death rate due to chronic liver disease
- Death rate due to nervous system
- Death rate due to diseases of the respiratory system
- Death rate due to influenza
- Death rate due to pneumonia
- Death rate due to other acute respiratory infections
- Death rate due to bronchitis asthma & emphysema
- Death rate due to diabetes Mellitis
- Death rate due to chronic lower respiratory diseases
- Death rate due to Infectious, parasit.dis
- Death rate due to Influenza & pneumonia
- Microbiological foodborne diseases per 100000
- S pneumonia_PNSP+ENSP (% infected)
- S pneumonia_PNSP (% infected)
- S aureus_MRSA (% infected)
- S aureus_Vancomycin (% infected)
- E coli_Aminoglycosides (% infected)
- E coli_Aminopenicillins (% infected)
- E coli_Fluoroquinolones (% infected)
- E coli_3rd gen. ceph. (% infected)

- Crude death rate aged 0
- Crude death rate ages 1 - 4

Culture and perception of illness

- % of population self-assess health good
- % of population breast Feeding at 3 Months
- Corruption Index Score
- Individualism (index score)
- Masculinity (index score)
- Power Distance Index
- Uncertainty Avoidance Index
- % of regular daily smokers in the population, age 15+
- Number cigarettes consumed per person per year
- Pure alcohol consumption, litres per capita
- Most people can be trusted (index score)
- I seek to be myself rather than to follow others (index score)
- Greater respect for authority (index score)
- Science and technology are making our lives healthier, easier, and more comfortable (index score of the degree to which the population agree with this)
- Because of science and technology, there will be more opportunities for the next generation (index score of the degree to which the population agree with this)
- We depend too much on science and not enough on faith (index score of the degree to which the population agree with this)
- The world is better off, or worse off, because of science and technology(index score of the degree to which the population agree with this)
- Trust: People you meet for the first time (index score of the degree to which the population trust people)
- Confidence: The Government (index score of the degree to which the population have confidence in the goverment)
- Having experts make decisions about the country (index score of the degree to which the population are happy with experts making decisions)
- Democraticness in own country (index score of the degree to which the population think the country is democratic)
- Most serious problem for own country is poor sanitation and infectious diseases (% of respondents in survey that believe this)
- Most serious problem of the world is poor sanitation and infectious diseases (% of respondents in survey that believe this)
- Religious person (index score indicating of people are more religious or atheist)
- Fate versus control (index score of population that think life is determined by faith or by themselves)
- I see myself as citizen of the European Union (index score of population that agree with this)

Demographic factors

- Birth rate
- Female life expectancy at 65
- Male life expectancy at 65
- Male life expectancy at 60
- Female life expectancy at 60
- Male life expectancy at birth
- Female life expectancy at birth
- Women per men ratio
- Infant deaths per 1000 live births
- Disability-adjusted life expectancy
- Average Population Density per km^2
- Population (on 1 January)
- % Population aged 0-14
- % Population aged 65 and above
- % of Urban Population
- Average Household Size
- Percentage of new born babies with weight > 2.5 kg
- Percentage of kids aged less than three that recieve no form of formal care
- Percentage of kids aged less than three that are cared for by only their parents
- Average absolute humidity (measured in capital city)
- Standard deviation of absolute humidity (measured in capital city)

Education and knowledge about antibiotics

- Usage of internet for info on goods and services (% of population)
- Educational level Attainment upper secondary
- Educational level Schoolxpectancy Years
- Individuals using the Internet for seeking health-related information in the last 3 months (% of population)
- Percentage of population that know antibiotics does not kill viruses (measured in Eurobarometer survey)
- Percentage of 15 year old know that antibiotic use leads to antibiotic resistance

Healthcare system

- Bed days due to diseases of the respiratory system
- Bed days due to acute upper respiratory infections and influenza
- Bed days due to pnuemonia
- Bed days due to other acute lower respiratory infections
- Bed days due to chronic obstructive pulmonary diseases & bronchiectasis
- Bed days due to diabetes mellitus
- Bed days due to infectious and parasitic diseases
- Bed days due to carcinoma in situ
- Bed days due to ciculatory system
- Bed days due to Aids
- Bed days due to alcoholic liver disease
- Bed days due to diseases of the nervous system
- Long-term care beds per 1000 population
- Number of doctors' consultations per capita
- Percentage of children immunised for DTP
- Percentage of 65+ pop vaccinated against influenza
- Public expenditure on clinical laboratory as a percentage of total expenditure on health
- Public expenditure on diagnostic imaging as a percentage of total expenditure on health
- Total expenditure on private health as a percentage of total expenditure on health
- Public expenditure on prevention and public health as percentage of public expenditure on health
- Total health employment as percentage of total cival employment
- Percentage of physicians working in hospital
- Percentage of infants vaccinated against invasive disease due to Haemophilius influenzae type b
- Percentage of infants vaccinated against Mumps
- Private households' out-of-pocket payment on health as % of total health expenditure
- Percentage of infants vaccinated against Pertusis
- Percentage of infants vaccinated against Rubella
- Total inpatient expenditure as % of total health expenditure
- Hospitals per 100000
- Hospital beds per 100000
- Pharmacisits per 100000
- In-patient care admissions per 100
- Inpatient surgical procedures per year, per 100000
- Outpatient contacts per person per year
- Bed occupancy rate in %, acute care hospitals only
- Average length of stay, all hospitals
- Total health expenditure, PPP$ per capita, WHO estimates
- Expenditure on inpatient care, PPP$ per capita
- Total pharmaceutical expenditure as % of total health expenditure
- Pharmaceutical expenditure, PPP$ per capita
- Total capital investment expenditures on medical facilities as % of total health expenditure
- Salaries as % of total public health expenditure
- Public sector expenditure on health as % of total government expenditure, WHO estimates
- Physicians per 100 hospital beds
- Total expenditure on pharmaceuticals & other medical non-durables
- GPs per 100000
- Practising physicians per 100000
- Pediatricians per 100000
- Patients have to be registered at a GP and it is easy to change between GPs (Yes/No)
- Patients have to be registered at a GP and it is not easy to change between GPs (Yes/No)
- Patients do not have to be registered at a GP and there is a financial benefit for being registered at a GP (Yes/No)

- Patients must consult a GP before visiting a peadiatrician (Yes/No)
- Patients do not have to consult a GP before visiting a peadiatrician and there is a financial benefit for consulting a GP first (Yes/No)
- Patients must consult a GP before visiting a gynaecologist (Yes/No)
- Patients do not have to consult a GP before visiting a gynaecologist and there is a financial benefit for consulting a GP first (Yes/No)
- Patients must consult a GP before visiting a pulmologist (Yes/No)
- Patients do not have to consult a GP before visiting a pulmologist and there is a financial benefit for consulting a GP first (Yes/No)
- Main source of income for physicians
- Are there treatment guidelines available to GPs for treating respiratory track infections (Yes/No)
- Are there treatment guidelines available to paedistricians for treating respiratory track infections (Yes/No)
- Are there treatment guidelines available to pulmologists for treating respiratory track infections (Yes/No)
- Do GPs recieve individual feedback on their antibiotic prescribing behaviour versus that of their colleagues (Yes/No)
- Do paeditricians recieve individual feedback on their antibiotic prescribing behaviour versus that of their colleagues (Yes/No)
- Do gynaecologists recieve individual feedback on their antibiotic prescribing behaviour versus that of their colleagues (Yes/No)
- Do pulmologists recieve individual feedback on their antibiotic prescribing behaviour versus that of their colleagues (Yes/No)
- Are pharmaceutical companies prohibited from providing physicians free drug samples as part of their marketing strategies (Yes/No)
- Are pharmaceutical companies prohibited from providing physicians personal presents as part of their marketing strategies (Yes/No)
- Are pharmaceutical companies prohibited from providing physicians complementary dinners as part of their marketing strategies (Yes/No)
- Are pharmaceutical companies prohibited from providing physicians conferences as part of their marketing strategies (Yes/No)
- Are pharmaceutical companies prohibited from providing physicians breakaways as part of their marketing strategies (Yes/No)
- Role between prescribing physician and pharmacists
- Number of antibiotics available
- Total health expenditure as % of GDP

Socioeconomic factors

- Hours worked per week of full time employment
- Household savings as % of income
- Inability to keep home warm
- Living Area
- Poverty rate
- Unemployment
- Inequality of income distribution
- UNDP Human Development Index (HDI)
- Average number of people per room in occupied housing unit
- GDP / capita at Purchasing power standard
- Percentage of women aged 25 - 49 with at least one child aged 0 - 5 years who are employed
- Pecentage of people (aged over 15) with a BMI>= 25

ANNEX V: ABSTRACTS OF PAPERS IN PEER-REVIEWED JOURNALS

European Surveillance of Antimicrobial Consumption (ESAC): disease-specific quality indicators for outpatient antibiotic prescribing

Adriaenssens N, Coenen S, Tonkin-Crine S, Verheij T.J.M., Little P, Goossens H. and the ESAC Ambulatory Care Subproject Group.

BMJ Qual Saf (Accepted)

Background: In 2007, ESAC (www.esac.ua.ac.be) published a set of 12 valid drug-specific quality indicators for outpatient antibiotic use in Europe. In this study, we aimed to develop evidence-based disease-specific quality indicators for outpatient antibiotic prescribing in Europe.

Methods: Two meetings were convened to produce a list of disease-specific quality indicators for outpatient antibiotic prescribing conform recommendations of DURQUIM, building on similar development of drug-specific quality indicators, and in collaboration with CHAMP and HAPPY AUDIT. 62 experts were asked to complete two scoring rounds of the proposed indicators on seven dimensions: their relevance to 1. reducing antimicrobial resistance, 2. patient health benefit, 3. cost-effectiveness, 4. policy makers, 5. individual prescribers, 6. their evidence base, and 7. their range of acceptable use, using a scale ranging from 1 (= completely disagree) to 9 (= completely agree). Scores were judged according to the UCLA-RAND appropriateness method.

Results: For the 6 main indications for antibiotic prescribing (acute otitis media, acute upper respiratory infection, acute/chronic sinusitis, acute tonsillitis, acute bronchitis/bronchiolitis, cystitis/other urinary infection) and for pneumonia, 3 quality indicators were proposed, the percentage prescribed a. antibiotics; b. recommended antibiotics; c. quinolones. This set was scored by 40 experts from 25 countries. After one scoring round, all indicators were already rated as relevant on all dimensions, except one.

Conclusion: All proposed disease-specific quality indicators for outpatient antibiotic prescribing have face validity and are potentially applicable. They could be used to better describe antibiotic use and assess the quality of antibiotic prescribing patterns in ambulatory care.

Drug Utilization 75% (DU75%) in 17 European Hospitals (2000 - 2005): Results from the ESAC-2 Hospital Care Sub Project.

Zarb P, Ansari F, Muller A, Vankerckhoven V, Davey PG, Goossens H.

Curr Clin Pharmacol 2011 Jan 11. (Epub ahead of print)

Background: The study aimed to assess 75% of drug utilization (DU75%) in participating hospitals and identify quality indicators which should be used to monitor performance within the hospitals.

Methods: In the European Surveillance of Antimicrobial Consumption (ESAC; http://www.esac.ua.ac.be) project anatomic therapeutic chemical (ATC), defined daily dose (DDD) and route of administration (RoA) were used for drug categorization. Data were collected for: antibacterials for systemic use; intestinal antibiotics; rifampicin; and nitroimidazole derivatives.

Results: Each hospital's annual data were analyzed separately (hospital-year) adding up to a total of 97 hospital-year data-sets. The drug most persistently present within DU75% was ciprofloxacin (84/97 hospital-years). Co-amoxiclav was the drug which most frequently ranked first (28 times). The number of drugs constituting the DU75% by substance ranged from 7-15 (median 12) and 8-19 (median 15) by RoA which identified oral amoxicillin most frequently ranking first (17 times). In many hospitals the oral route accounted for most of the DU75%. Therefore, the extent of oral use was identified as a quality indicator which could be monitored using DU75% methodology.

Conclusions: Since substantial variation both in extent and distribution of antibiotic use was observed, DU75% methodology is best adapted for intra-hospital consumption trend analyses or for hospitals with comparable characteristics and formularies. The number of drugs within DU75% was identified as another quality indicator. Thus, aspiring to decrease the consumption of overused drug classes should be set by the hospitals as a quality indicator on prescribing patterns.

Identification of targets for quality improvement in antimicrobial prescribing: the web-based ESAC Point Prevalence Survey 2009.

Zarb P, Amadeo B, Muller A, Vankerckhoven V, Davey P, Goossens H, on behalf of the ESAC-3 hospital care subproject group

J Antimicrob Chemother. 2011; 66: 443-449

Objectives: Since electronic prescribing is limited to few hospitals, point prevalence surveys, such as the standardized European Surveillance of Antimicrobial Consumption point prevalence survey (ESAC PPS), are an alternative tool for monitoring prescribing and helping to identify performance indicators and prescribing trends. The main objective of this study was to identify and assess targets for quality improvement.

Methods: Each hospital had to carry out the survey within 2 weeks. Each department had to be surveyed in 1day. Data collected, for all inpatients, included age and gender. For patients on systemic antimicrobial treatment, the antimicrobial/s, infection/prophylaxis site, reason in medical notes and guideline compliance were also collected. A central database using a web-based tool (WebPPS) developed in-house was used for data entry.

Results: Combination of two or more antimicrobials accounted for 30% of use. Surgical prophylaxis was prolonged (>1 day) in 53% of cases. 'Intensive care' had higher proportions of treated patients (53% versus 29%), combination therapy (49% versus 31%), hospital-acquired infections (49% versus 31%) and parenteral administration (91% versus 61%). 'Reason in notes' was documented in 76%, and 'guideline compliance' occurred in 62% of patients.

Conclusions: The ESAC PPS provided useful information on the quality of prescribing, which identified a number of targets for quality improvement. These could apply to specific departments or whole hospitals. Intensive care, which has different characteristics, should not be compared with general wards with respect to combination therapy, hospital-acquired infections or parenteral proportion. The study confirmed that the ESAC PPS methodology can be used on a large number of hospitals at regional, national, continental or global level.

A point prevalence survey of antibiotic prescriptions: benchmarking and patterns of use

Aldeyab MA, Kearney MP, McElnay JC, Magee FA, Conlon G, Gill D, Davey P, Muller A, Goossens H, Scott MG; ESAC Hospital Care Subproject Group.

Br J Clin Pharmacol 2011; 71(2): 293-6.

Aim: The aim of the study was to assess current patterns of antibiotic prescribing and the impact of a hospital antibiotic policy on these practices.

Methods: The study involved collecting information regarding hospitalized patients utilizing the ESAC audit tool.

Results: In the study site hospital, the use of the restricted agents was low whilst the use of the non-restricted agents was high. Compliance with the hospital antibiotic guidelines was 70%.

Discussion: The findings identified monitoring non-restricted antibiotics and compliance with guidelines as targets for quality improvements in our hospital. Point prevalence surveys may offer a simple method of monitoring antibiotic policies, thus, informing antibiotic stewardship.

European Surveillance of Antibiotic Consumption (ESAC) point prevalence survey 2008: paediatric antimicrobial prescribing in 32 hospitals of 21 European countries.

Amadeo B, Zarb P, Muller A, Drapier N, Vankerckhoven V, Rogues AM, Davey P, Goossens H; on behalf of the ESAC III Hospital Care Subproject Group.

J Antimicrob Chemother. 2010; 65(10): 2247-52.

Background: Antimicrobials are the most common medicines prescribed to children, but very little is known about patterns of hospital paediatric antimicrobial prescribing. This study aimed at describing paediatric antimicrobial prescribing in European hospitals to identify targets for quality improvement.

Methods: The European Surveillance of Antibiotic Consumption (ESAC) project (www.esac.ua.ac.be) collected data during 2 calendar weeks between May and June 2008 in 32 hospitals of 21 European countries with paediatric departments, using a standardized method. The ESAC point prevalence survey included all inpatient beds and identified all patients who were receiving systemic antimicrobials on the day of the survey or had received antimicrobial surgical prophylaxis on the previous day.

Results: Of 1799 children, 583 (32%) received one or more antimicrobials (range 17%-100%). The indications were therapeutic in 71%, prophylactic in 26% and both indications in 3% of patients. The parenteral route was used in 82% of therapeutic indications and in 63% of prophylactic indications. Third-generation cephalosporins were the most prescribed antimicrobials for therapeutic indications (18%). A high proportion of treated children received antimicrobial combinations (37%). The most commonly treated diagnosis site was the respiratory tract for both therapeutic use (30%) and prophylaxis (25%). The duration of surgical prophylaxis was >1 day in 67%.
Conclusions: Targets identified for quality improvement of antimicrobial use in children included excessive use of antimicrobial combinations and a high proportion of parenteral antimicrobials, both of which require further investigation. Surgical prophylaxis for >1 day should also be curbed in order to achieve quality improvement.

European Surveillance of Antimicrobial Consumption (ESAC): outpatient systemic antimycotic and antifungal use in Europe.
Adriaenssens N, Coenen S, Muller A, Vankerckhoven V, Goossens H; ESAC Project Group.
J Antimicrob Chemother. 2010 Apr;65(4):769-74
Objectives: To assess the total outpatient systemic antimycotic and antifungal use in Europe, and to identify the antimycotic and antifungal substances most commonly used.
Methods: Within ESAC (www.esac.ua.ac.be), using the anatomical therapeutic chemical (ATC) and defined daily dose (DDD) classification, data on outpatient use of all 14 antimycotics (12) and antifungals (2) for systemic use (ATC J02 and D01B, respectively), aggregated at the level of the active substance, were collected for 2007. Use was expressed in DDD (WHO ATC/DDD, version 2008) per 1000 inhabitants per day (DID). Only countries for which data on both J02 and D01B use were available were included in the analysis.
Results: In 20 European countries (data for Cyprus and Estonia include hospital use), total outpatient systemic antimycotic and antifungal use varied by a factor of 6.7 between the country with the highest (3.03 DID in Belgium) and the country with the lowest (0.45 in Croatia) use. Terbinafine, ketoconazole, itraconazole and fluconazole represented >94% of the total outpatient antimycotic and antifungal use in all countries. Terbinafine use represented >50% of the total systemic antimycotic and antifungal use in 16 out of 20 countries (not in Croatia, Italy, Luxembourg and Bulgaria).
Conclusions: We present for the first time a standardized and validated data set of outpatient systemic antimycotic and antifungal use in Europe. Our study demonstrates a variation of antimycotic and antifungal use in Europe, as striking as that of antibiotic use. The ESAC data facilitate the auditing of antimycotic and antifungal prescribing, and the evaluation of the implementation of guidelines and public health policies to promote their judicious use.

European Surveillance of Antimicrobial Consumption (ESAC): Gebruik van antischimmelpreparaten in de ambulante praktijk in Europa.
Adriaenssens N, Coenen S, Muller A, Vankerckhoven V, Goossens H; ESAC Project Group.
Huisarts Nu 2010;39(5):186-91.
Doel: Deze studie wil het totale ambulante gebruik van systemische antischimmelpreparaten beschrijven en nagaan welke substanties het meest worden gebruikt.
Methode: Binnen het ESAC-project (www.esac.ua.ac.be) werden gegevens verzameld over het systemisch gebruik door ambulante patiënten in het jaar 2007, van alle veertien preparaten, twaalf antimycotica (ATC J02) en twee fungiciden (ATC D01B), volgens de ATC (Anatomic Therapeutic Chemical)/DDD (Defined Daily Dose)-methode (WHO, version 2008) en uitgedrukt in DDD per 1000 inwoners per dag (DID). Enkel landen waarvan gegevens beschikbaar waren over zowel J02 als D01B, werden in de analyse opgenomen.
Resultaten: In twintig Europese landen (gegevens voor Cyprus en Estland bevatten ook het hospitaalgebruik) varieerde het gebruik van systemische antischimmelpreparaten in de ambulante praktijk met een factor 6,7 tussen het land met het hoogste gebruik (3,03 DID in België) en het land met het laagste gebruik (0,45 in Kroatië). Terbinafine, ketoconazole, itraconazole en fluconazole vertegenwoordigden 94% van het totale gebruik in alle landen samen. Terbinafine stond voor >50% van het totale gebruik in zestien van de twintig landen (niet in Kroatië, Italië, Luxemburg en Bulgarije).
Besluit: Dit onderzoek presenteert voor het eerst gestandaardiseerde en gevalideerde gegevens over het gebruik van systemische antischimmelpreparaten in de ambulante praktijk

in Europa. Ons onderzoek toont een verschil in gebruik aan dat minstens zo frappant is als dat van het antibioticagebruik. De ESAC-gegevens maken het opvolgen van het voorschrijven van antischimmelpreparaten mogelijk, alsook de evaluatie van de implementatie van richtlijnen en gezondheidszorgmaatregelen om het oordeelkundig gebruik ervan te promoten.

ANNEX VI: ABSTRACTS ACCEPTED FOR ORAL PRESENTATION

- Annex VI: Abstracts accepted for oral presentation -

ANNEX VII: ABSTRACTS ACCEPTED FOR POSTER PRESENTATION

European Surveillance of Antimicrobial Consumption (ESAC): disease-specific quality indicators for outpatient antibiotic prescribing

Niels Adriaenssens, Samuel Coenen, Sarah Tonkin-Crine, Theo J.M.Verheij, Paul Little, Herman Goossens1 and the ESAC Ambulatory Care Subproject Group.

Objectives: To develop a set of evidence-based disease-specific outpatient antibiotic prescribing quality indicators in Europe.
Methods: Within the ESAC Ambulatory Care Subproject 2 meetings were convened in 2008 and 2009 to produce a list of proposed evidence-based disease-specific outpatient antibiotic prescribing quality indicators, building on previous and similar development of drug-specific quality indicators, and in close collaboration with CHAMP (www.champ-antibiotics.org) and HAPPY AUDIT (www.happyaudit.org). 62 experts from 33 countries were asked to complete 2 scoring rounds of the proposed indicators on 7 dimensions, i.e. their relevance to 1 reducing antimicrobial resistance, 2 patient health benefit, 3 cost-effectiveness, 4 policy makers, 5 individual prescribers, 6 their evidence base, and 7 their range of acceptable use, using a scale ranging from 1 (= completely disagree) to 9 (= completely agree). According to the UCLA-RAND appropriateness method, proposed indicators were judged relevant if the median score was not within the 1-6 interval and if there was consensus, i.e. the number of scores within the 1-3 interval was less than one third of the panel.
Results: For each of the 6 mean indications for antibiotic prescribing (acute otitis media, acute upper respiratory infection, acute/chronic sinusitis, acute tonsillitis, acute bronchitis/bronchiolitis, cystitis/other urinary infection) and for pneumonia (labelled by ICPC codes H71, R74, R75, R76, R78, U71 and R81, respectively), 3 quality indicators were proposed, i.e. a. the percentage of patients with age and/or gender limitation prescribed an antibiotic; b. the percentage of patients with age and/or gender limitation prescribed an antibiotic, receiving the recommended antibiotic; c. the percentage of patients with age and/or gender limitation prescribed an antibiotic, receiving quinolones (see Table). This set was scored by 40 experts from 25 countries. Already after the first scoring round, all indicators were rated as relevant on all 7 dimensions, except 3a. was scored 6 on cost- effectiveness.
Conclusion: All 21 (7x3) proposed disease-specific evidence based quality indicators for outpatient antibiotic prescribing have face validity and are potentially applicable. In line with the main objectives of antimicrobial use surveillance at the European level, this set could be used to better describe antibiotic use and assess the quality of antibiotic prescribing patterns in ambulatory care.

Table: List of proposed disease-specific quality indicators for outpatient antibiotic prescribing

N°	Title	Label
1a.	*The percentage of patients **aged between 18 and 75 years with acute bronchitis/bronchiolitis (ICPC-2-R: R78)** prescribed antibacterials for systemic use (ATC: J01)*	*[R78_J01_%]*
1b.	*= 1a. receiving the recommended antibacterials (ATC: J01CA or J01AA)*	*[R78_RECOM_%]*
1c.	*= 1a. receiving quinolones (ATC: J01M)*	*[R78_J01M_%]*
2a.	*The percentage of patients **older than 1 year with acute upper respiratory infection (ICPC-2-R: R74)** prescribed antibacterials for systemic use (ATC: J01)*	*[R74_J01_%]*
2b.	*= 2a. receiving the recommended antibacterials (ATC: J01CE)*	*[R74_RECOM_%]*
2c.	*= 2a. receiving quinolones (ATC: J01M)*	*[R74_J01M_%]*
3a.	*The percentage of **female** patients **older than 18 years with cystitis/other urinary infection (ICPC-2-R: U71)** prescribed antibacterials for systemic use (ATC: J01)*	*[U71_J01_%]*
3b.	*= 3a. receiving the recommended antibacterials (ATC: J01XE or J01EA or J01XX)*	*[U71_RECOM_%]*
3c.	*= 3a. receiving quinolones (ATC: J01M)*	*[U71_J01M_%]*
4a.	*The percentage of patients **older than 1 year with acute tonsillitis (ICPC-2-R: R76)** prescribed antibacterials for systemic use (ATC: J01)*	*[R76_J01_%]*
4b.	*= 4a. receiving the recommended antibacterials (ATC: J01CE)*	*[R76_RECOM_%]*
4c.	*= 4a. receiving quinolones (ATC: J01M)*	*[R76_J01M_%]*
5a.	*The percentage of patients **older than 18 years with acute/chronic sinusitis (ICPC-2-R: R75)** prescribed antibacterials for systemic use (ATC: J01)*	*[R75_J01_%]*
5b.	*= 5a. receiving the recommended antibacterials (ATC: J01CA or J01CE)*	*[R75_RECOM_%]*
5c.	*= 5a. receiving quinolones (ATC: J01M)*	*[R75_J01M_%]*
6a.	*The percentage of patients **older than 2 years with acute otitis media/myringitis (ICPC-2-R: H71)** prescribed antibacterials for systemic use (ATC: J01)*	*[H71_J01_%]*
6b.	*= 6a. receiving the recommended antibacterials (ATC: J01CA or J01CE)*	*[H71_RECOM_%]*
6c.	*= 6a. receiving quinolones (ATC: J01M)*	*[H71_J01M_%]*
7a.	*The percentage of patients **aged between 18 and 65 years with pneumonia (ICPC-2-R: R81)** prescribed antibacterials for systemic use (ATC: J01)*	*[R81_J01_%]*
7b.	*= 7a. receiving the recommended antibacterials (ATC: J01CA or J01AA)*	*[R81_RECOM_%]*
7c.	*= 7a. receiving quinolones (ATC: J01M)*	*[R81_J01M_%]*

ICPC-2-R: revised second edition of International Classification of Primary Care

Identifying determinants of antibiotic use in Europe

P. Beutels, C. Marais, N. Hens, A. Blommaert, J.A. Cortinas, S. Coenen, A. Muller, and H. Goossens.

Objectives: To identify determinants that most contribute to observed differences in outpatient antibiotic use between European countries over time.
Methods: Data on outpatient antibiotic use (DDDs and packages) were collected for 35 European countries from 1999 to 2007 through the European Surveillance of Antimicrobial Consumption (ESAC) network. For these country-years, through databases (eg, EUROSTAT) and surveys, 180 variables were collected in the following categories: Agriculture (7 variables), Culture (26), Demography (21), Disease burden (35) Education (6), health care (73) and socioeconomics (12). Multiple imputation generalized estimation equations with a backward

selection procedure were applied to fit models to the data using outpatient antibiotic use as dependent variable.
Results: The following variables were found to be significant in the overall model: (1) % attaining upper secondary education, (2) population density, (3) death rate due to chronic liver disease, (4) existence of restrictions on pharmaceutical companies to pay physicians for attending conferences, (5) death rate due to respiratory disease, (6) existence of financial incentive for patients to register with one GP, (7) households' out of pocket payment on health as a % of total health expenditure, (8) density of GP practices, (9) Corruption Index score, (10) number of antibiotics available, (11) male life expectancy, (12) extent to which most people are trusted, (13) death rate due to ischaemic heart disease, (14) extent to which people respect authority, (15) private health expenditure as a % of health expenditure. In analyses focused on more developed countries (human development index >9.3), variables (1), (3), (5), (8), (9), (10), (11), (13), (14) above were no longer significant, but in addition to the others above, the following variables became significant in the final model: whether or not official guidelines for antibiotic prescribing are available for GPs and pulmonologists, death rate due to AIDS and production of turkey. Note that some significant determinants may act as a surrogate for combinations of others. In different subgroups of antibiotics similar results were found.
Conclusion: Our analysis reveals that there are many significant determinants and that these vary according to the scope of analysis. At each level of analysis, some significant determinants are inherent to culture and populations, but others could be changed through governance.

Antimicrobial prescribing for urinary tract infections in European nursing homes
K. Latour, E. Broex, A. Muller, N. Drapier , V. Vankerckhoven, R. Stroobants, H. Goossens, B. Jans on behalf of the European Surveillance of Antimicrobial Consumption (ESAC) Nursing Home subproject group.

Objectives: To explore antimicrobial (AM) prescribing for urinary tract infections (UTI) in European nursing homes (NH).
Methods: In November 2009 the European Surveillance of Antimicrobial Consumption NH subproject organised a second point prevalence survey (PPS) in order to explore AM prescribing and its indications by type of treatment and site of infection. A resident questionnaire was completed for each eligible resident receiving an AM on the PPS day. All oral, rectal, intramuscular and intravenous treatments with antibacterials and antimycotics for systemic use and antituberculosis drugs were included.
Results: Across 21 European countries (including 2 UK administrations) 266 NHs participated. Out of 1435 residents receiving AMs, 702 residents received one or more AM for an indication related to the urinary tract (81% female; median age=85 year). In total 714 molecules were registered (crude mean prevalence (CMP) of AM use for UTIs=2.4%; range by country: 0-10.0%) of which 48% served as uroprophylaxis (CMP=1.5%; range by country: 0-5.0%). Empirical treatments counted for 32% of all UTI therapies (CMP=0.9%; range by country: 0-5.3%) and documented treatments for 20% (CMP=0.5%; range by country: 0-2.0%).
The most frequently prescribed molecules for uroprophylaxis (n=343) were nitrofurantoin (29.7%), trimethoprim (19.8%) and nifurtoinol (16.0%). For empirical treatment (n=229) of UTI methenamine (14.4%), ciprofloxacin (13.5%) and nitrofurantoin (12.7%) were most commonly used, while for documented treatment (n=142) the main molecules were nitrofurantoin (24.7%), ciprofloxacin (16.9%), amoxicillin & enzyme inhibitor (7.8%) and pivmecillinam (7.8%). Isolated microorganisms (MO; optional question) were reported in 58.2% of the cases where a culture sample was taken prior to AM therapy (n=304). In total 195 MO were reported. Escherichia coli (n=98 of which 6 resistant (R) to 3rd generation cefalosporines), Proteus mirabilis (n=13; 1 R to 3rd generation cefalosporines), Pseudomonas aeruginosa (n=11; 1 R to carbapenem) and Klebsiella pneumoniae (n=10; 1 R to 3rd generation cefalosporines) were most frequently documented.
Conclusion: The prevalence of uroprophylaxis is high in European NHs. Further in-depth research is needed as AM therapy for asymptomatic bacteriuria has not been shown to be of benefit in elderly living in NHs and can even be harmful, for instance in light of the development of AM resistance.

Antimicrobial consumption and stewardship in nursing homes in European regions

B. Jans, K. Latour, E. Broex, A. Muller, N. Drapier, V. Vankerckhoven, R. Stroobants, H. Goossens on behalf of the European Surveillance of Antimicrobial Consumption (ESAC) Nursing Home subproject group

Methods: In April 2009 the ESAC point prevalence survey (PPS) on antimicrobial (AM) use in European nursing homes (NH) was held. Institutional determinants for AM use and curent AM stewardship resources were collected through a NH questionnaire. For each resident with an AM on the PPS day, a questionnaire was completed for measuring AM use in the NH.
Results: A total of 304 NHs from 20 EU countries participated: 15 in Eastern Europe(E-EU), 86 in Northern EU(N-EU), 43 in Southern EU (S-EU) and 157 in Western EU (W-EU). In all participating settings, 5.4% (median) of the residents used an AM on the PPS day (range by NH: 0-30%). The prevalence of AM use was significantly higher in N-EU NHs (10.4%, range: 0-28.3%) compared to S-EU (4%, range: 0-30%, $p<0.001$), E-EU (5%, range: 0-20.7%, $p=0.002$) and W-EU (4.9%, range: 0-20%, $p<0.001$). This variation could not be explained by differences in care load (incontinence, disorientation, impaired mobility) nor by the prevalence of wounds in the total NH populations. In N-EU NHs, urinary catheters were more frequently used (5.3%) compared to NHs from the other EU regions (2.5%, $p=0.003$). Medical care was only provided by the general practitioner (GP) in 66.2% of all EU NHs (N-EU: 60.3%, other regions: 68.5%). In 87.2% of all N-EU NHs only working with GPs, no medical coordinator was present while in the other regions medical coordination was absent in only 10.5% of the NHs. In N-EU NHs, compared to NHs from other regions, some AM stewardship resources were significantly less available such as written guidelines for prudent AM use (N-EU: 24.6% versus other regions: 59.2%, $p<0.001$), a therapeutic formulary (4.3% versus 60.2%, $p<0.001$), annual data on AM consumption (8.7% versus 26.2%, $p=0.003$), a restrictive list of AM to be prescribed (6.% versus 20%, $p=0.004$) and the use of a motivation form for prescription outside the formulary (0% versus 9.9%, $p=0.007$). N-EU NHs were also more encouraged to take microbiological samples for guidance of AM prescriptions (92.8% versus 53.4%, $p<0.001$). In general, the prevalence of AM use was significantly higher (6.9%) in NHs promoting sampling prior to prescribing, compared to those who didn't (4.6%, $p=0.0001$).
Conclusions: In EU NHs a lack of medical coordination might contribute to a more important device use and less AM stewardship. Promoting microbiological sampling could produce adverse effects when positive cultures are treated without considering the clinical status of the residents.

European Surveillance of Antimicrobial Consumption (ESAC): outpatient antibiotic use in children and teenagers in Europe.

Ann Versporten, Samuel Coenen, Niels Adriaenssens, Herman Goossens, and the ESAC Ambulatory Care Project Group.

Objectives: To provide a detailed description of outpatient systemic antibiotic use among children and teenagers in Europe, and to assess differences between two outcome measures in the context of the first European Antibiotic Awareness Day (EAAD) focusing on this target group.
Methods: Since 2004, the ESAC Ambulatory Care subproject collects outpatient antibiotic consumption data by age using the Anatomical Therapeutic Chemical (ATC) Defined Daily Doses (DDD) methodology. We analysed 2007 and 2008 data on outpatient use of antibacterials for systemic use (ATC J01) for children and teenagers up to age 20 in countries where use could be expressed in both DDD (WHO version 2010) and packages per 1000 inhabitants per day (DID and PID, respectively).
Results: In 2008, outpatient antibiotic use up to the age of 20 (10) represented 15% (6%) of total antibiotic use in DID compared to 22% (14%) of total antibiotic use in PID. In DID, use varied with a factor 2.6 between highest (18.7 DID in Luxemburg) and lowest (7.2 DID in Norway) use. In PID, use among children varied with factor 3.3 between highest (3.0 PID in Luxembourg) and lowest (0.9 PID in Norway) use.
Between 2007 and 2008 outpatient antibiotic use in Belgium, Denmark, Luxembourg and Norway decreased both in DID and PID when assessed by age from the age of 0 until the age of 18 years (see figure). Use in DID (age 0-20) decreased with 5% and in PID with 8% as compared to 2007. Total outpatient antibiotic use (all ages) decreased in PID, not in DID.

In children, mainly penicillins (J01C) and macrolides (J01FA) are commonly used, and to a lesser extent second-generation cephalosporins (J01DC), sulfonamides and trimethoprim (J01EE). Cephalosporin use is negligible in Norway. Denmark only uses penicillins and macrolides in children.
Conclusion: Quantities and classes of antibiotic substances used by children vary substantially between European countries. The proportion of antibiotic use in children on the total antibiotic use is highly dependent on the outcome measure. To evaluate the effect of interventions targeting antibiotic use in children, e.g. the EAAD, antibiotic use data expressed in DID should best be linked to the patient's age, and if information on age is missing, be complemented with used data expressed in PID. Applying this methodology, the 2008 EAAD appears to have been a success.

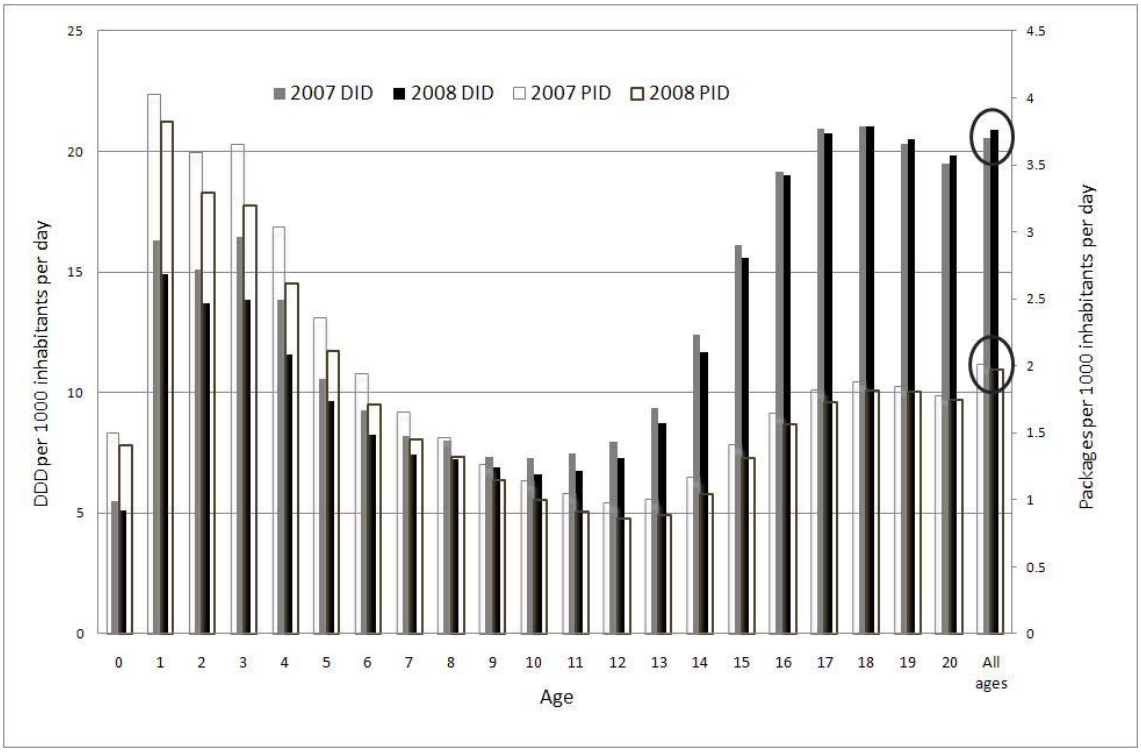


Figure 1: Outpatient antibiotic use in young children and teenagers (ages 0-20) versus all ages: use for Belgium, Denmark, Luxembourg and Norway, years 2007-2008.

Repeated Point Prevalence Surveys on Antimicrobial Prescriptions in Finnish Nursing Homes, 2009-2010

M Rummukainen, O Lyytikäinen, T Kärki, M Kanerva, M Haapasaari, J Ollgren, B Jans, A Muller, H Goossens on behalf of the European Surveillance of Antimicrobial Consumption (ESAC) project group

Objectives: Finnish Nursing homes (NH) participated in 3 European Surveillance of Antimicrobial Consumption (ESAC) Point Prevalence Surveys (PPS) in April and November 2009 and May 2010 which were conducted in order to assess the antimicrobial (AB) consumption in European NHs. We analyzed Finnish ESAC PPS data and compared the results with those previously published by the ESAC project group.
Methods: All residents present in NH for ≥24 hours and receiving systemic ABs on the day of the survey were included. Data on ABs and their indications were collected from residents' charts: prophylaxis or treatment and the type of infection.
Results: In 2009 8 NHs and in 2010 9 NHs participated in the survey. In total, there were 5791 eligible residents (range by survey, 1706-2320); 737 (12.7%; range, 9.7-17.2%) of them received at least one AB. The most common indication was prophylaxis (487/737, 66.0%; range 56.8-73.4 %), mainly for urinary tract infection (UTI) (460/737, 62.4%). Of the residents, 250 (4.3%, range, 3.5-5.2%) were on AB treatment. UTI (119/250; 47.6%) was

the most common indication for treatment. Methenamine (306/ 737, 41.5%) was most commonly used AB, followed by trimethoprim (14.0%) and pivmecilinam (13.2%). The proportion of residents on methenamine prophylaxis decreased, from 8.3% in April 2009 to 4.0-4.1% in November 2009 and May 2010.
Conclusion: AB consumption in Finnish NHs was high. Most ABs were used for UTI prophylaxis. Especially the use of methenamine was very common, even though it reduced by half during the study period. If methenamine consumption were excluded, the Finnish AB prevalence would be in line with the ESAC results from spring 2009 (median 5.4%). Differences in AB consumption between countries may also be related to differences in NH patient population and patients' underlying conditions.

European Surveillance of Antimicrobial Consumption: trends in systemic azole consumption in hospital care in Europe
Niels Adriaenssens, Samuel Coenen, Ann Versporten, Arno Muller, Peter Zarb, Herman Goossens, and the ESAC Project Group

Objectives: To describe trends in systemic azole consumption in hospital care in Europe from 2005 till 2009 in the context of increased prevalence of azole-resistant species.
Methods: Within ESAC (www.esac.ua.ac.be) adopting the anatomic therapeutic chemical (ATC) and defined daily dose (DDD) methodology, data on hospital use of all 14 antimycotics (12) and antifungals (2) for systemic use (ATC J02 and D01B), aggregated at the level of the active substance, were collected for 2005-2009, and use was expressed in DDD (WHO ATC/DDD, version 2010) per 1000 inhabitants per day (DID). Only countries for which validated data were available for at least three years, were included in the analysis.
Results: Data were available for 15 countries. Total systemic azole use in hospital care on average represented ≥ 75% of the total hospital antimycotic and antifungal use in all countries except in Croatia (72%), Malta(68%) and Ireland (46%). In 10 out of 15 countries, total systemic azole use in hospital care increased on average > 5% each year between 2005 and 2009. In France, it declined on average > 5% each year. In Hungary, Ireland, Luxembourg and Slovenia no such changes were observed. In 2009, fluconazole was the most frequently used azole in hospital care in all countries except in Slovakia (ketoconazole). In 2009, azole consumption more than doubled in hospital care in Denmark, Finland, Latvia and Croatia compared to 2008.
Conclusion: Our study demonstrates a trend of increased systemic azole use in hospital care in Europe contrasted by a decreasing use in France. These trends are mainly driven by fluconazole use, and call for closer monitoring of antimycotic and antifungal use and resistance.

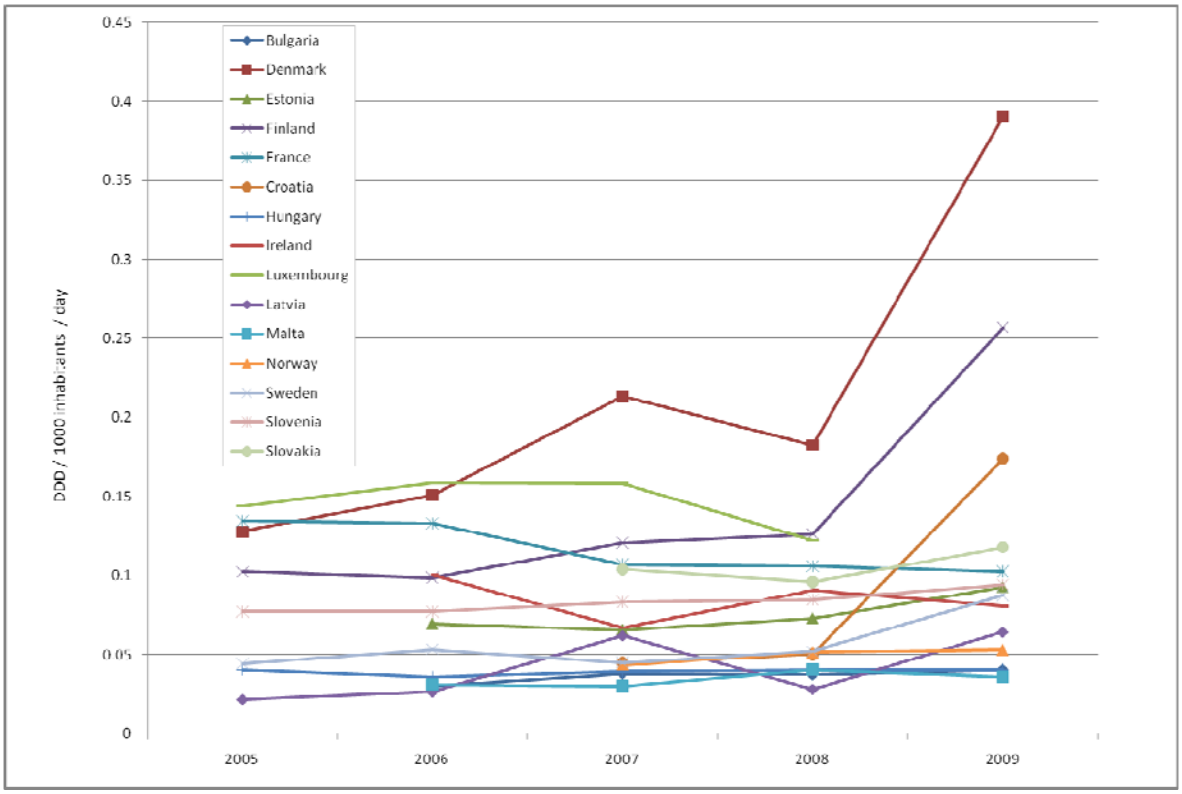


Figure: Consumption of azoles for systemic use (ATC J02AB & J02AC) in hospital care from 2005 till 2009 in 15 European countries

ANNEX VIII: ESAC NEWSLETTERS

ESAC Newsletter

February 2011
Volume 5 (1)

Editorial

We are pleased to present the 2nd NH report describing the results of the second PPS which was conducted in November 2010. From May 7 to May 10, 2011 the European Congress of Clinical Microbiology and Infectious Diseases (ECCMID) will take place in Milan, Italy. ESAC will be presenting a lot of new data on the subprojects, as well as on the core data. If you are attending ECCMID, please check out our presentations and visit our posters.
On February 16 and 17 we had a HUB visit from ECDC to discuss the transition of ESAC tot ECDC on June 30. It was a very fruitful meeting.
Importantly, 2 new European projects will start as from April 1, 2011 at the Laboratory of Medical Microbiology (University of Antwerp). We are looking for a project manager to work on both projects and kindly ask you to distribute the vacancy in this newsletter within your network.
Unfortunately we also have sad news to report. Faranak Ansari who has worked for several years on the ESAC project has suddely passed away.
Please note that our ESAC final meeting will be held in Riga, Latvia, from May 19 to 20, 2011 where we will be celebrating 10 years of ESAC! We look forward to meeting you in Riga!

Herman Goossens

ESAC transition to ECDC !!

Klaus Weist and his team from ECDC were welcomed in Antwerp on February 16 and 17 by the ESAC Management Team to discuss the transfer of the ESAC project to ECDC on June 30, 2011. It was a very fruitful meeting during which all available ESAC data was discussed to ensure a smooth transition to ECDC. Also people from the Tessy Team were present to see how data collection and processing can be integrated into their system.

ESAC at ECCMID, 2011

Also this year ESAC data will be presented at ECCMID, which will be held in Milan from May 7 to May 10, 2011. The following abstracts have been accepted for presentation:

- Adriaenssens et al. European Surveillance of Antimicrobial Consumption (ESAC): disease-specific quality indicators for outpatient antibiotic prescribing
- Adriaenssens et al. European Surveillance of Antimicrobial Consumption: trends in systemic azole consumption in hospital care in Europe
- Beutels et al. Identifying determinants of antibiotic use in Europe
- Jans et al. Antimicrobial consumption and stewardship in nursing homes in European Regions
- Latour et al. Antimicrobial prescribing for urinary tract infections in European nursing homes
- Versporten et al. European Surveillance of Antimicrobial Consumption (ESAC): outpatient antibiotic use in children and teenagers in Europe

In remembrance of Faranak Ansari

We are very sad to announce that Faranak Ansari suddenly passed away after a short period of illness. Some of you had the opportunity to work with her in the past.
Faranak joined our ESAC team in 2003 and she particularly worked on the Hospital Care subproject together with Peter Davey (at Dundee University) till 2006.
Faranak continued to work on the 2006 data collected in the Point Prevalence and Longitudinal Survey of the Hospital Care subproject. Faranak also contributed to the analysis of the core ambulatory care data comparing the four UK administrations with Belgium (Davey et al, J Antimicrob Chemother 2008). She published two landmark papers (Ansari et al, Clin Infect Dis 2009 and J Antimicrob Chemother 2010) on antibiotic use in hospitals and this work also formed a substantial part of Faranak's PhD thesis. She defended this successfully in October 2010.
Faranak made a tremendous contribution to a better understanding of measuring antibiotic use in hospitals. She demonstrated the success of the ESAC Point Prevalance Survey protocol which was then rolled out to hundreds of hospitals in 2008 and 2009, in Europe and other parts of the world. She also developed a methodology to measure antibiotic use in longitudinal surveys, comparing different indicators. Faranak had a brilliant mind for sciences and was very devoted to her work. She was very determined to find solutions and move our field forward, which she did!
We will miss her. Our thoughts are with her family.

Project Management Vacancy

We have 2 new projects that will be launched in April at the University of Antwerp:

TRACE is a European Project that will be funded as Research Networking Programme (RNP) from the European Science Foundation (ESF; April 2011 till March 2016). The purpose of TRACE is to continue the translational work currently performed within GRACE (www.grace-lrti.org) and to identify opportunities for new GRACE-related research.

RAPP-ID is a European project that will be funded by the Innovative Medicines Initiative (IMI) from the European Commission (April 2011 till March 2016). The purpose of RAPP-ID is the development of a Point-of-Care Test (POCT) for the rapid detection of bacteria, mycobacteria, fungi, viruses and biomarkers in the hospital as well as in ambulatory care.

TASKS: · you will be responsible for the overall project management of the European projects TRACE and RAPP-ID · you will be responsible for the management of available financial resources of these projects · you will coordinate the organization of international scientific workshops as part of the TRACE project · you will work in close collaboration with researchers and administrative staff of the laboratory of medical microbiology and the Infectious Diseases research team · you contribute to the preparation of innovative research projects within both European and national funding channels

PROFILE: · you have a degree in (bio)medical sciences · a PhD is an added value · you have research experience in the field of infectious diseases or medical microbiology · capabilities in project management and relevant experience in preparing competitive scientific research proposals is a plus · excellent knowledge of English is required · you possess the necessary computer skills as well as communication skills · you are willing to travel and a high degree of autonomy is required.

WE OFFER: a 100% (or 80%, if preferred) position of assistant or doctor-assistant (depending on the academic qualifications and professional experience) for a period of 12 months, extendable up to 5 years if positively evaluated · starting date is April 1, 2011. Please send your application to Prof Dr Herman Goossens (herman.goossens@uza.be) no later than March 15. Please contact Prof Goossens for further information on the position.

National Networks

Switzerland

- **Lead National Representative**
  Giorgio Zanetti, *Lausanne University Hospital*.
- **Other National Representative(s)**
  Christian Ruef, *University Hospital of Zurich*.
  Giuliano Masiero, *University of Lugano*.
  Catherine Plüss-Suard, *Lausanne University Hospital*.
  Kathrin Muehlemann, *University of Bern*.

The Netherlands

- **Lead National Representative**
  Stephanie Natsch, *Radboud University Nijmegen*.
- **Other National Representative(s)**
  Theo Verheij, *Julius Centre for Health and Primary Care*.
  Paul Van Der Linden, *Tergooienziekenhuis*.
  Marie-José Veldman, *RIVM*.

Turkey

- **Lead National Representative**
  Serhat Unal, *Haceteppe University, Ankara*.
- **Other National Representative(s)**
  Deniz Gür, *Haceteppe University, Ankara*.
  Yesim Cetinkaya Sardan, *Haceteppe University, Ankara*.

United Kingdom

- **Lead National Representative**
  Peter Davey, *University of Dundee*.
- **Other National Representative(s)**
  Tracey Guise, *BSAC, Birmingham*.
  Hayley Wickens, *BSAC, Birmingham*.
  Jonathan Cooke, *University Hospital South Manchester*.
  Maggie Heginbothom, *Welsh Antimicrobial Research*.
  Hugh Webb, *Royal Victoria Hospital, Belfast*.
  Jacqueline Sneddon, *Gartnavel General Hospital,Glasgow*.
  William Malcolm, *NHS Scotland*.

Nursing Homes Report 2nd PPS (November 2009)

The report on 2nd Nursing Home PPS has recently been made available and can be found on the ESAC website. A total of 266 NHs from 22 countries participated in the second PPS. The prevalence rate of antimicrobial consumption, with a mean of 5.8% and a median of 5.0% was observed in this study. The results of the second PPS were in line with those of the first PPS, which indicates that the PPS methodology is reproducible and that the results from both PPSs are sound. Our results clearly showed that variation within the results can largely be explained by the variation in NH systems, in case-mix and in care practices (institutional factors like AB stewardship resources) that exist throughout Europe.

It is important to maintain this network and the awareness by organizing regular PPSs, to develop better adapted AB prescribing practices and antibiotic stewardships for NHs and long-term care facilities and to promote appropriate AB use and infection control in NHs.

Upcoming Meetings

Final ESAC Meeting (Riga, Latvia) — **May 19-20, 2011**

Information

ESAC
University of Antwerp
Universiteitsplein 1
BE-2610 Antwerp
T +32 3 265 27 50
F +32 3 265 27 52
info_esac@ua.ac.be

For further details visit …

www.esac.ua.ac.be

Design: Anita Muys - Nieuwe Media Dienst