



# Deliverable 7.1

## Website with evaluated tools and information

WP7 | Appropriate use of antimicrobials in human and animals

Leader acronym | FHI & AEMPS

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## Introduction and objective

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The aim of Work package 7 of the EU-JAMRAI is to gather information available on antimicrobial stewardship and find quality pathways of implementation for good practices throughout Europe. In line with the overarching strategy of the Joint action, this work package will not deliver new research but will instead consolidate knowledge and deliver it in a form that is useable for doctors, pharmacists, nurses, vets and policy makers around Europe.

Deliverable 7.1 relates to task 7.1 that aims to identify and review existing materials on antibiotic stewardship in human health for different levels of health care: hospital, long-term care facility and community setting. This repository of information can help professionals on this topic to develop their projects and learn from others experiences.

It has been structured into two groups:

- International documents - organizations of high-standing
- National documents - policy and experience of local/national implementation

Initially, the results of this deliverable will be publicly shared on our website

[eu-jamrai.eu/results](http://eu-jamrai.eu/results)

The final aim is to provide these results to ECDC so EU-JAMRAI can contribute to update and expand the information available on ECDC's directory.

The work package leaders from AEMPS and FHI would like to take this opportunity to acknowledge and thank our partners from the Belgian Sciensano institute and the Health Service of Murcia (DGPIFAC/FFIS/SMS) for their contributions to this task.

# Mapping exercise methodology

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## International documents

For the international documents we included the following:

1. Guidelines for Antimicrobial Stewardship Programs (ASPs) developed by *agencies* (e.g. EC, WHO)
2. Reports describing the implementation of ASPs at the *European* level.
3. Published literature: A selection of scientific publications assessing the implementation and experience of ASPs primarily, but not exclusively, in Europe. Documents from other regions were included where it was thought their results could be applicable to EU member states.

Guidelines and reports concerning ASPs were specifically searched for at the websites of the following institutions, Joint Action stakeholders, projects, and associations:

- ECDC (European Centre for Disease Prevention and Control)
- CDC (Centers for Disease Control and Prevention)
- ESCMID (European Society of Clinical Microbiology and Infectious Diseases)
- NICE (National Institute for Clinical Excellence)
- IFIC (International Food Information Council)
- EMA (European Agency of Medicines)
- WHO (World Health Organization)
- GHSA (Global Health Security Agenda)
- ARNA project (Antimicrobial resistance and causes for non prudent use of antibiotics in human medicine project)
- OECD (Organization for Economic Co-operation and Development)
- STRAMA network
- PGEU (Pharmaceutical Group of the European Union)
- EPHA (European Public Health Alliance)
- HFE (Health First Europe)

## Published literature

A literature search was conducted in PubMed with the following keywords:

(Antimicrobial stewardship [Mesh Major Topic] AND Humans [Mesh])

## Google search/input from WP7 partners

A Google search was conducted to supplement the findings from the PubMed search. The following keywords were used:

Antimicrobial/antibiotic stewardship guidelines AND nursing homes/ AND long term care facilities/ AND hospitals/ AND primary care/ AND community care

In addition, partners of the WP were asked to give input on relevant documents

## National documents

A call was launched to all partners involved in task 7.1 to ask for this kind of documents. Unfortunately, there was a low response rate to this call for information.

We performed a web-search during the month of September 2018. Languages chosen were English, Spanish and Czech due to knowledge of the researchers.

Search n°	Keywords	Results total
	<b>PUBMED</b>	
1	Mesh Major Topic: national guidelines for antimicrobial stewardship + Filters: Humans + Filter: European Union	0
2	Mesh Major Topic: guidelines for antimicrobial stewardship + Filters: Humans + Filter: European Union	0
3	Mesh Major Topic: national guidelines for antimicrobial stewardship + Filters: Humans	20
4	Mesh Major Topic: antimicrobial stewardship + Filters: Humans + Filters: published in the last 10 years	275
5	Mesh Major Topic: antimicrobial stewardship + Filters: Humans	276
6	AND nursing homes	7
7	AND long term care facilities	7
8	AND hospitals	88
9	AND primary care	26
10	AND community care	21
11	All topics and filters together	0
12	Mesh Major Topic: Spain + antimicrobial stewardship programs	24

Search n°	Keywords	Results total
	<b>LILACS</b>	
13	Mesh Major Topic: optimizacion and antibioticos	9

Search n°	Keywords	Results total
	<b>Direct search in Google</b>	
14	Mesh Major Topic: antimicrobial stewardship AND Slovakia	0
15	Mesh Major Topic: antimicrobial stewardship AND Czech Republic	4
16	Mesh Major Topic: antimicrobial stewardship AND UK	8
17	Mesh Major Topic: antimicrobial stewardship AND Spain	25

Search n°	Keywords	Results total
	Direct search in MurciaSalud.es web page (scientific bibliography search section)	
18	Mesh Major Topic: antimicrobial AND stewardship AND programmes (Filter: article types -Metanalysis; revision; systematic revision; clinical guides)	25

### Inclusion and exclusion criteria

A set of additional inclusion/exclusion criteria were developed to guide the selection of publications to be included from the PubMed for the two mapping exercises.

Inclusion criteria	Comment/Exceptions
Scientific reviews related to the implementation of ASP in Europe and the US	Excluded if high degree of subjectivity or not EU-relevant.
Publications related to indicators	Included if relevant for stewardship in Europe. These publications are also relevant for Task 7.3.
National guidelines for antibiotic stewardship programs outside Europe	Excluded if guidelines were developed by specific hospitals, nursing homes etc. outside Europe. Only included if national guidelines.
Commentaries, opinion and statement papers	Included if they were produced by professional societies or international expert groups, but excluded if too “subjective” of nature or produced by one person/research group.

Exclusion criteria	Comments/Exceptions
Primary research	Excluded primary research unless describing/discussing surveys related to the implementation of antibiotic stewardship programs in Europe.
Commentaries, opinion and statement papers	Excluded opinion papers, statements, commentaries or other types of papers if they are of a more “subjective” nature or produced by one person/research group.
Research papers on the effect of ASPs (e.g. on infection rates, antibiotic prescribing)	It is assumed that antibiotic stewardship programs have a positive effect on the appropriate use of antibiotics. Research that looked specifically at one specific outcome of stewardship programs (e.g. infection rates, antibiotic prescribing bacterial resistance rates) was therefore excluded.
Documents or guidelines developed by specific hospitals, nursing homes etc. outside Europe	Primarily such documents were only included if developed by an European hospital and the information was of a general character.

Two rounds of screening were performed after compiling the results from the two mapping exercises in order to:

- Avoid duplicates
- Check that the links were correct
- Check that the inclusion and exclusion criteria were fulfilled

Table 1.Results

Search	N° of documents identified	N° of documents included
International	208	83
National	319	49
<b>Total</b>		<b>132</b>

Finally, 132 documents were included in the repository, some of them applied to more than one level of health care:

- Hospital care: 111
- Primary care: 58
- Long-term care facilities: 48

70% of the documents are published in the last 3 years (from January 2015 to October 2018).

### **Limitations**

It is important to note that the list of documents on the website is a selection of publications identified and reviewed within the available resources and time line limits of the EU-JAMRAI project. We did not conduct a systematic literature review. The list of publications is therefore not an exhaustive list and we have added a paragraph on the website that encourages experts in the field to suggest publications to be added if they identify gaps.

# Guidelines, tools and implementation methods

In this section, all the results of the mapping of the different guidelines, tools and implementation methods of antimicrobial stewardship in the different levels of health care are included.

The documents have been classified by the following categories:

- Antimicrobial stewardship programs
- Commentaries, Statements and Opinions
- Reports
- Researches
- Tools and educational resources
- Other publications (the ones that did not fit into the above groups)

Within each category, documents are sorted by year of publication, from the most recent to the oldest.

They also include information about their scope (Nation-wide, Region-wide, Locally developed or International relevance); country/region where it came out including general terms like International, European when it was produced by several countries or global institutions; setting to which they are related to (Hospital, Primary care and Long-Term Care Facility); short summary and finally, a “download” hyperlink that takes to the document of the web page that hosts it.

The final repository will be available at: [eu-jamrai.es/results](http://eu-jamrai.es/results)

And there will be four different downloadable *.pdf* documents that contain lists by each level of care and a global list that includes all.

	All levels of care (Hospital care, Community/primary care and Long-term facility care)	<a href="#">View</a>
	Hospital care	<a href="#">View</a>
	Community/primary care	<a href="#">View</a>
	Long-term facility care	<a href="#">View</a>

Figure 1. Screenshot of website

# Antibiotic Stewardship Programmes (ASPs)

## Role of antimicrobial stewardship programmes in children: a systematic review.

<i>Publishing year</i>	2018
<i>Author(s)</i>	Araujo da Silva AR, Albernaz de Almeida Dias DC, Marques AF, Biscaia di Biase C, Murni IK, Dramowski A, Sharland M, Huebner J, Zingg W.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The United Nations and the World Health Organization have designated antimicrobial resistance (AMR) as a major health priority and developed action plans to reduce AMR in all healthcare settings. Establishment of institutional antimicrobial stewardship programmes (ASPs) is advocated as a key intervention to reduce antibiotic consumption in hospitals and address high rates of multi-drug-resistant (MDR) bacteria. PUBMED and the Cochrane Database of Systematic Reviews (January 2007-March 2017) were searched to identify studies reporting the effectiveness of ASPs in general paediatric wards and paediatric intensive care units (PICUs) for reducing antibiotic consumption, use of broad-spectrum/restricted antibiotics, and antibiotic resistance and healthcare-associated infections (HAIs). Neonatal units and antifungal agents were excluded.

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## Antimicrobial Stewardship in Australian Health Care

<i>Publishing year</i>	2018
<i>Author(s)</i>	Australian Commission on Safety and Quality in Health Care
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Australia
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Book on antimicrobial stewardship in Australian health care with a summary of the current evidence on antimicrobial stewardship, strategies for implementing and sustaining antimicrobial stewardship programmes, and a description of the roles of different clinicians.

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## Antimicrobial stewardship: From principles to practice

<i>Publishing year</i>	2018
<i>Author(s)</i>	British Society for Antimicrobial Chemotherapy
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care

Community/primary care  
Long-term facility care

*Short summary*

Practical e-book on global antimicrobial stewardship with (among other chapters) key steps in the development of antimicrobial stewardship programmes, a toolkit and practical recommendations and examples for different settings.

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**Mitigate Antimicrobial Stewardship Toolkit - A guide for practical implementation in adult and pediatric emergency department and urgent care settings**

*Publishing year*

2018

*Author(s)*

The Society for Healthcare Epidemiology of America (SHEA)

*Type of document*

Antibiotic Stewardship Programme (ASP)

*Scope/aim*

Nation-wide

*Country/region*

USA

*Setting(s)*

Hospital care

*Short summary*

From source: This guide outlines how facilities can implement individualized, effective, and practical antimicrobial stewardship programs in acute care (emergency department and urgent care) settings.

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**EU Guidelines for the prudent use of antimicrobials in human health**

*Publishing year*

2017

*Author(s)*

European Commission

*Type of document*

Antibiotic Stewardship Programme (ASP)

*Scope/aim*

International relevance

*Country/region*

Europe

*Setting(s)*

Hospital care

Community/primary care

Long-term facility care

*Short summary*

Non-binding guidelines to promote the prudent use of antimicrobials in humans. It includes measures, good clinical practice, activities, resources, systems and processes targeting to all actors involved in the use of antimicrobials.

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**Antibiotic stewardship : A programmatic approach to improved antimicrobial management**

*Publishing year*

2017

*Author(s)*

Müller M, Lehmann P, Willy C.

*Type of document*

Antibiotic Stewardship Programme (ASP)

*Scope/aim*

Nation-wide

*Country/region*

Germany

*Setting(s)*

Hospital care

*Short summary*

Objectives of this set of measures are the optimization of the individual treatment outcome and on a longer range the improvement of the epidemiological situation. AMS programs include all clinical disciplines that use antimicrobials. Trauma surgery is also affected in a

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special way as soon as complicated infections and those with multidrug-resistant bacteria are treated.

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### **Building a national Infection Intelligence Platform to improve antimicrobial stewardship and drive better patient outcomes: the Scottish experience. (J Antimicrob Chemother)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Bennie et al.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Scotland
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	A summary of the experience with and the capabilities of a new national platform for infection-related health data (NHS Scotland Infection Intelligence Platform - IIP) to improve antimicrobial stewardship and drive better patient outcomes.

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### **Guidelines on Implementation of the Antimicrobial Strategy in South Africa: One Health Approach & Governance**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Department of Health, South Africa
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	South-Africa
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	From source: These guidelines are intended to act as a blueprint for the steps to be taken by South African healthcare and veterinary workforce to enact AMS at national, provincial, district and health establishment levels as appropriate, in line with the Strategic Framework and Implementation Plan. It aims to provide a practical, step-by-step or 'how to' guide, addressing the governance framework at each level of the health system.

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### **Antimicrobial stewardship overview. NICE Pathways**

<i>Publishing year</i>	2017
<i>Author(s)</i>	National Institute for Health and Care Excellence (NICE)
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care

*Short summary* Interactive topic-based flowcharts that allow navigating NICE recommendations on Antimicrobial stewardship.

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### Antibiotic Stewardship Implementation Framework for Health Departments

*Publishing year* 2017  
*Author(s)* Centers for Disease Control and prevention  
*Type of document* Antibiotic Stewardship Programme (ASP)  
*Scope/aim* Nation-wide  
*Country/region* USA  
*Setting(s)* Hospital care  
Community/primary care  
Long-term facility care

*Short summary* This framework describes what activities state and local health departments can do to implement antibiotic stewardship: 1) Establish leadership in health departments, 2) Conduct surveillance, 3) Coordinate activities, 4) Provide and develop education and tools, 5) Develop a communications plan, 6) Inform the legislative process.

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### The Core Elements of Hospital Antibiotic Stewardship Programs CHECKLIST

*Publishing year* 2017  
*Author(s)* Centers for Disease Control and prevention  
*Type of document* Antibiotic Stewardship Programme (ASP)  
*Scope/aim* Nation-wide  
*Country/region* USA  
*Setting(s)* Hospital care

*Short summary* This checklist is a companion to Core Elements of Hospital Antibiotic Stewardship Programs. A tool to systematically assess key elements and actions to ensure optimal antibiotic prescribing and limit overuse and misuse of antibiotics in hospitals.

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### Long-Term Care Antimicrobial Stewardship Program Resources

*Publishing year* 2017  
*Author(s)* Centers for Medicare & Medicaid Services (CMS)  
*Type of document* Antibiotic Stewardship Programme (ASP)  
*Scope/aim* Locally developed  
*Country/region* USA  
*Setting(s)* Long-term facility care

*Short summary* A document with links to many resources about antibiotic stewardship programs in nursing homes.

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## Template for an Antibiotic Stewardship Policy for Post-Acute and Long-Term Care Settings. (JAMDA)

<i>Publishing year</i>	2017
<i>Author(s)</i>	Jump et al.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	Describes a template for antimicrobial stewardship programs in long-term care facilities (LTC) developed by Infection Advisory Committee at AMDA - The Society for Post-Acute and Long-Term Care Medicine. Includes lists of resources for antibiotic stewardship in LTC in the US, and antibiotic use metrics.

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## Acceptability of antibiotic stewardship measures in primary care.

<i>Publishing year</i>	2016
<i>Author(s)</i>	Giry M, Pulcini C, Rabaud C, Boivin JM, Mauffrey V, Birgé J.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	France
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	The aim was to assess the acceptability of antibiotic stewardship measures by family physicians. An online cross-sectional survey was conducted in 2015 with a sample of family physicians practicing in a specific French region.

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## SWAB Guidelines for Antimicrobial Stewardship

<i>Publishing year</i>	2016
<i>Author(s)</i>	The Dutch Working Party on Antibiotic Policy (SWAB)
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Netherlands
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The aim of this SWAB guideline is to summarize, for the hospital setting, the current state of evidence of the effects of the various antimicrobial stewardship objectives in adults and of the effects of various stewardship improvement strategies. Effectiveness is assessed on patient outcomes (e.g., mortality, length of stay), adverse events, costs and bacterial resistance.

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## Antimicrobial stewardship programs in the critical care setting

<i>Publishing year</i>	2016
<i>Author(s)</i>	Ruiz-Ramos J. et al.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain

*Setting(s)* Hospital care  
*Short summary* Antimicrobial stewardship programs in the critical care setting

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#### **Programa de optimización del uso de antimicrobianos (PROA). Experiencia en un hospital secundario.**

*Publishing year* 2016  
*Author(s)* Ugalde-Espiñeira J. et al.  
*Type of document* Antibiotic Stewardship Programme (ASP)  
*Scope/aim* Locally developed  
*Country/region* Spain  
*Setting(s)* Hospital care  
*Short summary* Experience of a program for optimizing the use of antimicrobials (PROA) in a regional hospital

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#### **Antimicrobial stewardship: Quality Standard**

*Publishing year* 2016  
*Author(s)* The National Institute for Health and Care Excellence (NICE)  
*Type of document* Antibiotic Stewardship Programme (ASP)  
*Scope/aim* International relevance  
*Country/region* United Kingdom  
*Setting(s)* Hospital care  
Community/primary care  
Long-term facility care  
*Short summary* From source: This quality standard covers the effective use of antimicrobials to reduce the emergence of AMR (loss of effectiveness of antimicrobials). It covers all settings, all formulations of antimicrobials (oral, parenteral and topical agents) and is for health and social care practitioners, organisations that commission, who provide or support the provision of care, as well as people using antimicrobials and their carers.

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#### **Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use. Recommendations**

*Publishing year* 2016  
*Author(s)* National Institute for Health and Care Excellence (NICE)  
*Type of document* Antibiotic Stewardship Programme (ASP)  
*Scope/aim* Nation-wide  
*Country/region* United Kingdom  
*Setting(s)* Hospital care  
Community/primary care  
Long-term facility care  
*Short summary* Recommendations for organisations (commissioners and providers): Antimicrobial stewardship programmes

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## Antimicrobial stewardship: tools and resources

<i>Publishing year</i>	2016
<i>Author(s)</i>	National Institute for Health and Care Excellence (NICE)
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Tools to help you put the guidance into practice: Implementation advice; Tailored service improvement support; Guidance into practice - practical steps

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## Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America (Clinical Infectious Diseases)

<i>Publishing year</i>	2016
<i>Author(s)</i>	Barlam et al. (IDSA)
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	Evidence-based guidelines (2016) for implementation and measurement of antibiotic stewardship interventions in inpatient populations including long-term care.

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## New Antimicrobial Stewardship Standard

<i>Publishing year</i>	2016
<i>Author(s)</i>	Joint Commission Perspectives (US)
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	The antimicrobial stewardship standard developed by the Joint Commission in 2015 is updated. It concerns 1) Hospitals and Critical Access Hospitals and 2) Nursing Care Centers. Key elements are leadership, education, monitoring.

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## A Path to Better Antibiotic Stewardship in Inpatient Settings

<i>Publishing year</i>	2016
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<i>Author(s)</i>	The Pew Charitable Trusts
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	10 in-depth case studies map how to improve antibiotic use in acute and long-term care facilities. Though ASPs differ in their details, these case studies reveal themes that are critical to any successful program implementation.

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### National Quality Partners Playbook: Antibiotic Stewardship in Acute Care

<i>Publishing year</i>	2016
<i>Author(s)</i>	Quality Forum/Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	A practical guide with concrete strategies and suggestions for the implementation of successful antibiotic stewardship programs in acute-care hospitals. For each CDC Core Element, the guide includes a brief rationale and overview, examples for implementation, potential barriers and suggested solutions, and suggested tools and resources.

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### The Core Elements of Outpatient Antibiotic Stewardship

<i>Publishing year</i>	2016
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	Summary on the core elements of successful outpatient antibiotic stewardship programs, taking into account commitment, action for policy and practice, tracking and reporting, and education and expertise.

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### The Core Elements of Outpatient Antibiotic Stewardship - Facility Checklist

<i>Publishing year</i>	2016
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	This checklist is a baseline to be used for assessing policies and practices that are in place for antibiotic stewardship in outpatient settings at the facility level. The checklist can then be used to review progress in expanding stewardship activities on a regular basis.

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### The Core Elements of Outpatient Antibiotic Stewardship - Clinician Checklist

<i>Publishing year</i>	2016
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	This checklist is a baseline to be used for assessing policies and practices that are in place for ASP in outpatient settings at the clinical level. Then use the checklist to review progress in expanding stewardship activities on a regular basis.

## Download

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### Antibiotic Stewardship in Long-Term Care Facilities - A Fact Sheet

<i>Publishing year</i>	2016
<i>Author(s)</i>	The Pew Charitable Trusts
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	A summary of the core elements of antibiotic stewardship for nursing homes.

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### Start Smart - Then Focus Antimicrobial Stewardship Toolkit for English Hospitals

<i>Publishing year</i>	2015
<i>Author(s)</i>	Public Health England
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	A toolkit that provides an outline of evidence-based antimicrobial stewardship in the secondary healthcare setting. Contains guidelines and advice to assist in patient safety, enhancing stewardship in antibiotic usage, and ensuring optimal patient care and safety by reducing inappropriate prescribing.

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## The Core Elements of Antibiotic Stewardship for Nursing Homes

<i>Publishing year</i>	2015
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	Summary on the core elements of successful antibiotic stewardship programs in nursing homes, taking into account leadership commitment, accountability, drug expertise, actions, tracking, reporting and education.

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## The Core elements of Antibiotic Stewardship for Nursing Homes CHECKLIST

<i>Publishing year</i>	2015
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	A checklist to be used as a baseline assessment of policies and practices which are in place. Then use the checklist to review progress in expanding stewardship activities on a regular basis (e.g., annually). The checklist is a companion to the Core Elements of Antibiotic Stewardship in Nursing Homes

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## Antimicrobial Stewardship Criterion - Frequently asked questions

<i>Publishing year</i>	2014
<i>Author(s)</i>	Australian Commission on Safety and Quality in Health Care
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Australia
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Answers to frequently asked questions about antimicrobial stewardship programs and the implementation of such programs.

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## Implementation of a multidisciplinary infectious diseases team in a tertiary hospital within an Antimicrobial Stewardship Program

<i>Publishing year</i>	2014
<i>Author(s)</i>	F. M. Buyle, M. Wallaert, N. Beck, J. Boelens, S. Callens, G. Claeys, S. Deryckere, E. Haegeman, I. Leroux-Roels, E. Sermijn, E. Steel, H. Robays, L. Vandekerckhove, K. Vermis, D. Vogelaers
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Locally developed

<i>Country/region</i>	Belgium
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Prospective, observational study after implementation of a multidisciplinary infectious diseases team consisting of infectious diseases physicians, clinical microbiologists, and clinical pharmacists in a tertiary hospital within an Antimicrobial Stewardship Program

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**Protocol on Antimicrobial Stewardship Program in Healthcare Facilities**

<i>Publishing year</i>	2014
<i>Author(s)</i>	Ministry of Health Malaysia
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Malaysia
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	This protocol serves as a practical guide for all health care professionals in delivering an appropriate antimicrobial management through a systematic approach. Describes the structure, function and activities of an antimicrobial stewardship program.

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**A cross-sectional survey of antimicrobial stewardship strategies in UK hospitals**

<i>Publishing year</i>	2014
<i>Author(s)</i>	A. P. Tonna, S, I. M. Gould and D. Stewart
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The objective of this study was to describe the profile and activities of AMTs within hospitals in the United Kingdom (UK).

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**Core Elements of Hospital Antibiotic Stewardship Programs**

<i>Publishing year</i>	2014
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Summary on the core elements of successful hospital antibiotic stewardship programs, taking into account leadership commitment, accountability, drug expertise, actions, tracking, reporting and education.

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## Practical Guide to Antimicrobial Stewardship in Hospitals

<i>Publishing year</i>	2013
<i>Author(s)</i>	bioMérieux S.A. (Scotland)
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Scotland
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Booklet with practical recommendations for healthcare workers in hospitals on why and how to implement an antimicrobial stewardship programme.

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## Initiatives and resources to promote antimicrobial stewardship

<i>Publishing year</i>	2013
<i>Author(s)</i>	Paño-Pardo J.R. et al.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Potentially information useful for professionals responsible for the design and implementation of antimicrobial stewardship programs

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## Antimicrobial stewardship: English Surveillance Programme for Antimicrobial Utilization and Resistance (ESPAUR).

<i>Publishing year</i>	2013
<i>Author(s)</i>	Ashiru-Oredope D1, Hopkins S; English Surveillance Programme for Antimicrobial Utilization and Resistance Oversight Group.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	The programme will bring together the elements of antimicrobial utilization and resistance surveillance in both primary and secondary care settings, alongside the development of quality measures and methods to monitor unintended outcomes of antimicrobial stewardship and both public and professional behaviour interventions. This article reports on the background to the programme development, the current oversight group membership and the public reporting structure.

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## Improving the quality of antibiotic prescribing in the NHS by developing a new Antimicrobial Stewardship Programme: Start Smart—Then Focus (J Antimicrob Chemother)

<i>Publishing year</i>	2012
<i>Author(s)</i>	Ashiru-Oredope et al.
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Description of the current activities in England to support antimicrobial stewardship, national audits and the introduction of new national antimicrobial stewardship programmes in primary and secondary care (Start Smart - Then Focus).

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## Antimicrobial Stewardship in Australian Hospitals

<i>Publishing year</i>	2011
<i>Author(s)</i>	Australian Commission on Safety and Quality in Health Care
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Australia
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	From source: The publication provides guidance on developing and introducing a hospital antimicrobial stewardship program. It describes the structure, governance and resources needed for an effective program, along with those strategies shown to influence antimicrobial prescribing and reduce inappropriate use.

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## Programas de optimización de uso de antimicrobianos (PROA) en hospitales españoles: documento de consenso GEIH-SEIMC, SEFH y SEMSPH

<i>Publishing year</i>	2011
<i>Author(s)</i>	Rodríguez-Baño J. et al
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Consensus document - Program of adequate use of antimicrobials in hospitals in Spain

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## Scottish Antimicrobial Prescribing Group (SAPG): development and impact of the Scottish National Antimicrobial Stewardship Programme.

<i>Publishing year</i>	2011
<i>Author(s)</i>	Nathwani D, Sneddon J, Malcolm W, Wiuff C, Patton A, Hurding S, Eastaway A, Seaton RA, Watson E, Gillies E, Davey P, Bennie M; Scottish Antimicrobial Prescribing Group.

<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Region-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The primary objective of SAPG is to co-ordinate and deliver a national framework or programme of work for antimicrobial stewardship. This programme, led by SAPG, is delivered by NHS National Services Scotland (Health Protection Scotland and Information Services Division), NHS Quality Improvement Scotland, and NHS National Education Scotland as well as NHS board Antimicrobial Management Teams.. The early successes achieved by SAPG demonstrate that this delivery model is effective and provides the leadership and focus required to implement antimicrobial stewardship to improve antimicrobial prescribing and infection management across NHS Scotland.

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### Guidelines for Antimicrobial Stewardship in Hospitals in Ireland

<i>Publishing year</i>	2009
<i>Author(s)</i>	Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) - Hospital Antimicrobial Stewardship Working Group
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Ireland
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	Provides the following guidelines: 1. Rationale for antimicrobial stewardship in hospitals; 2. Resources and structures that need to be in place to develop stewardship programmes; 3. Specific guidance on stewardship interventions.

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### Achievements of the Belgian Antibiotic Policy Coordination Committee (BAPCOC)

<i>Publishing year</i>	2008
<i>Author(s)</i>	Goossens H, Coenen S, Costers M, De Corte S, De Sutter A, Gordts B, Laurier L, Struelens M J
<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	Locally developed
<i>Country/region</i>	Belgium
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Achievements of BAPCOP until 2008: objectives, activities, and campaigns

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### Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship (Clinical Infectious Diseases)

<i>Publishing year</i>	2007
<i>Author(s)</i>	Dellit et al. (IDSA)

<i>Type of document</i>	Antibiotic Stewardship Programme (ASP)
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Guidelines (2007) for developing institutional programs to enhance hospital antimicrobial stewardship. Each recommendation is rated on the basis of the strength of the recommendation and the quality of evidence supporting it.

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## Commentaries, Statements and Opinions

### **Antimicrobial resistance and antibiotic stewardship programs in the ICU: insistence and persistence in the fight against resistance. A position statement from ESICM/ESCMID/WAAAR round table on multi-drug resistance.**

<i>Publishing year</i>	2018
<i>Author(s)</i>	De Waele JJ, Akova M, Antonelli M, Canton R, Carlet J, De Backer D, et. All
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Belgium
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Recommendations from the ESICM/ESCMID MDR round table panel. Conference Reports and Expert Panel

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### **Antimicrobial stewardship and infection prevention—leveraging the synergy: A position paper update (American Journal of Infection Control)**

<i>Publishing year</i>	2018
<i>Author(s)</i>	Manning et al.
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Update of the position paper of APIC (The Association for Professionals in Infection Control and Epidemiology)/SHEA (The Society for Healthcare Epidemiology of America) (Moody et al. 2012, ID43) on the importance of antimicrobial stewardship. The critical role of infection preventionists and health care epidemiologists is reaffirmed and the synergistic strategy of infection prevention and control and antimicrobial stewardship programmes is highlighted.

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## Metrics of Antimicrobial Stewardship Programs

<i>Publishing year</i>	2018
<i>Author(s)</i>	Brotherton AL.
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	This article reviews the various antimicrobial stewardship metrics that have been described in the literature, evidence to support these metrics, controversies surrounding metrics, and areas in which future research is necessary.

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## Infectious Diseases Physicians: Leading the Way in Antimicrobial Stewardship (Clinical Infectious Diseases)

<i>Publishing year</i>	2018
<i>Author(s)</i>	Ostrowsky et al. (Infectious Diseases Society of America, Pediatric Infectious Diseases Society, and the Society for Healthcare Epidemiology of America)
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	White paper on the leading role of infectious diseases physicians in antimicrobial stewardship.

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## Role of Technology in Antimicrobial Stewardship.

<i>Publishing year</i>	2018
<i>Author(s)</i>	Bremmer DN, Trienski TL, Walsh TL, Moffa MA.
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Because of the increasing plague of antimicrobial resistance and antibiotic misuse, antimicrobial stewardship programs (ASPs) are now a mandatory entity in all US hospitals. ASPs can use technological advances, such as the electronic medical record and clinical decision support systems, to impact a larger patient population with more efficiency. Additionally, through the use of mobile applications and social media, ASPs can highlight and propagate educational information regarding antimicrobial utilization to patients and providers in a widespread and timely manner. In this article, the authors describe how technology can play an important role in antimicrobial stewardship.

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## Estrategias para optimizar el uso de antibióticos en los hospitales

<i>Publishing year</i>	2017
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<i>Author(s)</i>	J. Gómez, et al
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Region-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The inadequate use of antibiotics is a clinical reality we are faced with day by day. The great peculiarity of this group of drugs is the influence they have not only on the patients and at the time of their use, but also of future infections and the general population, by favouring alterations in the resistance patterns of the bacterial microflora that colonize people. It is our obligation as experts in infectious diseases to work on improving the use of antimicrobials.

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## The pharmacy contribution to antimicrobial stewardship

<i>Publishing year</i>	2017
<i>Author(s)</i>	Royal Pharmaceutical Society, UK
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	This policy focuses on the pharmacist's role as part of a multidisciplinary approach in tackling the challenges of inappropriate use of antibiotics.

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## Choosing Wisely in Healthcare Epidemiology and Antimicrobial Stewardship (Infection control & hospital epidemiology)

<i>Publishing year</i>	2016
<i>Author(s)</i>	Morgan et al. (The Society for Healthcare Epidemiology of America)
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	To reduce and understand medical overuse the Choosing Wisely Campaign was established in 2012. This article presents a list with 5 Choosing Wisely recommendations (and 5 runner-up items) by SHEA concerning antibiotic stewardship, using a Delphi method.

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## Guidance for the Knowledge and Skills Required for Antimicrobial Stewardship Leaders (Infection control and hospital epidemiology)

<i>Publishing year</i>	2014
<i>Author(s)</i>	Cosgrove et al. (The Society for Healthcare Epidemiology of America)
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA

<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Overview of the core knowledge and skills that are needed to lead and maintain an antimicrobial stewardship program.

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## Education on antibiotic use. Education systems and activities that work.

<i>Publishing year</i>	2013
<i>Author(s)</i>	Cisneros J.M. et al.
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Education systems and activities that work for the antimicrobial stewardship use

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## Public Health England Antibiotic prescribing and stewardship competencies

<i>Publishing year</i>	2013
<i>Author(s)</i>	Department of Health, Expert Committee on Antimicrobial Resistance and Healthcare Associated Infections (ARHAI) and Public Health England through an independent multi-professional development group.
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Antimicrobial stewardship competencies were designed to complement the National Institute for Health and Care Excellence (NICE) National Prescribing Centre's (NPC) generic competency framework for all prescribers. Competencies are described as a "combination of knowledge, skills, motives and personal traits", development of which should help individuals to continually improve their performance and to work more effectively. The NPC competency framework provides an outline framework of "generic prescribing competencies that, if acquired and maintained, can help prescribers to continually develop their prescribing practice". It is intended for any independent prescriber, doctor, dentist or non-medical. The vision is to provide a "starting point for discussion of competencies required by an individual, or groups of, prescribers at all levels of practice, from new (or training) prescribers, through to those practicing at a specialist level." There is also an emphasis on multidisciplinary expertise. These five competencies complement the NPC document and each has an overarching statement that describes the activity or outcome that prescribers should be able to demonstrate.

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## ASHP Statement on the Pharmacist's Role in Antimicrobial Stewardship and Infection Prevention and Control

<i>Publishing year</i>	2013
<i>Author(s)</i>	American Society of Health-System Pharmacists (ASHP)
<i>Type of document</i>	Commentary/Statement/Opinion

<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Overview of the responsibilities of pharmacists in antimicrobial stewardship and infection prevention and control.

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#### **Policy Statement on Antimicrobial Stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS). (Infect Control Hosp Epidemiol 2012)**

<i>Publishing year</i>	2012
<i>Author(s)</i>	SHEA/IDSA/PIDS
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Policy paper on antimicrobial stewardship with recommendations for the mandatory implementation of antimicrobial stewardship throughout health care, process and outcome measures to monitor interventions, and attention for deficiencies in education and research.

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#### **Antimicrobial stewardship: A collaborative partnership between infection preventionists and health care epidemiologists (American Journal of Infection Control)**

<i>Publishing year</i>	2012
<i>Author(s)</i>	Moody et al. (The Association for Professionals in Infection Control and Epidemiology/The Society for Healthcare Epidemiology of America)
<i>Type of document</i>	Commentary/Statement/Opinion
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Position paper from The Association for Professionals in Infection Control and Epidemiology (APIC) and the Society for Healthcare Epidemiology of America (SHEA) on the critical role of health care epidemiologists and infection preventionists in effective antimicrobial stewardship programs.

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## Reports

### ARNA project: Antimicrobial resistance and causes of non-prudent use of antibiotics in human medicine in the EU.

<i>Publishing year</i>	2017
<i>Author(s)</i>	John Paget et al. (European Commission)
<i>Type of document</i>	Report
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Final report of the ARNA ('Antimicrobial resistance and the causes of non-prudent use of antibiotics') project, funded by the European Commission, which aimed to: 1) investigate the use of antibiotics without a prescription, 2) assess the level of enforcement of 'prescription-only' legislation, 3) document good practices for the prudent use of antibiotics, 4) develop policy options.

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### Global Framework for Development & Stewardship to Combat Antimicrobial Resistance

<i>Publishing year</i>	2017
<i>Author(s)</i>	WHO
<i>Type of document</i>	Report
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Description of the current state and the future tasks of WHO for the establishment of a global development and stewardship framework (background information to the 'Global Action Plan on Antimicrobial Resistance' of WHO).

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### Prudent use of antimicrobial agents in human medicine: third report on implementation of the Council recommendation

<i>Publishing year</i>	2016
<i>Author(s)</i>	European Commission
<i>Type of document</i>	Report
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care Community/primary care

*Short summary* Long-term facility care  
Analysis of countries' reports on the implementation of the Council recommendation of 15 November 2001 (2002/77/EC) on the prudent use of antimicrobial agents in human medicine.

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#### **DRIVE-AB WP1A: Quality Indicators and Quantity Metrics of Antibiotic Use**

*Publishing year* 2015  
*Author(s)* Driving reinvestment in research and development and responsible antibiotic use (DRIVE-AB)  
*Type of document* Report  
*Scope/aim* International relevance  
*Country/region* Europe  
*Setting(s)* Hospital care  
Community/primary care  
Long-term facility care  
*Short summary* Overview of quality indicators and quantity metrics of antibiotic use, identified in the Drive-AB project (work package 1A)

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#### **Global Action Plan on Antimicrobial Resistance**

*Publishing year* 2015  
*Author(s)* WHO  
*Type of document* Report  
*Scope/aim* International relevance  
*Country/region* International  
*Setting(s)* Hospital care  
Community/primary care  
Long-term facility care  
*Short summary* Sets out the key actions structured around 5 strategic objectives: 1) effective communication, education and training; 2) surveillance and research, 3) effective sanitation, hygiene and infection prevention measures; 4) optimize the use of antimicrobial medicines in human and animal health, 5) develop the economic case for sustainable investment and increase investment in new medicines, diagnostic tools etc.

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#### **Summary the modified Delphi process for common structure and process indicators for hospital antimicrobial stewardship programs**

*Publishing year* 2015  
*Author(s)* Centers for Disease Control and prevention (CDC), European Centre for Disease Prevention and Control (ECDC)  
*Type of document* Report  
*Scope/aim* International relevance  
*Country/region* USA  
*Setting(s)* Hospital care  
*Short summary* List of structure and process indicators for hospital antimicrobial stewardship programmes, developed by an expert group with the Delphi method (part of the Transatlantic Task Force on Antimicrobial Resistance (TATFAR), a cooperation between ECDC and CDC)

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### Antimicrobial stewardship programs: A public health priority in Spain. The SEIMC-REIPI initiative.

<i>Publishing year</i>	2013
<i>Author(s)</i>	Rodríguez-Baño J. et al
<i>Type of document</i>	Report
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	A communication about the PROA initiative in Spain

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### Actividades de monitorización y mejora del uso de antibióticos en hospitales españoles: resultado de una encuesta nacional

<i>Publishing year</i>	2011
<i>Author(s)</i>	Paño-Pardo J.R. et al.
<i>Type of document</i>	Report
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Monitoring activities and improvement in the use of antibiotics in Spain hospitals: results of a national survey

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### Ensuring Prudent Use of Antimicrobials In Human Medicine In The European Union.

<i>Publishing year</i>	2005
<i>Author(s)</i>	Werner & Bronzwaer (Eurosurveillance)
<i>Type of document</i>	Report
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Report on the main actions in the EU Member States to implement the 'Council Recommendation on the prudent use of antibiotics in human medicine (2002)': national strategies and intersectoral mechanism, surveillance systems for antimicrobial resistance and use, control and preventive measures, education/training and commission support for EU action.

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## **Metrics for quantifying antibiotic use in the hospital setting: results from a systematic review and international multidisciplinary consensus procedure (J Antimicrob Chemother)**

<i>Publishing year</i>	2018
<i>Author(s)</i>	Benic et al. (DRIVE-AB)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Systematic review on metrics to measure antibiotic inpatient use with the objective to propose a set of quality indicators (conducted within the Drive-AB project).

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## **Quality indicators for responsible antibiotic use in the inpatient setting: a systematic review followed by an international multidisciplinary consensus procedure (J Antimicrob Chemother)**

<i>Publishing year</i>	2018
<i>Author(s)</i>	Monnier et al. (DRIVE-AB WP1 group)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Systematic review combined with the Delphi method combining evidence from literature and stakeholder opinion to obtain consensus on generic inpatient quality indicators to assess the quality of antibiotic use (conducted within the Drive-AB project).

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## **Use of evidence-based recommendations in an antibiotic care bundle for the intensive care unit (International Journal of Antimicrobial Agents)**

<i>Publishing year</i>	2018
<i>Author(s)</i>	Mutters et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Description of an antibiotic care bundle with evidence-based recommendations for intensive care units, by performing a systematic review and a Delphi method, and assessment of the adherence and applicability of the care bundle.

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## Developing core elements and checklist items for global hospital antimicrobial stewardship programmes: a consensus approach. (Clinical Microbiology and Infection)

<i>Publishing year</i>	2018
<i>Author(s)</i>	Pulcini et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Provides a list of 6 core elements with 29 checklist items for global stewardship programs based on literature review and an expert panel.

### Download

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## Antibiotic stewardship interventions in hospitals in low-and middle-income countries: a systematic review. (Bull World Health Organ)

<i>Publishing year</i>	2018
<i>Author(s)</i>	Dijck et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The majority of studies reported a positive effect of hospital antibiotic stewardship interventions. However, no general conclusions can be drawn about the effectiveness of such interventions in LICs and MICs because of low study quality, heterogeneity of interventions and outcomes, and under-representation of certain settings.

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## The Current State of Antimicrobial Stewardship: Challenges, Successes, and Future Directions (Current Infectious Disease Reports)

<i>Publishing year</i>	2018
<i>Author(s)</i>	Emberger et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Review on the current state (2018, USA) of the field of antimicrobial stewardship with key challenges, successes and future directions.

### Download

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## What is antimicrobial stewardship? (Clinical Microbiology and Infection)

<i>Publishing year</i>	2017
<i>Author(s)</i>	Dyar et al. (ESCMID Study Group for Antimicrobial stewardship)

<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Review on the emergence and evolution of the term ‘antimicrobial stewardship’.

### Download

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#### **ESGAP inventory of target indicators assessing antibiotic prescriptions: a cross-sectional survey. (J Antimicrob Chemother)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Howard et al. (ESCMID Study Group for Antimicrobial stewardship)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Results of a European survey among all ESGAP (ESCMID Study Group for Antimicrobial stewardship) members, on indicators assessing antibiotic prescriptions at a national levels is presented, with both targets and incentives

### Download

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#### **A framework for ensuring a balanced accounting of the impact of antimicrobial stewardship interventions. (J Antimicrob Chemother)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Toma et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Describe a structured framework for considering the range of consequences that antimicrobial stewardship interventions can have, both positive and negative. Based on a Cochrane review.

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#### **A global call from five countries to collaborate in antibiotic stewardship: united we succeed, divided we might fail (Lancet Infect Dis)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Goff et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care

Community/primary care  
Long-term facility care

*Short summary*

Review on different approaches for antibiotic stewardship in five countries: USA, South Africa, Colombia, Australia, and the UK.

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**Antibiotic stewardship in low- and middle-income countries: the same but different? (Clinical Microbiology and Infection)**

*Publishing year*

2017

*Author(s)*

Cox et al.

*Type of document*

Research

*Scope/aim*

International relevance

*Country/region*

International

*Setting(s)*

Hospital care  
Community/primary care  
Long-term facility care

*Short summary*

A literature review of antibiotic stewardship programs in low- and middle-income countries, highlighting challenges in LMICs. Examples of national programs are listed.

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**Managing responsible antimicrobial use: perspectives across the healthcare system (Clinical Microbiology and Infections)**

*Publishing year*

2017

*Author(s)*

ESCMID Study Group for Antimicrobial stewardshiP (ESGAP) (Dyar et al.)

*Type of document*

Research

*Scope/aim*

International relevance

*Country/region*

International

*Setting(s)*

Hospital care  
Community/primary care  
Long-term facility care

*Short summary*

To review real-world examples of how healthcare systems can promote responsible antimicrobial use, focusing on the role of governance and managers. Based on literature review, official documents (governments and agencies), and the experience that ESGAP has gained on the topic.

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**Antimicrobial Stewardship in Inpatient Settings in the Asia Pacific Region: A Systematic Review and Meta-analysis. (Clinical Infectious Diseases)**

*Publishing year*

2017

*Author(s)*

Honda et al.

*Type of document*

Research

*Scope/aim*

International relevance

*Country/region*

Asia

*Setting(s)*

Hospital care

*Short summary*

A review of the effect of antimicrobial stewardship programs in inpatient settings in the Asia Pacific region from January 2005 through March 2016. Forty-six studies were included for a

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### Optimising the quality of antibiotic prescribing in out-of-hours primary care in Belgium: a study protocol for an action research project

<i>Publishing year</i>	2017
<i>Author(s)</i>	A.Colliers, S. Coenen, H.Philips, R.Remmen, S.Anthierens
<i>Type of document</i>	Research
<i>Scope/aim</i>	Locally developed
<i>Country/region</i>	Belgium
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	Research project on optimising antibiotic prescription in out-of-hours primary care in Belgium.

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### What is the perception of the 10-point plan of the German Federal Ministry of Health against multidrug-resistant pathogens and measures of antibiotic stewardship? : An interdisciplinary analysis among German clinicians and development of a decision tool for urologists

<i>Publishing year</i>	2017
<i>Author(s)</i>	May M, Vetterlein MW, Wagenlehner FM, Brookman-May SD, Gilfrich C, Fritsche HM, Spachmann PJ, Burger M, Schostak M, Lebentrau S; MR2-Studiengruppe.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Germany
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Due to increasing antibiotic resistances, relevant treatment problems are currently emerging in clinical practice. In March 2015, the German Federal Ministry of Health (BMG) published a 10-point plan designed to combat this development. Furthermore, the first German guideline on antibiotic stewardship (ABS) was implemented in 2013 and instructs physicians of different specialties about several treatment considerations. Evidence is scarce on how such concepts (10-point plan/BMG, ABS) are perceived among clinicians.

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### Antimicrobial stewardship: a qualitative study of the development of national guidelines for antibiotic use in hospitals.

<i>Publishing year</i>	2017
<i>Author(s)</i>	Eli Feiring and Anne Berit Walte
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Norway
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	This study provides insights as to how guidelines that are intended to promote responsible use of antibiotics in hospitals can be carefully developed to facilitate perceptions of relevance, transparency, and authority by health professionals.

## Download

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## **Disease-based antimicrobial stewardship: a review of active and passive approaches to patient management. (J Antimicrob Chemother)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Foolad et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	Disease-based antimicrobial stewardship interventions for the following diseases were evaluated: pneumonia, acute bacterial skin and skin structure infections, bloodstream infections, urinary tract infections, asymptomatic bacteriuria, Clostridium difficile infection and intra-abdominal infections. The effect of these ASPs varies based on infectious disease syndrome, resource availability and intervention type.

### **Download**

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## **Antibiotic Stewardship in Small Hospitals: Barriers and Potential Solutions. (Clinical Infectious Diseases)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Stenehjem et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Propose potential solutions that tailor stewardship activities to the needs of the facility and the resources typically available in small hospitals. Presents four examples of small hospitals with significant experience in operationalizing ASPs.

### **Download**

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## **Implementing Antimicrobial Stewardship in Long-term Care Settings: An Integrative Review Using a Human Factors Approach (Clinical Infectious Diseases)**

<i>Publishing year</i>	2017
<i>Author(s)</i>	Katz et al. (IDSA)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	Review on the implementation of antimicrobial stewardship in long-term care facilities, using a human factors engineering approach to understand all aspects associated with successful implementations of multimodal interventions.

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## Antibiotic Stewardship in Nursing Facilities. (Infect Dis Clin N Am)

<i>Publishing year</i>	2017
<i>Author(s)</i>	McElligott et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	A review describing factors that influence antibiotic prescribing decisions, strategies to improve antibiotic prescribing, the current state of ASPs, and suggestions for expansion of antibiotic stewardship activity, in nursing facilities.

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## Ten key points for the appropriate use of antibiotics in hospitalised patients: a consensus from the Antimicrobial Stewardship and Resistance Working Groups of the International Society of Chemotherapy (International Journal of Antimicrobial Agents)

<i>Publishing year</i>	2016
<i>Author(s)</i>	Hara et al. (The Antibiotic Stewardship and Resistance Working Groups of the International Society for Chemotherapy)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Consensus document of the Antibiotic Stewardship and Resistance Working Groups of the International Society for Chemotherapy with ten key points for the appropriate use of antibiotics in hospitalised patients.

### Download

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## Antimicrobial stewardship in wound care: a Position Paper from the British Society for Antimicrobial Chemotherapy and European Wound Management Association

<i>Publishing year</i>	2016
<i>Author(s)</i>	Benjamin A. Lipsky, Matthew Dryden, Finn Gottrup, Dilip Nathwani, Ronald Andrew Seaton and Jan Stryja
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	This guidance document is aimed at providing clinicians an understanding of: the basic principles of why AMS is important in caring for patients with infected wounds; who should be involved in AMS and how to conduct AMS for patients with infected wounds

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## Current evidence on hospital antimicrobial stewardship objectives: a systematic review and meta-analysis. (Lancet Infect Dis)

<i>Publishing year</i>	2016
<i>Author(s)</i>	Schuts et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Netherlands
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	A systematic review and meta-analysis to study the effect of ASPs on four patient outcomes in hospitals and long-term care facilities: clinical outcomes, adverse events, costs, and bacterial resistance rates.

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## Antibiotic Stewardship Programs in U.S. Acute Care Hospitals: Findings From the 2014 National Healthcare Safety Network Annual Hospital Survey. (Clinical Infectious Diseases)

<i>Publishing year</i>	2016
<i>Author(s)</i>	Pollack et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	A national assessment of antibiotic stewardship based on CDC's 2014 National Healthcare Safety Network (NHSN) Annual Hospital Survey where questions on the 7 core elements of CDC's recommended hospital ASP were included. Gaps in the implementation of programs were identified.

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## Antimicrobial Stewardship for Neonates and Children: A Global Approach (Pediatric Infectious Disease Journal)

<i>Publishing year</i>	2015
<i>Author(s)</i>	Bielicki et al. (European Society for Paediatric Infectious Diseases)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Review on the basic principles and strategies of pediatric antimicrobial stewardship and application in different settings.

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## **An international cross-sectional survey of antimicrobial stewardship programmes in hospitals (J Antimicrob Chemother)**

<i>Publishing year</i>	2015
<i>Author(s)</i>	ESCMID Study Group for Antimicrobial Policies (ESGAP) and ISC Group on Antimicrobial Stewardship
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Results of an internet-based survey worldwide (660 hospitals, 67 countries) on the extent and components of antimicrobial stewardship programmes in hospitals.

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## **Antimicrobial stewardship activities in hospitals in Ireland and the United Kingdom: a comparison of two national surveys.**

<i>Publishing year</i>	2015
<i>Author(s)</i>	Aoife Fleming, Antonella Tonna, Síle O'Connor, Stephen Byrne, Derek Stewa
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Ireland
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Objective: To compare the membership of AMTs and AMS activities conducted in Irish and United Kingdom (UK) hospitals. Methods: A postal questionnaire to determine the membership and activities of AMTs was issued to the specialist antimicrobial pharmacist or pharmacist in charge

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## **Antibiotic Stewardship Initiatives as Part of the UK 5-Year Antimicrobial Resistance Strategy (Antibiotics)**

<i>Publishing year</i>	2015
<i>Author(s)</i>	Johnson et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	In 2013, a five-year national strategy for tackling antimicrobial resistance was published in the UK. This article reviews a number of stewardship activities implemented in England in support of the five-year national strategy for controlling antibiotic resistance.

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## Antibiotic stewardship challenges in the management of community-acquired infections for prevention of escalating antibiotic resistance (Journal of Global Antimicrobial Resistance)

<i>Publishing year</i>	2014
<i>Author(s)</i>	Garau et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	Review on antibiotic stewardship strategies and other preventative approaches that support the management of community-acquired infections.

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## Antimicrobial stewardship in long term care facilities: what is effective? (Antimicrobial Resistance and Infection Control)

<i>Publishing year</i>	2014
<i>Author(s)</i>	Nicolle, L. E.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Canada
<i>Setting(s)</i>	Long-term facility care
<i>Short summary</i>	This review identified a limited number of studies which evaluate the implementation and effectiveness of ASPs for long term care residents. The programs described in these reports are all unique. There is no standardization of program components, implementation strategies, or evaluation.

### Download

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## Antibiotic stewardship has been established at Herlev Hospital

<i>Publishing year</i>	2014
<i>Author(s)</i>	Arpi M, Gjørup I, Boel JB, Bøggild N, Hansen SW, Jarløv JO.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Locally developed
<i>Country/region</i>	Denmark
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	A high incidence of Clostridium difficile and multiresistant organisms and increasing consumption of cephalosporins and quinolones have required an antibiotic stewardship programme, and antibiotic audits with feedback, revised guidelines and stringent prescription rules have been successful. The hospital intervention was managed by an antibiotic team combined with contact persons in all departments, a pocket edition of the guideline was available, and monthly commented reports about antibiotic consumption in each department were presented on the intranet. Significant declining use of restricted antibiotics was observed.

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## Importance of antimicrobial stewardship to the English National Health Service.

<i>Publishing year</i>	2014
<i>Author(s)</i>	Dixon J, Duncan CJ.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Here we provide a concise summary to clarify the current position and importance of AMS within the NHS and review the evidence base for AMS recommendations.

### Download

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## Development and validation of potential structure indicators for evaluating antimicrobial stewardship programmes in European hospitals (Eur J Clin Microbiol Infect Dis 2013)

<i>Publishing year</i>	2013
<i>Author(s)</i>	Buyle et al. (Antibiotic Strategy International (ABS) Quality Indicators Team)
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	Europe
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Study on the development and pilot validation of structure indicators for hospital antimicrobial stewardship programmes in European hospitals.

### Download

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## Antimicrobial Stewardship Initiatives Throughout Europe: Proven Value for Money.

<i>Publishing year</i>	2017
<i>Author(s)</i>	Edwin J.M. Oberjé, Marit A.C. Tanke Patrick P.T. Jeurissen <sup>2</sup> ,
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Netherlands
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	The aim of this study is to highlight some of the success stories of proven cost-effective interventions, and to describe the actions that have been taken, the outcomes that have been found, and the difficulties that have been met. In some cases we came across substantial scope for real-life cost savings. Although the best approach to effectively hinder the spread of antimicrobial resistance remains unclear and may vary significantly among settings, several EU-wide examples demonstrate that cost-effective antimicrobial stewardship is possible. Such examples can encourage others to implement (the most cost-effective) elements in their system.

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## **The Global Alliance for Infections in Surgery: defining a model for antimicrobial stewardship-results from an international cross-sectional survey.**

<i>Publishing year</i>	2018
<i>Author(s)</i>	Sartelli M, Labricciosa FM, Barbadoro P, Pagani L, Ansaloni L, Brink AJ, et al.
<i>Type of document</i>	Research
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	The aim of this study is to evaluate structures and resources of antimicrobial stewardship teams (ASTs) in surgical departments from different regions of the world.

### **Download**

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## **Role of the Clinical Microbiology Laboratory in Antimicrobial Stewardship**

<i>Publishing year</i>	2018
<i>Author(s)</i>	Bouza E, Muñoz P, Burillo A.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Locally developed
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Describe the contributions of the microbiology department to the antimicrobial stewardship program of a large teaching hospital as 10 main points ranging from the selection of patients deemed likely to benefit from a fast track approach, to their clinical samples, or the rapid reporting of results via a microbiology hotline, to rapid searches for pathogens and susceptibility testing. These points should serve as guidelines for similar programs designed to decrease the unnecessary use of antimicrobials.

### **Download**

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## **The economic evaluation of an antibiotic checklist as antimicrobial stewardship intervention.**

<i>Publishing year</i>	2017
<i>Author(s)</i>	van Daalen FV, Opmeer BC, Prins JM, Geerlings SE, Hulscher MEJL.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Region-wide
<i>Country/region</i>	Netherlands
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	An antibiotic checklist was introduced in nine Dutch hospitals to improve appropriate antibiotic use. We estimated the cost-effectiveness of checklist use

### **Download**

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## Inventory of antibiotic stewardship programs in general practice in France and abroad.

<i>Publishing year</i>	2015
<i>Author(s)</i>	Wang S, Pulcini C, Rabaud C, Boivin JM, Birgé J.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	France
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	The authors conducted a survey of measures implemented in France and abroad for a better use of antibiotics in general practice. A literature review was conducted from January 2000 to July 2014. Emails were sent to every infectious diseases department, to all regional health authorities (ARS), to the health insurance offices (CPAM) with the highest and lowest antibiotic use, and to the ministry of health to make an inventory of all antibiotic stewardship programs. The ministry of health, the board of general practitioners, infectious diseases specialists, pharmacists, and the medical and pharmacy schools of the nation's capital were contacted in 17 countries of Europe and North America.

### Download

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## Participatory action research in antimicrobial stewardship: a novel approach to improving antimicrobial prescribing in hospitals and long-term care facilities.

<i>Publishing year</i>	2014
<i>Author(s)</i>	van Buul LW1, Sikkens JJ, van Agtmael MA, Kramer MH, van der Steen JT, Hertogh CM.
<i>Type of document</i>	Research
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Netherlands
<i>Setting(s)</i>	Hospital care Long-term facility care
<i>Short summary</i>	It is challenging to change physicians' antimicrobial prescribing behaviour. Although antimicrobial prescribing is determined by contextual (e.g. a lack of guidelines), cultural (e.g. peer practice) and behavioural (e.g. perceived decision making autonomy) factors, most antimicrobial stewardship programmes fail to consider these factors in their approach. This may lead to suboptimal intervention effectiveness. We present a new approach in antimicrobial stewardship programme development that addresses relevant determinants of antimicrobial prescribing: participatory action research (PAR). PAR is a collaborative process that aims to bring about change in social situations by producing practical knowledge that is useful in local practice. It requires substantial involvement of relevant stakeholders to address determinants of the studied behaviour and to facilitate empowerment. PAR is well suited for complex problems in multidisciplinary settings as it adapts to local needs, delivering a tailored approach to improving local practice. We describe how PAR can be applied to antimicrobial stewardship, and describe the PAR design of two ongoing multicentre antimicrobial stewardship projects, in the acute care setting and the long-term care setting, respectively.

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## Tools and educational resources

### Antimicrobial Stewardship: A competency-based approach

<i>Publishing year</i>	2018
<i>Author(s)</i>	WHO
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	From source: This course will equip clinicians who frequently prescribe antimicrobials with knowledge and tools to improve their use in daily clinical practice. Through case based examples, the course will highlight how antimicrobial stewardship principles can be applied to common clinical scenarios.

#### Download

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### Antimicrobial Stewardship: Managing Antibiotic Resistance (online course)

<i>Publishing year</i>	2018
<i>Author(s)</i>	The British Society for Antimicrobial Chemotherapy (BSAC)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	Course aims to help participants understand antibiotic resistance, and how antimicrobial stewardship can slow down or reduce it. The course is free.

#### Download

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### TARGET Antibiotic Toolkit (website)

<i>Publishing year</i>	2018
<i>Author(s)</i>	Royal College of General Practitioners (UK)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	A website with information and resources for antibiotics use in the primary care setting. Targeting mainly antibiotic prescribers but also their patients. Collectively, the TARGET resources will support practices in planning, implementing and reviewing activity in delivering quality improvement programmes relating to antimicrobial stewardship

#### Download

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## TARGET Antibiotic Training Modules

<i>Publishing year</i>	2018
<i>Author(s)</i>	Public Health England (PHE), the British Society for Antimicrobial Chemotherapy (BSAC)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	From source: Webinars describing actions to take to help improve antibiotic prescribing in the primary care setting.

### Download

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## CDC's Antibiotic Stewardship Training Series

<i>Publishing year</i>	2018
<i>Author(s)</i>	Centers for Disease Control and prevention
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	From source: Interactive web-based course designed to help clinicians optimize antibiotic use to combat antibiotic resistance and improve healthcare quality and patient safety. Includes information about antibiotic resistance and threats and explanations of the benefits of antibiotic stewardship.

### Download

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## Antimicrobial Stewardship (AMS), Volume Two (book)

<i>Publishing year</i>	2017
<i>Author(s)</i>	ESCMID study group on antibiotic policies (ESGAP)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	A 'hands on', practical approach, tips to increase success, a description of the most common mistakes, a global picture (out- and inpatient settings, all countries) and a short list of 10-20 landmark references.

### Download

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## Antimicrobial stewardship: changing risk related behaviours in the general population

<i>Publishing year</i>	2017
<i>Author(s)</i>	National Institute for Health and Care Excellence (NICE)

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<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care Community/primary care Long-term facility care
<i>Short summary</i>	This guideline covers making people aware of how to correctly use antimicrobial medicines (including antibiotics) and the dangers associated with their overuse and misuse. It aims to change people's behaviour to reduce antimicrobial resistance and the spread of resistant microbes. The website also has Tools and Evidence with resources.

## Download

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### NECS e-learning: antibiotic prescribing and antimicrobial stewardship in primary care

<i>Publishing year</i>	2016
<i>Author(s)</i>	National Institute for Health and Care Excellence (NICE)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	Working across 11 Clinical Commissioning Groups (CCGs) in the North East and Cumbria, the North of England Commissioning Support (NECS) team developed an e-learning package to promote antimicrobial stewardship and prudent prescribing amongst primary care clinicians across the North East & Cumbria.
	The package (Shared learning database) is designed to support local implementation of NICE CG69 (respiratory tract infections (self-limiting): prescribing antibiotics), especially the decision making process when considering whether or not to prescribe an antibiotic.

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### Evaluation of new antimicrobials for the hospital formulary. Policies restricting antibiotic use in hospitals.

<i>Publishing year</i>	2013
<i>Author(s)</i>	Pujol M, Delgado O, Puigventós F, Corzo JE, Cercenado E, Martínez JA.
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Region-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	This review summarizes information regarding antibiotic evaluation and available restrictive strategies to limit the use of antibiotics at hospitals with the aim of curtailing increasing antibiotic resistance.

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### How to assist clinicians in improving antimicrobial prescribing: tools and interventions provided by stewardship programs

<i>Publishing year</i>	2013
<i>Author(s)</i>	López-Medrano F. et al.

<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Tools to implement the antimicrobial stewardship program

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#### **Boletín farmacoterapéutico: La ventana farmacoterapéutica: Uso prudente de antimicrobianos en atención primaria**

<i>Publishing year</i>	2013
<i>Author(s)</i>	Unidad de Gestión Clínica de Farmacia de Atención Primaria de Sevilla (Andalucía)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Locally developed
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Community/primary care
<i>Short summary</i>	Recommendations on the proper use of antimicrobials

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#### **Appropriate Use of Medical Resources: Antimicrobial Stewardship Toolkit**

<i>Publishing year</i>	2013
<i>Author(s)</i>	American Hospital Association (AHA)
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Antimicrobial stewardship toolkit with an overview of resources (to get started, to enhance an existing program, implementation guidelines and tools, webinars, patient resources).

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#### **Blog: PROAntibióticos**

<i>Publishing year</i>	2012
<i>Author(s)</i>	H.U.La Paz (Madrid); H.C.U.de Zaragoza
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Blog and/or forum with Information and tools for the correct use of antibiotics.

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#### **Antimicrobial stewardship: an evidence-based, antimicrobial self-assessment toolkit (ASAT) for acute hospitals (J Antimicrob Chemother)**

<i>Publishing year</i>	2010
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<i>Author(s)</i>	Cooke et al. (Advisory Non-Departmental Public Body on Antimicrobial Resistance and Healthcare Associated Infections (ARHAI))
<i>Type of document</i>	Tool and/or educational resource
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	United Kingdom
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Development of an antimicrobial self-assessment toolkit (ASAT) that offers a checklist for hospitals to self-assess their organizations' levels of antimicrobial stewardship.

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## Other publications

### Antimicrobial Stewardship Programs: Principles and Practice.

<i>Publishing year</i>	2018
<i>Author(s)</i>	Cunha CB.
<i>Type of document</i>	Other Publications
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Antimicrobial stewardship involves optimizing antibiotic use while using cost-effective interventions to minimize antibiotic resistance and control <i>Clostridium difficile</i> . An effective hospital-wide antimicrobial stewardship program (ASP) should be led by an infectious disease (ID) physician. The ASP team needs full and ongoing financial support for the ASP from the hospital administration. The ID clinician leader should have special expertise in various aspects of antimicrobial therapy, that is, pharmacokinetics, resistance, pharmacoeconomics, and <i>C difficile</i> . The ASP ID team leader and ID-trained clinical pharmacist staff are responsible for customizing ASP interventions to the hospital's unique set of antibiotic use-related concerns.

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### Redefining the Antibiotic Stewardship Team: Recommendations from the American Nurses Association/Centers for Disease Control and Prevention Workgroup on the Role of Registered Nurses in Hospital Antibiotic Stewardship Practices

<i>Publishing year</i>	2017
<i>Author(s)</i>	American Nurses Association (ANA), Centers for Disease Control and prevention
<i>Type of document</i>	Other Publications
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	USA
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	White paper on the role of nurses in hospital antimicrobial stewardship programmes consisting of three parts: 1) review of the literature on antimicrobial stewardship, 2) current barriers for full nurse participation in antimicrobial stewardship programmes, 3) opportunities for nurses.

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## AP 06b Infectious Disease Management\_logical frame

<i>Publishing year</i>	2015
<i>Author(s)</i>	Ministry of Health of the Czech Republic
<i>Type of document</i>	Other Publications
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Czech Republic
<i>Setting(s)</i>	Hospital care
<i>Short summary</i>	Logical frame for the implementation of the HEALTH 2020 - Action Plan 6: Managing Infectious Diseases for 2015-2020

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## Success stories of implementation of antimicrobial stewardship: a narrative review.

<i>Publishing year</i>	2014
<i>Author(s)</i>	B.Huttnera, S.Harbartha, D.Nathwanibon behalf of the ESCMID Study Group for Antibiotic Policies (ESGAP)
<i>Type of document</i>	Other Publications
<i>Scope/aim</i>	International relevance
<i>Country/region</i>	International
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	The aim of this review is to highlight some of the success stories of AMS strategies, and to describe the actions that have been taken, the outcomes that have been obtained, and the obstacles that have been met. Although the best approach to effective AMS remains elusive and may vary significantly among settings, these diverse examples from a range of healthcare contexts demonstrate that effective AMS is possible. Such examples will inform others and encourage them to formally evaluate and share their results with the global stewardship community.

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## Plan estratégico y de acción para reducir el riesgo de selección y diseminación de la resistencia a antibióticos

<i>Publishing year</i>	2014
<i>Author(s)</i>	Spanish Agency of medicines and health products (AEMPS)
<i>Type of document</i>	Other Publications
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Spain
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	Strategic plan to reduce the risk of selection and dissemination of antibiotic resistance.

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## Action Plan of the National Antibiotic Program for the period 2011-2013

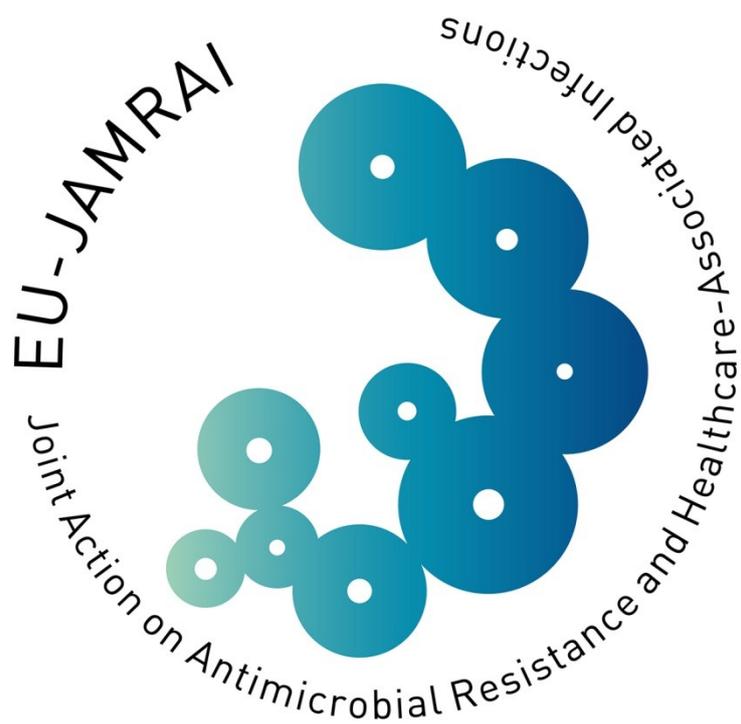
<i>Publishing year</i>	2011
<i>Author(s)</i>	Ministry of Health of the Czech Republic
<i>Type of document</i>	Other Publications
<i>Scope/aim</i>	Nation-wide
<i>Country/region</i>	Czech Republic
<i>Setting(s)</i>	Hospital care Community/primary care
<i>Short summary</i>	National Antibiotic Action Plan for 2011-2013 ("AP NAP") of Czech Republic.

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