Worldwide country situation analysis:

response to antimicrobial resistance

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Acronyms and abbreviations

AMR	antimicrobial resistance
CAESAR	Central Asian and Eastern European Surveillance of Antimicrobial Resistance network
EARS-Net	European Antimicrobial Resistance Surveillance Network
IPC	infection prevention and control
MDR	multidrug-resistant
PAHO	Pan American Health Organization
TB	tuberculosis
WePARS	Western Pacific Antimicrobial Resistance Surveillance

1. Country strategies to control antimicrobial resistance

Global overview

Antimicrobial resistance has been detected in all parts of the world; it is one of the greatest challenges to global public health today, and the problem is increasing. Although antimicrobial resistance is a natural phenomenon, it is being propagated by misuse of antimicrobial medicines, inadequate or inexistent programmes for infection prevention and control (IPC), poor-quality medicines, weak laboratory capacity, inadequate surveillance and insufficient regulation of the use of antimicrobial medicines.

A strong, collaborative approach will be required to combat antimicrobial resistance, involving countries in all regions and actors in many sectors. Over a 2-year period, from 2013 to 2014, WHO undertook an initial "country situation analysis" in order to determine the extent to which effective practices and structures to address antimicrobial resistance were already in place and where gaps remained. The survey was conducted in countries in each of the six WHO regions.

A multi-stage analytical tool was developed to assess the situation at the national level. The tool was based on existing WHO assessment tools and reflected the elements contained in the policy package to address antimicrobial resistance that was issued on World Health Day 2011. Country authorities were asked to complete a questionnaire on their existing strategies, systems and activities. The questionnaires were completed either by the authorities themselves through self-assessment or at an interview with a WHO officer on the occasion of a country visit.

This report presents the overall findings of the survey. It provides an analysis, by region and globally, of the initiatives under way to address antimicrobial resistance and identifies areas in which more work is needed. The survey focused on the building blocks that are considered prerequisites to combat antimicrobial resistance: a comprehensive national plan, laboratory capacity to undertake surveillance for resistant microorganisms, access to safe, effective antimicrobial medicines, control of the misuse of these medicines, awareness and understanding among the general public and effective infection prevention and control programmes. Since the survey was conducted, some countries have made further advances and additional initiatives have been launched. No reference therefore is made to individual countries, and the results reflect the situation at the time the questionnaires were completed.

Comprehensive national plans, based on a multisectoral approach and with sustainable financing, are regarded as one of the main ways to fight antimicrobial resistance globally (WHO, 2011); however, few countries reported having such a plan. Some countries did report that a national focal point for antimicrobial resistance had been identified and had a national coordination mechanism in place. Others had introduced national strategies and policies to address antimicrobial resistance.

A national surveillance mechanism and the necessary laboratory capacity are essential to detect, analyse and track resistant microorganisms. Surveillance can reveal the presence of patterns of resistant microorganisms and identify trends and outbreaks. In many regions, however, poor laboratory capacity, infrastructure and data management prevented effective surveillance. Although laboratory capacity varied by country in all regions, at least one country in each of the six regions had a national reference laboratory capable of testing for antibiotic sensitivity and subject to external quality assessment. The same countries also reported monitoring of antimicrobial resistance in humans.

Regions in which there are many high-income countries, such as the European and the Western Pacific regions, reported higher rates of access to high-quality medicines than other regions.

The survey also revealed that the sale of antimicrobial medicines without prescription was widespread in many countries. Furthermore, many countries lacked standard treatment guidelines for health care. Thus, the potential for overuse of antimicrobial medicines by the public and by the medical profession was common in countries in all regions. Few countries reported a system for monitoring the use of antimicrobial medicines. Thus, tracking prescribing patterns and over-the-counter sales remains a significant challenge.

Public awareness of antimicrobial resistance was low in all regions. Even in some countries in which national public awareness campaigns had been conducted, there was still widespread belief that antibiotics are effective against viral infections. More education and collaborative awareness-raising campaigns in sectors such as health care, politics and the media may therefore be required.

Programmes to prevent and control the spread of antimicrobial-resistant infections are also essential. Without effective hygiene and sanitation measures, infections can spread rapidly through health care facilities and between countries and regions by travel and trade. Half of the countries in the European, South-East Asia and Western Pacific regions that responded to the survey reported having a national IPC programme in place; fewer had comparable programmes in all tertiary hospitals. IPC thus tended to be inadequate.

Overall, the findings of this survey reveal that much is under way and indicate that countries are committed to addressing this complex problem. Some countries already have a number of activities in place, while others are embarking on the work and face challenges. This initial country situation analysis provides an overview and can serve as a reference against which countries and WHO can monitor progress in implementing actions to address the challenge of antimicrobial resistance in coming years.

1.1 Introduction

Antimicrobial resistance is recognized as one of the principal threats to public health throughout the world: its impact is felt all areas of health, and it affects the whole of society. Although antimicrobial resistance is a natural phenomenon, it is exacerbated by the misuse of antimicrobial medicines, poor or non-existent IPC programmes, poor-quality medicines, weak laboratory capacity, inadequate surveillance and poor regulation or enforcement of regulations to assure access to high-quality antimicrobial medicines and their appropriate use.

On 7 April 2011, on the occasion of World Health Day[1], WHO introduced a policy package to combat antimicrobial resistance, which lists critical actions by all stakeholders to stimulate change.

Although widely recognized as an urgent problem by many international organizations and ministries of health, not all countries have a response plan to tackle antimicrobial resistance. Some regions face other, more pressing problems, and many low- to middle-income countries do not have the resources to implement response mechanisms. A "country situation analysis" was subsequently conducted in countries in each of the six WHO regions to assess current practices and to determine the structures that were in place to control antimicrobial resistance. The results of that analysis are summarized in this report.

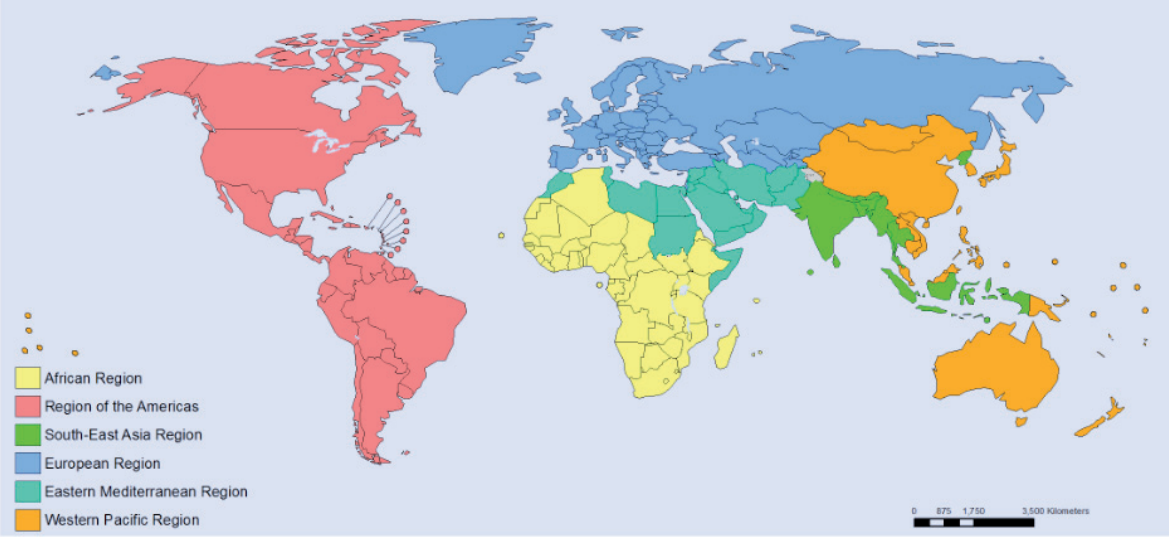
[1] World Health Day 2011: Policy briefs. http://www.who.int/world-health-day/2011/policybriefs/en/

At the Sixty-seventh World Health Assembly, in May 2014, Member States approved a resolution, WHA67.25, requesting WHO to draft a global action plan on antimicrobial resistance. The draft plan will be reviewed at the Sixty-eighth World Health Assembly[2]. It is based on input received during broad multisectoral consultations with countries, international organizations, nongovernmental organizations and other stakeholders and sets out five strategic objectives: to improve awareness and understanding of antimicrobial resistance, to gain knowledge through surveillance and research, to reduce the incidence of infection, to optimize the use of antimicrobial medicines and to ensure sustainable investment in countering antimicrobial resistance.

1.2 Data collection methods

WHO is represented throughout the world, divided into six regions: the African Region, the Region of the Americas, the Eastern Mediterranean Region, the European Region, the South-East Asia Region and the Western Pacific Region (Figure 1.1). The survey was conducted in countries in all WHO regions.

Figure 1.1. **World Health Organization regions**



A multi-stage rapid assessment analytical tool was devised to assess the situation in countries. The tool was based on existing WHO assessment tools and reflected the elements contained in the policy package to address antimicrobial resistance that was issued on World Health Day 2011, which built on previous recommendations (WHO global strategy for containment of antimicrobial resistance, 2001) and resolution WHA51.17. It listed the following activities for combatting antimicrobial resistance:

- Adhere to a comprehensive, financed national plan with accountability and civil society engagement.
- Strengthen surveillance and laboratory capacity.
- Ensure uninterrupted access to essential medicines of assured quality.
- Regulate and promote rational use of medicines, and ensure proper patient care.
- Enhance infection prevention and control.
- Foster innovation, research and new tools.

[2] Antimicrobial resistance: draft global action plan on antimicrobial resistance http://apps.who.int/gb/ebwha/pdf_files/WHA68/A68_20-en.pdf

The questionnaire was pilot-tested in 2012, and a simplified version was distributed to countries for completion between 2013 and 2014. Authorities in each country were invited to complete the questionnaire themselves or with WHO staff from the regional or country office and to return it to the regional office. The data were compiled, and the results were recorded as simple frequencies. Blank responses were recorded as "unknown".

The questionnaire addressed the use of antimicrobial medicines in both human and animal health; however, this report is limited to the findings in humans. In due course, a further survey will be conducted, in collaboration with the Organisation for Animal Health and the Food and Agriculture Organization of the United Nations, on issues related to antimicrobial resistance and animal health.

Table 1.1 gives the numbers of Member States in each region from which information was received. A total of 133 of the 194 WHO Member States provided information.

Table 1.1 – **Responses to requests for information for the country situation analysis, by region**

WHO region	No. of Member States	Total no. of Member States in region	Percentage
African Region	8	47	17
Region of the Americas	26	35	74
Eastern Mediterranean Region	13	21	62
European Region	49	53	92
South-East Asia Region	11	11	100
Western Pacific Region	26	27	96

For each region, all data were analysed on the basis of the number of countries from which information was received.

The aim of this report is to provide an overview of the extent to which effective practices and structures designed to address ant microbial resistance are in place and where gaps remain. Some of the data are more than 1 year old; it is likely that improvements have been made since the original assessment, which will be reflected in future reports.

In view of the difference in the proportions of countries in each region that responded, the results should be interpreted with caution, particularly in making any comparisons between countries or regions.

1.3 National plans and other strategies

A financed national plan with multisectoral input is essential for addressing antimicrobial resistance, and the draft global action plan urges all countries to have such a plan. Figure 1.2 shows that the South-East Asia Region had the highest proportion of countries with such plans (45%); the European Region followed closely, with 43%. Further work is therefore needed, including among countries that have strong health care systems.

Other national mechanisms, such as a national focal point and a central coordination mechanism, were generally more common than plans (Figure 1.2). Many countries reported having a national policy or strategy, but few had published a progress report within the previous 5 years.

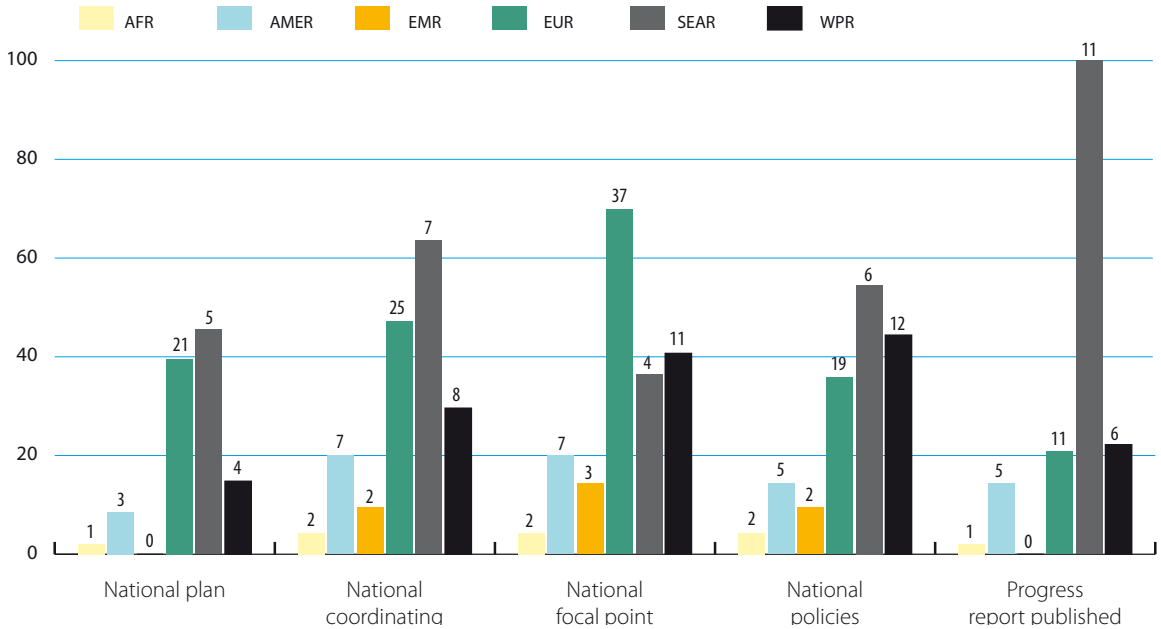


Figure 1.2 – **Percentages of Member States that had a national plan for antimicrobial resistance, a coordinating mechanism, a focal point, a policy or a strategy and had prepared a report in the previous 5 years, by region**
(Note: numbers above the bars represent the numbers of participating Member States that answered "yes")

AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

1.4 Surveillance and laboratory capacity

Well-equipped laboratories with well-trained staff that report regularly to functioning surveillance systems allow the detection and tracking of antimicrobial-resistant microorganisms and prompt notification to the relevant authorities when an outbreak occurs. Data from surveillance also allow policy-makers to introduce evidence-based standards and regulations and health care managers to make decisions on appropriate care.

Antimicrobial resistance among rapidly growing bacteria and Mycobacterium tuberculosis was monitored in all regions, over 60% of respondents in each region reporting this type of surveillance (Figure 1.3). Regional networks support surveillance in many countries; however, none includes all the countries in its respective region.

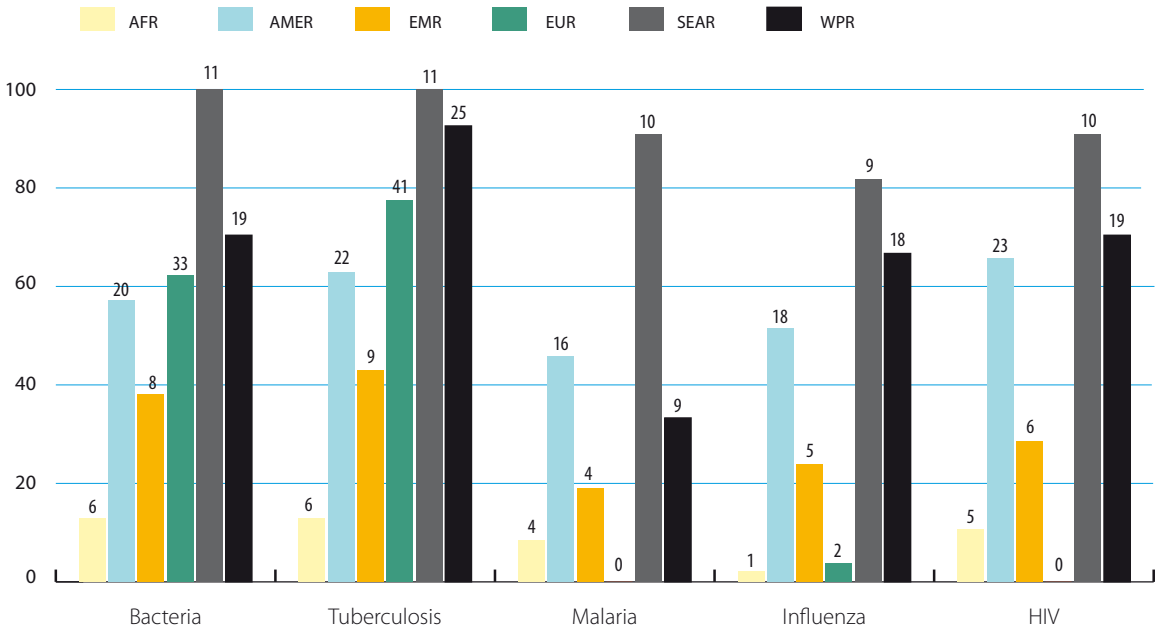


Figure 1.3 – **Percentages of Member States that had conducted surveillance for antimicrobial resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, all regions**
(Note: numbers above the bars represent the numbers of participating Member States that answered "yes")

AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

Typically, countries cited a lack of laboratories with sufficient competent technical staff, weak infrastructure, poor data management and lack of standards as impediments to effective laboratory surveillance. Figure 1.4 shows that the highest percentage of countries with national reference laboratories in which organisms are tested for antibiotic sensitivity (96%) was in the Region of the Americas. National reference laboratories existed in 69–82% of countries in the European, South-East Asia and Western Pacific regions. National reference laboratories are often responsible for implementing national external quality assessment schemes, to ensure that the same testing standards and methods are used throughout the country. Although at least one country in each region reported having a national reference laboratory, many did not participate in external quality assessment schemes to ensure that the data on antimicrobial resistance that were collected were of reliable quality (Figure 1.4).

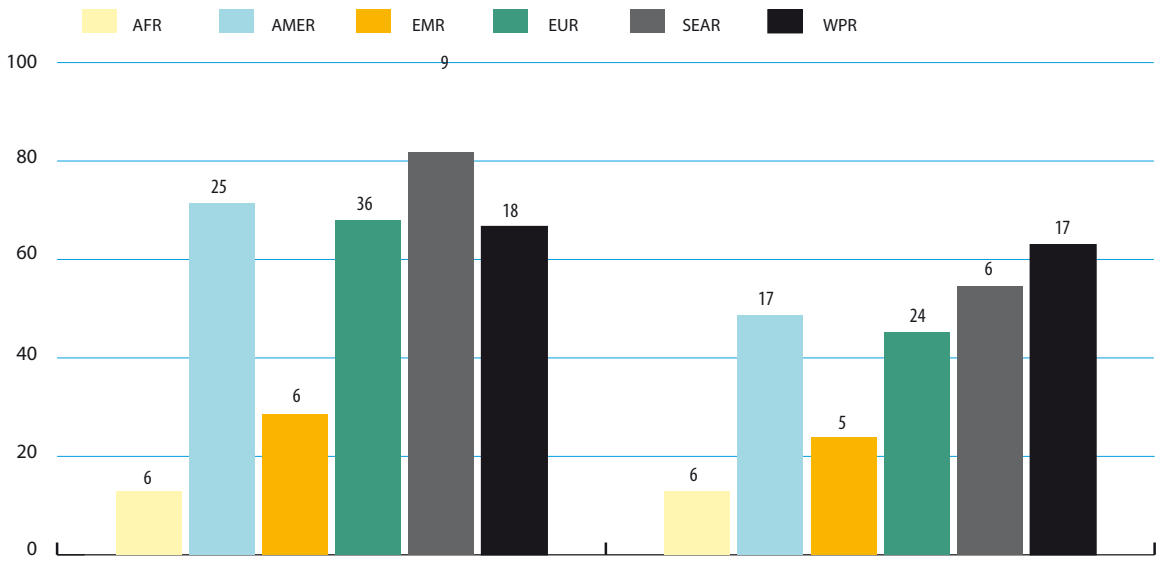


Figure 1.4 – **Percentages of Member States in which laboratory sensitivity was tested and which participated in external quality assessment, all regions**
(Note: numbers above the bars represent the numbers of Member States that answered "yes")

NRL, national reference laboratory; EQA, external quality assessmentAFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

With the exception of two regions in which most countries reported on antimicrobial resistance surveillance, national reports on this topic were infrequent (Figure 1.5).

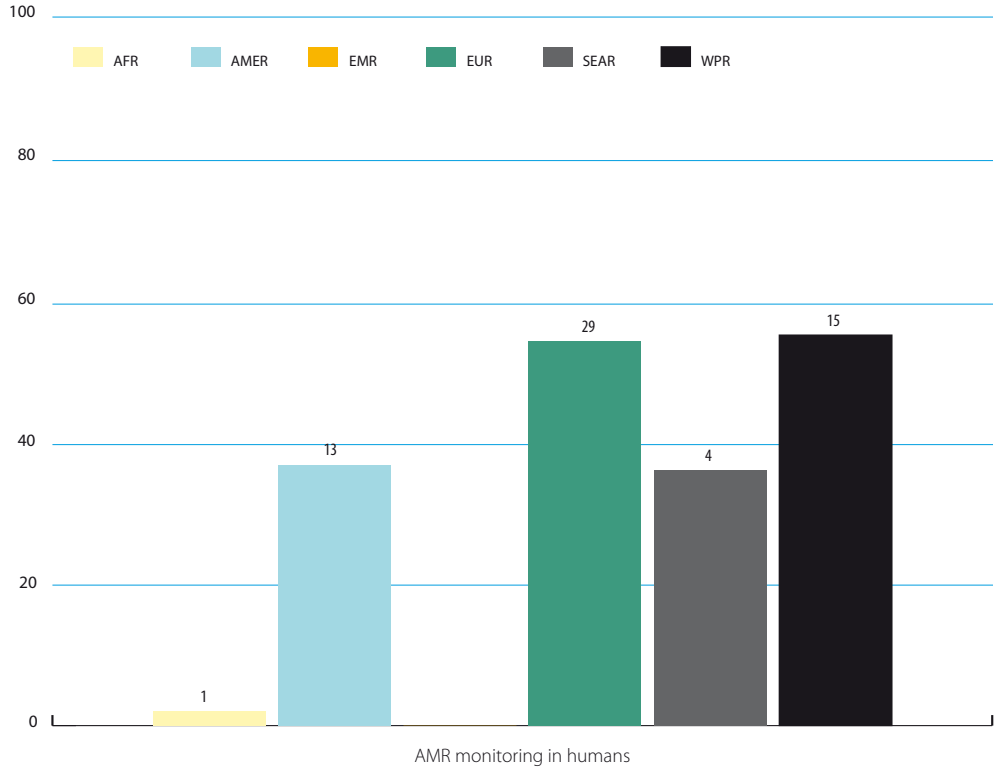


Figure 1.5 – **Percentages of Member States in which reports on surveillance for antimicrobial resistance had been prepared in the past 5 years, all regions**
(Note: numbers above the bars represent the numbers of Member States that answered "yes")

AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

1.5 Access to quality-assured antimicrobial medicines

Ready access to quality-assured antimicrobial medicines is important for preventing the appearance of new antimicrobial-resistant microorganisms. Poor-quality medicines may not contain the correct amount of active ingredient, resulting in sub-optimal dosing. This can be overcome with strong national regulations on medicine production and by strengthening the ability of authorities to regulate the industry.

Counterfeit medicines have been reported to be a problem in many regions (WHO, 2006, 2010; Ndihokubwayo et al., 2013; WHO Regional Office for the Eastern Mediterranean, 2013). The situation stems from weak regulatory systems and inability to enforce laws. The wide availability of medicines for direct sale to patients—for example, on the Internet—remained a problem for all regions. Figure 1.6 shows the percentages of countries in each region that reported having a national regulatory authority, national quality standards and capacity within the regulatory authority to enforce the standards. In the regions in which there were problems of low-quality and/or counterfeit medicines, few countries had a national regulatory authority, national standards or the capacity to enforce them.

The majority of countries participating in the survey had a list of essential medicines (Figure 1.7), which are those that "satisfy the priority health care needs of the population" (WHO, 2003). Comparison of Figures 1.6 and 1.7 would indicate, however, that having such a list does not necessarily result in access to high-quality essential medicines.

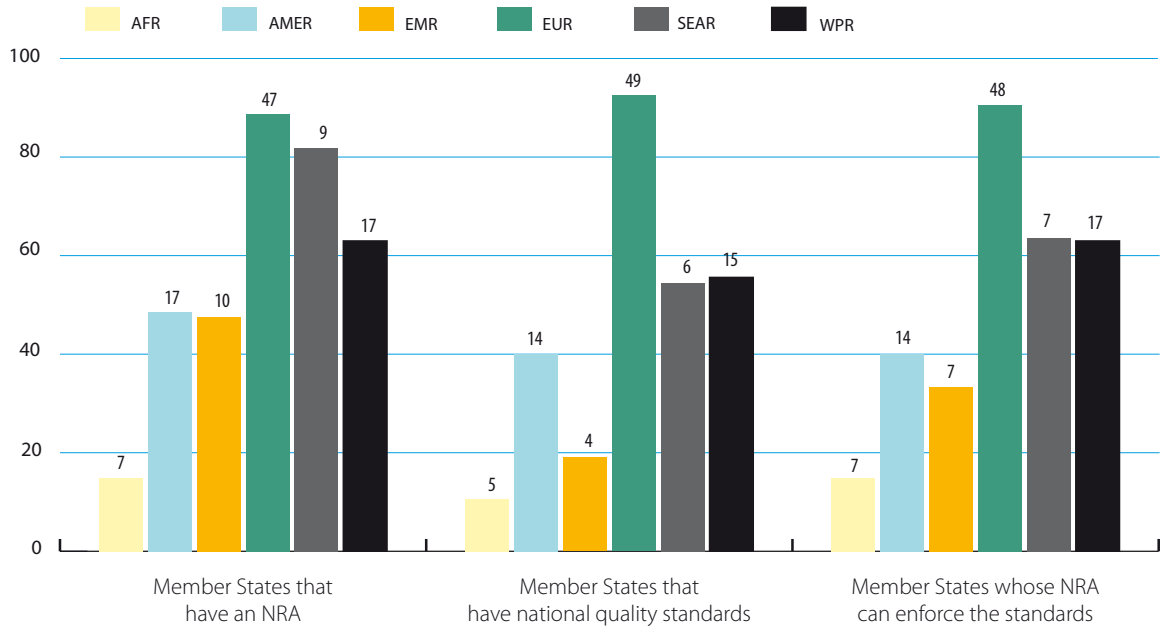


Figure 1.6 – **Percentages of Member States with a regulatory authority, quality standards and the capacity to enforce the standards, all regions**
(Note: numbers above the bars represent the numbers of Member States that answered "yes")

NRA, national regulatory authority AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

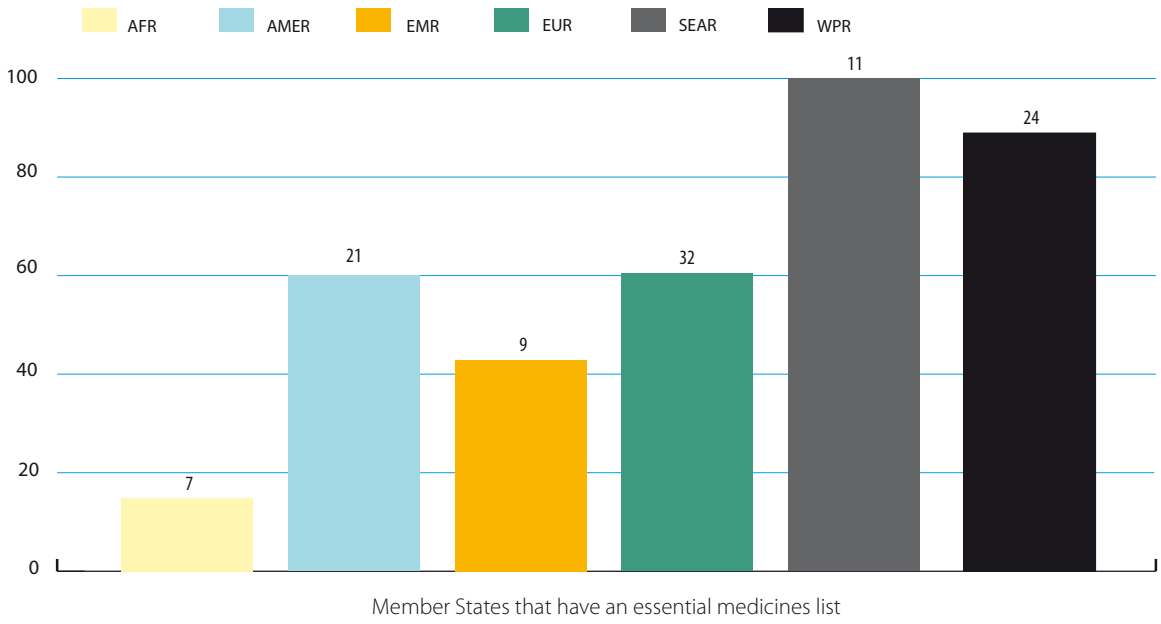


Figure 1.7 – **Percentages of Member States that had a list of essential medicines, all regions**
(Note: numbers above the bars represent the numbers of Member States that answered "yes")

AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

1.6 Use of antimicrobial medicines

Both overuse and misuse of antimicrobial medicines accelerate the emergence of resistant microorganisms. Misuse can be due to:

- poor prescribing practice, including prescribing antimicrobial medicines when not required, incorrect choice of medicine, or at an incorrect dosage;
- self-medication in countries in which antimicrobial medicines are freely available;
- failure to finish a course of antimicrobial medicines or taking them for too long;
- lack of regulations or standards for health care workers (WHO, 2011); and
- misuse and overuse in animal husbandry and agriculture.

Table 1.2 shows that antimicrobial medicines were generally freely available in all countries and regions. Furthermore, regulations on the sale of prescription-only medicines could not be widely enforced in several regions, and many countries had no guidelines for proper prescribing practice. Poor awareness of antimicrobial resistance represents a major area for urgent national and regional action (see section 1.7).

Monitoring of the use of antimicrobial medicines was infrequent in most regions; the highest proportion of countries that monitored such use was in the European Region. Monitoring use enables national authorities to identify unmet needs in order to improve prescribing practice, for example through standard treatment guidelines, public awareness campaigns and education and training for health care workers (WHO, 2011). Even knowledgeable personnel may lack up-to-date information on prescribing antimicrobial medicines in line with current standard treatment recommendations.

Table 1.2 – **Practices related to use of antimicrobial medicines, all WHO regions**

	WHO region (percentage: no. of positive responses/ no. of Member States)					
	African	Americas	Eastern Mediterranean	European	South-East Asia	Western Pacific
Antimicrobial medicines are available without a prescription.	17	51	43	43	64	52
Restriction of prescription-only medicines can be enforced.	11	31	33	55	82	85
Standard treatment guidelines could be drawn up.	11	40	33	43	100	59
Use of antimicrobial medicines was monitored in the previous 5 years.	6	17	19	66	9	52

1.7 Public awareness

At the time of the survey, public awareness appeared to be low in all regions (Figure 1.8). This situation is alarming, particularly in countries where antimicrobial medicines are readily available without a prescription (see section 1.6). In the analysis of the level of awareness about antimicrobial resistance in health care, politics, the media and academia, academics were generally more aware of the problem than others, including health care workers. The general lack of awareness in these sectors would indicate that antimicrobial resistance is likely to spread further. Without sufficient awareness, the appropriate regulations and standards will not be legislated, and other sectors will lack the information needed to implement them effectively.

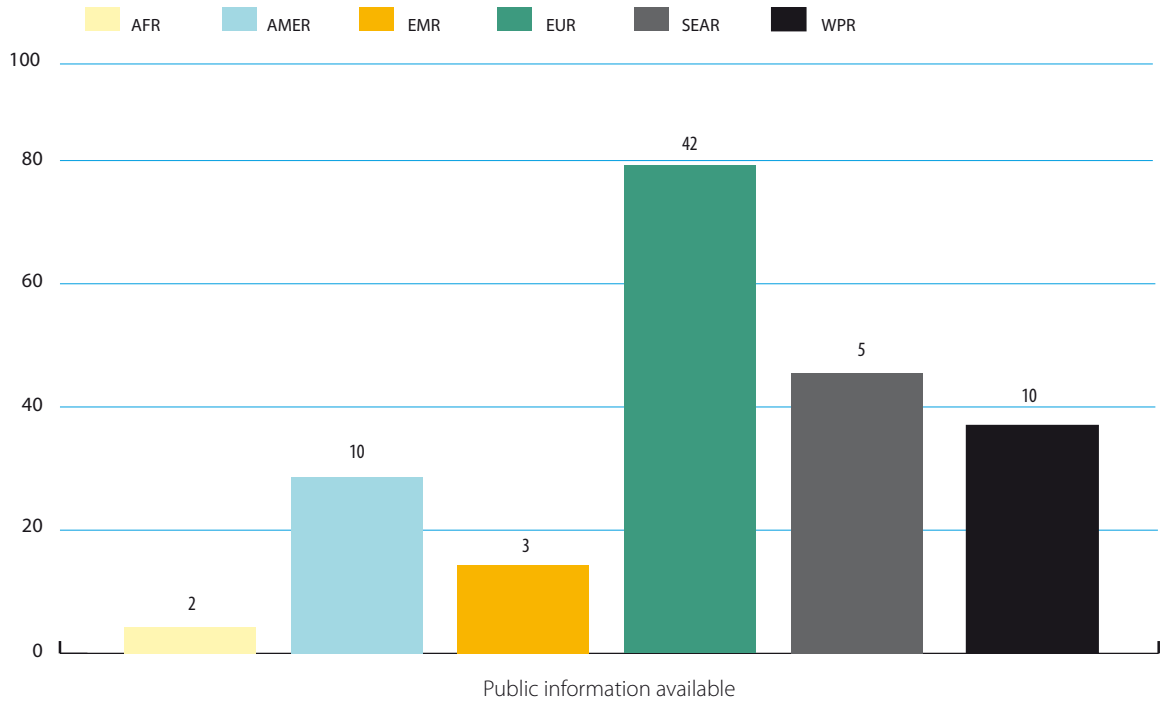


Figure 1.8 – **Percentages of Member States that had conducted a public information campaign about use of antimicrobial medicines in the previous 2 years, by region**
(Note: numbers above the bars represent the numbers of Member States that answered "yes")

AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

1.8 Infection prevention and control programmes

Resistant microorganisms can spread rapidly across countries, regions and the world, facilitated by global trade, travel and tourism. Poor infection control in any setting can greatly increase the spread of drug-resistant infections, especially during outbreaks of disease. IPC programmes are thus essential to curb the movement of antimicrobial-resistant organisms, starting with good basic hygiene, which limits the spread of all infections, including those that are resistant to antimicrobial medicines.

Figure 1.9 shows that relatively few countries had a national IPC programme. At least half the Member States in the European, South-East Asia and Western Pacific regions reported having such a programme; fewer stated that all tertiary hospitals in the country had one.

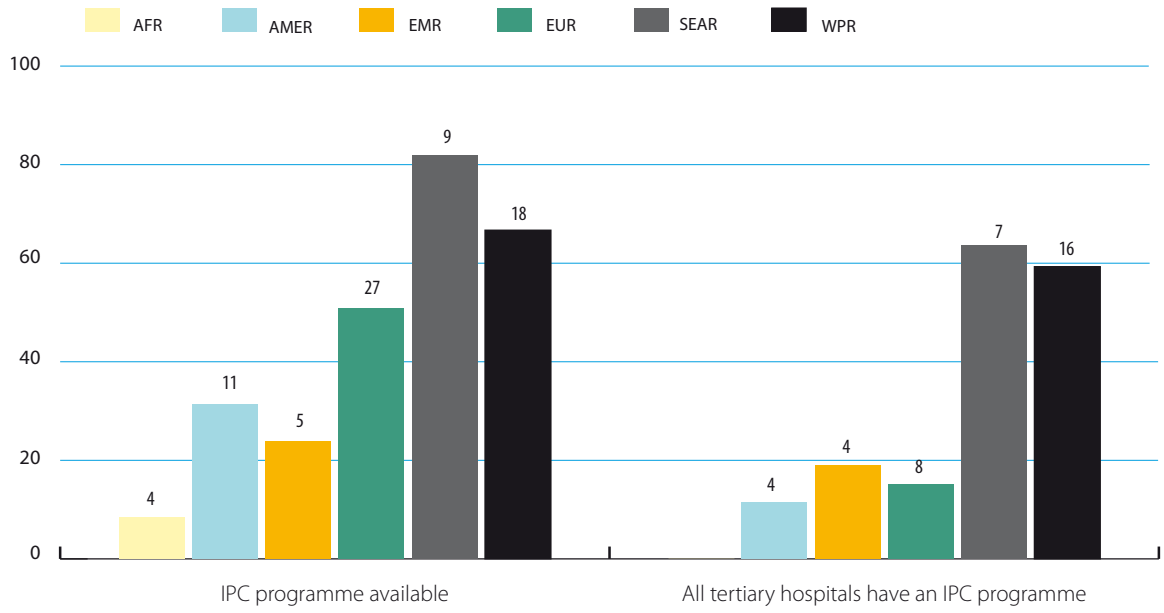


Figure 1.9 – **Percentages of Member States that had an infection prevention and control (IPC) programme and in which all tertiary hospitals had such a programme, all regions**
(Note: numbers above the bars represent the numbers of Member States that answered "yes")

AFR, WHO African Region; AMER, WHO Region for the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region

2. WHO African Region

Regional facts

Number of Member States: 47

Number of Member States for which information was available for the analysis: 8 (17%)

Regional population: 805 million

Life expectancy in the Region: average: 58 years; range: 51–62 years

Regional overview

The WHO African Region comprises 47 Member States. As information was available for only eight (17%), the data are incomplete and perhaps misleading with regard to some aspects of antimicrobial resistance. All those that participated in the survey are low- or middle-income countries. The results suggest, however, that antimicrobial resistance is a growing problem in the Region.

Only one of the eight countries reported having a national plan, while this is considered crucial for addressing antimicrobial resistance on a national scale. Few countries had a national coordinating mechanism, national focal point, policy or strategy or had issued a progress report, although some countries were preparing plans or strategies.

Awareness of antimicrobial resistance was generally low among the public and in sectors including politics and health care. Education and training could be key activities.

Although surveillance of resistance in bacteria (including M. tuberculosis) was reported by six of the eight countries that participated, some noted the importance of increasing laboratory capacity and surveillance for controlling antimicrobial resistance. Many laboratories that perform surveillance were not coordinated nationally, limiting their effectiveness. The Regional Office recently published guidelines to help countries establish laboratory-based surveillance (WHO Regional Office for Africa, 2013). Field epidemiology and laboratory training programmes established in Africa (e.g. Ghana AMR Project, 2014) have helped to increase laboratory capacity.

The countries had little capacity for IPC, and programmes were not common in tertiary hospitals.

Counterfeit and poor-quality medicines, including antimicrobial medicines, are a general problem in the Region, further contributing to the spread of antimicrobial resistance.

2.1 Introduction

The WHO African Region comprises most of the African continent, although some countries are included in the Eastern Mediterranean Region. All eight countries that participated are lower- or middle-income countries. As the response was limited (17%), the data in this section are less complete than for other regions and may misrepresent the situation. The Region recognizes, however, that antimicrobial resistance is a growing problem. In 1998, Member States endorsed the Integrated Disease Surveillance Response strategy, which helps strengthen public laboratory networks, and thus antimicrobial resistance surveillance, and, in 2013, the Regional Office

published guidelines for establishing laboratory-based surveillance (WHO Regional Office for Africa, 2013) .

For this country situation analysis, all eight countries that responded reported that malaria and tuberculosis (TB) were their greatest public health challenges. Multidrug- and extensively drug-resistant (MDR and XDR) TB are problems in many countries (Ndihokubwayo et al., 2013). Cholera and meningitis were also reported to be important concerns.

2.2 National plans and other strategies

Only one of the countries that responded reported having a national plan (Figure 2.1), whereas having a comprehensive, funded national plan is one of the best ways to control antimicrobial resistance. In addition, few countries reported having a national coordinating mechanism (two countries), a national focal point (two countries), policies or strategies (two countries) or having made a progress report (one country). Two countries reported, however, that they were aware of the problem and were preparing guidelines or policies. Two other countries recognized the need for national coordination, and one has established a global antibiotic resistance partnership as a first step. At the Sixty-seventh World Health Assembly, in May 2014, Ghana urged all countries that do not yet have a national plan to develop one through a multisectoral approach (Ghana AMR Project, 2014).

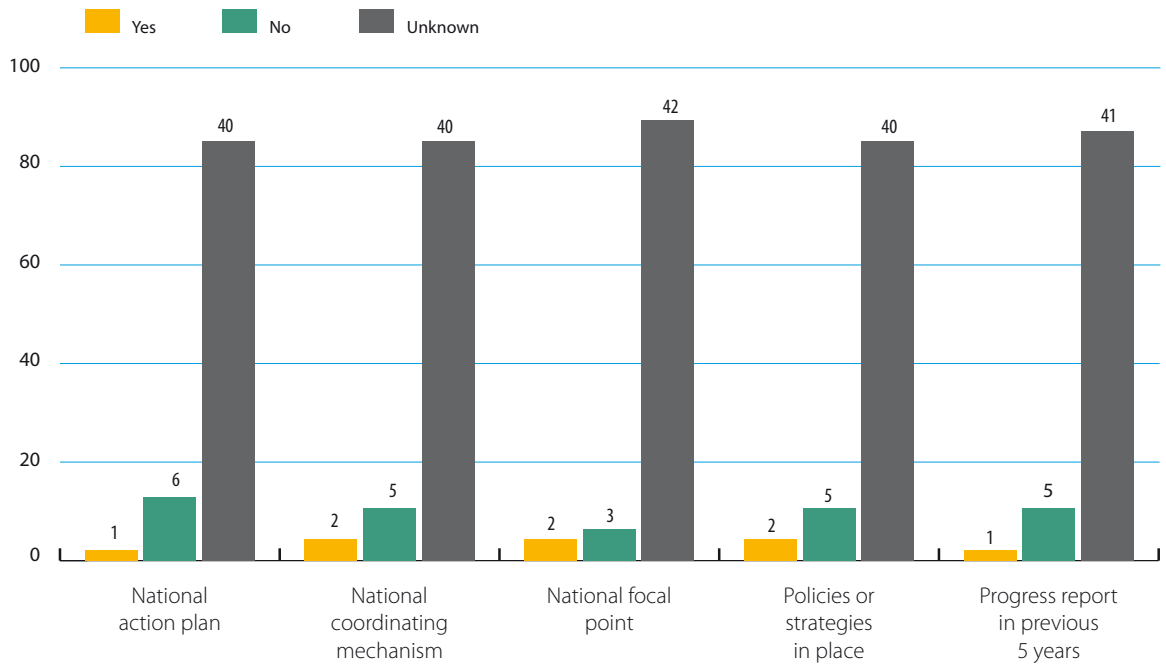


Figure 2.1 – **Percentages of Member States that had a national antimicrobial resistance plan, coordinating mechanism, focal point, policy or strategy and had prepared a report in the previous 5 years, WHO African Region**
(Note: numbers above the bars represent the numbers of responses)

2.3 Surveillance and laboratory capacity

Standardized diagnostics are critical for tracking antimicrobial resistance, and the field epidemiology and laboratory training programmes established in Africa are helping to strengthen the capacity of health care professionals in laboratory management, including antimicrobial resistance (Ghana AMR Project, 2014). Six of the eight responding countries undertook some bacterial surveillance (Figure 2.2); however, in many, it was not coordinated at national level, reducing its effectiveness. As MDR-TB is present in a number of countries, surveillance for resistance in this disease is reasonably frequent.

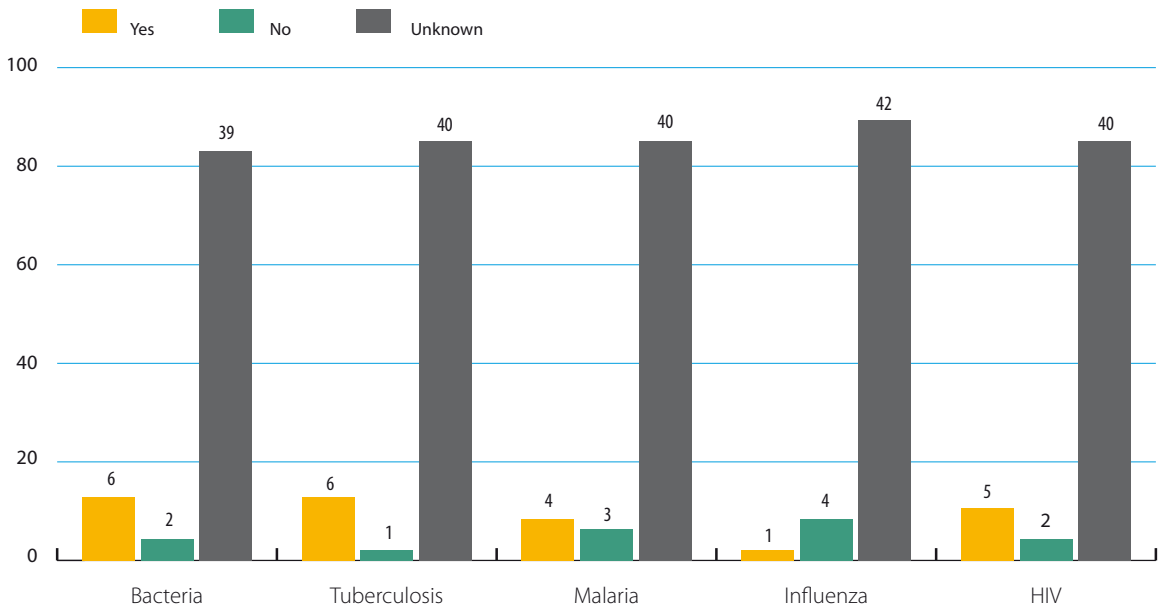


Figure 2.2 – **Percentages of Member States that had conducted surveillance for antimicrobial resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, WHO African Region**
(Note: numbers above the bars represent the numbers of responses)

Six of the eight countries had a national reference laboratory and undertook testing for sensitivity to antibiotics. Some countries reported that building laboratory capacity is essential for tackling antimicrobial resistance. Only one of the countries that responded had prepared a report on surveillance of antimicrobial resistance in humans within the past 5 years.

2.4 Access to quality-assured antimicrobial medicines

Seven of the eight countries that responded had a national regulatory authority, and five had quality standards. Seven countries reported that they could enforce standards. Many of the countries had fragmented supplies of good-quality medicines, and many face the problem of counterfeit antimicrobial medicines (Ndihokubwayo et al., 2013). Although some of the countries that participated thus had the capacity to ensure good-quality medicines, the situation may be different in the Region as a whole.

Seven of the responding countries had an essential medicines list.

2.5 Use of antimicrobial medicines

Table 2.1 shows a high potential for misuse of antimicrobial medicines in the countries of the African Region that responded. All the countries reported that these drugs are available without a prescription, which represents a significant problem, especially when combined with the overall poor awareness of antimicrobial resistance (see section 2.6). Furthermore, the countries reported limited ability to enforce any existing regulations for use of these drugs in human medicine, and there was little monitoring of antimicrobial resistance.

Table 2.1 – **Monitoring of use of antimicrobial medicines, WHO African Region**

	Yes (%)	No (%)	Unknown (%)
Antimicrobial medicines are available without a prescription.	17	0	83
Restriction of prescription-only medicines can be enforced.	11	4	85
Standard treatment guidelines could be drawn up.	11	4	85
Use of antimicrobial medicines was monitored in the previous 5 years.	6	6	88

2.6 Public awareness

The data indicated little public awareness of the proper use of antimicrobial medicines. Only two of the countries that responded had conducted a public awareness campaign in the previous 2 years. Some reported that education of both the public and health care workers would be essential to tackle antimicrobial resistance in their country, and many reported poor awareness in the important sectors of politics, health care, pharmaceuticals, the mass media and academia.

2.7 Infection prevention and control programmes

Four of the eight countries that responded had national IPC programmes (Figure 2.5), but none reported that all their tertiary hospitals had such a programme. These programmes are important for preventing the spread of infectious diseases, including those caused by antimicrobial-resistant microorganisms.

3. WHO Region of the Americas

Regional facts

Number of Member States: 35

Number of Member States for which information was available for the analysis: 26 (74%)

Regional population: approximately 950 million

Life expectancy for Region: average: 75 years; range: 63–82 years

Regional overview

The WHO Region of the Americas comprises 35 Member States. Most (88%) of the 26 countries that responded to the request for information are low- to middle-income countries. The WHO Regional Office for the Americas through the Pan American Health Organization (PAHO) initiated strategies and interventions to contain antimicrobial resistance almost two decades ago. Nevertheless, major gaps remain in some areas.

Only three countries reported having a national plan to address antimicrobial resistance in a multisectoral approach. In 2013, the Regional Technical Advisory Group on Antimicrobial Resistance and Infection Prevention and Control suggested a framework to assist countries in establishing national plans.

Public awareness of antimicrobial resistance was low, and only 10 countries had conducted a public information campaign within the previous 2 years. Overall knowledge about antimicrobial resistance was low in the key sectors of health care, politics and the media.

The Latin American Network for Antimicrobial Resistance Surveillance has helped to improve bacterial surveillance in the Region, specifically in the Latin American countries. A national reference laboratory for testing sensitivity to antibiotics was present in 25 countries (71%). Few countries (13), however, reported having provided a report on surveillance of antimicrobial resistance in humans.

A national IPC programme was reported by 11 countries; four had one in all tertiary hospitals.

Antimicrobial medicines were readily available over the counter in 18 countries, and prescriptions could be regulated in only 11 countries. Ten countries had standard treatment guidelines.

WHO (2006) reported that counterfeit medicines are a problem in the Region, particularly in Latin America. Strong national regulatory authorities and quality standards could weaken the production of counterfeit medicines; however, only 17 countries reported that they had a national regulatory authority, 14 had quality standards, and 14 had the capacity to enforce the standards.

3.1 Introduction

The WHO Region of the Americas comprises all of North, Central and South America and the Caribbean islands (Figure 3.1). All except three of the countries that responded to the request for information are lower- to middle-income countries.

The Regional Office recognized the serious threat posed by antimicrobial resistance in the mid-1990s and undertook a programme to improve surveillance and to control antimicrobial re-

sistance in the Americas by strengthening laboratory capacity to identify bacteria and test for antimicrobial susceptibility (Periago, 2011).

For the survey, countries identified acute respiratory infections (including pneumonia and TB), gastroenteritis and dengue fever as their main public health challenges. Inappropriate use of antimicrobial medicines is a major driver of antimicrobial resistance in the Region, with self-medication, easy access to these medicines and lack of awareness in several important sectors.

3.2 National plans and other strategies

Few countries reported having a national plan (9%; Figure 3.1). More had a national coordinating mechanism (20%) and a national focal point (20%), but policies and strategies were less frequent. Only 14% of countries had issued a progress report in the previous 5 years.

Developing national plans and strategies is a major area for improvement in the Region, as these are crucial for controlling antimicrobial resistance globally. Many countries recognized that national plans were urgently needed. The Regional Technical Advisory Group on Antimicrobial Resistance and Infection Prevention and Control suggested that a framework be developed to help countries construct national plans (PAHO, 2013a).

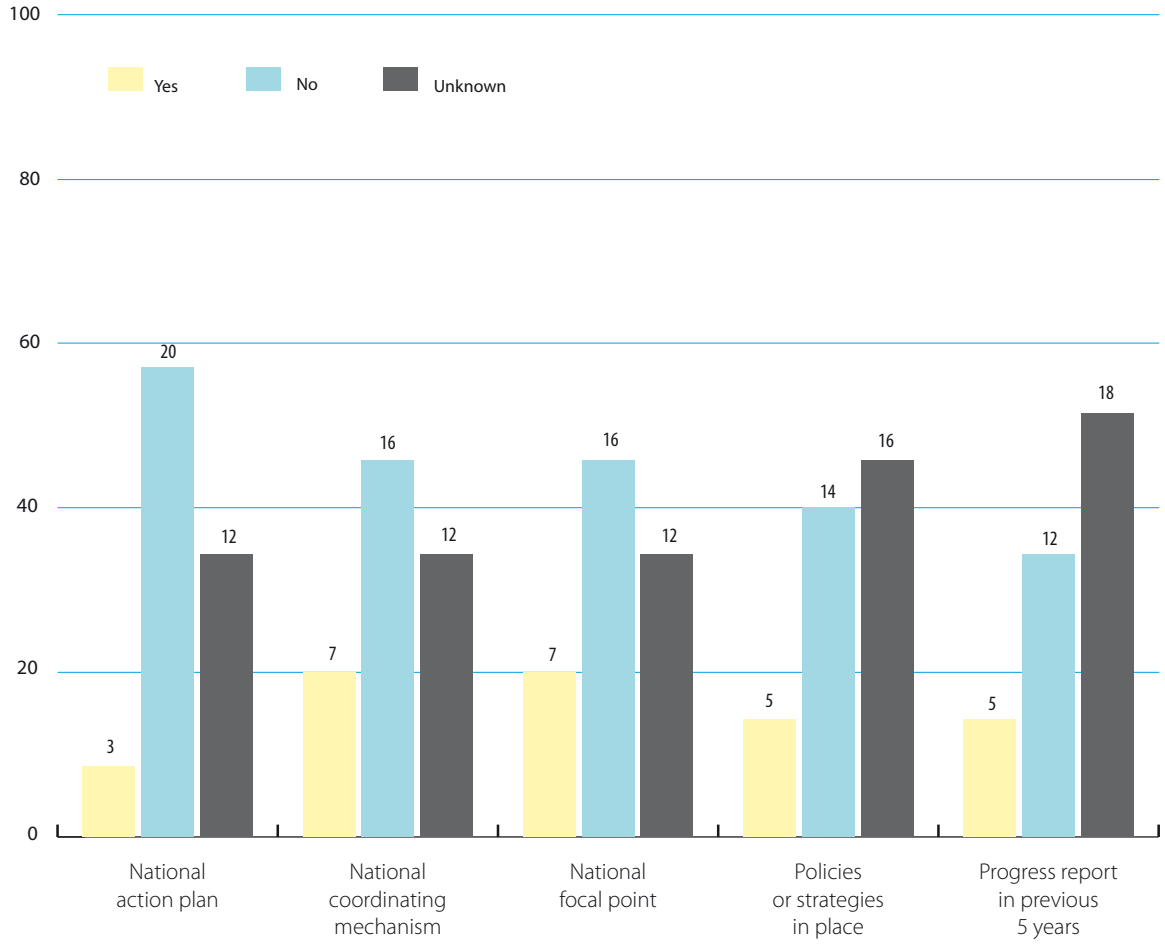


Figure 3.1 – **Percentages of Member States that had a national antimicrobial resistance plan, coordinating mechanism, focal point, policy or strategy and had prepared a report in the previous 5 years, WHO Region of the Americas**
(Note: numbers above the bars represent the numbers of responses)

3.3 Surveillance and laboratory capacity

The Americas have a regional surveillance network, the Latin American Network for Antimicrobial Resistance Surveillance, which coordinates surveillance in 21 countries (WHO, 2014). The Network includes many Latin American countries; English-speaking Caribbean countries are invited to contribute data but are not part of the external quality assessment programme. Some countries are also a part of the Sistema de Redes de Vigilancia de los Agentes Responsables de Neumonias y Meningitis Bacterianas, which monitors bacteria that cause vaccine-preventable pneumonia and meningitis (*Neisseria meningitidis, Pneumococcus pneumoniae and Haemophilus influenzae*).

Surveillance of antimicrobial resistance was performed in 57% of countries in the Region (Figure 3.2).

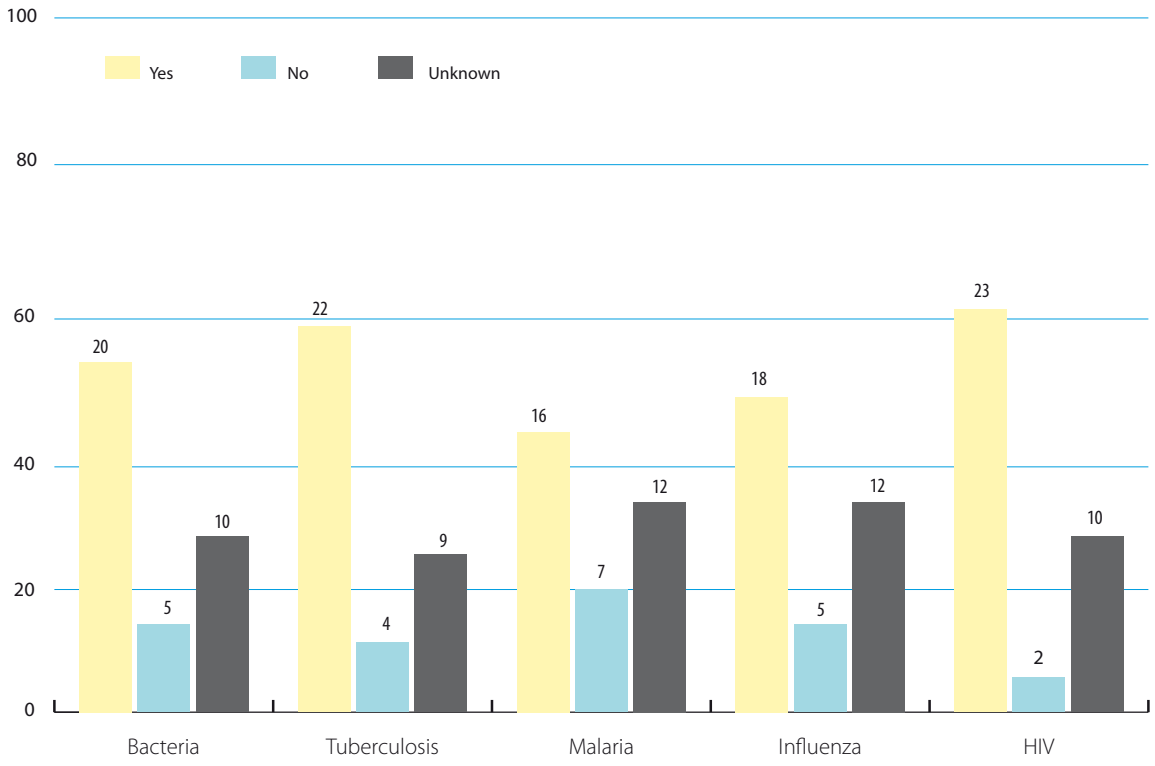


Figure 3.2 – **Percentages of Member States that had conducted surveillance for resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, WHO Region of the Americas**
(Note: numbers above the bars represent the numbers of responses)

National reference laboratories for testing sensitivity to antibiotics were present in 25 (71%) countries. This partly reflects the work of the Latin American Network for Antimicrobial Resistance Surveillance, which has strengthened laboratory networks considerably in many countries.

Only 13 countries (37%) had prepared reports on antimicrobial resistance surveillance.

3.4 Access to quality-assured antimicrobial medicines

The Regional Office uses a system based on indicators to classify the Region's national regulatory authorities. The highest level designates a "national regulatory authority that is competent and efficient in performance of the health regulation functions recommended by PAHO/WHO to guarantee the efficacy, safety and quality of medicines"; it is therefore considered a regional reference authority (PAHO, 2014). The Pan American Network for Drug Regulatory Harmonization was initiated by the Region's national regulatory authorities and the Regional Office (PAHO, 2013b).

Only 17 (49%) countries reported having a national regulatory authority; 14 (40%) had quality standards, and 14 (40%) could enforce those standards. Most countries (21; 60%) had an essential medicines list. Good initiatives existed in the Region to improve access to safe, high-quality medicines; however, many countries still lacked stringent control. Many reported previously that counterfeit medicines were a significant problem in their country (WHO, 2006).

3.5 Use of antimicrobial medicines

Over 50% of countries reported that antimicrobial medicines were freely available without a prescription. Only about 40% of the countries could prepare standard treatment guidelines. Use of antimicrobial medicines had been monitored in 17% of countries in the previous 5 years (Table 3.1).

Table 3.1 – **Use of antimicrobial medicines, WHO Region of the Americas**

	Yes (%)	No (%)	Unknown (%)
Antimicrobial medicines are available without a prescription.	51	14	35
Restriction of prescription-only medicines can be enforced.	31	20	49
Standard treatment guidelines could be drawn up.	40	11	49
Use of antimicrobial medicines was monitored in the previous 5 years.	17	26	57

3.6 Public awareness

Public awareness in the participating countries in the Americas was relatively low; about 29% of countries (10) had conducted a public information campaign in the previous 2 years. Many countries noted that educating the public is important in tackling the problem of antimicrobial resistance but indicated poor general awareness in politics, health care, pharmaceuticals and the media.

3.7 Infection prevention and control programmes

Enhanced IPC programmes are crucial for controlling the spread of infections and antimicrobial-resistant microorganisms within and between health care facilities and via travel and trade. A national IPC programme was present in 11 (42%) countries, and 4 (15%) had an IPC programme in all tertiary hospitals.

4. WHO Eastern Mediterranean Region

Regional facts

Number of Member States: 21

Number of Member States for which information was available for the analysis: 13 (62%)

Regional population: 583 million

Life expectancy in the Region: average: 72 years; range: 60–80 years

Regional overview

The Eastern Mediterranean Region comprises 21, mostly low- to middle-income Member States.

Overall, many gaps were found in addressing antimicrobial resistance in the Region. This is not surprising, given the other emergencies in those countries. None of the countries reported having a national action plan for antimicrobial resistance, which is considered a priority and an outcome indicator for control measures. There was poor awareness of antimicrobial resistance in all sectors included in the survey (national authorities, civil society and people involved in health care and pharmaceuticals). Fragmented information on the safe use of antimicrobial medicines was available, although this is crucial. These medicines were available without a prescription in nine countries. Three countries had conducted a public information campaign in the previous 2 years.

Investment in surveillance of antimicrobial resistance appeared to be low: eight of the 21 countries reported surveillance of resistant bacteria. The laboratories that performed antimicrobial testing generally did not have adequate capacity for accurate, comprehensive testing.

Prevention of nosocomial infections requires strong national IPC programmes. Five countries had an IPC programme in place, and four of these indicated that a programme was functioning in all tertiary hospitals. IPC is important for controlling the spread of infection across borders, especially in view of the numbers of refugees in these countries. Regional collaboration will be essential for sharing data from antimicrobial resistance surveillance. Four countries reported monitoring use of antimicrobial medicines.

Counterfeit medicines are a significant problem in the Region. A few countries had regulations for quality standards but with limited enactment due to lack of capacity to enforce regulations.

4.1 Introduction

The WHO Eastern Mediterranean Region covers the area around the southern Mediterranean Sea and the Middle East, including some countries of North Africa and the Horn of Africa. The countries are mostly lower- to middle-income countries; only two of the countries that participated in the survey are high-income countries.

Many countries in the Region are facing health emergencies, and political turmoil and internal conflicts have resulted in large internally displaced populations, which compete for the attention of health care professionals and policy-makers. The Region is also receiving large numbers of refugees (50% of the world's total), adding to the complexity of control of antimicrobial resistance and other public health issues. As is to be expected, many of the low-income countries had un-

derdeveloped or overburdened health care systems that were unable to cope with the additional load of antimicrobial resistance (WHO Regional Office for the Eastern Mediterranean, 2013).

Most countries reported that TB was their major challenge among infectious diseases; however, antimicrobial resistance was not a high priority in the Region (WHO Regional Office for the Eastern Mediterranean, 2013). Countries are being urged to reverse this trend by establishing better antimicrobial resistance surveillance systems and more effective enforcement of regulations.

4.2 National plans and other strategies

National planning is essential for controlling antimicrobial resistance: the draft global action plan relies on countries having and implementing a national plan. As seen in Figure 4.1, none of the participating countries in the Eastern Mediterranean Region reported having a national action plan, although some had a national coordinating mechanism (9%), national focal points (14%) or policies or strategies (9%). No country had prepared a progress report in the previous 5 years.

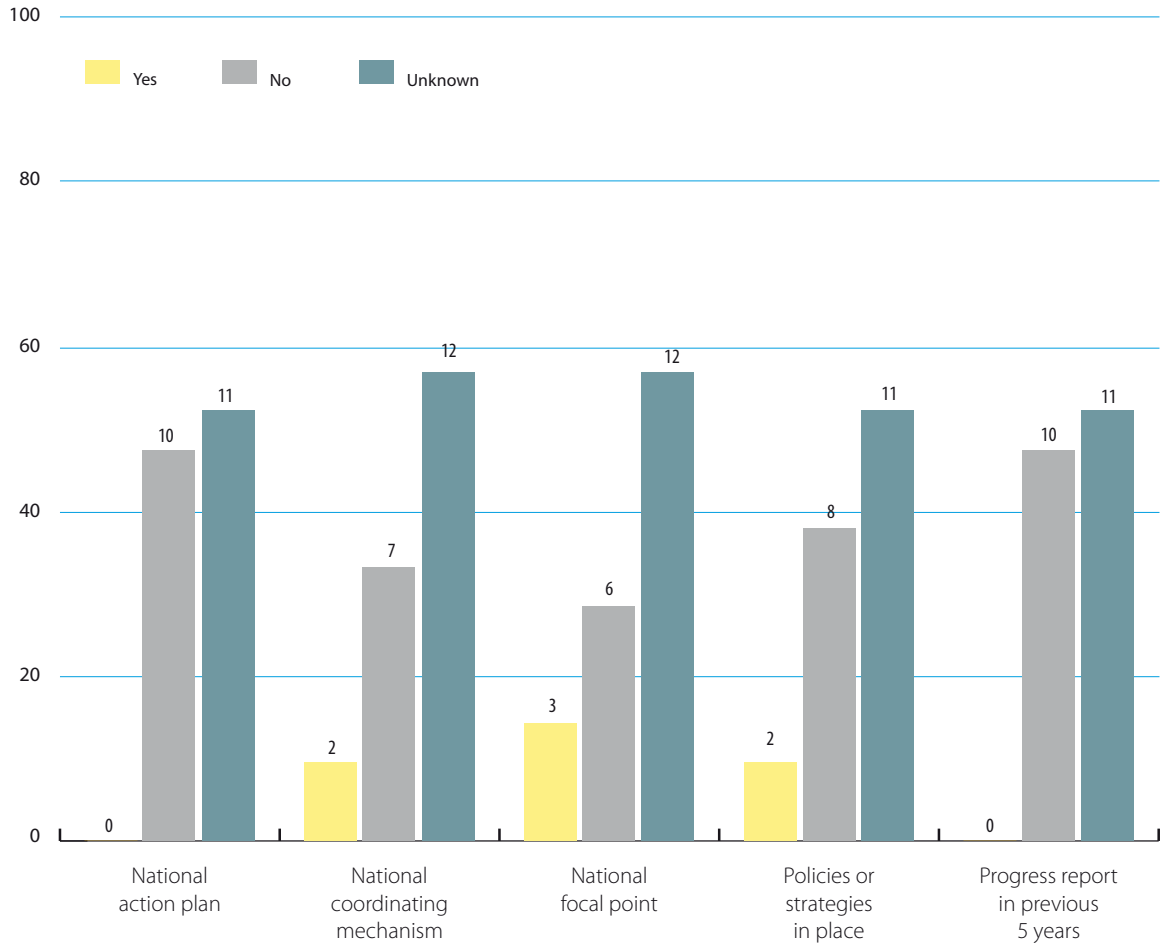


Figure 4.1. **– Percentages of Member States that had a national plan for antimicrobial resistance, coordinating mechanism, focal point, policy or strategy and had prepared a report in the previous 5 years, WHO Eastern Mediterranean Region**

(Note: numbers above the bars represent the numbers of responses)

4.3 Surveillance and laboratory capacity

About 38% of countries reported that they performed surveillance of resistant bacteria (Figure 4.2). The percentage was higher (nearly 43%) for M. tuberculosis, as this infection represents a huge public health problem in the Region. Countries in the Region are increasingly concerned about antimicrobial resistance, and regional collaboration is being sought to improve surveillance (WHO Regional Office for the Eastern Mediterranean, 2013).

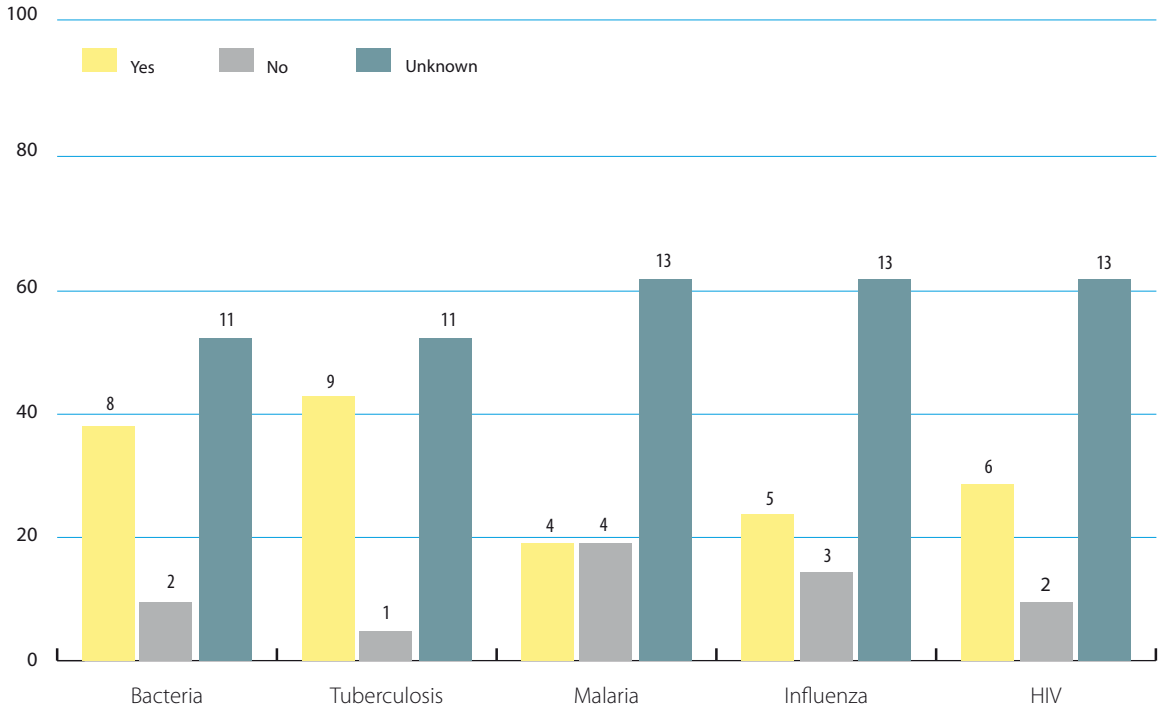


Figure 4.2 – **Percentages of Member States that had conducted surveillance for resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, WHO Eastern Mediterranean Region**
(Note: numbers above the bars represent the numbers of responses)

At the time of the survey, there was little investment in laboratory surveillance of antimicrobial resistance. Less than half the countries in the Region had national reference laboratories for testing sensitivity to antibiotics, and only five participated in external quality assessment. None of the countries reported having prepared a report on surveillance of antimicrobial resistance, and none had data on the prevalence of antimicrobial resistance, which are necessary for quantifying and efficiently addressing the problem.

4.4 Access to quality-assured antimicrobials

Quality-assured antimicrobials are essential for treating infections successfully. Poor-quality, degraded and counterfeit antimicrobial medicines can lead to antimicrobial resistance (WHO Regional Office for the Western Pacific, 2014); counterfeit medicines are a particular problem in the Eastern Mediterranean Region (WHO Regional Office for the Eastern Mediterranean, 2013).

Regulatory agencies can set standards to ensure that medicines are of high quality and available to the entire population. Ten countries had a national regulatory authority, four had quality standards, and the national regulatory authority could enforce standards in seven countries. Nine had a list of essential medicines.

4.5 Use of antimicrobial medicines

In the Region, there is a strong possibility of misuse of antimicrobial medicines in the health sector and little enforcement of the rules and regulations that are in place (Table 4.1). It has been reported that antimicrobial medicines are often prescribed at the request of patients, and pharmacies do not necessarily comply with regulations (Habibzadeh, 2013; WHO Regional Office for the Eastern Mediterranean, 2013). In addition, pharmaceutical companies and distributors promote use of antimicrobial agents (WHO Regional Office for the Eastern Mediterranean, 2013)

Antimicrobial medicines were available without a prescription in nine of the 21 participating countries. There is no uniform access to health care, and many people find it cheaper and easier to obtain antimicrobial medicines themselves, eliminating the cost and time required to see a health care worker (WHO Regional Office for the Eastern Mediterranean, 2013). About half the surveyed countries reported that they could enforce prescription-only regulations and set standard treatment guidelines. Antimicrobial use was monitored in four countries.

There were gaps in knowledge about the policies and practices of use of antimicrobial medicines, as high percentages of "unknown" were recorded in nearly all categories.

Table 4.1 – **Use of antimicrobial medicines, WHO Eastern Mediterranean Region**

	Yes (%)	No (%)	Unknown (%)
Antimicrobial medicines are available without a prescription.	43	5	52
Restriction of prescription-only medicines can be enforced.	33	9	58
Standard treatment guidelines could be drawn up.	33	9	58
Use of antimicrobial medicines was monitored in the previous 5 years.	19	24	57

4.6 Public awareness

Overall, public awareness in the Region about the problem of antimicrobial resistance and its causes was poor. Only three (14%) countries had conducted a public information campaign in the previous 2 years. It has been reported that many people in the Region believe that antibiotics help in most ailments (Habibzadeh, 2013). Better public education and changes to systems and policies will be required to curb inappropriate use of antimicrobials.

4.7 Infection prevention and control programmes

Effective IPC programmes are important for managing and containing antimicrobial resistance. Five of the 21 countries had IPC strategies, and four reported that an IPC programme was available in all tertiary hospitals.

5. WHO European Region

Regional facts

Number of Member States: 53

Number of Member States for which information was available for the analysis: 49 (92%)

Regional population: 902 million

Life expectancy for region: average: 77 years; range: 63–83 years

Regional overview

The WHO European Region comprises 53 Member States, 58% of which are high-income countries.

The Region has several plans and strategies to address antimicrobial resistance, and 40% of countries reported having an action plan. Many had a national coordinating mechanism (47%) or national focal point (70%).

Public information campaigns were common in the Region, as 79% of the countries had implemented one in the previous 2 years; however, a survey conducted in 2013 in the European Union indicated that about half the population believed that antibiotics are effective against viruses (European Commission, 2013a). This illustrates that there continues to be a need for targeted information campaigns even in countries with a long-standing effort in this area.

All countries that are members of the European Union undertake surveillance of resistance in bacteria through EARS-Net, which is facilitated by the European Centre for Disease Prevention and Control. Since 2012, countries that are not members of the European Union receive support from the Central Asian and Eastern European Surveillance of Antimicrobial Resistance (CAESAR) network, initiated by WHO and partners to strengthen surveillance of antimicrobial resistance in that part of the Region. The CAESAR network will provide data compatible with that collected by EARS-Net to complete the overview of antimicrobial resistance trends throughout the Region.

About half the countries had a national IPC programme in place; less than 20% had one in every tertiary hospital. IPC programmes are important for preventing the transmission of resistant organisms.

5.1 Introduction

The WHO European Region is a very diverse region comprising 53 countries. More than half (58%) are high-income countries; the remainder are lower to middle-income countries. Good infrastructure is available to combat antimicrobial resistance in the Region, especially in the high-income countries; as a result, many countries can focus on indicators of progress and on optimizing their systems. The Regional Office recognizes the implications of antimicrobial resistance for global public health and has undertaken international and interregional initiatives to address the problem. For example, in 2011, all 53 countries adopted a strategic action plan with the following activity areas and strategic objectives (WHO Regional Office for Europe, 2014): strengthen intersectoral coordination; strengthen surveillance of antibiotic resistance; promote rational use and strengthen surveillance of antibiotic consumption; strengthen infection control and surveillance in health care settings; promote innovation and research on new drugs; and improve awareness, patient safety and partnership.

The Transatlantic Taskforce on Antimicrobial Resistance (2014), a collaboration between the European Union and the United States of America, also encourages appropriate therapeutic use of antimicrobial medicines, prevention of antimicrobial-resistant infections in health care facilities and communities, and strategies to improve the "pipeline" for new antimicrobial medicines. Antimicrobial stewardship programmes to promote adherence to treatment guidelines are used in the European Union to optimize antimicrobial prescribing in health care facilities in order to slow the spread of antimicrobial resistance (Huttner et al., 2013).

5.2 National plans and other strategies

National action plans are important to combat antimicrobial resistance both nationally and globally. Less than half the countries of the Region had an action plan (Figure 5.1); however, 47% had a national coordination mechanism, and 70% had national focal points. Although a number of countries have made good progress in this area for many years, a financed, multisectoral national action plan remains an important means for countries to adopt a comprehensive approach to combat antimicrobial resistance. Less than 40% of countries had policies or strategies in place to counteract antimicrobial resistance, and about 21% had issued a recent report on relevant activities.

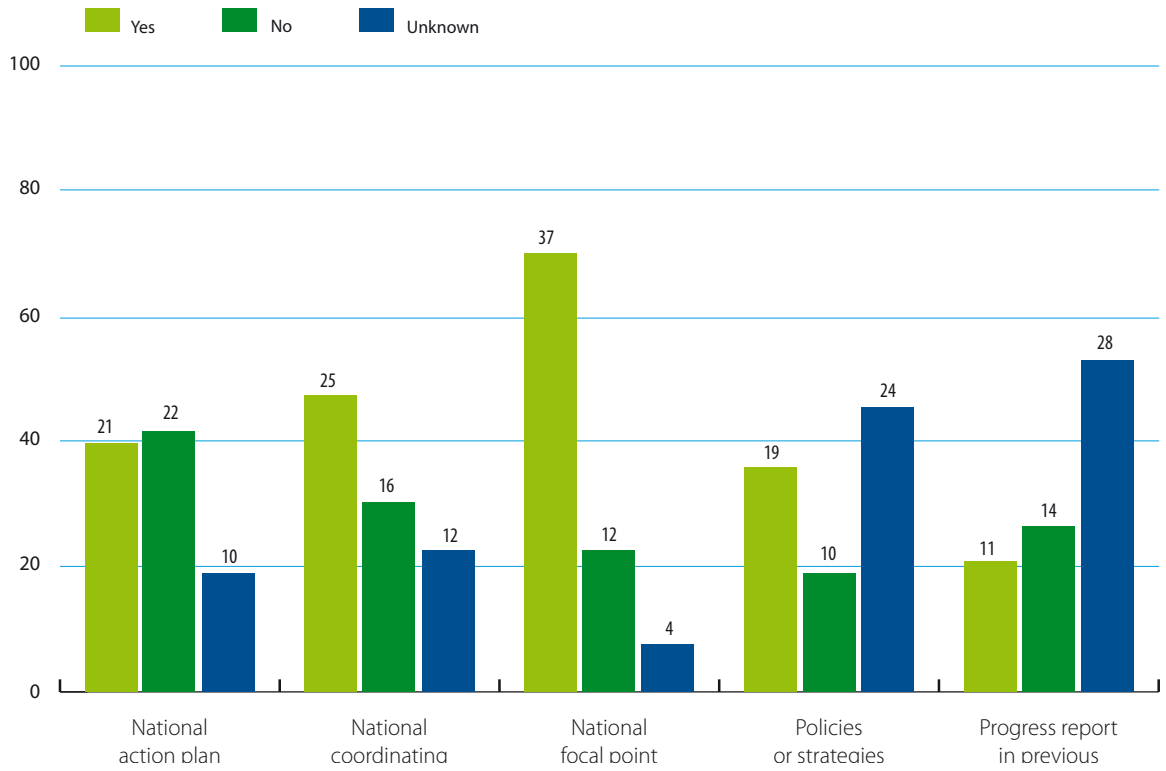


Figure 5.1 – **Percentages of Member States that had a national plan for antimicrobial resistance, coordinating mechanism, focal point, policy or strategy and had prepared a report in the previous 5 years, WHO European Region**
(Note: numbers above the bars represent the numbers of responses)

5.3 Surveillance and laboratory capacity

Figure 5.2 shows that 62% of countries collected data from surveillance of antimicrobial-resistant bacteria. Antimicrobial resistance in the European Union is monitored through EARS-Net, a network of surveillance sites in European Union countries coordinated by the European Centre for Disease Prevention and Control. For the non-European Union countries of the Region, WHO and partners have established the Central Asian and Eastern European Surveillance of Antimicrobial Resistance (CAESAR) network of national surveillance systems, which uses the same methods as EARS-Net. CAESAR connects existing national surveillance systems and builds surveillance in countries that do not yet have established systems. Currently, 16 countries are participating at various stages in CAESAR.

Many countries collect comprehensive data on the prevalence of specific resistant strains (WHO Regional Office for Europe, 2014).

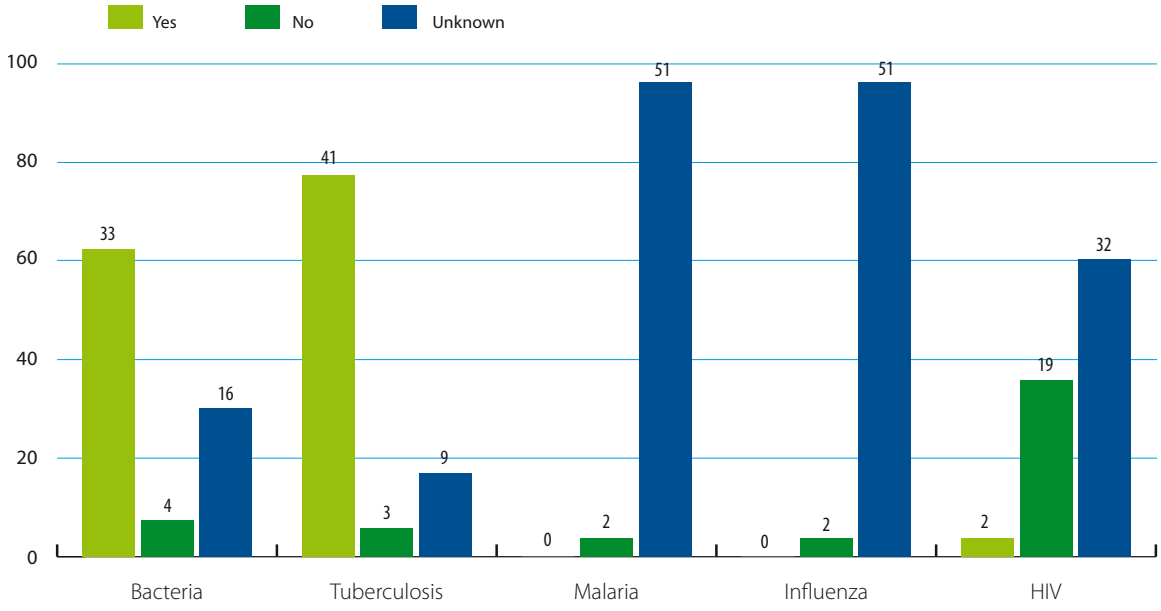


Figure 5.2 – **Percentages of Member States that had conducted surveillance for resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, WHO European Region**
(Note: numbers above the bars represent the numbers of responses)

A national reference laboratory for testing sensitivity to antibiotics was present in 36 (68%) countries. In 40 (75%) countries, laboratories participated in external quality assessment.

Surveillance of antimicrobial resistance was reported by 29 (55%) countries.

5.4 Access to quality-assured antimicrobial medicines

The quality of antimicrobial medicines in the Region is high, as 47 (89%) countries had a national regulatory agency, and 49 (92%) had quality standards. In addition, 48 (91%) countries reported that they could enforce the quality standards. Poor-quality and counterfeit medicines may therefore not be a significant cause of antimicrobial resistance in the Region. A list of essential medicines was available in 32 (60%) countries.

5.5 Use of antimicrobial medicines

In 43% of the countries, antimicrobial medicines were sold without a prescription; 55% of countries reported that they could enforce regulations (Table 5.1). Only 43% of countries reported that they could prepare standard guidelines for health care workers treating infections.

Data on antimicrobial use are gathered through the European Surveillance of Antimicrobial Consumption Network (ESAC-Net) from countries in the European Union and the European Economic Area by the European Centre for Disease Prevention and Control; for non-European Union countries, data are collected through the Antimicrobial Medicines Consumption Project Group of the Regional Office. As a result, there is good monitoring of antimicrobial use (Table 5.1).

Table 5.1 – **Antimicrobial use, WHO European Region**

	Yes (%)	No (%)	Unknown (%)
Antimicrobial medicines are available without a prescription.	43	36	21
Restriction of prescription-only medicines can be enforced.	55	2	43
Standard treatment guidelines could be drawn up.	43	9	48
Use of antimicrobial medicines was monitored in the previous 5 years.	66	4	30

5.6 Public awareness

The frequency of public information campaigns on antibacterial resistance in the Region was relatively high, as about 79% of Member States (42) reported having organized at least one campaign in the previous 2 years. A European Union survey in 2013 revealed, however, that about half of the population believed that antibiotics are effective against viral infections and therefore expected them to be prescribed for a common cold or influenza (European Commission, 2013a).

5.7 Infection prevention and control programmes

IPC programmes are essential for controlling all infections and especially for halting the transmission of antimicrobial-resistant organisms. These programmes are most useful when there is guidance at national and facility levels. Twenty-seven (51%) countries had a national IPC programme, and eight (15%) reported that all their tertiary hospitals had a facility-specific IPC programme.

Europe is currently the world's first tourist destination (European Commission, 2013b), which could facilitate the spread of resistant microorganisms across borders. In addition, Europe is experiencing an influx of refugees, mainly from the Syrian Arab Republic (Migration Policy Centre, 2014). More, stronger IPC programmes will help to address cross-border transmission of antimicrobial resistance.

6. WHO South-East Asia Region

Regional facts

Number of Member States: 11

Number of Member States for which information was available for the analysis: 11 (100%)

Regional population: approximately 1.75 billion

Life expectancy for region: average: 70 years; range: 66–77 years

Regional overview

The WHO South-East Asia Region comprises 11 Member States, all of which are lower- to middle-income countries.

The Region recognizes antimicrobial resistance as a serious threat to public health. The WHO Regional Office for South-East Asia has prepared a regional strategy on prevention and containment of antimicrobial resistance (WHO, 2010), and, in 2011, all health ministers in the Region committed themselves to concerted action by adopting the Jaipur Declaration on Antimicrobial Resistance. In accordance with the Jaipur Declaration and the regional strategy, all Member States are encouraged to have a multisectoral national plan to combat antimicrobial resistance. At the time of the survey, five of the 11 countries in the Region reported having such a plan, and two countries reported that a plan was in preparation. More countries reported having a national coordination mechanism or strategies or policies.

Public awareness in the Region is growing, as five countries reported having conducted a public awareness campaign on antimicrobial resistance in the previous 2 years.

Countries face many challenges in conducting surveillance, but it is recognized as a priority in the regional strategy. Four countries had prepared reports on antimicrobial resistance surveillance, and Member States report annually on progress made in accordance with the Jaipur Declaration.

Monitoring use of antimicrobial medicines was limited, and these medicines were available without a prescription in more than half the countries. Many countries reported that health care workers comply poorly with prescribing standards and guidelines.

IPC programmes are evolving in the Region, with nine of the 11 countries having a national IPC programme and seven with such a programme in all tertiary hospitals.

Nine of the 11 countries had a national regulatory agency, and six had quality standards.

6.1 Introduction

The WHO South-East Asia Region comprises 11 Member States. All the countries are lower- to middle-income countries.

The Region recognizes antimicrobial resistance as a serious global problem that requires a regional response. In 2011, the Region's health ministers adopted the Jaipur Declaration on Antimicrobial Resistance, which states that combating antimicrobial resistance must be a priority for national governments. To this end, the Regional Office has prepared a strategy (WHO Regional Office for South-East Asia, 2010) to support countries in introducing legislation and policies to govern the use of antimicrobial medicines; establishing laboratory-based networks for surveillance

of antimicrobial resistance; ensuring rational use of antimicrobial medicines in all health care settings; and promoting community awareness about antimicrobial resistance.

Since 2011, policies for containing antimicrobial resistance have become more common (WHO Regional Office for South-East Asia, 2013). The regional strategy also encourages research into the development or improvement of antimicrobial medicines.

The country situation analysis showed that antimicrobial resistance is a major problem in the Region and that nosocomial infections are a particular concern. The main cause of resistance appears to be inappropriate use of antimicrobial medicines, due to both their over-the-counter availability and the poor compliance of health care workers with standards.

6.2 National plans and other strategies

Five (45%) of the Region's Member States had a national plan. Seven (64%) reported having a national coordinating mechanism, and six (55%) reported having policies or strategies (Figure 6.1).

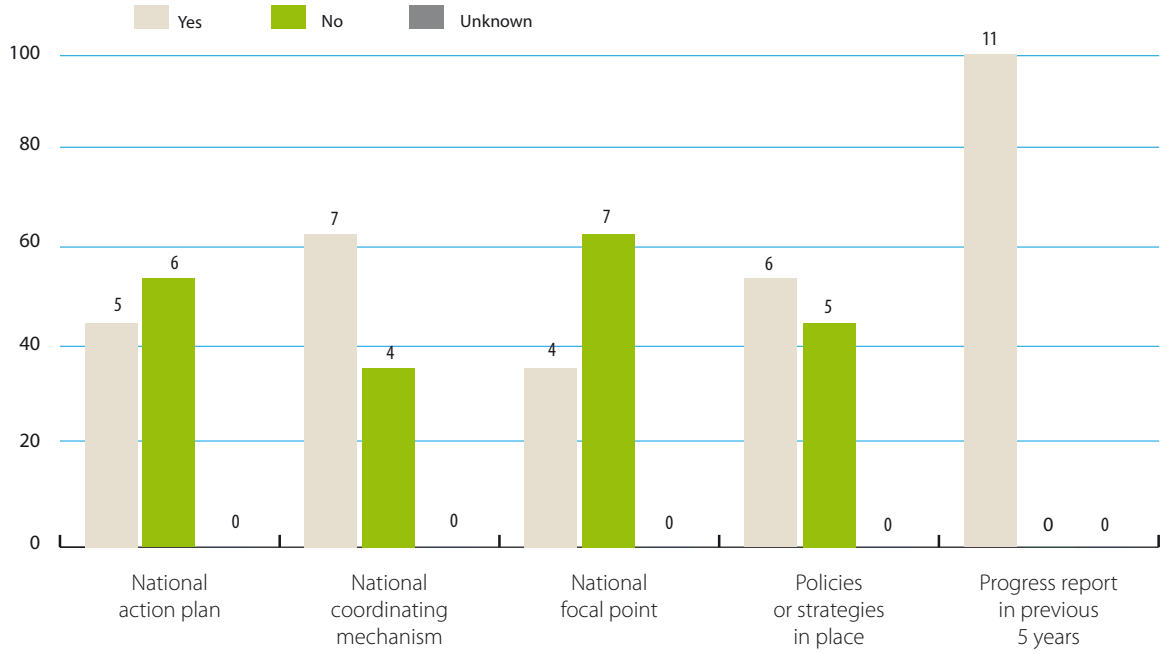


Figure 6.1 – **Percentages of Member States that had a national plan for antimicrobial resistance, coordinating mechanism, focal point, policy or strategy and had prepared a report in the previous 5 years, WHO South-East Asia Region**
(Note: numbers above the bars represent the numbers of responses)

6.3 Surveillance and laboratory capacity

Figure 6.2 shows that all 11 countries collected surveillance data on antimicrobial resistance in bacteria. The survey did not include a breakdown by target organism, but the Regional Office (2013) reported a focus on methicillin-resistant Staphylococcus aureus, vancomycin-resistant enterococci and bacteria that produce extended-spectrum b-lactamases and metallo-b-lactamases.

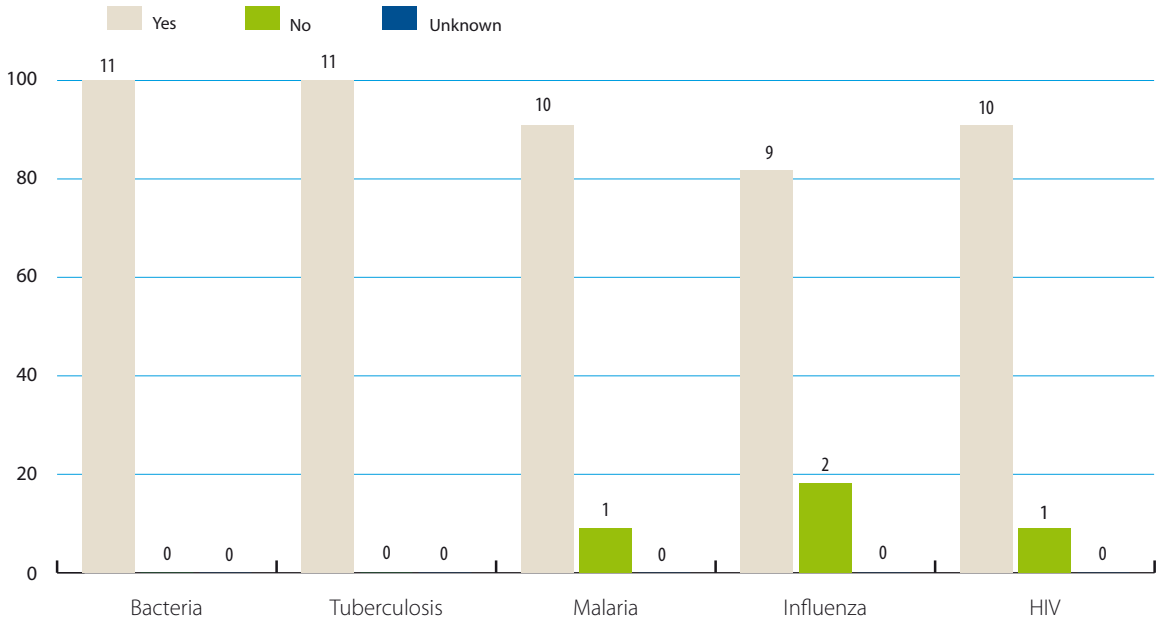


Figure 6.2 – **Percentages of Member States that had conducted surveillance for antimicrobial resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, WHO South-East Asia Region**
(Note: numbers above the bars represent the numbers of responses)

Nine countries (82%) had national reference laboratories for testing sensitivity to antibiotics, and six (53%) participated in external quality assessment.

In countries that had prepared reports on antimicrobial resistance surveillance, monitoring in humans was infrequent (36%; four countries).

6.4 Access to quality-assured antimicrobial medicines

A national regulatory agency existed in nine (82%) countries, and six (55%) had quality standards; seven (64%) reported that they could enforce the quality standards. WHO (2010) reported that counterfeit medicines are a significant problem in both the WHO South-East Asia and Western Pacific regions.

All 11 Member States had a list of essential medicines.

6.5 Use of antimicrobial medicines

Antimicrobial medicines were available without a prescription in 64% of countries, and 82% reported that they could enforce regulations (Table 6.1). Few countries had conducted information campaigns on antimicrobial resistance, although all had prepared standard treatment guidelines to raise awareness among health care workers about the treatment of infections. Many countries reported compliance with prescribing regulations. Little monitoring of antimicrobial use was reported in the Region (Table 6.1).

Table 6.1 – **Antimicrobial use, WHO South-East Asia Region**

	Yes (%)	No (%)	Unknown (%)
Antimicrobial medicines are available without a prescription.	64	9	27
Restriction of prescription-only medicines can be enforced.	82	0	18
Standard treatment guidelines could be drawn up.	100	0	0
Use of antimicrobial medicines was monitored in the previous 5 years.	9	64	27

6.6 Public awareness

At the time of the survey, five countries (45%) reported having conducted a public information campaign on antimicrobial use in the previous 2 years (Figure 6.7). Further progress has been made, with campaigns now being undertaken in almost all countries. Since World Health Day in 2011, the WHO Regional Office has been distributing material to Member States in the Region to raise awareness.

6.7 Infection prevention and control programmes

IPC programmes address all types of infection and are especially important in slowing the transmission of antimicrobial-resistant organisms. Nine of the Region's Member States reported a national IPC programme, and seven reported that all their tertiary hospitals had such a programme.

7. WHO Western Pacific Region

Regional facts

Number of Member States: 27

Number of Member States for which information was available for the analysis: 26 (96%)

Regional population: 1.85 billion

Life expectancy for region: average: 73 years; range: 62–84 years

Regional overview

The Western Pacific Region comprises 27 Member States, which are widely diverse socioeconomically and include some of the world's least developed countries.

The WHO Regional Office for the Western Pacific was the first WHO regional office to implement recommendations for surveillance of antimicrobial resistance, in 1982; however, other competing major public health issues (e.g. severe acute respiratory syndrome in 2003 and avian influenza) have slowed progress.

Four countries (17%) reported having a national action plan. There was lack of awareness about antimicrobial resistance among the general public and in all sectors, including policy-making, and lack of public information on the safe use of antimicrobial medicines. Less than half the countries had conducted a public information campaign in the previous 2 years.

Nearly 70% of countries reported surveillance for antimicrobial resistance in bacteria; this proportion may increase following introduction of the Western Pacific Antimicrobial Resistance Surveillance system in the near future.

More than half the countries (67%) reported having an IPC programme; 59% indicated that a programme was operating in all tertiary hospitals.

There was weak enforcement of regulations on the sale of antimicrobial medicines without prescription and of quality standards. Countries had poor capacity to enforce standards and requirements to promote the rational use of antimicrobial medicines.

7.1 Introduction

The WHO Western Pacific Region covers a vast area, from Mongolia and China in the north and west to New Zealand in the south and French Polynesia in the east; it comprises 37 countries and areas. The Region's population represents about 25% of the total world population, China itself accounting for approximately three fourths of the population of the Region (United Nations Development Programme, 2014). The Region is one of the most diverse of all the WHO regions, as it includes some of the world's least developed countries as well as highly developed and rapidly emerging economies. It includes six high-income countries, while the remainder are lower- to middle-income countries (World Bank, 2014). This socioeconomic spread results in wide variation in health care resources and financing and differences in strategies for containing antimicrobial resistance.

The commonest public health threats reported by high-income countries included antimicrobial resistance and health care-associated and vaccine-preventable infections. In the lower- to

middle-income countries, the main public health challenges are TB, insect-borne infections (e.g. dengue, malaria), bacterial infections and sexually transmitted infections (including HIV infection).

The Regional Office for the Western Pacific was the first regional office to implement recommendations for surveillance of antimicrobial resistance, in 1982. The scale of the problem of antimicrobial resistance in the Region varies. Some high-income countries reported that it is an issue mainly in hospitals, while many lower- to middle-income countries indicated that inappropriate use of antimicrobial medicines is prevalent.

7.2 National plans and other strategies

Four countries (15%) in the Region reported having a national action plan to contain antimicrobial resistance, and less than half reported having national focal points, national coordinating mechanisms, policies or strategies (Figure 7.1). Six countries (22%) had issued a progress report within the previous 5 years. These data indicate gaps in strategies and policies to contain antimicrobial resistance at country and regional levels, even in many high-income countries.

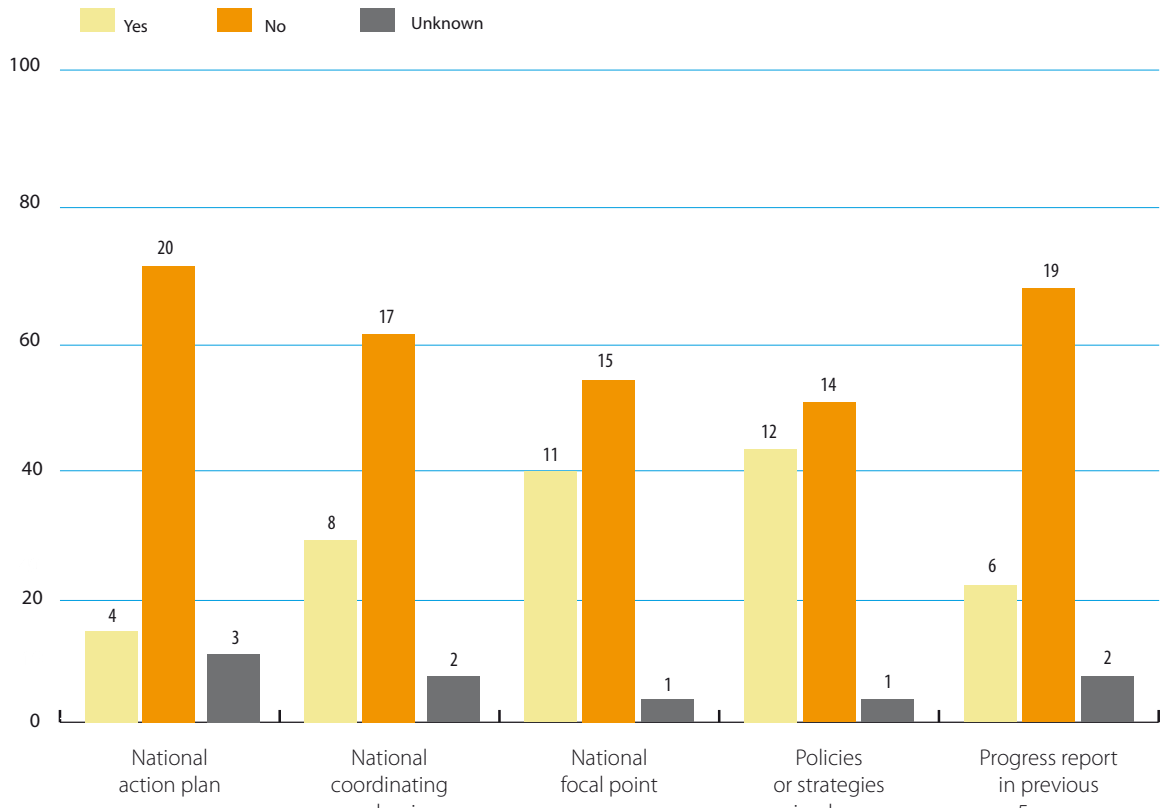


Figure 7.1 – **Percentages of Member States that had a national plan for antimicrobial resistance, coordinating mechanism, focal point, policy or strategy and had prepared a report in the previous 5 years, WHO Western Pacific Region**
(Note: numbers above the bars represent the numbers of responses)

7.3 Surveillance and laboratory capacity

In 2013, the Regional Office proposed the Western Pacific Antimicrobial Resistance Surveillance (WePARS) network for tracking and early detection of antimicrobial resistance. It identified strengthening laboratory capacity and harmonizing laboratory methods as crucial elements in containing antimicrobial resistance in the Region. The main focus of WePARS will be resistance in bacteria in sectors that are not covered by other vertical disease programmes, such as for MDR-TB.

Just over 70% of countries reported conducting some bacterial surveillance (Figure 7.2).

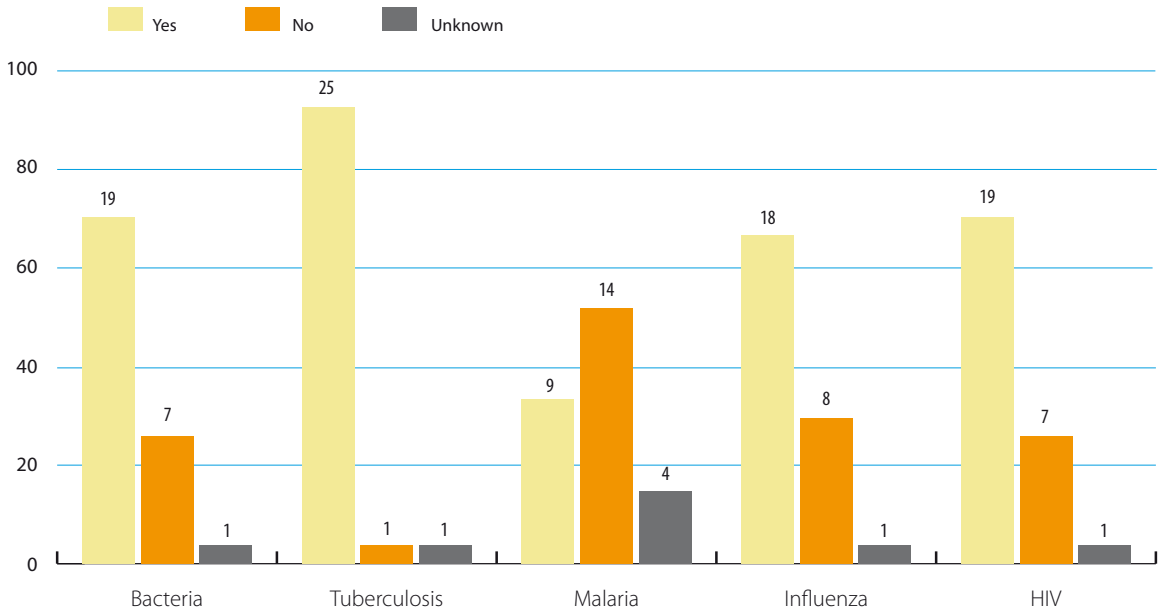


Figure 7.2 – **Percentages of Member States that had conducted surveillance for resistance in bacteria in general and in the causative agents of tuberculosis, malaria, influenza and HIV infection, WHO Western Pacific Region**
(Note: numbers above the bars represent the numbers of responses)

Bacterial surveillance is successful only if laboratories can ensure the quality of testing and the reliability of the results (i.e. internal quality control). The Clinical and Laboratory Standards Institute in the United States of America and the European Committee on Antimicrobial Susceptibility Testing (EUCAST) both publish standardized testing methods; most countries in the Western Pacific Region use the former (WHO Regional Office for the Western Pacific, 2014).

Eighteen countries in the Region (67%) reported having a national reference laboratory in which sensitivity to antibiotics was tested, and 17 (63%) had laboratories that participated in external quality assessment (Figure 7.3).

More than half (56%; 15) of the countries reported having prepared reports on antimicrobial resistance surveillance; nearly 44% had not or were unsure.

7.4 Access to quality-assured antimicrobial medicines

Seventeen countries reported having a national regulatory authority, and the same number reported that the authority could enforce quality standards. Fifteen (56%) reported having national quality standards; however, some reported that although they had a national regulatory authority they were unable to enforce standards, while others reported that they could enforce standards but did not have a regulatory authority.

A list of essential medicines was available in 92% (24) of participating countries.

7.5 Use of antimicrobial medicines

A few countries reported that a national system was in place to monitor rational use of antimicrobial medicines. The Regional Office is strengthening countries' national monitoring systems, and the data obtained will be used to track progress towards appropriate use of antimicrobial medicines and to inform policy-makers in establishing national plans and policies (see section 7.2). The public could buy antimicrobial medicines without a prescription in 52% of the countries (Table 7.1). Only 59% of the countries reported that they could prepare standard treatment guidelines. Half the responding countries reported monitoring use of antimicrobial medicines in humans.

Table 7.1 – **Antimicrobial use, Western Pacific Region**

	Yes (%)	No (%)	Unknown (%)
Antimicrobial medicines are available without a prescription.	52	41	7
Restriction of prescription-only medicines can be enforced.	85	7	8
Standard treatment guidelines could be drawn up.	59	26	15
Use of antimicrobial medicines was monitored in the previous 5 years.	52	41	7

7.6 Public awareness

Public information about appropriate antimicrobial use is especially important in areas where these medicines are available without a prescription, and 52% of the countries reported that this was the case (see section 7.5). Just over one third the Member States (10 countries) had conducted a public information campaign within the previous 2 years.

7.7 Infection prevention and control programmes

More than half the countries (81; 67%) reported having an IPC programme, and 16 indicated that a programme was present in all tertiary hospitals.

8. Conclusions

Although antimicrobial resistance is a natural phenomenon, it is being propagated by misuse of antimicrobial medicines, poor-quality medicines, weak laboratory capacity and surveillance, insufficient regulation of the use of these medicines and inadequate or inexistent programmes for IPC. This initial "country situation analysis" was conducted in 2013 in Member States in each of the six WHO regions to determine the extent to which effective practices and structures to address antimicrobial resistance are already in place and where gaps remain. As widely different proportions of countries in each Region provided information, caution should be exercised in interpreting the results and in comparing the results among regions.

The survey addressed the key elements for combating antimicrobial resistance: a comprehensive national plan, laboratory capacity to undertake surveillance for resistant microorganisms, access to safe, effective antimicrobial medicines, control of the misuse of antimicrobial medicines, awareness and understanding among the general public and effective IPC programmes.

1. Only a few countries reported having a comprehensive national plan based on a multisectoral approach and with sustainable financing. More countries reported having a national focal point for antimicrobial resistance and a national coordination mechanism; others had put in place relevant strategies and policies. Progress is to be made even in countries with strong health-care systems.

2. Surveillance of antimicrobial resistance varied by type of resistance and by country in all WHO regions; in many, poor laboratory capacity, infrastructure and data management prevented effective surveillance. A national reference laboratory capable of testing for antibiotic sensitivity was present in each region; however, many of the laboratories did not participate in external quality assessment schemes. Monitoring of antimicrobial resistance was infrequent, although, in three regions, more than half the responding countries had prepared reports on surveillance of antimicrobial resistance in humans.

3. Regions in which there are many high-income countries, such as the European and the Western Pacific regions, reported higher rates of access to high-quality medicines. In the regions in which there were problems of low-quality and/or counterfeit medicines, few countries had a national regulatory authority, national standards or the capacity to enforce them.

4. The sale of antimicrobial medicines without prescription was widespread, and many countries lacked standard treatment guidelines for health care workers. Thus, overuse of antimicrobial medicines by the public and by the medical profession was a potential problem in all regions. Few countries reported a system for monitoring the use of antimicrobial medicines; tracking of prescribing patterns and over-the-counter sales is therefore a significant challenge. Furthermore, regulations on the sale of prescription-only medicines could not be widely enforced in several regions.

5. Public awareness of antimicrobial resistance was generally low in all regions. Even in some countries in which national public awareness campaigns had been conducted, there was still widespread belief that antibiotics are effective against viral infections. The level of awareness about antimicrobial resistance was also low in the sectors of health care, politics, the media and academia. More education and collaborative awareness-raising campaigns in these sectors will be required. If these sectors are not well informed, the appropriate regulations and standards will not be legislated, and the other sectors will not have the information to implement them effectively.

6. Half the Member States in the European, South-East Asia and Western Pacific regions that responded to the survey reported having a national IPC programme; fewer had IPC programmes in all tertiary hospitals.

This first country situation analysis provides an overview of existing structures and policies to address antimicrobial resistance in 133 Member States. The survey summarized in this report can inform future global efforts to tackle antimicrobial resistance and form the basis for a monitoring framework to assess progress in countries.

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Annex 1.

A

Afghanistan
Albania
Antigua and Barbuda
Argentina
Armenia
Australia
Austria
Azerbaijan

B

Bahrain
Bangladesh
Barbados
Belarus
Belgium
Belize
Bhutan
Bolivia (Plurinational State of)
Bosnia and Herzegovina
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso

C

Cambodia
Canada
Central African Republic
Chile
China
Colombia
Cook Islands
Costa Rica
Croatia
Cuba
Cyprus
Czech Republic

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Democratic People's Republic of Korea
Denmark
Dominica
Dominican Republic

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Egypt
El Salvador
Estonia

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Greece
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Guyana

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Hungary

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Iceland
India
Indonesia
Iran (Islamic Republic of)
Ireland
Israel
Italy

J

Jamaica
Japan
Jordan

K

Kazakhstan
Kiribati
Kyrgyzstan

L

Lao People's Democratic Republic
Latvia
Lebanon

L (continued)

Lithuania
Luxembourg

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Malaysia
Maldives
Malta
Marshall Islands
Mexico
Micronesia (Federated States of)
Mongolia
Montenegro
Morocco
Myanmar

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Nepal
Netherlands
New Zealand
Nicaragua
Niue
Norway

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Palau
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal

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Republic of Korea
Republic of Moldova
Romania
Russian Federation

S

Saint Kitts and Nevis
Samoa
Saudi Arabia
Serbia
Singapore

S (continued)

Slovakia
Slovenia
Solomon Islands
South Sudan
Spain
Sri Lanka
Sudan
Suriname
Sweden
Switzerland
Syrian Arab Republic

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Tajikistan
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