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QUALIFICATION WORK

on the topic: **«STUDY ON THE CURRENT APPROACHES OF PHARMACEUTICAL CARE TO PATIENTS WITH MEASLES»**

Performed by: higher education graduate of group Фм20 (4,10д) англ-02
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ANNOTATION

The qualification work analyzes global and national approaches to measles control, with a focus on the role of pharmaceutical care and pharmacists in Morocco. It examines the epidemiological burden of measles, the structure of immunization programs, and the accessibility of supportive treatment. The current limitations and strategic potential of involving pharmacists in prevention and case management are explored. Key directions for improving pharmaceutical care are identified in line with WHO and FIP guidelines.

The qualification work consists of an introduction, 3 chapters, conclusions, a list of used sources and is laid out on 53 pages of printed text. The work is illustrated with 19 figures and 5 tables. The bibliography includes 48 information sources.

Keywords: measles, pharmaceutical care, vaccination, vitamin A, pharmacists, Morocco, health system, access to treatment, immunization strategy

АНОТАЦІЯ

Кваліфікаційна робота присвячена аналізу глобальних і національних підходів до боротьби з кором, з акцентом на роль фармацевтичної допомоги та фармацевтів у Марокко. Розглянуто епідеміологічний тягар захворювання, структуру програм імунопрофілактики та доступність підтримувального лікування. Досліджено обмеження та стратегічні можливості залучення фармацевтів до профілактики та ведення випадків. Визначено основні напрями вдосконалення фармацевтичної допомоги відповідно до рекомендацій ВООЗ та FIP.

Кваліфікаційна робота складається зі вступу, 3 розділів, висновків, списку використаних джерел та розміщена на 53 сторінках друкованого тексту. Робота ілюстрована 19 рисунком та 5 таблицями. Бібліографія містить 48 джерел.

Ключові слова: кір, фармацевтична допомога, вакцинація, вітамін А, фармацевти, Марокко, система охорони здоров’я, доступ до лікування, стратегія імунізації.

CONTENT

LIST OF ABBREVIATIONS

ADR – Adverse Drug Reaction

CPD – Continuing Professional Development

EPI – Expanded Programme on Immunization

FIP – International Pharmaceutical Federation

GPP – Good Pharmacy Practice

MAD – Moroccan Dirham

MCV – Measles-Containing Vaccine

MCV1 – First dose of measles-containing vaccine

MCV2 – Second dose of measles-containing vaccine

MMR – Measles, Mumps, and Rubella vaccine

MOH – Ministry of Health

ORS – Oral Rehydration Salts

OTC – Over-the-Counter (medicine)

SIA – Supplementary Immunization Activities

USD – United States Dollar

UNICEF – United Nations International Children's Emergency Fund

WHO – World Health Organization

INTRODUCTION

Measles remains one of the most contagious and potentially deadly infectious diseases globally, particularly affecting unvaccinated children and individuals with weakened immune systems. Despite the availability of highly effective and safe vaccines, measles continues to cause substantial morbidity and mortality, especially in low- and middle-income countries. In 2022 alone, more than 140,000 measles-related deaths were reported worldwide, with outbreaks becoming increasingly frequent due to declining vaccination coverage, social inequalities, and pandemic-related disruptions in health services. These challenges underscore the need for integrated, community-level strategies to improve measles prevention and management.

Pharmaceutical care plays an essential role in supporting measles control through both prevention and therapeutic management. Pharmacists, due to their accessibility and trust within communities, can contribute significantly to raising awareness, promoting vaccination, managing measles symptoms, and preventing complications. In cases where immunization coverage is incomplete, timely access to vitamin A, antipyretics, antibiotics, and caregiver counselling becomes critical to reducing the burden of the disease. However, in many countries, including Morocco, the role of pharmacists in infectious disease control remains underdeveloped and insufficiently formalized within national strategies.

Understanding the current state of pharmaceutical care in the context of measles is important not only for optimizing patient outcomes but also for strengthening the resilience of primary health systems. Evaluating international best practices and analyzing national gaps can guide future policy reforms and support the decentralization of preventive and therapeutic services. This study is situated at the intersection of public health and pharmaceutical care and aims to contribute evidence-based insights into how pharmacists can be better integrated into measles response systems.

The purpose of the study is to explore the current approaches to pharmaceutical care for patients with measles, with a particular focus on the Moroccan context, and to assess their alignment with international recommendations and strategic frameworks for measles control and elimination.

Research objectives:

- to analyze the global epidemiological and public health burden of measles;
- to examine international guidelines and best practices related to pharmaceutical care in measles prevention and treatment;
- to evaluate the structure and implementation of measles vaccination policies at the global and national levels;
- to assess the availability and accessibility of pharmaceutical services and essential medicines for measles patients;
- to explore the current and potential role of pharmacists in measles prevention and supportive care;
- to identify strategic directions for optimizing pharmaceutical care systems and pharmacist engagement in Morocco.

The object of the research became literary sources on the development of measles treatment and prevention, the regulatory and legal framework, WHO policies, and guidelines, statistical data, medication prices in Morocco.

The subject of the study is the organization and implementation of pharmaceutical care in relation to measles prevention and treatment in Morocco and globally.

Research methods. The study uses analytical, systemic, and comparative methods; content analysis of WHO guidelines, national health documents, and immunization data; graphical modeling; and evidence synthesis from published and grey literature.

The scientific novelty and practical significance of the study lie in its comprehensive examination of pharmaceutical care in the context of measles – an area often overlooked in national immunization and outbreak response strategies.

This research highlights existing gaps in access to pharmaceutical services, regulatory barriers to pharmacist participation, and the underutilization of pharmacists in public health education and surveillance. The findings offer policy-oriented recommendations for expanding the pharmacist's role in both measles prevention and case management, thereby supporting more equitable and decentralized care.

The study results were approved at the XXXI International scientific and practical conference of young scientists and students "TOPICAL ISSUES OF THE NEW MEDICINES DEVELOPMENT" held on April 23-25, 2025.

Structure and scope of qualification work. The qualification work consists of the introduction, three chapters, conclusions to each chapter, a general conclusion, and list of used sources. The results of the study are presented on 53 pages of text, the number of figures – 19, the number of tables – 5, and the list of references – 48 titles.

CHAPTER I.
LITERATURE REVIEW ON THE MEDICAL AND SOCIAL SIGNIFICANCE OF MEASLES

1.1 The concept of measles as a public health issue

Measles is a highly contagious viral disease that remains a pressing concern for global public health, despite decades of vaccine availability. The pathogen responsible, Morbillivirus, belongs to the family Paramyxoviridae and is transmitted primarily through airborne respiratory droplets. It can linger in enclosed spaces for up to two hours, making it particularly difficult to contain in densely populated or poorly ventilated environments [6].

The disease is characterized by a high basic reproduction number (R_0) estimated between 12 and 18, meaning that one infected individual can transmit the virus to as many as 18 susceptible persons in the absence of immunity [52]. This makes measles one of the most transmissible human diseases known to science. Consequently, maintaining high levels of immunization coverage, typically above 95%, is essential to achieve and sustain herd immunity.

Historically, before the introduction of the measles vaccine in 1963, major outbreaks occurred every 2–3 years, causing an estimated 2.6 million deaths annually [25]. The introduction of mass immunization campaigns led to a substantial reduction in mortality and morbidity. However, recent trends are alarming. According to the World Health Organization, more than 140,000 measles-related deaths were recorded globally in 2018, most of them among children under five years old [41].

The clinical presentation of measles includes an initial prodromal phase with high fever, cough, coryza (runny nose), and conjunctivitis, followed by the appearance of Koplik spots and a maculopapular rash that typically spreads from the face down to the trunk and limbs. The rash is often accompanied by severe malaise, gastrointestinal symptoms, and lymphadenopathy [36].

Figure 1.1 illustrates these hallmark symptoms, including the characteristic facial rash and red, watery eyes observed in children infected with measles.

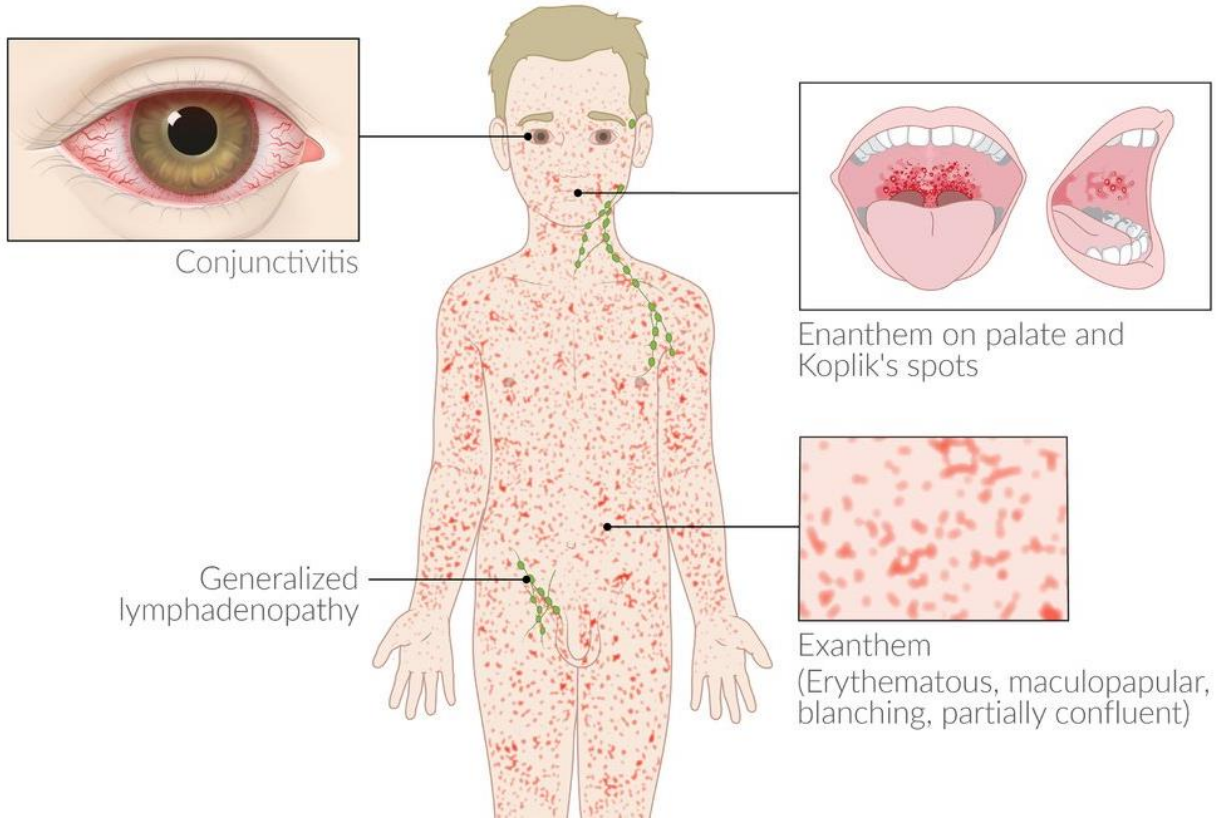

Fig. 1.1. Typical rash and conjunctivitis in a child with measles [25]

The typical rash appears 3 to 5 days after the onset of prodromal symptoms and progresses from the face to the trunk and limbs. The characteristic maculopapular exanthema is a key diagnostic feature. Figure 1.2 clearly illustrates the widespread distribution of the rash on the trunk and extremities, which assists clinicians in differential diagnosis alongside other viral exanthems.

Complications occur in approximately 30% of cases and are more common in malnourished children or individuals with immunodeficiencies. These complications include pneumonia, encephalitis, otitis media, and diarrhea – all of which can be fatal or lead to long-term disability [36]. In rare cases, subacute sclerosing panencephalitis (SSPE) may develop years after infection, with fatal neurodegenerative consequences [52].

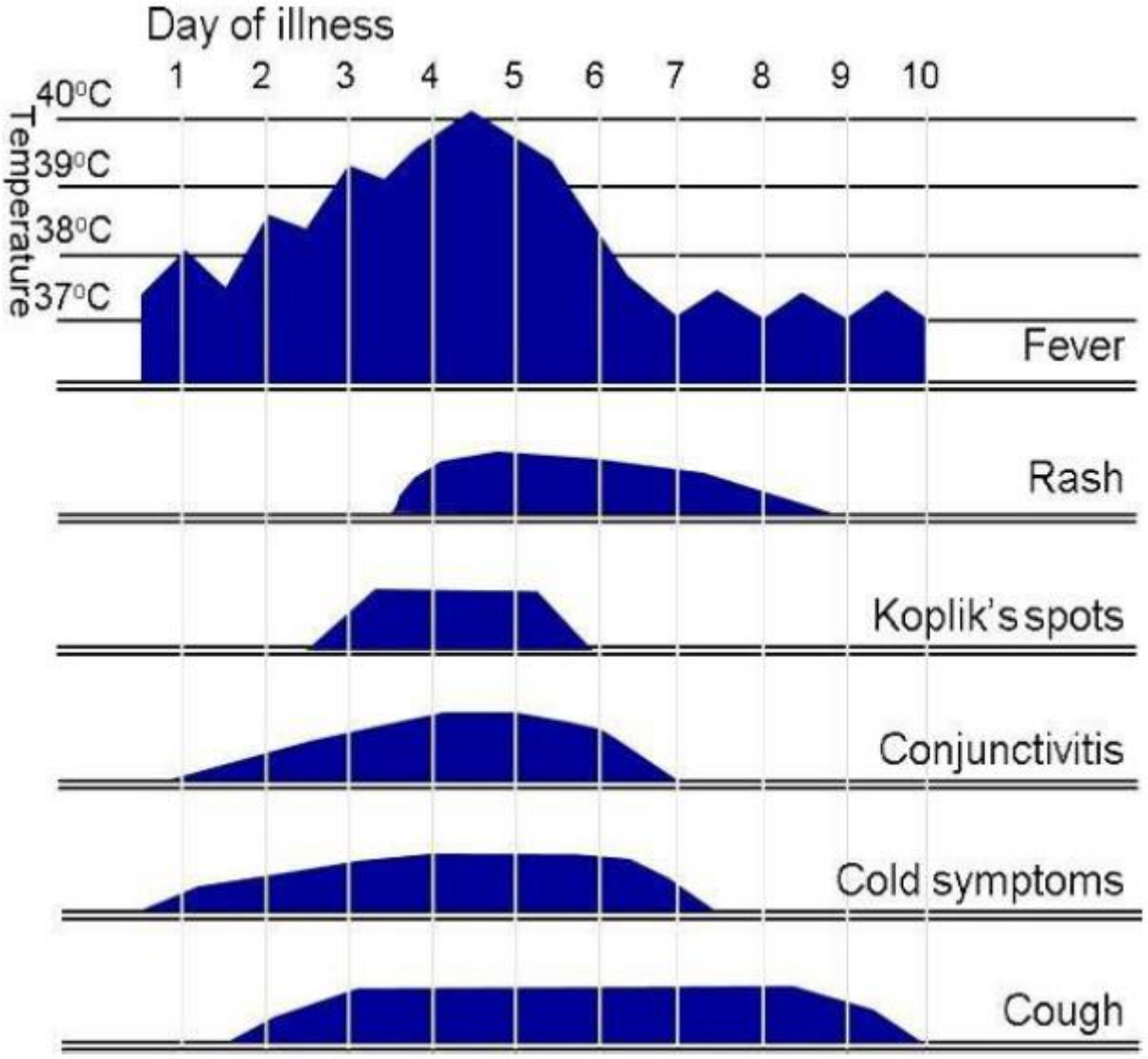

Fig. 1.2. Clinical course of primary measles infection and its main symptoms

In addition to its clinical burden, measles significantly disrupts immune homeostasis. Infection can lead to prolonged immune suppression, sometimes referred to as “immune amnesia,” which erases the host’s immunological memory and increases susceptibility to other infectious diseases for months after recovery [52].

From a public health perspective, measles serves as a sensitive barometer of healthcare system performance. Outbreaks are frequently linked to lapses in vaccination coverage caused by conflict, vaccine hesitancy, or health system disruptions. For example, in many parts of sub-Saharan Africa and the Middle

East, political instability and lack of infrastructure have created pockets of unvaccinated populations, making outbreak containment exceedingly difficult [12].

Economically, the cost of measles outbreaks is immense. Direct medical expenses (hospitalization, treatment, diagnostics), indirect costs (parental work loss, long-term care), and broader societal impacts (school closures, public health emergency response) make measles one of the most expensive vaccine-preventable diseases [9, 31]. In the United States, a single measles case has been estimated to cost up to $142,000 when all economic factors are considered [31].

Global initiatives such as the Measles & Rubella Strategic Framework 2021–2030 and the Immunization Agenda 2030 emphasize measles control as foundational for resilient healthcare systems [15, 27]. These frameworks recognize measles outbreaks as not merely isolated epidemiological events, but as signals of deeper systemic vulnerabilities in surveillance, supply chains, and vaccine equity.

Furthermore, the COVID-19 pandemic has disrupted routine immunization programs in more than 60 countries, putting over 90 million children at risk of missing their measles vaccine doses, thereby exacerbating the threat of resurgence [12, 25]. The global resurgence in measles cases during the past five years highlights the urgent need for renewed investment in immunization outreach and public awareness.

In summary, measles is not only a disease of clinical concern but also a critical public health indicator. Its control requires more than vaccines; it demands strong governance, resilient primary healthcare, and public trust in science. For Morocco and other countries aiming to strengthen pharmaceutical care, measles serves as both a challenge and a benchmark for evaluating healthcare system capacity.

1.2 Social and economic burden of measles outbreaks

Measles imposes a substantial burden on societies worldwide, affecting not only individual health but also healthcare systems, economies, and broader social stability. Despite being a vaccine-preventable disease, measles continues to cause significant morbidity and mortality, particularly in regions with limited access to immunization or weakened health infrastructure [25, 41].

The direct social consequences of measles outbreaks are far-reaching. High infection rates among children lead to increased absenteeism from schools, impairing educational continuity. Families often experience distress and disruption, especially when children require hospitalization or suffer complications such as pneumonia, diarrhea, or encephalitis [36]. In vulnerable communities, this translates into long-term developmental consequences, particularly when outbreaks coincide with malnutrition or poor access to healthcare [52].

In many low- and middle-income countries (LMICs), measles-related mortality is exacerbated by underlying social determinants, such as poverty, inadequate sanitation, and weak immunization infrastructure. For instance, data from the UN Inter-agency Group for Child Mortality Estimation show that measles remains one of the top causes of death among children under five in several African and Southeast Asian countries [18]. Moreover, misinformation and vaccine hesitancy, often amplified by social media, contribute to declining vaccination rates, even in high-income countries [41].

From an economic perspective, the cost burden of measles includes both direct and indirect components. Direct medical costs involve outpatient visits, hospital stays, laboratory diagnostics, and medications. A 2020 analysis in the United States found that the cost per measles case ranged from USD 7,000 to over USD 140,000, depending on the setting and complications [31]. In resource-constrained countries, such expenditures can cripple local health budgets during outbreaks.

Indirect costs are equally significant. Parents or caregivers often miss workdays to care for sick children, resulting in lost income and productivity. Outbreak control measures, such as contact tracing, isolation, public health alerts, and supplementary immunization campaigns, require substantial human and financial resources [9, 30]. In Morocco, while detailed national estimates are scarce, international studies suggest that each outbreak may cost several million dirhams, particularly when large-scale vaccination efforts are needed post-outbreak (Table 1.1).

Table 1.1

Estimated Economic Costs of Measles Outbreaks in Selected Countries

Country	Year	Total Cases	Estimated Cost (USD)
USA [31]	2019	1,282	>$140 million
Madagascar [25]	2019	200,000	$10 million+
India [9]	2017	13,000	$3 million
Ukraine [30]	2018	54,000	$6.5 million
Morocco (est.)	—	3,500	$1.2 million (estimated)

The macroeconomic implications of repeated outbreaks include reduced workforce productivity, increased strain on healthcare infrastructure, and delayed national development goals. In countries with fragile economies, these setbacks can derail poverty alleviation strategies and weaken public confidence in government capacity.

Moreover, the psychological toll of outbreaks, especially on caregivers of young children or immunocompromised individuals, cannot be underestimated. Fear, stigma, and social isolation have been observed during large-scale outbreaks, affecting mental health and community cohesion [12].

The psychosocial impact of measles is also considerable. Affected families may experience social isolation, fear of stigma, and mental health strain, particularly during large-scale outbreaks. These outcomes are especially pronounced in urban settings with high population density and low health literacy.

Figure 1.3 illustrates the most common social consequences of measles outbreaks, ranked by their relative perceived impact on families and society. These include school absenteeism, parental work loss, stigma, misinformation spread, and healthcare system overload.

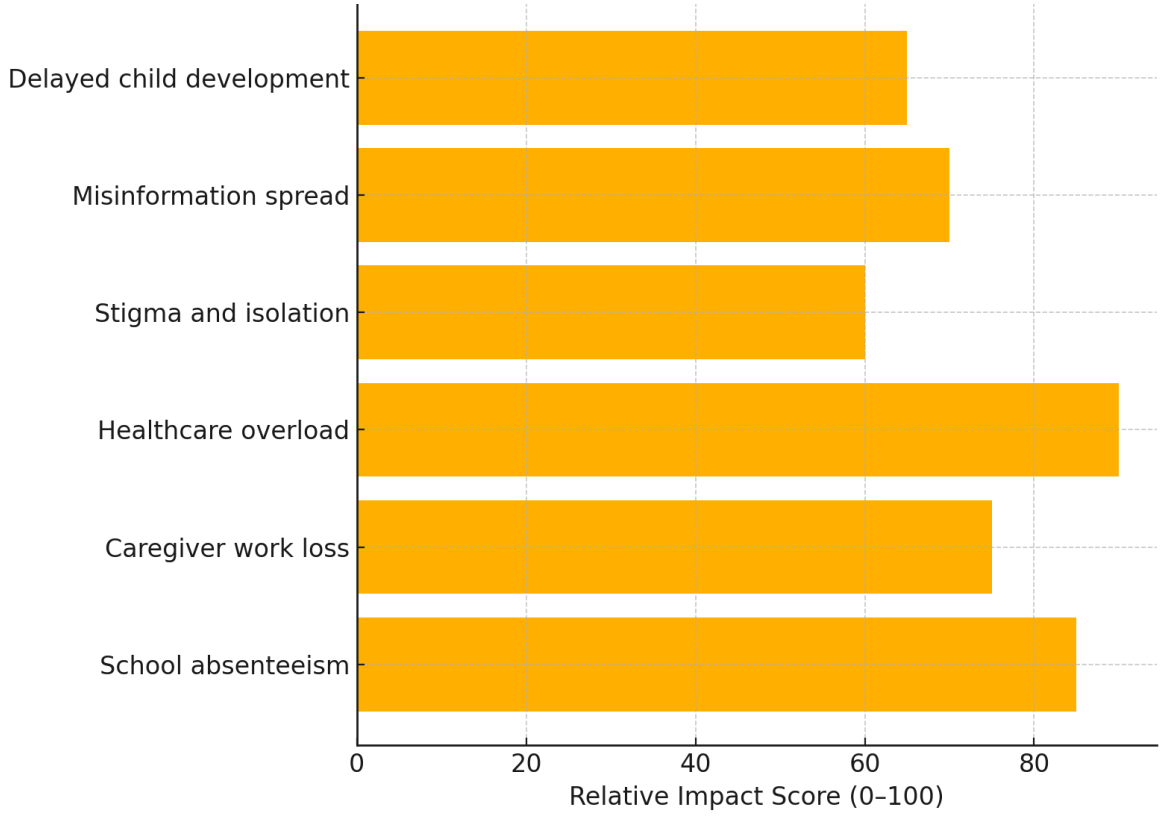

Fig. 1.3. Social Consequences of Measles Outbreaks

In addition, recent assessments by the CDC highlight the growing threat of undervaccination in both high- and low-resource settings. Figure 1.4 presents a visual risk map showing how regions with low immunization coverage can quickly become vulnerable to large-scale measles outbreaks, even in countries with historically high coverage.

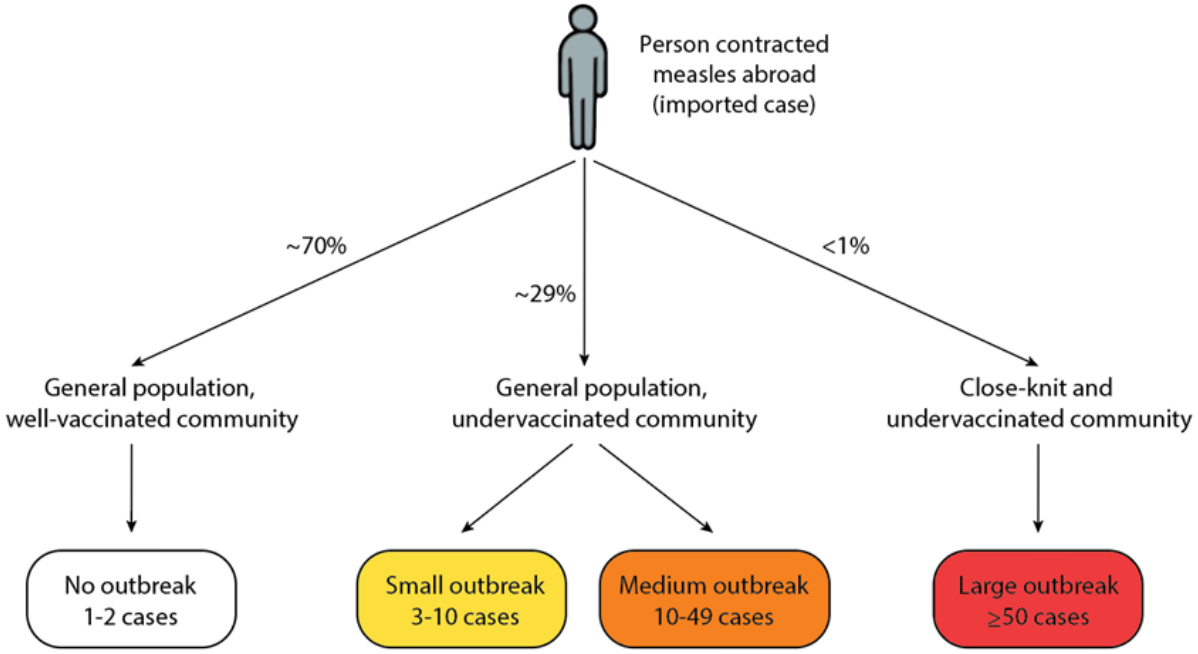

Fig. 1.4. Measles outbreak risk due to undervaccination

Measles outbreaks also highlight the inequities in healthcare access. Remote and rural populations, internally displaced persons, and migrant communities often remain outside the reach of national immunization programs. According to the Global Measles Report (2021), over 22 million infants missed their first measles vaccine dose due to systemic barriers, with the highest dropouts in conflict-affected zones [16].

In response, global health initiatives advocate for investment in early detection, rapid response, and preventive vaccination infrastructure, including integration with primary healthcare services. The WHO Measles Outbreaks Strategic Response Plan 2021–2023 emphasizes building health system resilience and prioritizing high-risk groups to reduce the social and economic toll of measles [27].

The burden of measles extends well beyond clinical symptoms. It disrupts education, increases healthcare spending, reduces productivity, and magnifies health inequities. A comprehensive, equity-driven, and economically informed approach is essential to mitigate these impacts and protect populations from future outbreaks.

Conclusions to Chapter 1

1. Measles remains one of the most significant vaccine-preventable diseases in terms of its public health relevance and socio-economic impact. Despite the availability of effective vaccination for decades, the disease continues to resurge globally, largely due to declining immunization coverage, misinformation, and systemic healthcare disruptions. Its persistent presence reflects not only biological risks, but also deep-rooted challenges in health system resilience, communication, and equity.

2. The nature of measles as an extremely contagious viral infection, combined with its capacity to cause serious complications such as pneumonia, encephalitis, and immune suppression, underscores its danger to vulnerable populations, particularly young children. Measles serves as a barometer of immunization system performance: its appearance in any region signals critical gaps in vaccine outreach and population coverage.

3. The consequences of measles outbreaks extend far beyond clinical outcomes. Socially, the disease contributes to educational interruption, psychological stress in families, and reduced productivity due to caregiver burden. Economically, measles places a heavy load on national healthcare systems – through both direct treatment costs and the need for emergency public health interventions. In many cases, these outbreaks lead to the reallocation of resources away from other critical health priorities.

4. Measles exerts a complex and multifaceted burden on individuals, communities, and governments. Effective response requires a comprehensive approach that ensures equitable vaccine access, strengthens public health infrastructure, and promotes awareness through multidisciplinary collaboration. Pharmaceutical care professionals, including pharmacists, play a vital role in this process by supporting vaccination campaigns, counseling the public, and participating in outbreak response strategies. Addressing measles as both a medical and social issue is essential for achieving lasting public health security.

CHAPTER II.
INTERNATIONAL EXPERIENCE AND NATIONAL POLICIES IN MEASLES PREVENTION AND TREATMENT

2.1 Epidemiology and trends of measles worldwide and in Morocco

Measles remains a persistent global health challenge, despite the availability of safe and effective vaccines. Its extreme contagiousness, high morbidity, and association with immune suppression make it a key indicator of the performance of immunization programs and broader public health resilience. The disease is characterized by a basic reproduction number (R_0) of 12–18, making it one of the most transmissible infectious diseases known. Sustained control and eventual elimination require high population immunity – typically above 95% coverage with two doses of a measles-containing vaccine (MCV1 and MCV2).

According to the World Health Organization, measles incidence globally declined substantially from 2000 to 2016. However, this progress reversed in 2018–2019, culminating in over 870,000 cases in 2019 – the highest in two decades [25]. Figure 2.1 illustrates this resurgence, followed by a sudden drop during the COVID-19 pandemic. While on the surface this decline may suggest improvement, WHO warns that pandemic-related disruptions in surveillance and immunization likely led to significant underreporting, potentially masking continued transmission [25].

Further insight is provided by regional analysis. Figure 2.2 shows the distribution of reported cases across WHO regions from 2017 to 2025. The African Region consistently bears the largest burden, followed by the Eastern Mediterranean and South-East Asia Regions. Even the European Region, with traditionally strong systems, experienced a notable resurgence in 2018–2019, particularly in Romania and Ukraine [25].

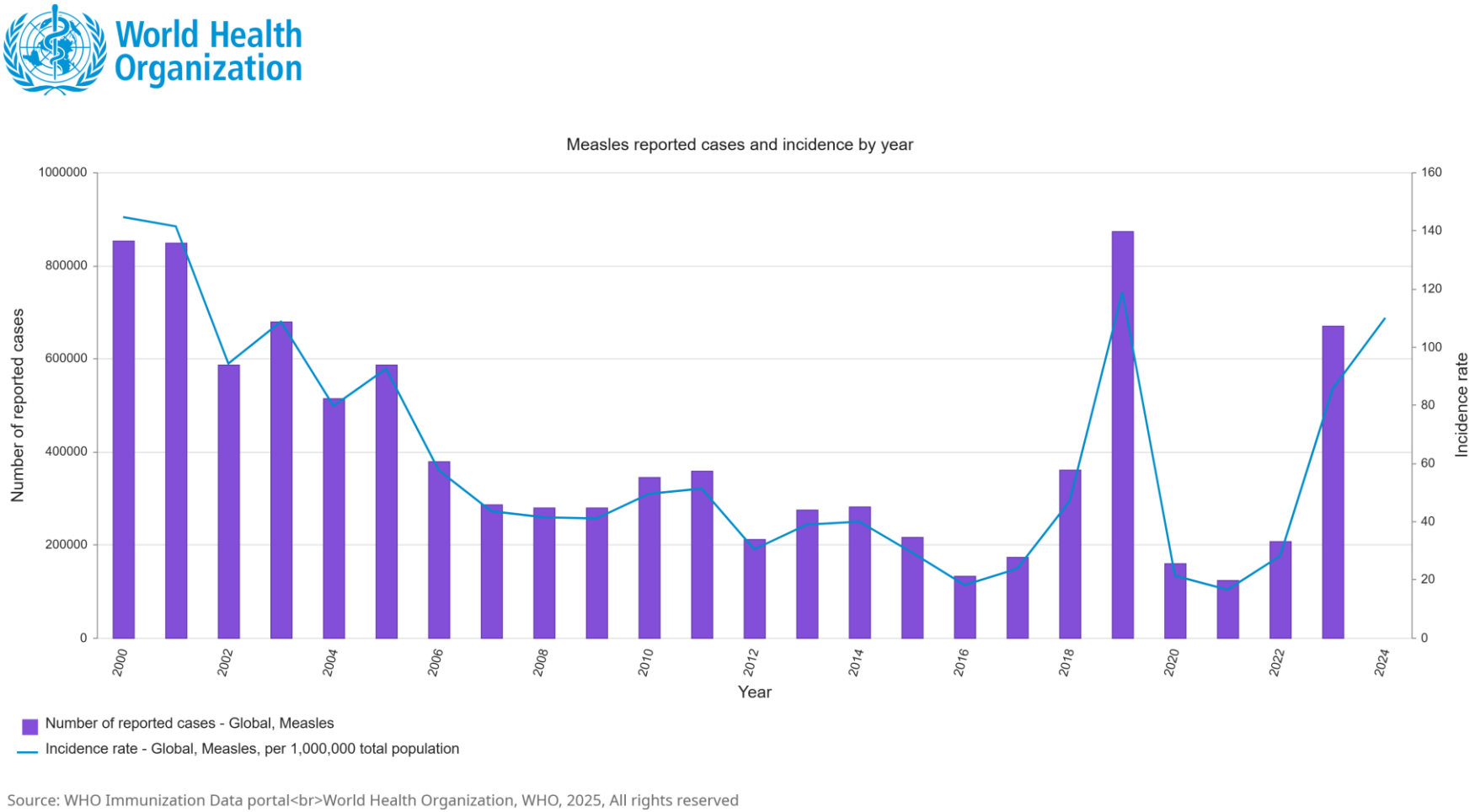

Figure 2.1. Measles reported cases and incidence by year, 2000–2023 [25]

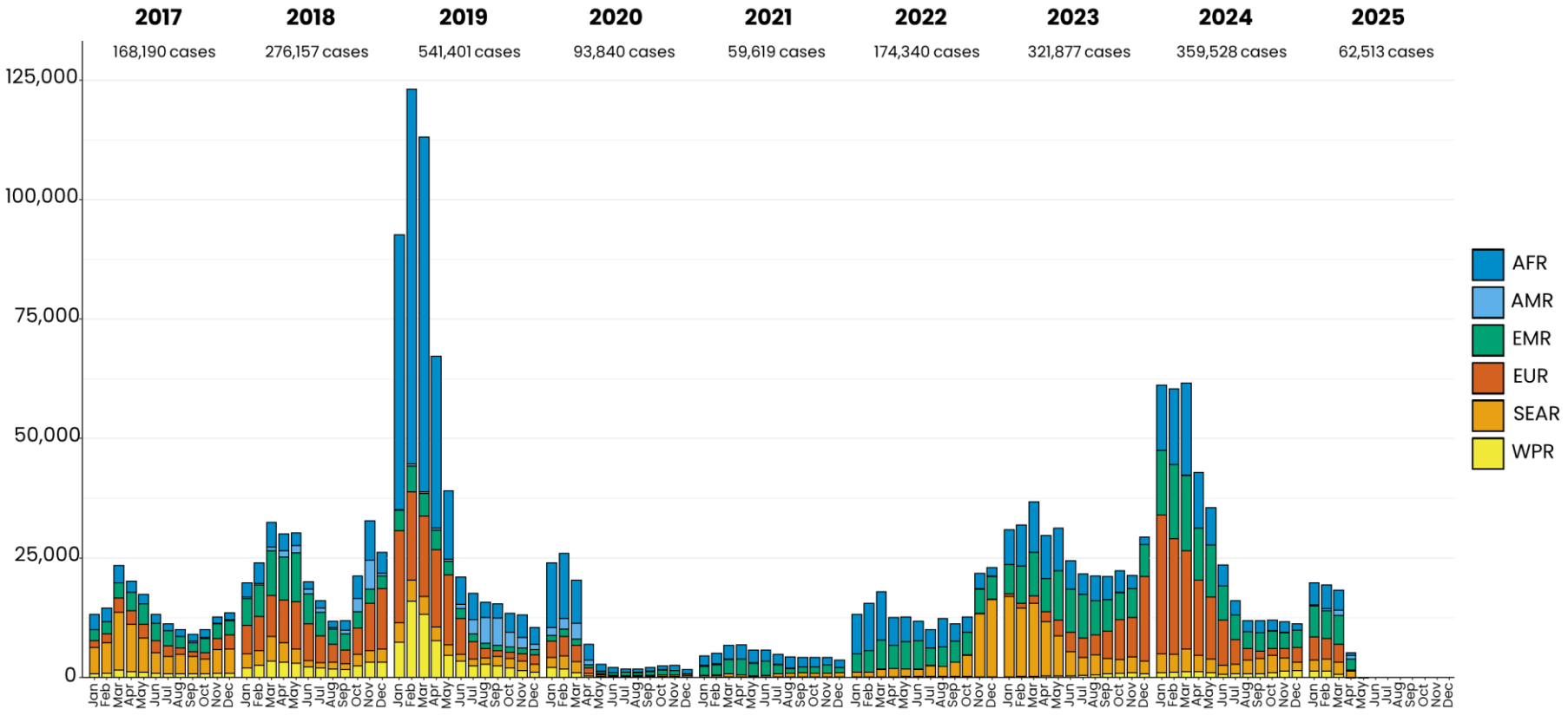

Figure 2.2. Monthly measles case distribution by WHO Region, 2017–2025 [25]

Between 2020 and 2024, the African Region reported an average of over 181,000 cases annually. This is followed by the Eastern Mediterranean (~45,900), South-East Asia (~37,600), European (~18,200), Western Pacific (~3,685), and Region of the Americas (~2,715). The global average during this five-year span approached 290,000 cases per year, highlighting persistent gaps in vaccine coverage and surveillance [25].

A spatial view of measles risk is offered in Figure 2.3. Countries such as Kyrgyzstan, Romania, Yemen, Kazakhstan, and Afghanistan report the highest incidence rates. Morocco is situated in the 10–20 cases per million category, which represents a moderate burden with potential for local outbreaks [25].

The epidemiological profile of Morocco reflects long-term progress punctuated by intermittent challenges. As shown in Figure 2.4, the country experienced high burden in the early 2000s, with annual incidence above 300 per million. With the implementation of two-dose MCV strategy and expanded coverage, measles cases declined dramatically after 2005. From 2014 to 2019, Morocco reported consistently low incidence, meeting key elimination benchmarks [25].

However, granular monthly data indicate a recent resurgence. Morocco reported 134 confirmed measles cases in 2023, 409 in 2024, and already 299 cases in the first quarter of 2025. The spike in early 2025 suggests ongoing transmission in under-immunized populations [25].

Recent national reports cite a much sharper increase. According to Moroccan media quoting the Ministry of Health, between 10 and 16 February 2025, a total of 3,365 measles cases and 6 deaths were reported nationwide. The highest case numbers occurred in the Rabat-Salé-Kenitra (807), Fez-Meknes (713), and Casablanca-Settat (624) regions. All 12 administrative regions reported cases during that period, indicating widespread transmission.

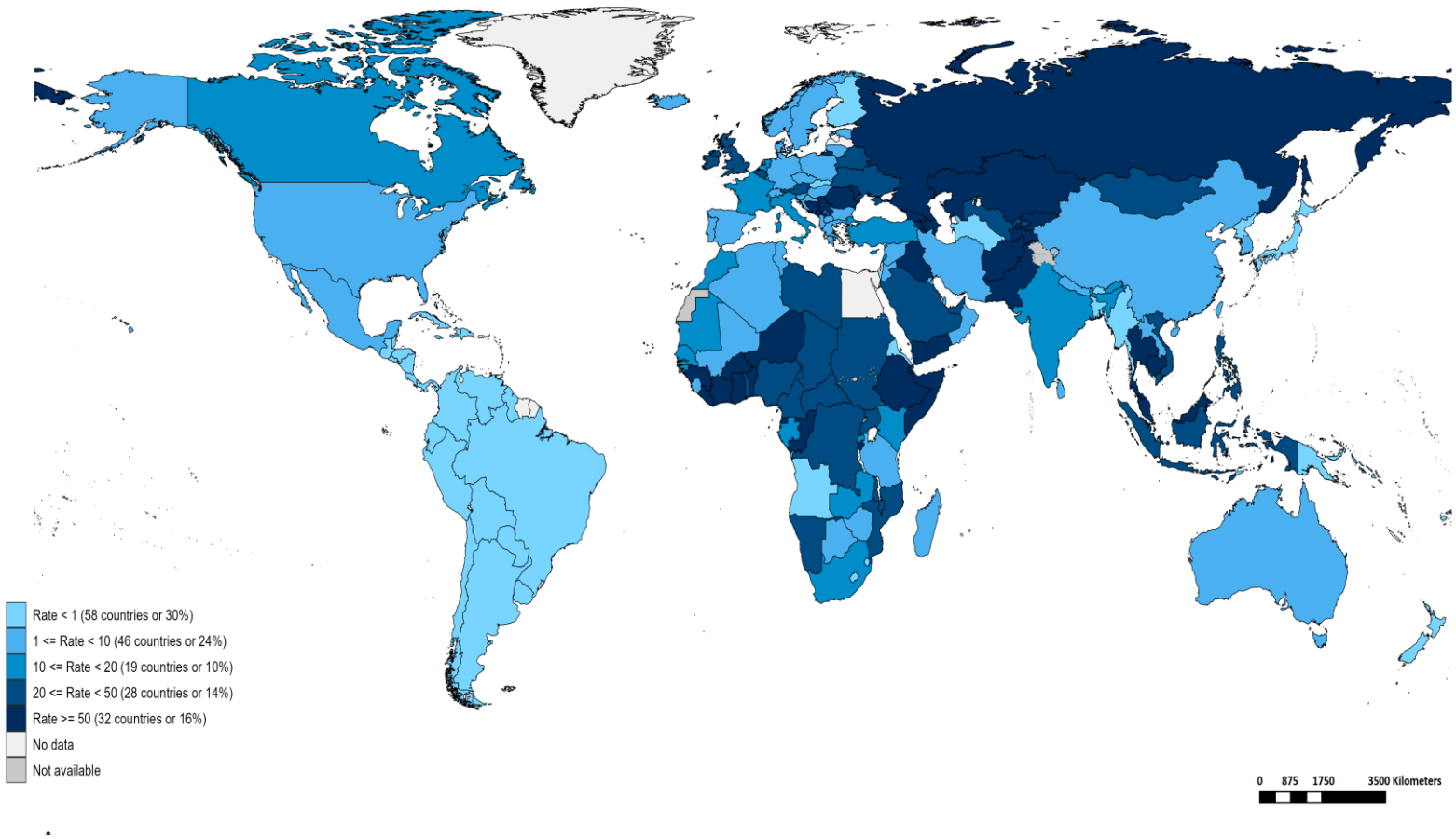

Figure 2.3. Measles incidence rate per million population (March 2024 – March 2025) [25]

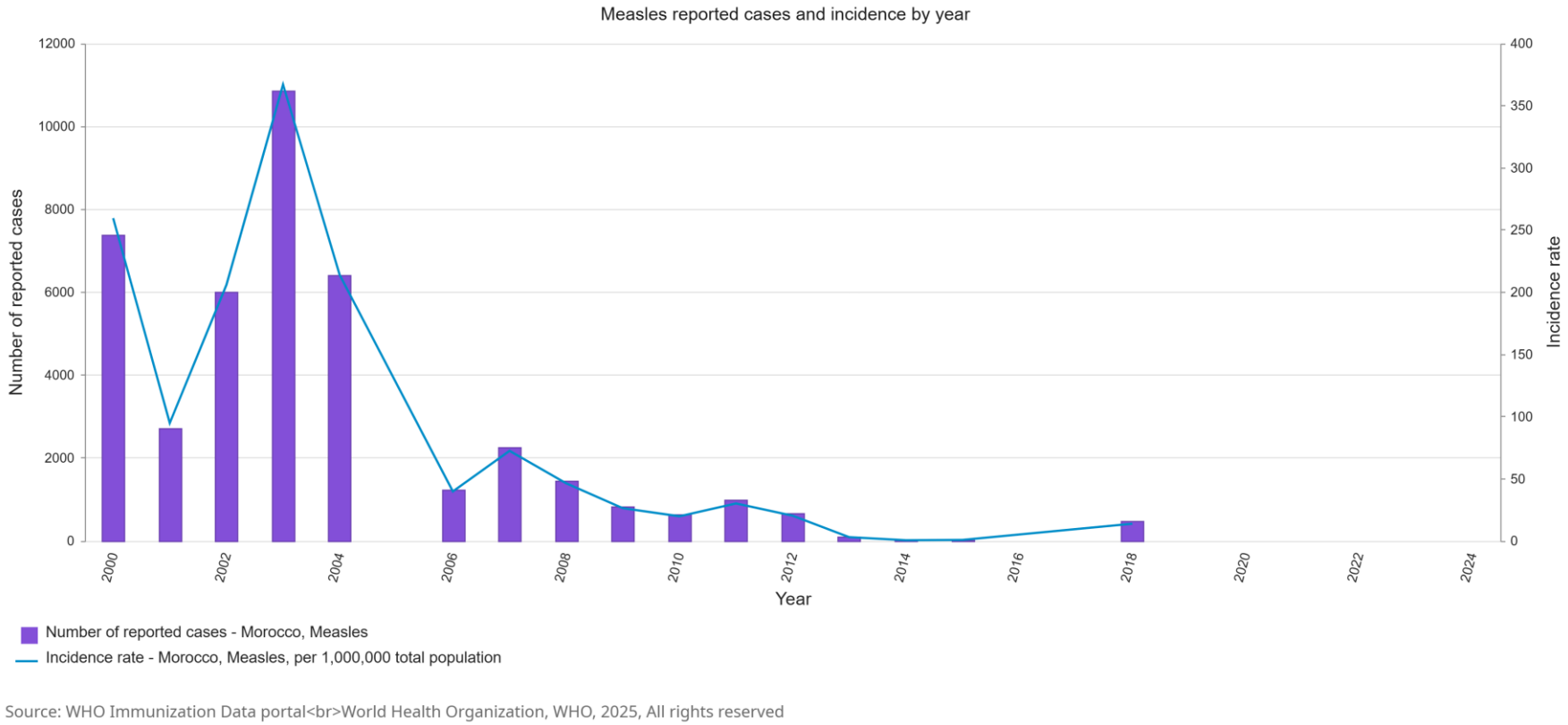

Figure 2.4. Measles reported cases and incidence in Morocco, 2000–2023

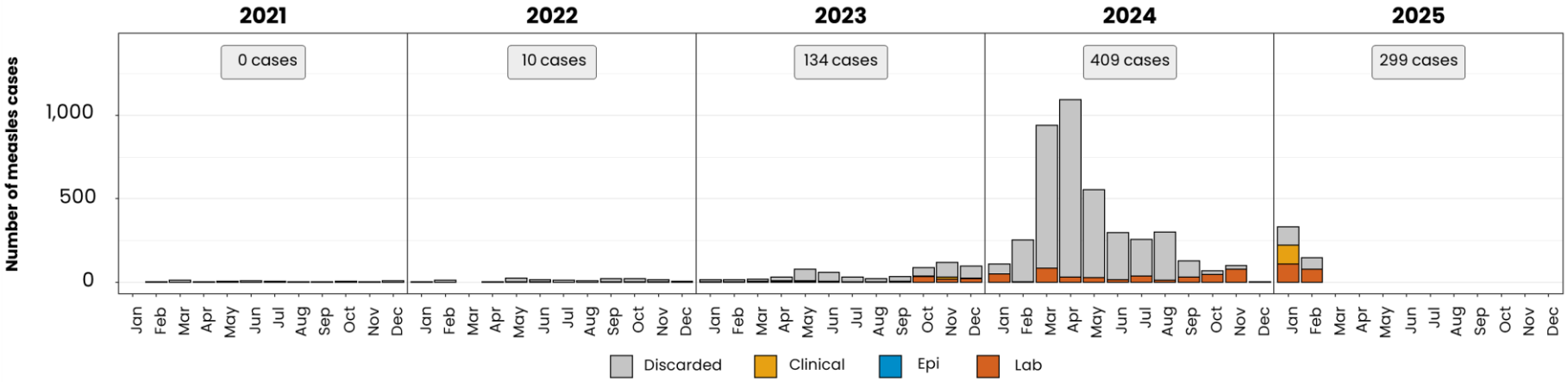

Figure 2.5. Monthly distribution of measles cases in Morocco by classification, 2021–2025

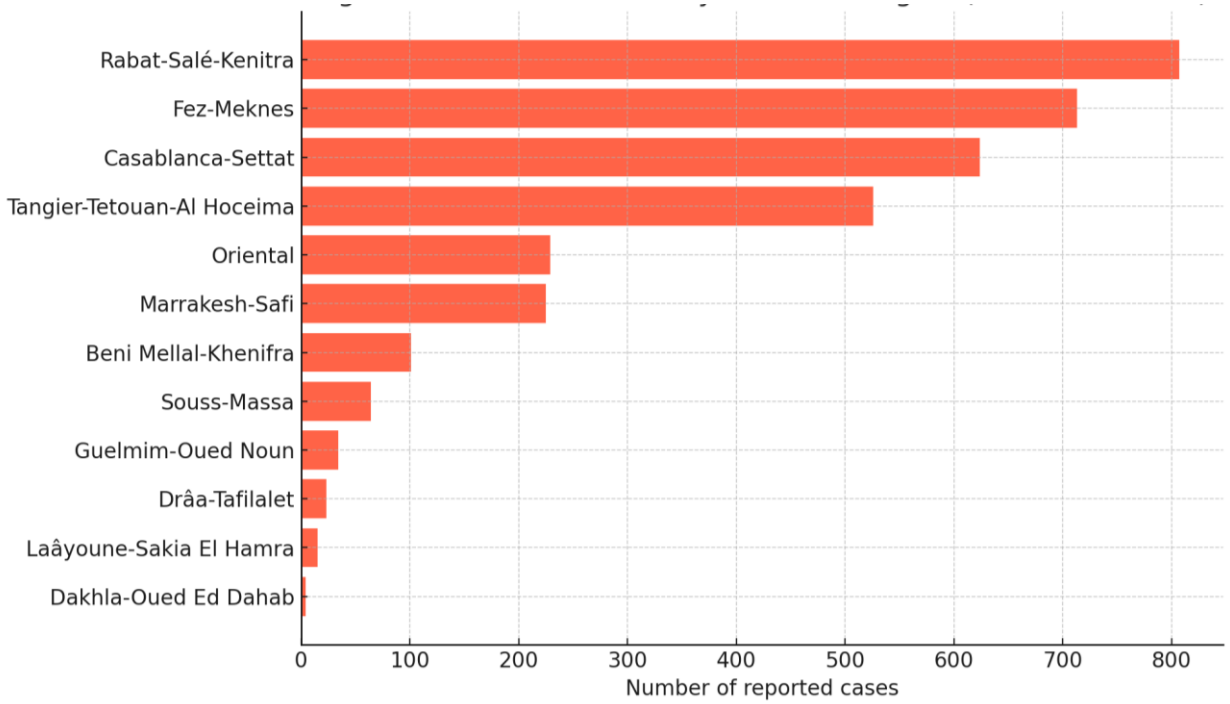

Figure 2.6. Measles cases by Moroccan region (10–16 February 2025)

This new data reinforces concerns about the accuracy and completeness of official surveillance reports. Underreporting may occur due to weak health access in rural areas, delayed laboratory confirmation, or administrative underestimation. Experts caution that the true epidemiological situation may be significantly worse than reflected in annual figures. WHO emphasizes that apparent elimination based on low reported incidence must be interpreted with caution in the presence of systemic data limitations [25].

2.2 Current treatment strategies for measles in accordance with international guidelines

Although measles is a self-limiting viral disease in the majority of immunocompetent individuals, clinical management is essential to reduce complications and mortality, particularly in children under five and immunocompromised patients. There is no specific antiviral therapy for measles; hence, treatment is mainly supportive and symptom-directed.

The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) provide consistent recommendations emphasizing the importance of early symptom management and prevention of complications. Supportive care includes adequate hydration, nutritional support, and the use of antipyretics to control fever. One of the most critical components of measles treatment is the administration of vitamin A, which has been shown to significantly reduce morbidity and mortality, particularly in children with nutritional deficiencies or immune suppression [25, 27, 48].

According to WHO clinical management guidelines (2019), the key therapeutic interventions in measles treatment are summarized in table 2.1.

Table 2.1

Approaches to the Treatment of Measles according to WHO Clinical Management Guidelines

Treatment Component	**Description**
Vitamin A supplementation	Immediate administration of 50,000–200,000 IU orally, repeated after 24 hours to reduce mortality and complications.
Hydration therapy	Ensuring adequate fluid intake to prevent dehydration and electrolyte imbalance.
Antipyretic therapy	Use of paracetamol or ibuprofen to manage fever and improve patient comfort.
Management of secondary infections	Empiric antibiotic treatment for suspected bacterial complications such as pneumonia, otitis media, or bacterial conjunctivitis.
Nutritional support	Providing balanced nutrition to support immune response and recovery.

In addition, oral rehydration therapy (ORT) is recommended in cases involving diarrhea or vomiting, which can exacerbate dehydration. Zinc

supplementation may also be beneficial, particularly in malnourished children. For severe or complicated cases, hospitalization and isolation may be required, especially for patients with pneumonia, encephalitis, or severe malnutrition [27].

In outbreak settings, WHO recommends the rapid deployment of Supplementary Immunization Activities (SIAs) within 72 hours of case detection, targeting unvaccinated and under-immunized populations, particularly children under five years of age. Outbreak response also involves rapid case identification, surveillance strengthening, and temporary isolation protocols. According to the WHO Measles Outbreak Response Guide and the Immunization Agenda 2030, these emergency responses should be integrated with broader health service delivery, including nutritional assessment and other child survival interventions [27, 48].

While treatment is essential to reduce morbidity and save lives, the cornerstone of measles control and elimination remains prevention through vaccination. Both WHO and CDC emphasize that achieving and maintaining at least 95% coverage with two doses of MCV1 and MCV2 is critical to interrupt transmission. The recommended schedule typically includes the first dose at 9–12 months and the second at 15–18 months or at school entry, depending on national protocols [25, 44].

The CDC advises a similar two-dose schedule, with the first MMR dose at 12–15 months and the second at 4–6 years, with catch-up programs for older children and unvaccinated adults. Additionally, UNICEF supports a "zero-dose" strategy aimed at identifying and immunizing children who have never received any vaccines, particularly in marginalized and conflict-affected settings [25].

These immunization-focused interventions, while not part of direct clinical treatment, are increasingly recognized as critical components of outbreak response and case containment. The integration of clinical care and immunization strategy thus forms the backbone of effective measles control – a subject explored in greater detail in the following section on national and global immunization policies.

2.3 National and global immunization policies for measles prevention

Immunization is globally recognized as the most effective strategy for the prevention and eventual elimination of measles. Owing to the virus's extremely high transmissibility, even small immunity gaps can lead to significant outbreaks. The WHO recommends that all countries adopt and sustain a policy of providing two routine doses of measles-containing vaccine (MCV1 and MCV2) to ensure population-level immunity and minimize the accumulation of susceptible individuals [44].

To illustrate the structure of childhood immunization schedules, including the timing of measles-containing vaccines, WHO provides a consolidated summary of routine vaccination. This includes standard recommendations for the age of first dose, minimum intervals between doses, and specific programmatic considerations (Fig. 2.7).

An additional global perspective is offered by examining how the adoption of the second dose (MCV2) has expanded over time across different countries. The series of maps below illustrates the inclusion of MCV2 in national immunization programs in 2003 (Fig. 2.8), 2013 (Fig. 2.9), and 2023 (Fig. 2.10). In 2003, most countries in sub-Saharan Africa, Southeast Asia, and Latin America had not yet adopted MCV2. By 2013, significant progress had been made, and by 2023, nearly all countries including Morocco had incorporated the second dose into their national schedules.

Antigen		Age of 1st Dose	Doses in Primary Series	Interval Between Doses			Booster Dose	Considerations (see footnotes for details)
				1st to 2nd	2nd to 3rd	3rd to 4th		
Recommendations for all children								
***Haemophilus influenzae* type b [5]**	**Option 1**	6 weeks (min) 59 months (max)	3	4 weeks (min) with DTPCV2	4 weeks (min) with DTPCV3		(see footnote)	Single dose if >12 months of age Not recommended for children > 5 yrs Delayed/ interrupted schedule Co-administration and combination vaccine
	Option 2		2-3	8 weeks (min) if only 2 doses 4 weeks (min) if 3 doses	4 weeks (min) if 3 doses		At least 6 months (min) after last dose	
Pneumococcal (Conjugate) [6]	**Option 1 3p+0**	6 weeks (min)	3	4 weeks (min)	4 weeks			Schedule options (3p+0 vs 2p+1); Vaccine options; HIV+ and preterm neonate booster; Vaccination in older adults
	Option 2 2p+1	6 weeks (min)	2	8 weeks (min)			9-18 months	
Rotavirus [7]		6 weeks (min) with DTP1	2 or 3 depending on product	4 weeks (min) with DTPCV2	For three dose series – 4 week (min) with DTPCV3			Not recommended if >24 months old
Measles [8]		9 or 12 months (6 months min, see footnote)	2	4 weeks (min) (see footnote)				Co-administration live vaccines; Combination vaccine; HIV early vaccination; Pregnancy
Rubella [9]		9 or 12 months with measles containing vaccine	1					Co-administration and combination vaccine; Pregnancy
HPV [10]		As soon as possible from 9 years of age (females only)	1-2	6-12 months				Target 9-14 year old girls; Off-label 1 dose schedule; MACs with intro; Pregnancy; HIV and immunocompromised

Figure 2.7. WHO-recommended childhood immunization schedule including measles vaccine [25]

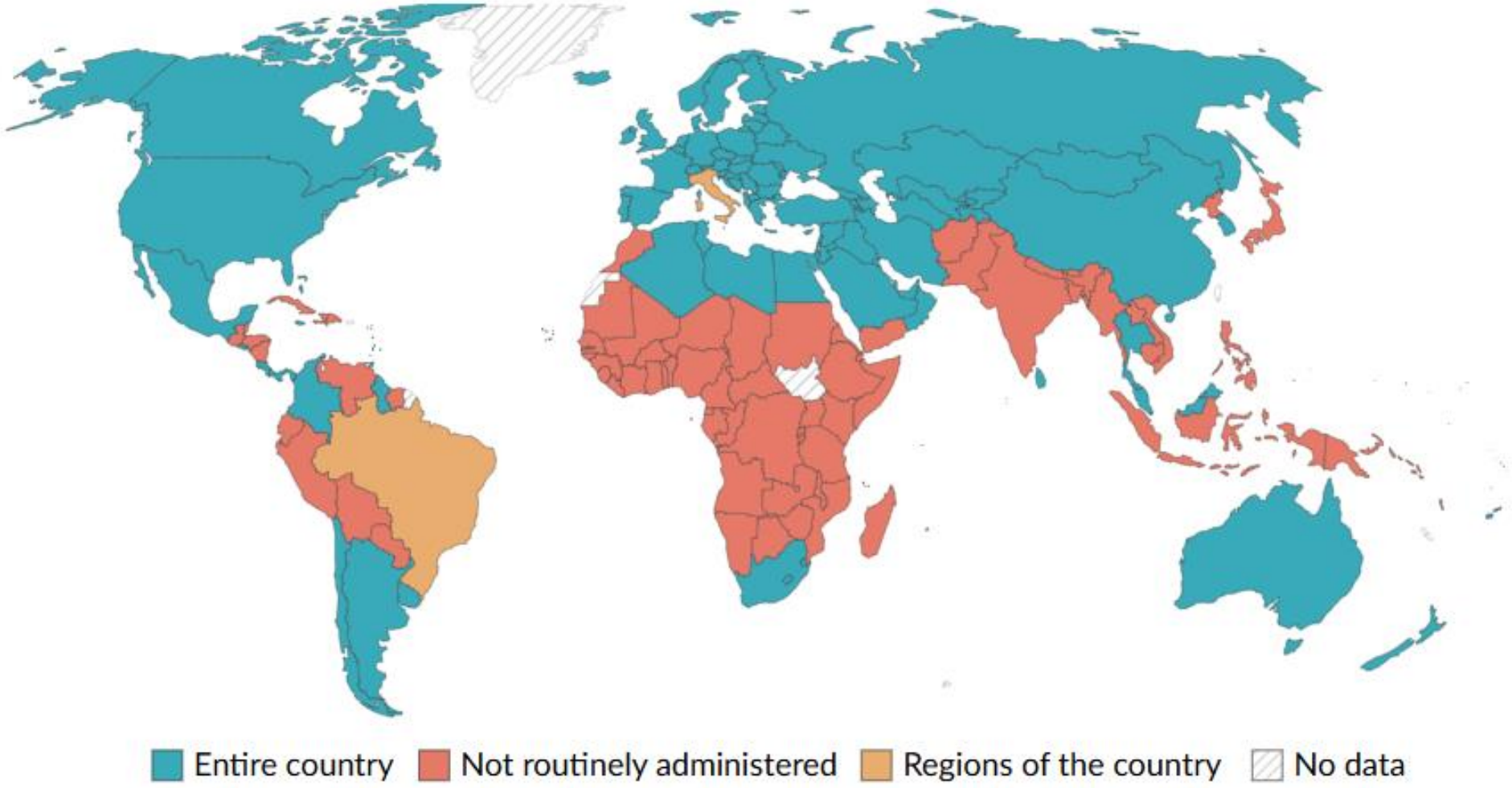

Figure 2.8. Global adoption of MCV2 in national immunization schedules in 2003

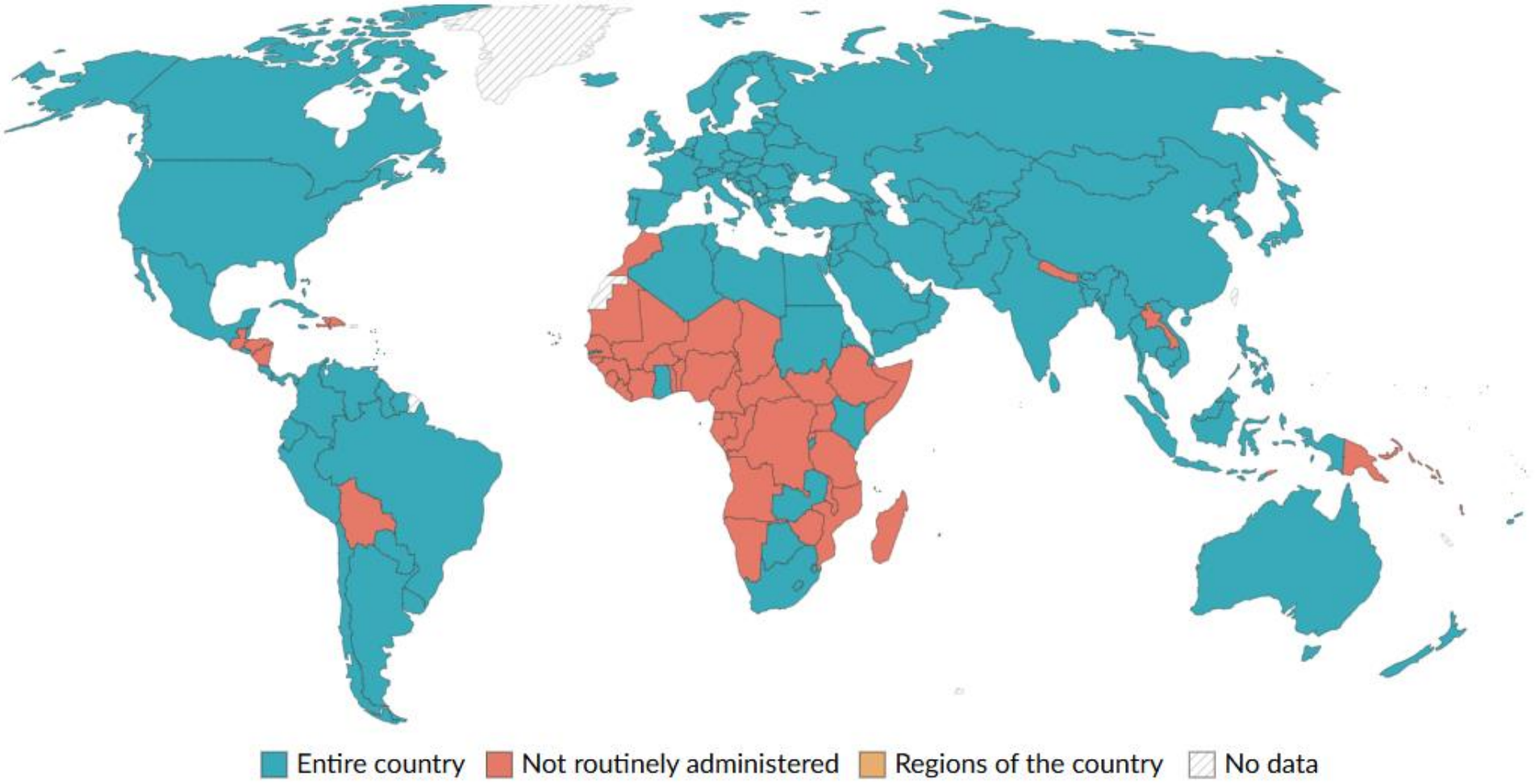

Figure 2.9. Global adoption of MCV2 in national immunization schedules in 2013

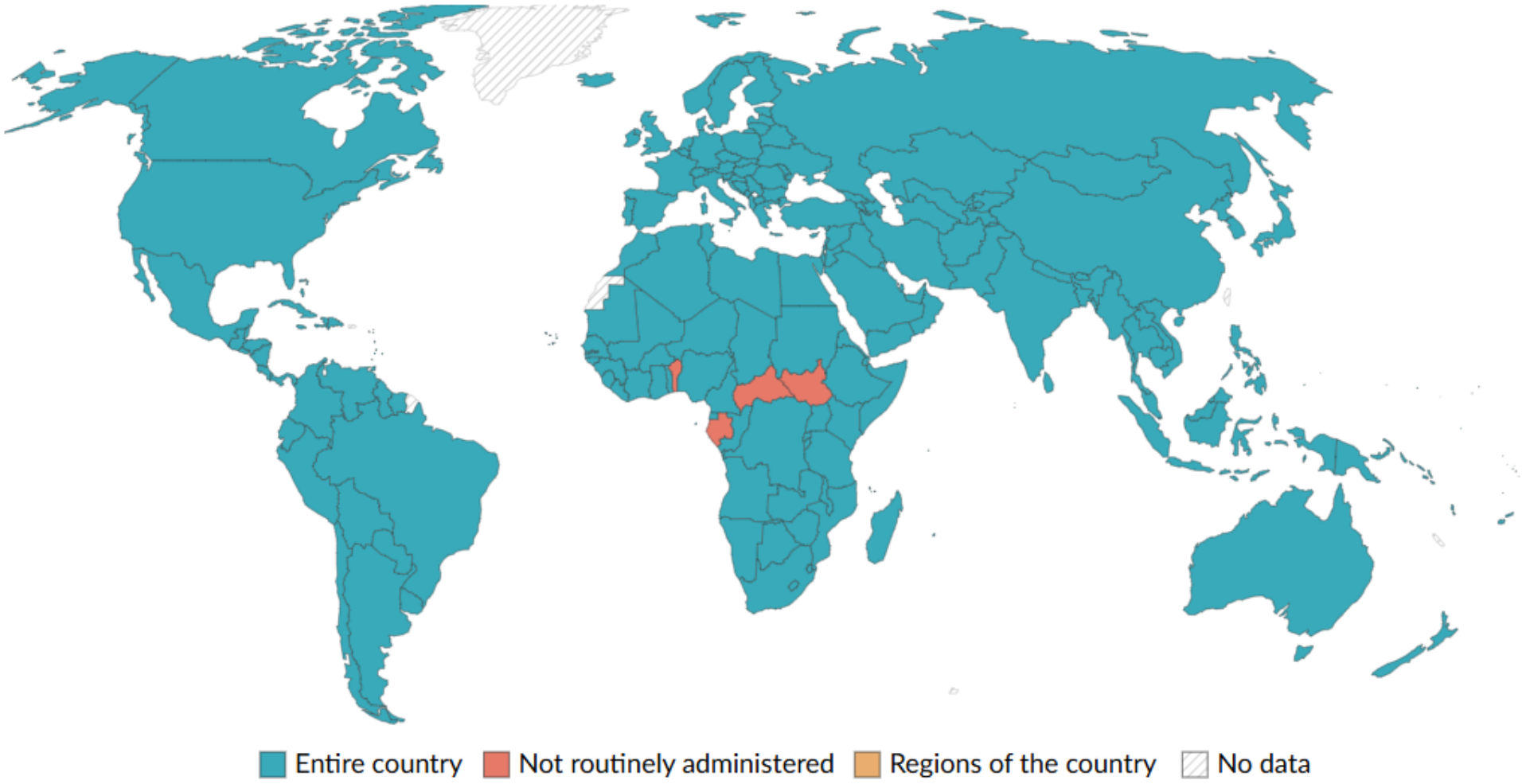

Figure 2.10. Global adoption of MCV2 in national immunization schedules in 2023

In countries such as the United States, measles vaccination is administered via the MMR (measles, mumps, rubella) vaccine. The first dose (MMR1) is given at 12–15 months, and the second (MMR2) at 4–6 years, commonly at school entry. This differs from WHO's general recommendation of MCV1 at 9–12 months and MCV2 at 15–18 months, which is more suited for countries with ongoing transmission [25, 44].

In Morocco, the national immunization schedule provides:

- MCV1 at 9 months;
- MCV2 at 18 months [42].

These recommendations align with WHO guidance for endemic transmission settings. Morocco's immunization policy is governed through the Expanded Programme on Immunization (EPI), supported by the Ministry of Health and Social Protection, WHO, and UNICEF. The country has aligned its efforts with the Immunization Agenda 2030 (IA2030) and UNICEF's "zero-dose" strategy, which prioritize outreach to children who have never received any vaccines [15, 25].

WHO guidance (2017; updated 2023) also highlights that MCV1 should be provided at 9 months of age in high-risk settings, and MCV2 between 15–18 months to reduce the risk of outbreaks. The minimum interval between doses is four weeks. Catch-up opportunities should be extended to older children, including those up to 15 years, particularly if they missed scheduled doses. In low-transmission or elimination settings, MCV1 may be delayed to 12 months, and MCV2 adjusted accordingly [44].

In special cases such as conflict, displacement, and HIV exposure, WHO recommends administration of a supplementary measles dose (MCV0) starting from 6 months of age. This is particularly relevant for:

- outbreak settings;
- internally displaced populations;
- infants with HIV exposure or infection;
- travel to high-risk areas.

Children who receive MCV0 must still receive the full routine schedule (MCV1 and MCV2). HIV-positive children, including those on HAART, may also require an additional dose following immune reconstitution [25, 44].

Despite a national MCV1 coverage rate above 94%, Morocco reports lower MCV2 coverage (~89–91%), especially in rural and underserved regions [16, 42]. These coverage gaps are illustrated by the immunity profile of populations in similar contexts.

To highlight the potential impact of incomplete MCV2 uptake on population immunity, the CDC provides estimates showing gaps by age group (Fig. 2.11). These gaps can enable transmission chains, particularly in school-aged children.

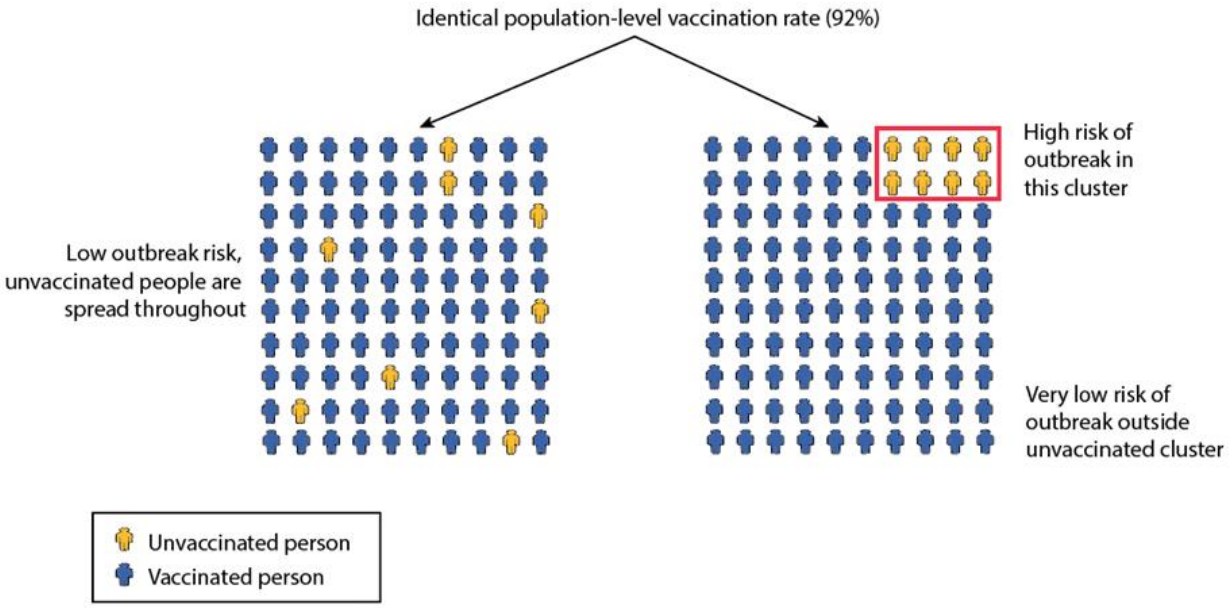

Figure 2.11 Estimated population immunity by age group

To address these challenges, the Moroccan Ministry of Health has implemented several key strategies:

- Supplementary Immunization Activities targeting missed children;
- Digital vaccination tracking to reduce MCV2 dropouts;
- Integration of measles vaccination with school enrollment and routine pediatric visits;
- Outreach to remote populations via mobile teams.

While Morocco's national policy is well aligned with WHO recommendations, the 2023–2025 measles resurgence underscores that formal adoption does not guarantee full protection. Operational, social, and equity-based barriers remain. Addressing these requires improved data use, targeted interventions, and stronger involvement of primary healthcare providers.

As measles control strategies become more integrated into broader health systems, the role of pharmaceutical care providers, particularly pharmacists, gains importance. Their ability to inform, refer, and support immunization efforts will be explored in the following chapter.

Conclusion to Chapter II

1. The analysis confirms that measles remains a major public health concern globally and nationally, with significant clinical, epidemiological, and systemic implications. Despite long-standing availability of effective vaccines, the persistence of outbreaks in both low- and middle-income and high-income countries underscores the fragility of immunization systems and the consequences of even small immunity gaps.

2. Global trends demonstrate a resurgence in measles cases after years of declining incidence, notably in 2018–2019 and again in 2022–2023. Disruptions caused by the COVID-19 pandemic have led to declines in routine vaccination, delays in outbreak detection, and increased susceptibility in multiple age cohorts. Regional disparities remain significant, particularly in sub-Saharan Africa and parts of the Eastern Mediterranean Region, where health systems face structural barriers to consistent vaccine delivery.

3. In Morocco, official data suggest moderate success in maintaining measles control, with relatively high MCV1 coverage and the inclusion of MCV2 in the national schedule. However, recent outbreaks and surveillance reports indicate that underreporting, delayed second-dose uptake, and access inequities in rural or marginalized communities continue to challenge elimination efforts. The

presence of measles cases across all regions of Morocco in early 2025 highlights the need for subnational risk assessment, improved microplanning, and flexible outbreak response strategies.

4. Clinical management of measles remains supportive, focusing on fever control, hydration, treatment of complications, and critically vitamin A supplementation. WHO and CDC guidelines emphasize early recognition of danger signs, management of comorbidities, and adaptation of care in humanitarian and HIV-endemic settings.

5. At the policy level, the global standard of two routine measles vaccine doses has been broadly adopted, with MCV2 now included in nearly all national schedules. The WHO Immunization Agenda 2030 and UNICEF's zero-dose strategy offer a framework for closing immunization gaps, prioritizing missed children, and strengthening routine and supplementary campaigns. Morocco's national program reflects these priorities but requires enhanced programmatic implementation, particularly in reaching hard-to-reach and at-risk populations.

CHAPTER III.
STUDY ON PHARMACEUTICAL CARE FOR PATIENTS WITH MEASLES AND THE ROLE OF THE PHARMACIST

3.1 Research on the availability of pharmaceutical care for measles patients

The availability of pharmaceutical care plays a critical role in mitigating the health consequences of measles, particularly in under-immunized or high-risk populations. While the primary objective of national immunization strategies is to prevent infection, access to treatment and symptom management remains essential for individuals who contract the disease or develop complications. In the context of Morocco, the real accessibility of pharmaceutical care for measles patients is shaped by a complex interplay of physical, economic, and social factors.

Geographical or physical access is often the first barrier. Although Morocco maintains a relatively dense network of pharmacies in urban centres, the same cannot be said for rural and mountainous regions such as Souss-Massa, Oriental, or Drâa-Tafilalet. In some provinces, the ratio of pharmacies to population significantly exceeds WHO recommendations, resulting in limited proximity to antipyretics, vitamin A supplements, and other over-the-counter therapies essential for managing measles symptoms [42]. Moreover, pharmaceutical facilities are rarely integrated into outbreak response systems or used systematically to deliver vitamin A supplementation during active measles circulation. This reduces the strategic role pharmacies could otherwise play in early care and referral.

Affordability further affects access to essential measles-related therapies. Although measles treatment is relatively inexpensive, the cumulative cost of managing multiple cases in a household can be substantial for low-income families. For example, a full course of vitamin A as recommended by WHO costs between $0.04 and $0.10 per patient in the public sector [48], but retail prices in Moroccan pharmacies may reach 5–10 MAD per dose. Antipyretics such as

paracetamol and ibuprofen cost 8–20 MAD, and antibiotics needed for bacterial complications (e.g. amoxicillin) may cost 15–30 MAD per course [34]. These seemingly modest sums can be prohibitive where health insurance is limited and out-of-pocket payments dominate healthcare financing. In Morocco, out-of-pocket health expenditure remains above 45% of total health spending [15], disproportionately affecting rural households and informal workers.

Economic barriers are compounded by opportunity costs. Although measles vaccination is provided free of charge through national programs, families may still face indirect expenses such as travel, time away from work, or loss of daily income. These hidden costs often explain missed MCV2 doses in older children, especially in regions where second-dose delivery is not school-based or actively followed up [42].

To better understand the economic dimension of pharmaceutical care, Table 3.1 presents updated pricing and coverage information for both preventive and therapeutic interventions. It distinguishes between fully subsidized options, such as routine measles vaccination and vitamin A supplementation, and out-of-pocket expenses for medications like antipyretics or antibiotics. The table also includes price estimates in both Moroccan dirhams and US dollars for comparison [48].

The social dimension of availability includes awareness, cultural perceptions, and trust in pharmaceutical services. Health-seeking behaviours are strongly influenced by perceptions of measles as a benign or "normal" childhood illness. In rural communities and among populations with lower health literacy, reliance on traditional medicine may delay consultation with pharmacists or healthcare providers [27]. Social norms also influence whether caregivers, especially women, can independently access pharmacies or public clinics. In several regions of Morocco, informal gender roles, language barriers, or stigma limit access to accurate information and timely care [42].

Table 3.1

Economic availability of pharmaceutical interventions for measles in Morocco (MAD / USD)

	Pharmaceutical Component	**Average Unit Price (MAD/USD)**	**Estimated Cost per Full Course (MAD/USD)**	**Public Coverage**
Prevalance				
1.	Measles vaccine (MCV, monovalent)	18.5–25.0 / ~$1.9–2.5	~37–50.0 / $1.9–2.5	Fully covered (2 doses) under EPI; private purchase optional
2.	MMR vaccine (measles, mumps, rubella)	30.0–40.0 / ~$3.0–4.0	60.0–80.0 / ~$6–8 (2 doses, private)	Not covered (private only)
Treatment				
3.	Vitamin A (2 doses, therapeutic)	4.75 / ~$0.48 per cap	9.50 / ~$0.95	Free in public health centers
4.	Paracetamol (for fever, 3–5 days)	9.50 / ~$0.95 per box	9.50–29.80 / ~$0.95–2.98	
	Ibuprofen (alternative antipyretic)	14.90 / ~$1.50 per box		Not covered
5.	Amoxicillin (pneumonia, 5–7 days)	17.20 / ~$1.72 per box	17.20–34.40/ ~$1.72–3.44	Not covered
6.	Oral Rehydration Salts (ORS, 2–3 sachets)	3.80 / ~$0.38 per sachet	7.60–11.40 / ~$0.76–1.14	Partially covered in some programs
TOTAL (private treatment)			9.50 – 85,1 / ~$0,95 – 8,51	

Vaccination coverage levels, both global and national, help illustrate the indirect consequences of these physical, economic, and social access barriers. As shown in Figure 3.1 – 3.2, global coverage with the first dose of measles-containing vaccine (MCV1) remains consistently higher than coverage with the second dose (MCV2) across all WHO regions. While MCV1 coverage averages around 85–95% depending on the region, MCV2 uptake often lags 10–20 percentage points behind [25]. The African Region and parts of the Eastern Mediterranean Region, including Morocco, continue to report low second-dose coverage despite moderate success in MCV1 delivery [16].

Morocco performs better than many regional counterparts, but with clear internal disparities. According to WHO/UNICEF and national administrative data, MCV1 coverage in Morocco has remained consistently above 90% since 2010, occasionally exceeding 95% [16]. MCV2 coverage has followed a slower trajectory, only approaching 90% after 2018. As shown in Figure 3.3, abrupt declines in 2012–2013 in official reporting may reflect either real programmatic gaps or inconsistencies in data collection during that period [16]. These fluctuations underscore the need for stronger monitoring of regional differences and continuity in outreach programs, especially in hard-to-reach areas.

An analysis of measles incidence by age group and vaccination status further illustrates the implications of incomplete access. As shown in Figure 3.4, the majority of measles cases over the past year in Morocco occurred among children aged 1–4 years, a group in which many individuals had received only one or no doses of measles-containing vaccine [26]. The incidence in this age group significantly exceeds that of older cohorts, indicating a critical vulnerability window. Additionally, a substantial number of cases are reported among children under one year of age, who are either too young to have received MCV1 or not reached by supplementary immunization activities. In contrast, incidence declines sharply among adolescents and adults, where vaccination coverage and natural immunity are higher. These trends highlight the importance of achieving full two-dose coverage before the age of five and ensuring consistent access to pharmaceutical care in early childhood.

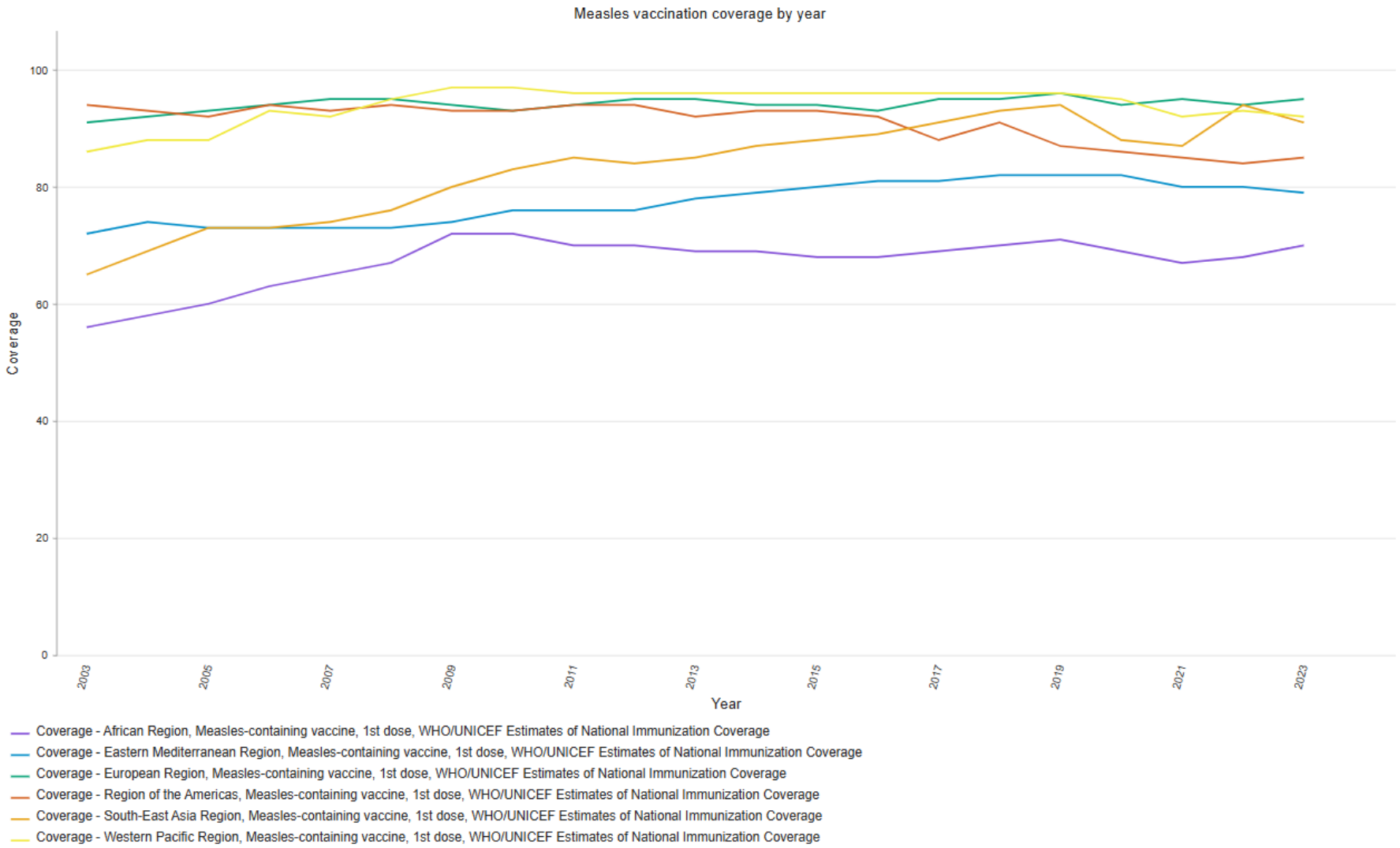

Figure 3.1. Global and regional measles vaccination coverage, MCV1 (2003–2023)

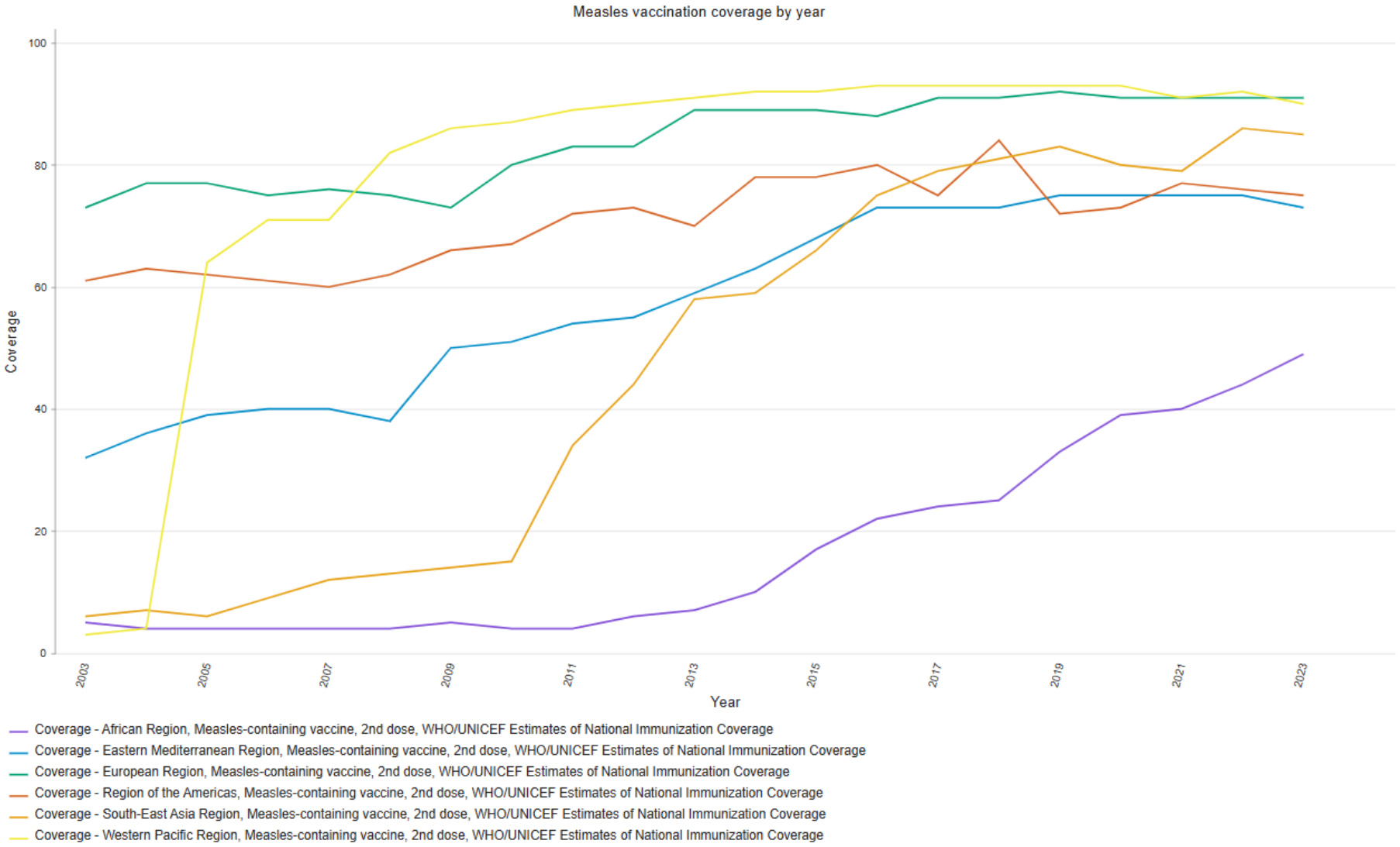

Figure 3.2. Global and regional measles vaccination coverage, MCV2 (2003–2023)

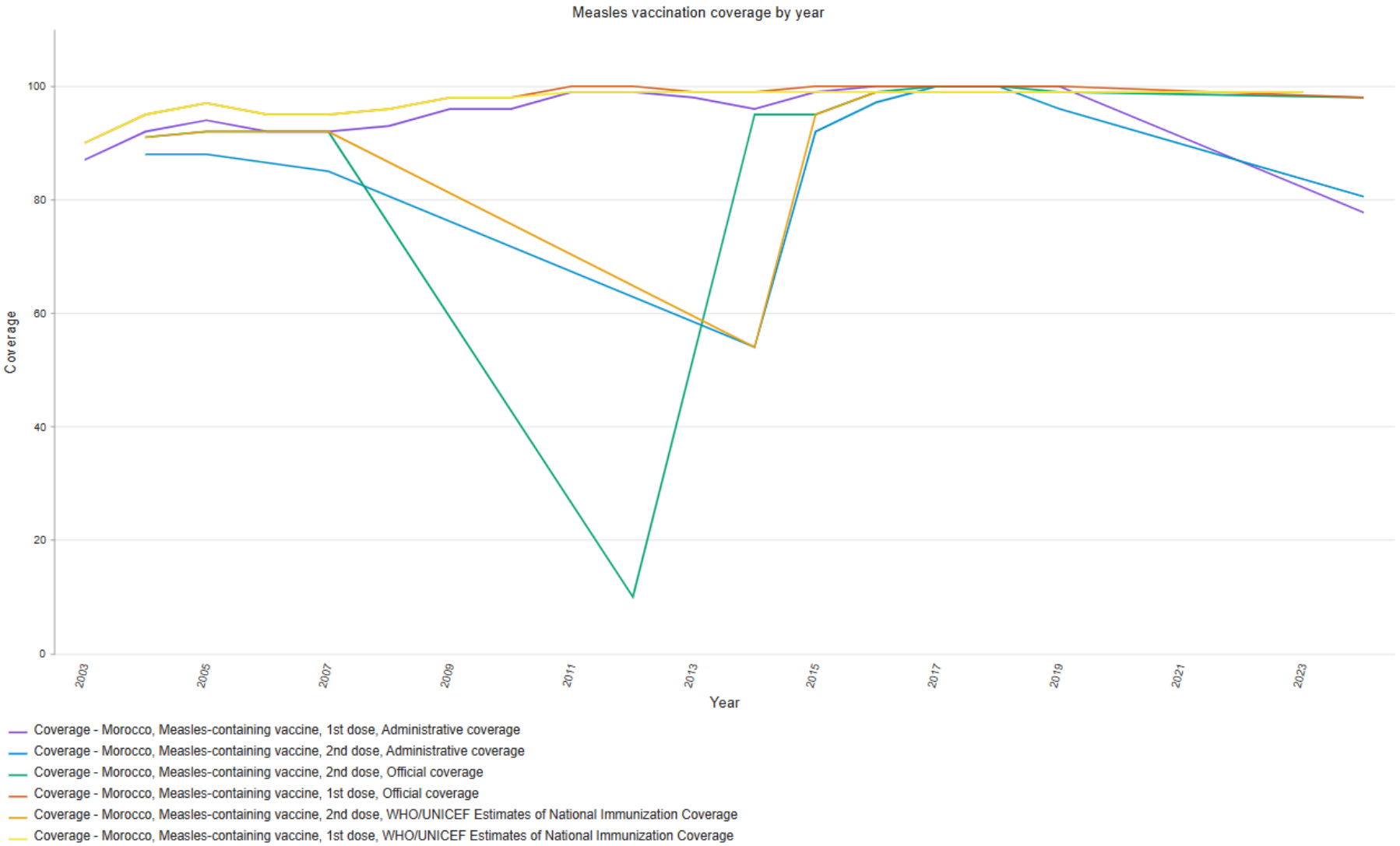

Figure 3.3. Measles vaccination coverage in Morocco by dose and reporting source (2003–2023)

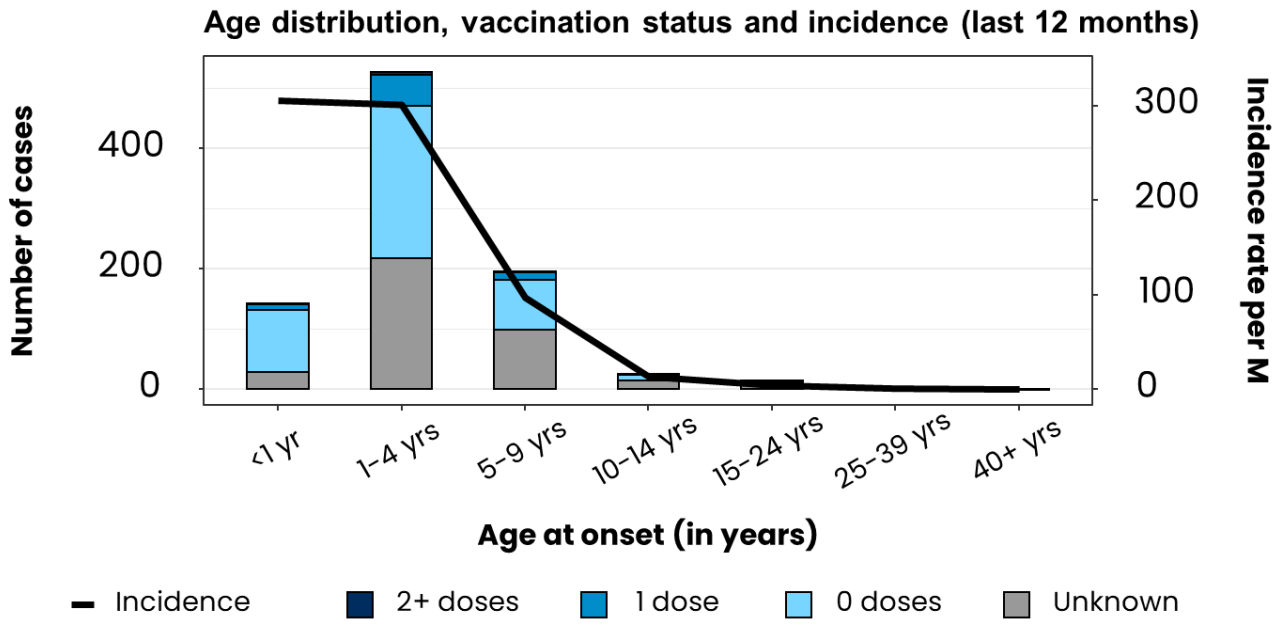

Figure 3.4. Age distribution, vaccination status, and incidence of measles in Morocco (last 12 months)

The current analysis is based on a content review of WHO coverage databases, Ministry of Health reports, national policy documents, and pharmaceutical pricing data collected from public and private pharmacies. While direct data on measles-specific pharmacy consultations is unavailable, proxy indicators such as regional coverage trends, medicine affordability, and infrastructure distribution, offer valuable insight into systemic strengths and weaknesses.

Pharmaceutical care for measles patients in Morocco is not equally available to all. Physical barriers limit access in rural and remote regions; economic barriers disproportionately affect poor households; and social barriers delay or reduce demand for appropriate care. These disparities are mirrored in immunization gaps, particularly in second-dose uptake and incidence among young children. Addressing this inequity requires a holistic strategy – one that combines improved access to pharmaceuticals, community education, and integration of pharmacy-based interventions into public health programs. The next section will explore how pharmacists, as trusted health professionals, can help close these gaps and strengthen the frontline response to measles.

3.2. Analysis of pharmaceutical services and patient counseling during measles outbreaks

Pharmacists are increasingly recognized as accessible, trusted, and highly trained healthcare professionals who play a critical role in the prevention and management of infectious diseases, including measles. Their role extends beyond the traditional scope of dispensing medications to include public education, symptom screening, therapeutic support, and referrals. This evolution is supported by international standards such as the Good Pharmacy Practice (GPP) guidelines issued by the International Pharmaceutical Federation (FIP) and World Health Organization (WHO), which highlight pharmacists' responsibility to support immunization programs, respond to outbreaks, and ensure rational use of medicines in all health system levels [27, 44].

Within officially recognized practice, pharmacists contribute to measles prevention and care through a set of core functions. These include the provision of non-prescription medications for symptomatic relief, such as antipyretics (paracetamol, ibuprofen), oral rehydration salts, and in many contexts, vitamin A supplements, which are essential in reducing measles-related morbidity and mortality. In countries where vitamin A is part of national nutrition protocols, pharmacists often serve as points of access or education, even if they do not directly distribute such products free of charge [48].

Pharmacists also play a key role in health literacy and risk communication. As front-line providers, especially in communities where access to physicians may be limited, they can advise caregivers on the seriousness of measles symptoms, encourage timely medical consultation, and provide information about vaccination schedules, locations, and post-exposure prophylaxis. While most jurisdictions do not authorize pharmacists to administer measles vaccines themselves, they remain crucial as referral agents and health educators. In this capacity, pharmacists serve as bridges between patients and formal immunization services [25].

Additionally, pharmacists are involved in the surveillance of adverse drug reactions (ADR) linked to medications used in the supportive care of measles. This is especially relevant when antibiotics or corticosteroids are used in the case of complications, or when medication is provided to vulnerable populations such as immunocompromised children. In systems where pharmacovigilance is well developed, community pharmacists contribute directly to patient safety and rational medicine use.

Internationally, the role of pharmacists in immunization continues to expand. In Canada, Australia, and Portugal, pharmacists are authorized not only to provide vaccine information but also to administer vaccines, including MMR, as part of national public health frameworks. During measles outbreaks in Australia, pharmacists participated in targeted awareness campaigns, provided on-site consultations, and collaborated with local health units to facilitate access to vaccines [27]. In Canada, pharmacists are part of provincial immunization strategies and may offer both scheduled and post-exposure measles vaccines in some regions. These examples underscore the growing integration of pharmacy services into national outbreak preparedness plans, especially in high-income countries with decentralized public health models.

Despite international progress, the role of pharmacists in measles prevention and control in Morocco remains limited. While pharmacists are licensed to dispense medications and offer basic counselling, they are not formally integrated into the national immunization program or measles-specific response plans [42]. This is partly due to regulatory frameworks that do not authorize vaccine administration by pharmacists, and partly due to fragmentation between pharmacy services and public health outreach programs. As a result, the potential of community pharmacists to contribute meaningfully to case identification, health education, or vitamin A provision is underutilized.

Moreover, pharmacists in Morocco often operate independently from local health authorities and have limited access to training on communicable disease management or real-time outbreak alerts. Although some pharmacies, particularly

in urban areas, provide educational posters or basic vaccine information, this practice is not systematic or coordinated. The lack of digital integration and public health communication infrastructure further limits their ability to participate in early detection or mass education campaigns.

Nevertheless, pharmacists represent an untapped asset in Morocco's strategy to eliminate measles. Their wide geographical presence, high accessibility, and public trust position them to support the national response through education, referral, therapeutic support, and potentially direct participation in targeted vaccination efforts if legal frameworks evolve. As WHO and FIP advocate for expanded pharmacy roles in immunization, Morocco may benefit from policy innovation that redefines pharmacists as active agents of primary prevention, rather than passive dispensers [15, 44].

Pharmacists have a well-defined yet variably implemented role in measles management. While international guidelines endorse their involvement in vaccination programs, actual practice differs across countries. In Morocco, pharmacists primarily support symptomatic care and health literacy, but with appropriate policy reform, their contribution could be broadened. The next section will explore strategic recommendations to optimize pharmaceutical care models for measles, aligning practice with global standards and national needs.

3.3. Exploring the role of the pharmacist in vaccination and public awareness about measles

Improving access to and the quality of pharmaceutical care is a fundamental element of strengthening national measles control strategies. As demonstrated in the preceding analysis, while Morocco has established infrastructure for pharmaceutical services and a relatively strong immunization program, significant opportunities remain to optimize the contribution of pharmacists, particularly in rural areas and among underserved populations. Strategic directions for improvement should encompass not only expanded access to medications and

patient education but also the formal integration of pharmacists into immunization programs and outbreak response systems.

To summarize the overarching priorities, Table 3.1 presents a strategic matrix outlining key directions, possible interventions, and the current status of implementation in Morocco.

These focus areas illustrate the breadth of possible reforms and innovations: enhancing health education roles; integrating pharmacies into disease surveillance and national systems; improving access to key medications; and strengthening professional training.

Table 3.1

Strategic matrix for strengthening pharmaceutical role in measles control

Strategic Focus Area	Examples of Interventions	Status in Morocco
Expanding pharmacists' preventive role	• referral for vaccination; • support mobile teams; • provide vaccine education	Not yet implemented; regulatory change required
Integrating pharmacies into health systems	• reporting suspected cases; • digital integration with MoH; • participate in outbreak response	Limited; pilot projects possible with infrastructure
Improving access to medicines	• distribute vitamin A, ORS, antipyretics; • participate in subsidized programs	Partially implemented in some programs
Enhancing training and professional development	• CPD programs on measles management; • training in communication and ADR reporting	Moderately feasible; requires coordination with pharmacy bodies

A first priority is enhancing the pharmacist’s role in health education and risk communication. Pharmacists, as highly accessible and trusted professionals, are well positioned to inform the public about the severity of measles, encourage timely care-seeking, and counteract misinformation about vaccines. Printed materials, posters, and direct counselling at pharmacies could be institutionalized as standard practice, especially during outbreak periods.

A second strategic area involves improving the availability of essential medications through pharmacy channels. Pharmacists can ensure regular access to vitamin A, antipyretics, oral rehydration salts, and basic antibiotics, particularly in districts where public sector distribution may be delayed or inconsistent. Collaboration with the Ministry of Health could enable state-subsidized access to these medicines during outbreaks.

The third direction involves integrating pharmacies into real-time disease surveillance and reporting systems. Pharmacists could report unusual increases in demand for specific medicines (e.g., fever medications), identify suspected measles cases based on presenting symptoms, and contribute to monitoring adverse drug reactions. While this would require investment in digital infrastructure and regulatory clarity, the potential benefit to outbreak management is substantial.

A fourth strategic pillar relates to the involvement of pharmacists in immunization processes. Although Moroccan legislation does not currently permit pharmacists to administer vaccines, many countries have revised their frameworks to allow this. In the interim, pharmacists can strengthen their role as vaccination advocates and referral agents. With appropriate training and oversight, they may also support mobile or school-based immunization days in cooperation with health teams.

A fifth focus is the provision of pharmaceutical support for measles treatment. This includes guiding caregivers on dosage, symptom monitoring, and medication interactions, particularly for children. Pharmacists can reinforce adherence to supportive care regimens and ensure early identification of complications that require referral to clinical care.

Finally, all the above depends on continuous professional development. Expanding training on measles epidemiology, pharmacological protocols, and public health communication will better equip pharmacists to fulfill their expanded roles. Partnerships with pharmacy faculties, professional associations, and health authorities will be essential to institutionalize this knowledge.

These strategic areas and their implementation potential are further detailed in Table 3.2, which focuses on pharmacist functions in both prevention and treatment of measles.

Table 3.2

Expanded and integrated roles of pharmacists in measles response

Strategic Area	Specific Roles for Pharmacists	Feasibility in Morocco (Current Status)
Health Education and Communication	• provide evidence-based information on measles and vaccination to the public; • address vaccine hesitancy; • guide caregivers on symptoms and care-seeking	High – can be implemented with minimal regulatory change via printed/visual materials
Pharmaceutical Access and Distribution	• ensure availability of vitamin A, antipyretics, and ORS; • participate in state-subsidized distribution schemes; • guide rational use	Moderate – requires logistical support and public-private coordination
Surveillance and Case Identification	• report suspected measles cases; • notify unusual OTC demand trends; • support ADR monitoring during outbreaks	Low – depends on digital infrastructure and inclusion in MoH reporting
Vaccination Participation	• refer patients to immunization services; • potentially administer vaccines in future under regulation; • host mobile vaccination days	Low – currently not authorized; requires policy and legal reform
Supportive Treatment and Patient Care	• advise on correct dosage and treatment duration for OTC medications; • monitor for drug interactions; • ensure therapeutic adherence; • educate on complication risks	High – already practiced informally; can be standardized and supported by national guidelines
Professional Training and Integration	• receive specialized training in measles prevention and management; • integrate pharmacy records with public health systems; • collaborate with MoH	Moderate – achievable through CPD programs and professional partnerships

The table illustrates that many of these interventions, particularly those related to health education and supportive treatment, are feasible under current regulations, while others, such as surveillance and vaccine administration, would require regulatory and infrastructural reform. In the short term, Morocco could prioritize pharmacist engagement in awareness campaigns, medication access, and referral pathways. In the medium term, digital reporting and structured education programs could be developed to expand their participation in national response systems.

Pharmacists are currently underutilized in Morocco's efforts to eliminate measles. By implementing the strategies outlined above, their role could evolve from peripheral to central in both prevention and care. This would improve service equity, strengthen outbreak resilience, and bring the country's pharmaceutical system in line with international standards and practices.

Conclusions to Chapter III

1. The analysis highlights the critical yet underdeveloped role of pharmaceutical care in the prevention and management of measles in Morocco. While the country maintains a relatively strong national immunization program and has achieved notable MCV1 coverage, challenges remain in ensuring equitable access to treatment, strengthening pharmacist participation, and addressing service gaps across regions.

2. It was indicated that the availability of essential medicines, such as vitamin A, antipyretics, antibiotics, and oral rehydration salts, varies significantly across regions. Economic barriers, including out-of-pocket costs, limited health insurance coverage, and indirect expenses such as travel, further restrict equitable access to care. Social and cultural factors, including health literacy levels, perceptions about measles, and gender-related access constraints, also play a substantial role in delaying or preventing care-seeking behavior.

3. The role of pharmacists in measles prevention and treatment was identified as an important but insufficiently developed component of the health system. While pharmacists currently contribute through over-the-counter medicine provision and general health counselling, their integration into national measles strategies remains minimal. Nevertheless, their proximity to communities and status as trusted healthcare providers offer an opportunity to expand their function in vaccination promotion, referral, surveillance, and therapeutic education.

4. It was emphasized that improving pharmaceutical care in this context requires a multi-dimensional approach. This includes strengthening the availability and affordability of essential medicines, formalizing the participation of pharmacists in disease surveillance and immunization efforts, and providing targeted professional training in measles management. Policy reforms, institutional collaboration, and investment in digital infrastructure were identified as necessary conditions to unlock this potential.

5. Expanding the role of pharmacists in measles prevention and management presents a feasible and impactful strategy to reinforce Morocco's public health system. Doing so will not only improve outcomes in measles control but also contribute to broader goals of health system equity, resilience, and responsiveness.

CONCLUSIONS

1. It was confirmed that measles remains a major public health threat with profound medical, social, and economic consequences. Despite the global availability of highly effective vaccines, resurgence in measles cases has been observed due to immunization gaps, underreporting, and systemic inequalities in healthcare access. In Morocco, although the national immunization program has achieved high MCV1 coverage, delays in MCV2 uptake and recent outbreaks reflect subnational disparities and coverage limitations.

2. The study also emphasized the economic and social burden of measles. Outbreaks generate high direct treatment costs and indirect costs related to caregiver absenteeism, reduced productivity, and public health interventions. These burdens are exacerbated in vulnerable communities with limited access to medicines, weak health infrastructure, and low health literacy.

3. A central component of the thesis was the evaluation of pharmaceutical care availability for measles patients. It was demonstrated that while essential medicines are generally present in the Moroccan health system, disparities in physical access, affordability, and awareness create significant gaps. Rural and underserved populations face obstacles in obtaining timely and adequate treatment, which in turn increases the risk of complications and transmission.

4. The role of pharmacists in measles prevention and management was examined through the lens of international best practices and current national regulations. It was found that Moroccan pharmacists primarily support symptomatic treatment and patient counselling but are not formally included in surveillance or immunization strategies. However, the global trend toward integrating pharmacists into vaccination delivery, health education, and outbreak preparedness highlights the untapped potential of this professional group in Morocco.

5. Strategic directions were proposed to strengthen pharmaceutical care for measles patients. These include expanding pharmacists' preventive roles,

improving access to key medications, integrating pharmacy services into digital surveillance and response frameworks, and enhancing professional training. Many of these reforms are feasible in the short term and can be aligned with Morocco's public health goals and international commitments.

6. The research demonstrates that optimizing pharmaceutical care is essential for measles control. Strengthening the role of pharmacists in education, prevention, treatment, and system integration can significantly improve measles outcomes and contribute to broader health system equity and resilience. The results of this thesis provide a foundation for policy dialogue, programmatic innovation, and further research aimed at integrating pharmaceutical professionals into the frontline of infectious disease management.

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ANNEXES

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

АКТУАЛЬНІ ПИТАННЯ СТВОРЕННЯ НОВИХ ЛІКАРСЬКИХ ЗАСОБІВ

МАТЕРІАЛИ
XXXI МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ
КОНФЕРЕНЦІЇ МОЛОДИХ ВЧЕНИХ ТА СТУДЕНТІВ

23–25 квітня 2025 року
м. Харків

Харків
НФаУ
2025

УДК 615.1

Редакційна колегія: проф. Котвіцька А. А., проф. Владимирова І. М.
Укладачі: Сурікова І. О., Боднар Л. А., Комісаренко М. А., Комісарова Є. Є.

Актуальні питання створення нових лікарських засобів: матеріали XXXI міжнародної науково-практичної конференції молодих вчених та студентів (23-25 квітня 2025 р., м. Харків). – Харків: НФаУ, 2024. – 515 с.

Збірка містить матеріали міжнародної науково-практичної конференції молодих вчених та студентів «Актуальні питання створення нових лікарських засобів, які представлені за пріоритетними напрямами науково-дослідної роботи Національного фармацевтичного університету. Розглянуто теоретичні та практичні аспекти синтезу біологічно активних сполук і створення на їх основі лікарських субстанцій; стандартизації ліків, фармацевтичного та хіміко-технологічного аналізу; вивчення рослинної сировини та створення фітопрепаратів; сучасної технології ліків та екстемпоральної рецептури; біотехнології у фармації; досягнень сучасної фармацевтичної мікробіології та імунології; доклінічних досліджень нових лікарських засобів; фармацевтичної опіки рецептурних та безрецептурних лікарських препаратів; доказової медицини; сучасної фармакотерапії, соціально-економічних досліджень у фармації, маркетингового менеджменту та фармакоекономіки на етапах створення, реалізації та використання лікарських засобів; управління якістю у галузі створення, виробництва й обігу лікарських засобів; суспільствознавства; фундаментальних та мовних наук.

УДК 615.1

Materials and methods of research. The research materials included scientific articles from periodicals, specialized publications, and analytical data. The following methods were used in the study: content analysis, systems analysis, synthesis, generalization.

Research results. Based on the analysis of publications in periodicals, journals and analytical information, we identified the main current trends of digitalisation in the pharmaceutical healthcare sector. It finds that pharmaceutical companies are using big data analytics to optimise operations, improve outcomes and personalise the treatment of patients with their own medicines. The ability to process vast amounts of medical and pharmaceutical data enables predictive modeling for disease management, effectiveness assessment of medicines, and demand forecasting.

Other current trends include the digitalisation of healthcare, the development of telemedicine and telepharmacy. Digital healthcare solutions offer remote patient consultations, virtual diagnostics, e-referrals and e-prescriptions. In addition, mobile applications and wearable devices track patient health data, enabling continuous monitoring and more personalised pharmacotherapy plans.

With the introduction of digitisation of personal data of patients and healthcare professionals, blockchain technology is gaining ground for data protection. Blockchain technology is being used to improve the security, transparency and traceability of data in pharmaceutical supply chains, help prevent counterfeiting of medicines, ensure compliance with regulatory requirements and protect the personal data of pharmacotherapy participants by keeping unaltered records of transactions.

Another modern digitalisation tool in pharma is the use of artificial intelligence in drug development, based on predictive analytics, machine learning and automated modelling. AI-based algorithms enable more efficient identification of promising drug candidates, reducing the cost and time required for clinical trials, for example.

The main obstacles to the active implementation of electronic tools in pharmaceutical activities are identified as: the complexity of ensuring confidentiality and security of data, the need to update the regulatory framework in line with market needs and taking into account safety and ethical issues, the complexity of integration and interoperability, and the high cost of implementation.

The conclusions. In summary, digitalisation is transforming the healthcare pharmaceutical sector, driving innovation, efficiency and patient-centred care. While the industry is benefiting from artificial intelligence, blockchain and big data, overcoming regulatory barriers, security risks and integration challenges is crucial. Future advances are likely to focus on improving digital solutions while ensuring ethical and safe implementation in pharmaceutical operations.

CURRENT TREATMENT AND PREVENTING STRATEGIES FOR MEASLES IN ACCORDANCE WITH INTERNATIONAL GUIDELINES

Zhad Meryem
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Intriduction. Measles remains one of the most contagious infectious diseases, with the potential to cause severe health complications and death, particularly among young children and immunocompromised individuals. Despite the availability of an effective vaccine, recent years have seen a significant resurgence of measles outbreaks worldwide, largely due to declining immunization

rates, misinformation about vaccines, and disruptions caused by the COVID-19 pandemic. The World Health Organization (WHO) and UNICEF emphasize the urgent need to strengthen preventive measures and standardize treatment protocols to reduce morbidity and mortality from measles. Understanding and applying international guidelines is critical for achieving measles elimination goals and minimizing the global health and economic burden.

Aim: The objective of this study is to analyze current treatment approaches and prevention strategies for measles, based on recommendations from major international health organizations, including the WHO, UNICEF, and CDC. The research aims to highlight evidence-based practices that ensure optimal patient outcomes and to assess the effectiveness of current immunization programs in reducing the incidence of measles.

Materials and Methods: The study involved a comprehensive literature review of WHO position papers, UNICEF immunization reports, CDC guidelines, and peer-reviewed articles published between 2015 and 2024. Sources were selected based on relevance, scientific credibility, and focus on treatment and prevention practices. The methodology included a comparative analysis of existing vaccination policies, therapeutic approaches to clinical measles management, and public health intervention models. Data synthesis was conducted through thematic analysis to identify common strategies and key areas for improvement.

Results and discussion. According to the WHO Measles vaccines: WHO position paper – April 2017, achieving and maintaining at least 95% coverage with two doses of measles-containing vaccine (MCV1 and MCV2) is essential to interrupt transmission and achieve measles elimination. The recommended immunization schedule includes the first dose at 9–12 months of age and the second dose at 15–18 months or at school entry, depending on national protocols.

The Centers for Disease Control and Prevention (CDC) advises similar strategies, emphasizing that children should receive the first MMR (measles, mumps, rubella) dose at 12–15 months and the second at 4–6 years of age, with catch-up programs available for adolescents and adults who missed vaccination.

Treatment of measles remains primarily supportive, as there is no specific antiviral therapy available. Treatment protocols, based on WHO clinical management guidelines (WHO, 2019), focus on supportive care. The main approaches to treatment are summarized in Table 1.

Table 1

Approaches to the Treatment of Measles (Based on WHO Clinical Management Guidelines, 2019)

Treatment Component	**Description**
Vitamin A supplementation	Immediate administration of 50,000–200,000 IU orally, repeated after 24 hours to reduce mortality and complications.
Hydration therapy	Ensuring adequate fluid intake to prevent dehydration and electrolyte imbalance.
Antipyretic therapy	Use of paracetamol or ibuprofen to manage fever and improve patient comfort.
Management of secondary infections	Empiric antibiotic treatment for suspected bacterial complications such as pneumonia, otitis media, or bacterial conjunctivitis.
Nutritional support	Providing balanced nutrition to support immune response and recovery.

In outbreak settings, WHO recommends Supplementary Immunization Activities (SIAs) targeting unvaccinated populations, particularly children under 5 years old, and expanding to older age groups if necessary. Outbreak response protocols involve case identification, rapid vaccination campaigns within 72 hours, and temporary isolation measures.

UNICEF supports a "zero-dose" strategy, prioritizing identification and vaccination of children who have not received any vaccines, based on the Immunization Agenda 2030 framework.

Furthermore, recent WHO interim guidelines (2023) advocate for integrating measles vaccination campaigns with broader health service delivery, such as nutrition supplementation and routine check-ups, to maximize community outreach and resilience against future outbreaks.

Conclusions: Effective measles control requires a dual approach of maintaining high immunization coverage and providing standardized supportive care for infected individuals. Adherence to WHO and CDC guidelines on vaccination schedules and case management has proven successful in reducing measles-related morbidity and mortality. However, persistent challenges, such as vaccine hesitancy, logistical barriers in low-resource settings, and the impacts of global crises like the COVID-19 pandemic, continue to threaten progress. Strengthening healthcare systems, enhancing surveillance and outbreak response capacities, and investing in community-based health education are critical to sustaining measles elimination efforts worldwide.

ANALYSIS OF WHO STANDARDS AND INTERNATIONAL APPROACHES TO UNIVERSAL ACCESS TO RAPID TUBERCULOSIS DIAGNOSTICS

Zhad Nadia, Surikova I.O.
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Introduction. Tuberculosis (TB) remains a major global public health concern, with 10.6 million people falling ill and 1.3 million dying from the disease in 2022. Early and accurate diagnosis is critical for TB control, yet access to rapid molecular testing remains insufficient in many countries. To address this, the World Health Organization (WHO) developed in 2023 the Standard for Universal Access to Rapid Tuberculosis Diagnostics, offering a structured framework to enhance access to WHO-recommended rapid diagnostics (WRDs) globally. Ensuring equitable, timely, and widespread access to these technologies is essential for reducing TB incidence, detecting drug resistance early, and achieving global End TB Strategy targets.

Aim. To analyze the WHO approach for universal access to rapid TB diagnostics, focusing on the structure of the WHO standard and its benchmarks, and to consider its application within the context of international TB control efforts, including Morocco.

Materials and Methods. The study involved a desk review of the WHO document "Benchmarks for Universal Access to Rapid Tuberculosis Diagnostics" (2023), the WHO Shiny benchmarking tool, and relevant national reports on TB diagnostics. The analysis focused on the conceptual framework of the diagnostic cascade, the structure of benchmarks, and practical recommendations for improving access to WRDs.

Results and discussion. The WHO standard structures the diagnostic process into four critical steps along the patient pathway, as summarized in Table 1.

These four steps are linked with 12 specific benchmarks designed to assess performance at each stage of the cascade. The WHO standard emphasizes facility surveys, diagnostic network mapping, and patient pathway analysis to accurately evaluate national progress. In addition, the standard provides a comprehensive mapping of enablers, approaches, and solutions to help countries

СЕКЦІЯ 11. СОЦІАЛЬНО-ЕКОНОМІЧНІ, ОРГАНІЗАЦІЙНІ ТА ПРАВОВІ ДОСЛІДЖЕННЯ У ФАРМАЦІЇ
SOCIO-ECONOMIC, ORGANIZATIONAL AND LEGAL RESEARCH IN PHARMACY

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

СЕРТИФІКАТ УЧАСНИКА

Цим засвідчується, що

Zhad Meryem

Scientific supervisor: Surikova I.O.

брав(ла) участь у роботі

XXXI Міжнародної науково-практичної конференції молодих вчених та студентів

«АКТУАЛЬНІ ПИТАННЯ СТВОРЕННЯ НОВИХ ЛІКАРСЬКИХ ЗАСОБІВ»

В.о. ректора
Національного фармацевтичного
університету

Алла КОТВІЦЬКА

23-25 квітня 2025 р, м. Харків

Ф А 2.2.1–32-366

National University of Pharmacy

Faculty pharmaceutical
Department of social pharmacy

Level of higher education master

Specialty 226 Pharmacy, industrial pharmacy
Educational and professional program Pharmacy

APPROVED
The Head of Department
of Social Pharmacy

_____
Alina VOLKOVA
"11" of September 2024

ASSIGNMENT
FOR QUALIFICATION WORK
OF AN APPLICANT FOR HIGHER EDUCATION

Meryem ZHAD

1. Topic of qualification work: «Study on the current approaches of pharmaceutical care to patients with measles»,
supervisor of qualification work: Iryna SURIKOVA, PhD, associated professor,
approved by order of NUPh from "27th" of September 2024 № 237

2. Deadline for submission of qualification work by the applicant for higher education: May 2025.

3. Outgoing data for qualification work: data from scientific and periodical literature in accordance with research objectives; reports of international organizations, statistical data.

4. Contents of the settlement and explanatory note (list of questions that need to be developed):
- to analyze the global epidemiological and public health burden of measles;
- to examine international guidelines and best practices related to pharmaceutical care in measles prevention and treatment;
- to evaluate the structure and implementation of measles vaccination policies at the global and national levels;
- to assess the availability and accessibility of pharmaceutical services and essential medicines for measles patients;
- to explore the current and potential role of pharmacists in measles prevention and supportive care;
- to identify strategic directions for optimizing pharmaceutical care systems and pharmacist engagement in Morocco.

5. List of graphic material (with exact indication of the required drawings):
tables – 5, figures – 19

6. Consultants of chapters of qualification work

Chapters	Name, SURNAME, position of consultant	Signature, date	
		assignment was issued	assignment was received
1	Iryna SURIKOVA, associated professor of higher education institution of department Social Pharmacy	11.09.2024	11.09.2024
2	Iryna SURIKOVA, associated professor of higher education institution of department Social Pharmacy	21.11.2024	21.11.2024
3	Iryna SURIKOVA, associated professor of higher education institution of department Social Pharmacy	24.12.2024	24.12.2024

7. Date of issue of the assignment: «11» of September 2024.

CALENDAR PLAN

№	Name of stages of qualification work	Deadline for the stages of qualification work	Notes
1	Analysis of scientific, periodic literature on the topic of qualification work	September 2024	**done**
2	Study of international guidelines and best practices related to pharmaceutical care in measles prevention and treatment	October-November 2024	**done**
3	Evaluate the structure and implementation of measles vaccination policies at the global and national levels	December-January 2024-2025	**done**
4	Evaluate assess the availability and accessibility of pharmaceutical services and essential medicines for measles patients	February-March 2025	**done**
5	Summary of the results of the study	April 2025	**done**
6	Finalizing the work, preparing the report	May 2025	**done**

An applicant of higher education Meryem ZHAD

Supervisor of qualification work Iryna SURIKOVA

ВИТЯГ З НАКАЗУ № 237

По Національному фармацевтичному університету

від 27 вересня 2024 року

Затвердити теми кваліфікаційних робіт здобувачам вищої освіти 5-го курсу Фм20(4,10д) 2024-2025 навчального року, освітньо-професійної програми – Фармація, другого (магістерського) рівня вищої освіти, спеціальності 226 – Фармація, промислова фармація, галузь знань 22 Охорона здоров'я, денна форма здобуття освіти (термін навчання 4 роки 10 місяців), які навчаються за контрактом (мова навчання англійська та українська) згідно з додатком № 1.

Прізвище, ім'я здобувача вищої освіти	Тема кваліфікаційної роботи		Посада, прізвище та ініціали керівника	Рецензент кваліфікаційної роботи
по кафедрі соціальної фармації				
Зхад Меріем	Дослідження сучасних підходів фармацевтичної допомоги хворим на кір	Study on the current approaches of pharmaceutical care to patients with measles	Доцент Сурікова І.О.	Доцент Отрішко І.В.

Ректор

Вірно: секретар

ФА2.8-03-317

ВИСНОВОК

експертної комісії про проведену експертизу
щодо академічного плагіату у кваліфікаційній роботі

здобувача вищої освіти

«22» травня 2025 р. № 331315176

Проаналізувавши кваліфікаційну роботу здобувача вищої освіти Захад Меріем, групи Фм20 (4,10д) англ-02, спеціальності 226 Фармація, промислова фармація, освітньої програми «Фармація» на тему: «Дослідження сучасних підходів фармацевтичної допомоги хворим на кір / Study on the current approaches of pharmaceutical care to patients with measles», експертна комісія дійшла висновку, що робота, представлена до Екзаменаційної комісії для захисту, виконана самостійно і не містить елементів академічного плагіату (компіляції).

Голова комісії,
проректор ЗВО з НПР,
професор **Інна ВЛАДИМИРОВА**

Ф А 2.2.1-32-353

REVIEW

of scientific supervisor for the qualification work of the master's level of higher education of the specialty 226 Pharmacy, industrial pharmacy

Meryem ZHAD

on the topic: «Study on the current approaches of pharmaceutical care to patients with measles»

Relevance of the topic. Measles outbreaks have re-emerged globally due to uneven vaccine coverage, misinformation, and weakened public health systems. In Morocco, despite existing immunization efforts, gaps remain in vaccine uptake and in the integration of pharmacists into preventive care. Given their accessibility, pharmacists can play a key role in measles awareness, treatment support, and vaccination advocacy. Assessing their involvement addresses current challenges and supports the development of more resilient and equitable healthcare. Therefore, this topic is highly relevant.

Practical value of conclusions, recommendations and their validity. The work presents a comprehensive and evidence-based analysis of pharmaceutical access and pharmacist involvement in measles prevention and management. The conclusions are well-argued and supported by international guidelines (WHO, FIP) and national data. The author formulates practical recommendations for improving pharmaceutical care delivery and integrating pharmacists into immunization strategies. These proposals are of great practical value for health policy decision-makers in Morocco and could be further developed in national action plans.

Assessment of work. The student has demonstrated a high level of analytical competence in identifying gaps and proposing systemic improvements. The work reflects a deep understanding of both international frameworks and national realities. The use of statistical data, visual materials, and cross-country comparisons strengthens the analytical depth and presentation quality. The objectives of the research were fully achieved.

General conclusion and recommendations on admission to defend. In general, the qualification work of Meryem ZHAD on the topic: «Study on the current approaches of pharmaceutical care to patients with measles» is performed at the proper level, meets the requirements of the "Regulations on the preparation and protection of qualification works at the National University of Pharmacy" and can be recommended for defense in the Examination commission.

Scientific supervisor Iryna SURIKOVA
«22th» of May 2025

Ф А 2.2.1-32-356

REVIEW

for qualification work of the master's level of higher education, specialty 226 Pharmacy, industrial pharmacy

Meryem ZHAD

on the topic: «Study on the current approaches of pharmaceutical care to patients with measles»

Relevance of the topic. Despite the proven effectiveness of vaccination, measles continues to re-emerge in many countries, largely due to coverage gaps, misinformation, and health system limitations. In Morocco, pharmacists are widely accessible but are not yet systematically involved in immunization support or outbreak response. Strengthening their role could significantly improve prevention efforts and early care, especially in vulnerable populations. For these reasons, the topic of this thesis is highly relevant.

Theoretical level of work. The work demonstrates a strong theoretical understanding of the epidemiology of measles, global immunization strategies, and pharmaceutical care concepts. The literature review is comprehensive and integrates international guidelines and recent scientific findings. The theoretical framework is well structured and provides a solid foundation for the practical analysis.

Author's suggestions on the research topic. The author presents several well-reasoned proposals, including expanding the pharmacist’s role in patient education, improving access to essential medicines, and integrating pharmacies into national surveillance and immunization systems. These suggestions are clearly formulated, evidence-based, and aligned with global health policy trends.

Practical value of conclusions, recommendations and their validity.

The conclusions are logically derived from the data and literature analyzed. The recommendations are practical and adaptable to the current healthcare setting in Morocco. They offer actionable insights for policymakers and professional

pharmacy bodies seeking to enhance pharmaceutical involvement in public health.

Disadvantages of work. Some minor stylistic inconsistencies and occasional language issues are present, but they do not significantly affect the overall quality or comprehension of the research.

General conclusion and assessment of the work. According to the relevance and the results of the research qualification work of Meryem ZHAD on the topic: «Study on the current approaches of pharmaceutical care to patients with measles» meets the requirements for master's works and can be recommended for official defense in the Examination commission.

Reviewer Assoc. prof. Inna OTRISHKO

«24th» of May 2025

Ф А2.5-32-231

ВИТЯГ
з протоколу засідання кафедри соціальної фармації
№ 22 від «26» травня 2025 року

ПРИСУТНІ: зав. каф. доц. Аліна ВОЛКОВА, проф. Ганна ПАНФІЛОВА, проф. Вікторія НАЗАРКІНА, доц. Галина БОЛДАРЬ, доц. Наталія ГАВРИШ, доц. Тетяна ДЯДЮН, доц. Юлія КОРЖ, асист. Альміра НОЗДРІНА, доц. Вікторія МІЩЕНКО, доц. Ірина ПОПОВА, доц. Олександр СЕВРЮКОВ, доц. Ірина СУРІКОВА, доц. Любов ТЕРЕЩЕНКО, доц. Наталія ТЕТЕРИЧ.

ПОРЯДОК ДЕННИЙ:

Про представлення до захисту в Екзаменаційній комісії кваліфікаційних робіт.

СЛУХАЛИ: завідувачку кафедри доц. Аліну ВОЛКОВУ з рекомендацією представити до захисту в Екзаменаційній комісії кваліфікаційну роботу здобувачки вищої освіти спеціальності 226 Фармація, промислова фармація Меріем ЗХАД на тему: «Дослідження сучасних підходів фармацевтичної допомоги хворим на кір».

Науковий керівник: к. фарм. н., доцент кафедри СФ Ірина СУРІКОВА.

Рецензент: к. фарм. н., доцент кафедри фармакології та клінічної фармації, доц. Інна ОТРІШКО.

УХВАЛИЛИ: Рекомендувати до захисту в Екзаменаційній комісії кваліфікаційну роботу здобувачки вищої освіти Меріем ЗХАД на тему: «Дослідження сучасних підходів фармацевтичної допомоги хворим на кір».

Завідувачка каф. СФ, доцент Аліна ВОЛКОВА

Секретар, доцент Наталія ТЕТЕРИЧ

Ф А2.2.1-32-042

НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

ПОДАННЯ
ГОЛОВІ ЕКЗАМЕНАЦІЙНОЇ КОМІСІЇ
ЩОДО ЗАХИСТУ КВАЛІФІКАЦІЙНОЇ РОБОТИ

Направляється здобувачка вищої освіти Меріем ЗХАД до захисту кваліфікаційної роботи
за галуззю знань 22 Охорона здоров'я
спеціальністю 226 Фармація, промислова фармація
освітньою-професійною програмою Фармація
на тему: «Дослідження сучасних підходів фармацевтичної допомоги хворим на кір».

Кваліфікаційна робота і рецензія додаються.

Декан факультету _____ / Микола ГОЛІК/

Висновок керівника кваліфікаційної роботи

Здобувачка вищої освіти Меріем ЗХАД під час виконання кваліфікаційної роботи продемонструвала уміння працювати з науковими даними, проводити їх узагальнення, аналізувати та узагальнювати результати дослідження. Усі поставлені завдання відповідно до мети роботи було виконано у повному обсязі. Результати дослідження належним чином оброблені і представлені.

Таким чином, кваліфікаційна робота може бути рекомендована до офіційного захисту в Екзаменаційній комісії Національного фармацевтичного університету.

Керівник кваліфікаційної роботи Алла КОТВІЦЬКА

«22» травня 2025 р.

Висновок кафедри про кваліфікаційну роботу

Кваліфікаційну роботу розглянуто. Здобувач вищої освіти Меріем ЗХАД допускається до захисту даної кваліфікаційної роботи в Екзаменаційній комісії.

Завідувачка кафедри
соціальної фармації Аліна ВОЛКОВА

«26» травня 2025 р.

Qualification work was defended

of Examination commission on

« » June 2025

With the grade _____

Head of the State Examination commission,

DPharmSc, Professor

_____ / Volodymyr YAKOVENKO/