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Measles as a Tracer of Routine Immunization System Performance

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EXECUTIVE SUMMARY

Routine immunization has historically been one of the most successful and cost-effective public health interventions in Kosovo, contributing substantially to reductions in vaccine-preventable diseases and improvements in child survival. Between 2015 and 2019, national administrative data and international estimates indicate that Kosovo maintained relatively high coverage for key routine vaccines, including measles-containing vaccines, consistent with national policy objectives and international benchmarks for disease prevention[1–3].

The COVID-19 pandemic marked a critical disruption to routine immunization services. During 2020–2021, Kosovo experienced measurable declines in coverage across several antigens, with particularly pronounced effects for measles and dose-completion indicators such as DTP3 (Diphtheria–Tetanus–Pertussis). These declines reflected service interruptions, reduced care-seeking, reallocation of health system resources, and broader societal disruption[2,3]. Although recovery efforts from 2022 onward led to partial improvements, coverage levels have not yet been consistently restored to pre-pandemic or outbreak-prevention thresholds, especially for measles[2,3].

Measles vaccination performance is of particular concern. Measles is one of the most contagious vaccine-preventable diseases and requires sustained, high population immunity to prevent outbreaks. International guidance indicates that approximately 95% coverage with two doses of measles-containing vaccine is required to interrupt transmission and maintain elimination-level protection[4,5]. As such, measles is widely used as a tracer indicator of routine immunization system performance, resilience, and equity[6].

Equity gaps remain a defining feature of Kosovo's immunization landscape. Household survey evidence shows that full immunization coverage among children remains below administrative averages and varies substantially by population group. According to the Multiple Indicator Cluster Survey (MICS) 2019–2020, coverage among Roma, Ashkali, and Egyptian children is markedly lower than the national average, reflecting persistent social and structural barriers to access[7,8]. The global focus on zero-dose and under-immunized children reinforces the policy importance of addressing such inequities[7-9].

Beyond health impacts, under-vaccination carries significant economic and social costs. Outbreaks of vaccine-preventable diseases impose avoidable burdens on health systems, households, and public finances, while also disrupting education and productivity. Global evidence consistently shows that sustained investment in routine immunization yields high economic returns and that under-investment represents a form of policy inaction with predictable and preventable consequences[10–13].

This policy brief examines routine immunization performance in Kosovo over the period 2015–2025, using measles as a tracer indicator of system resilience and equity. It aims to support evidence-informed decision-making aligned with SDG 3 and the Immunization Agenda 2030[14,15].

Failure to restore and sustain high routine immunization coverage risks reversing public health gains and generating preventable health and economic costs.

2. Policy Context and Rationale (2015–2025): Why Routine Immunization Requires Renewed Policy Attention

Routine immunization is a core public health function and a foundational component of primary health care systems. In Kosovo, immunization has long been recognized as a high-impact and cost-effective intervention, embedded within national health strategies and operational plans as a key tool for preventing disease, reducing child mortality, and strengthening population health outcomes [1,2,16]. For much of the decade prior to the COVID-19 pandemic, routine immunization performance broadly reflected these policy intentions, with relatively high coverage for most antigens and sustained control of vaccine-preventable diseases [1-3].

However, the experience of the period 2015–2025 demonstrates that immunization gains are not automatically self-sustaining. The COVID-19 pandemic represented a systemic shock that disrupted routine service delivery and exposed underlying vulnerabilities in continuity of care, follow-up mechanisms, and demand for preventive services [2,3]. These disruptions underscore the need to situate routine immunization more firmly within health system governance, financing, and performance management, rather than viewing it as a stand-alone programme that can be restored through short-term corrective actions alone.

2.1 Routine immunization within Kosovo's health policy framework

Kosovo's routine immunization programme operates primarily through the primary health care system, with responsibilities shared across the Ministry of Health (MoH) and the National Institute of Public Health (NIPH), municipalities, and service delivery points. National strategic and operational documents consistently emphasize prevention, equity, and universal access as guiding principles, positioning immunization as a public good and a core responsibility of the health system[1,2,16].

Before 2020, this framework supported relatively stable immunization delivery[1-3]. However, the pandemic revealed structural limitations, including dependence on in-person service delivery, limited flexibility in follow-up systems, and insufficient integration of immunization performance into broader health system accountability mechanisms[2,3]. When routine services were disrupted, immunization coverage declined rapidly, demonstrating that policy intent alone is insufficient without operational resilience.

This experience highlights the importance of embedding routine immunization within broader health system strengthening efforts, including workforce planning, information systems, and municipal performance oversight.

2.2 Alignment with global commitments: SDGs and Immunization Agenda 2030

Kosovo's immunization objectives are closely aligned with global health and development commitments under the 2030 Agenda for Sustainable Development, particularly SDG 3 (Good

Health and Well-being). Immunization contributes directly to SDG target 3.2 (ending preventable deaths of newborns and children under five), 3.8 (universal health coverage), and 3.b (access to safe, effective, quality, and affordable vaccines) [15,17].

At the global level, the Immunization Agenda 2030 (IA2030) provides a comprehensive strategic framework for strengthening immunization programmes over the decade to 2030 [14]. IA2030 emphasizes interconnected strategic priorities:

1. Immunization programmes for primary health care and universal health coverage;
2. Commitment and demand;
3. Coverage and equity;
4. Life-course vaccination and integration;
5. Outbreak preparedness and response;
6. Supply and Sustainability; and
7. Research and innovation[14].

These priorities are relevant to Kosovo's current immunization challenges. In particular, IA2030's emphasis on equity, system resilience, and data-guided decision-making provides a useful lens for interpreting post-pandemic coverage trends and identifying areas for policy action.

Aligning national immunization planning and monitoring with IA2030 principles strengthens accountability and situates Kosovo's efforts within a globally recognized framework.

2.3 Measles as a policy-relevant tracer indicator

Measles occupies a unique position within immunization policy and programme monitoring. Due to its extremely high transmissibility, measles requires very high and evenly distributed population immunity to prevent outbreaks. International technical guidance indicates that sustained coverage of approximately 95% with two doses of measles-containing vaccine is required to interrupt transmission and maintain elimination-level protection [4,5].

From a policy perspective, measles serves as a tracer indicator of routine immunization system performance for several reasons. First, measles outbreaks tend to occur rapidly when coverage declines, providing an early warning signal of systemic weaknesses. Second, measles vaccination depends on effective follow-up and completion of a multi-dose schedule, making it sensitive to gaps in continuity of care, reminder systems, and data use. Third, measles coverage is often uneven across municipalities and population groups, making it a useful indicator of equity and inclusion [6].

In the context of Kosovo, fluctuations in measles coverage since 2020 should therefore be interpreted not only as a disease-specific concern, but as a signal of broader challenges related to service delivery, governance, and public trust in routine immunization.

2.4 Equity, vulnerability, and "zero-dose" considerations

Equity is central to both national and global immunization agendas. IA2030 explicitly prioritizes reaching zero-dose children, those who have not received any routine vaccines, as well as children who start but do not complete vaccination schedules [14]. These populations face the highest risk of vaccine-preventable disease and are often concentrated in socially and economically marginalized communities[9,14].

In Kosovo, household survey evidence indicates persistent disparities in immunization coverage by population group and socioeconomic status. Children from Roma, Ashkali, and Egyptian communities experience substantially lower coverage than the national average, reflecting a combination of access barriers, social exclusion, and challenges related to trust and engagement with public services [8].

From a policy standpoint, failing to address these inequities undermines progress toward universal health coverage and weakens overall outbreak protection. Even when national averages appear acceptable, pockets of under-vaccination can sustain transmission and generate preventable health and economic costs.

2.5 Rationale for renewed and sustained policy action

The period 2015–2025 demonstrates that routine immunization gains in Kosovo are achievable but fragile. The COVID-19 pandemic exposed vulnerabilities that cannot be fully addressed through temporary catch-up campaigns or isolated interventions. Instead, sustained policy attention is required to strengthen routine systems, improve data use, and rebuild trust and demand for preventive services.

Renewed policy action should therefore focus on:

- integrating routine immunization more deeply within primary health care governance and performance management;
- strengthening equity-focused planning and municipal accountability;
- improving data quality, triangulation, and use for decision-making[18]; and
- aligning immunization investments with long-term SDG and IA2030 commitments [14,15].

This policy context provides the foundation for the subsequent analysis of immunization performance trends and the formulation of actionable policy recommendations.

3. Routine Immunization Performance and Trends in Kosovo (2015–2025)

This section examines routine immunization performance in Kosovo over the period 2015–2025, drawing on national administrative data[1,2], WHO–UNICEF Estimates of National Immunization Coverage (WUENIC)[3], and household survey evidence from the Multiple Indicator Cluster Surveys (MICS 2013–2014 and 2019–2020)[7,8]. The use of multiple data sources allows for triangulation of trends and provides insight into both overall performance and persistent gaps related to equity, dose completion, and system resilience[18].

3.1 Data sources and methodological considerations

Routine immunization coverage in Kosovo is primarily monitored through administrative reporting from primary health care facilities, aggregated at municipal and national levels by the Ministry of Health and the National Institute of Public Health of Kosovo[1,2]. However, administrative data are subject to known limitations, including potential inaccuracies in population denominators, variations in reporting completeness, and challenges in capturing timeliness and completion[18]. As a result, high administrative coverage may mask underlying vulnerabilities[3].

Household surveys complement administrative reporting by capturing vaccination status at the individual child level and allowing disaggregation by socioeconomic characteristics, population group, and geography. Survey data are especially valuable for identifying inequities and patterns of under-vaccination that may not be apparent in national averages [7,8].

3.2 Coverage trends before and during the COVID-19 period

Between 2015 and 2019, Kosovo maintained relatively high routine immunization coverage across most antigens. National administrative data and WHO–UNICEF Estimates of National Immunization Coverage (WUENIC) indicate stable performance for vaccines such as BCG/Hep B, DTP-containing vaccines, and measles-containing vaccines (MMR) during this period, reflecting the effectiveness of routine service delivery and established immunization infrastructure[1-3].

The MMR coverage values presented in Table 1 reflect reported national administrative coverage for measles-containing vaccine in accordance with the routine immunization schedule[1–3]. These figures represent overall reported performance among the relevant target cohorts as captured in national reporting systems. Disaggregation of MMR1 and MMR2 coverage would provide additional insight into dose completion, continuity of care, and outbreak risk.

The onset of the COVID-19 pandemic marked a clear turning point. During 2020–2021, routine immunization coverage declined across several antigens, with more pronounced reductions observed for vaccines requiring multiple doses and scheduled follow-up, including DTP3 and measles-containing vaccines (MMR) [2,3]. These declines coincided with movement restrictions, reduced utilization of health services, redeployment of health workers, and broader disruptions to routine primary health care.

While catch-up activities and service restoration efforts initiated from 2022 onward contributed to partial recovery, coverage trends since then have been characterized by fluctuation rather than sustained stabilization[2,3]. In several years, coverage for measles-containing vaccines (MMR) remained below levels required to ensure population-level protection, indicating that recovery efforts have not yet fully addressed underlying system vulnerabilities[4-6].

Table 1 summarizes available national coverage data for selected antigens between 2015 and 2025.

Table 1: Routine immunization coverage by selected antigens, Kosovo, 2015–2025

Vaccine	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BCG/HepB	97	98	98	98	97	**94**	**92**	**93**	95	96	99
DTP1*	96	97	99	98	96	**94**	**92**	**93**	95	96	99
DTP3	**94**	96	99	95	95	**90**	**85**	**90**	**89**	**80**	**90**
MMR**	95	**94**	99	95	95	**90**	**85**	**88**	**92**	**89**	**82**

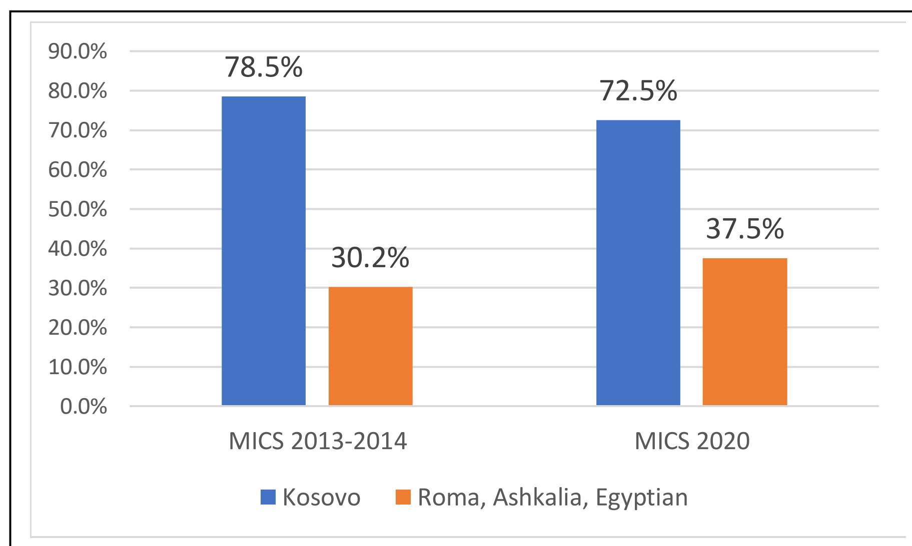
** DTP/HepB/Hib; ** MMR – Measles, Mumps, Rubella*

Source: *Ministry of Health of Kosovo; National Institute of Public Health of Kosovo; WHO–UNICEF Estimates of National Immunization Coverage, WUENIC [1–3].*

Administrative coverage data are complemented by household survey findings, which provide important insights into full immunization coverage and equity gaps that are not always visible in routine reporting. According to the Multiple Indicator Cluster Survey (MICS), at the national level 78.5% of children aged 24–35 months were fully vaccinated in 2013–2014, compared to 72.5% in 2019–2020, indicating a decline in full immunization coverage over time [7,8]. Marked disparities are observed among marginalized population groups. Among Roma, Ashkali, and Egyptian communities, full immunization coverage is substantially lower than the national average, reaching only 37.5% in 2019–2020 [8]. These findings highlight persistent inequities in access to and utilization of routine immunization services and underscore the limitations of relying solely on national averages to assess programme performance.

Figure 1. Full vaccination coverage among children aged 24–35 months, Kosovo and Roma, Ashkali, and Egyptian communities, 2013–2014 and 2019–2020

Source: *Kosovo Agency of Statistics (KAS) and UNICEF. Multiple Indicator Cluster Survey (MICS) 2013–2014 and 2019–2020.*



3.3 Dose completion and continuity of care

Dose completion is a critical dimension of immunization system performance. For multi-dose vaccines administered within infancy, such as DTP-containing vaccines, dropout between first and third doses reflects the effectiveness of follow-up systems, appointment scheduling, and caregiver engagement.

Available data suggest that dose completion challenges increased during the COVID-19 period and have not yet returned consistently to pre-pandemic levels, particularly for multi-dose antigens such as DTP3(2,3,18). This pattern indicates that while initial access to services may have resumed, systems for ensuring continuity of care, including reminder mechanisms, defaulter tracking, and proactive follow-up, remain uneven.

3.4 Timeliness of vaccination

Timeliness of vaccination is an often under-recognized aspect of immunization performance. Delays in receiving vaccines leave children unprotected during critical periods of susceptibility and can sustain transmission even when eventual coverage appears adequate.

National planning documents and international guidance emphasize the importance of monitoring timeliness alongside coverage and completion as part of a comprehensive immunization performance assessment(16,18). In the absence of systematic monitoring of on-time vaccination, delays may remain invisible in aggregate coverage figures while still posing a public health risk.

3.5 Demand-side dynamics: vaccine hesitancy and public trust

In addition to service disruptions and system-level constraints, demand-side factors increasingly shape routine immunization performance. Vaccine hesitancy, defined as a delay in acceptance or refusal of vaccines despite the availability of vaccination services, has emerged globally as a critical challenge to sustaining high coverage(19).

The World Health Organization identified vaccine hesitancy as one of the ten major threats to global health in 2019, highlighting its potential to reverse progress against vaccine-preventable diseases even in settings with functional immunization systems(19). Evidence accumulated since the COVID-19 pandemic indicates that hesitancy has expanded beyond novel vaccines to affect routine childhood immunization in multiple contexts(20,21).

International research suggests that the COVID-19 pandemic altered risk perception, trust in institutions, and information environments in ways that continue to influence vaccination decisions. Concerns related to vaccine safety, rapid development processes, misinformation, and distrust in authorities may persist and spill over into routine immunization behaviours(20,21).

Although Kosovo-specific quantitative data on vaccine hesitancy remain limited, observed fluctuations in measles-containing vaccine coverage despite service restoration, as well as persistent

inequities among marginalized populations, suggest that demand-side factors may contribute to coverage instability. Such patterns are consistent with international evidence indicating that hesitancy may affect timely vaccination and follow-up doses more strongly than initial access[20,21].

The presence of anti-vaccination narratives, amplified through social media and informal networks, poses an additional risk to routine immunization performance. These narratives may undermine confidence in public health institutions and health workers, particularly in contexts where trust was already fragile. Importantly, technical improvements alone are insufficient to address these dynamics; policies and programme decisions must be grounded in an accurate understanding of perceptions, beliefs, and lived realities at community level.

Failure to address vaccine hesitancy as part of routine immunization policy risks weakening system resilience and undermining the effectiveness of catch-up and recovery efforts. Conversely, strengthening trust, communication, and community engagement is increasingly recognized as an essential component of sustainable immunization systems[21].

3.6 Equity and sub-national variation

National averages mask substantial disparities in immunization coverage. MICS data demonstrate that full immunization coverage among children aged 24–35 months is lower than administrative averages and varies significantly by population group[7,8].

Children from Roma, Ashkali, and Egyptian communities experience markedly lower coverage than the national average, reflecting compounded barriers related to access, socioeconomic conditions, documentation, and trust in institutions[8]. In addition, coverage varies across municipalities, with some areas consistently lagging behind national targets.

Such inequities are of particular concern because they create localized pockets of susceptibility that can sustain outbreaks and undermine overall population immunity, even when national coverage appears acceptable.

3.7 Zero-dose and under-vaccinated children

The presence of **zero-dose children,** those who have not received any routine vaccines, represents a critical challenge for immunization equity and outbreak prevention. Internationally, zero-dose children are recognized as a priority population under the Immunization Agenda 2030[9,14].

While Kosovo does not face zero-dose levels comparable to some low-income settings, available evidence indicates that pockets of zero-dose and under-vaccinated children persist, particularly among marginalized communities[8]. Addressing these gaps requires targeted, locally adapted strategies rather than uniform national approaches.

3.8 Implications for system resilience

Taken together, trends from 2015–2025 suggest that Kosovo's routine immunization system has strong foundational capacity but limited resilience to systemic shocks. The COVID-19 pandemic exposed weaknesses in continuity of care, data use, timeliness, and equity that have not yet been fully resolved[2,3,18].

Persistent measles gaps, incomplete dose recovery, and inequitable coverage patterns indicate that restoring high and stable immunization performance will require sustained system-level action embedded within primary health care, rather than reliance on periodic catch-up campaigns alone.

4. The Cost of Inaction: Health, Economic, and Social Implications of Under-Vaccination

Routine immunization is consistently recognized as one of the most cost-effective public health investments. Conversely, failure to sustain high and equitable immunization coverage generates predictable, avoidable, and cumulative costs that extend well beyond the health sector. These costs are often underestimated in routine budgeting and policy discussions because they materialize gradually or during outbreaks, rather than as line items in preventive health expenditure.

This section examines the cost of inaction associated with declining or unstable routine immunization coverage in Kosovo, using measles as a tracer indicator of both epidemiological and economic vulnerability.

4.1 Household-level and productivity costs

The economic consequences of under-vaccination extend beyond the health system and directly affect households. When children fall ill with vaccine-preventable diseases, families incur direct costs such as transportation, medications, and informal care. In addition, caregivers often miss work to care for sick children, resulting in lost income and productivity[10,11].

Even uncomplicated measles cases can require extended absence from school and work, while severe cases may lead to long-term health consequences that affect educational attainment and lifetime productivity. These indirect costs are rarely captured in health sector budgets but represent a significant burden on families and society.

From a human capital perspective, global analyses emphasize that immunization protects not only child survival but also cognitive development, educational outcomes, and future economic productivity[11]. Under-vaccination therefore represents a missed opportunity to safeguard long-term development outcomes.

4.2 Education and social disruption

Under-vaccination can also lead to broader social disruption. Measles outbreaks may result in school absenteeism, class quarantines, or temporary closures, disrupting learning trajectories and disproportionately affecting children from disadvantaged backgrounds [12].

Such disruptions reinforce existing inequalities, as children from marginalized communities are less likely to have access to compensatory learning resources. Over time, these effects compound social and educational disparities, undermining broader social policy objectives.

In addition, repeated outbreaks and emergency responses can erode public confidence in health systems and institutions, particularly if outbreaks are perceived as preventable. This loss of trust may further reduce demand for preventive services, creating a negative feedback loop.

4.3 Fiscal and governance implications

From a public finance perspective, under-vaccination represents an inefficient and unpredictable use of resources. Outbreak response is typically financed through reallocation of existing budgets, emergency funding, or ad-hoc external support, rather than through planned and sustainable investment. This undermines fiscal predictability and complicates medium-term planning(13).

Moreover, the absence of a national cost-of-inaction analysis limits the ability of policymakers to compare the relatively modest and predictable costs of strengthening routine immunization with the higher and more volatile costs of outbreaks and system disruption. International guidance increasingly highlights the value of such analyses in supporting evidence-based budget decisions and protecting preventive health investments(10,13).

4.4 Measles as an economic and governance early-warning signal

Because measles outbreaks respond rapidly to declines in coverage, they function as an early-warning signal not only of epidemiological risk but also of economic exposure. Persistent gaps in measles coverage indicate that the system is operating below the threshold required to prevent avoidable health and financial losses(4-6).

International experience shows that countries failing to sustain measles coverage near elimination thresholds face repeated outbreaks, each carrying cumulative costs that far exceed the investment required to maintain routine immunization performance(10,13).

For Kosovo, preventing measles outbreaks is therefore not only a public health imperative but also a sound economic and governance decision.

4.5 Implications for policy and investment decisions

The evidence presented in this section underscores a central message for policymakers: under-vaccination is not a neutral or temporary gap, but a systemic policy failure with measurable and preventable consequences.

Investing in routine immunization delivers returns across multiple sectors, health, education, social protection, and economic development, while failure to act generates escalating costs and undermines system resilience. These considerations provide a strong economic and governance rationale for the policy recommendations presented in the following section.

5. Policy Recommendations: Strengthening Routine Immunization as a System Investment

The evidence available indicates that routine immunization challenges in Kosovo are structural and systemic, rather than episodic. While short-term recovery actions and catch-up activities following the COVID-19 pandemic have contributed to partial improvements, they have not fully addressed persistent weaknesses related to continuity of care, equity, data governance, and system resilience. International experience and global guidance emphasize that sustainable immunization performance requires deliberate policy choices embedded within health system governance and accountability frameworks[14,17,18].

The recommendations below are therefore framed to support long-term system strengthening, aligned with Kosovo's health system organization, municipal governance structure, SDG 3, and the principles of the Immunization Agenda 2030[14,15].

5.1 Elevate measles performance as a national benchmark for routine immunization resilience

Policy recommendation: Measles-containing vaccine coverage (MMR) should be formally adopted as a core national and municipal performance benchmark for routine immunization and primary health care.

Evidence base: Measles is one of the most contagious vaccine-preventable diseases and requires sustained, evenly distributed population immunity to prevent outbreaks. WHO guidance indicates that approximately 95% coverage with two doses is required to interrupt transmission[4-6]. Because measles coverage declines rapidly when systems weaken, it is widely used as a tracer indicator of immunization system performance, equity, and resilience[6].

Implementation considerations:

- Establish explicit national and municipal benchmarks for MMR1 and MMR2 coverage, including monitoring of long-interval follow-up between early childhood and school-entry vaccination.
- Require routine (e.g. quarterly) review of measles indicators at municipal and PHC levels.
- Use measles performance to trigger targeted technical support and corrective actions in underperforming areas.

Expected policy value: Using measles as a benchmark strengthens early warning capacity and shifts policy focus from aggregate averages to distribution, continuity, and equity[4-6].

5.2 Reorient routine immunization policy toward dose completion and continuity of care

Policy recommendation: Routine immunization policy should prioritize dose completion and continuity of care, not only first-dose access.

Evidence base: Analysis of coverage trends in Kosovo shows greater instability for later doses, indicating weaknesses in follow-up systems rather than initial service access. WHO guidance emphasizes that dose completion is a critical determinant of programme effectiveness and outbreak prevention[14,18].

Implementation considerations:

- Standardize reminder and recall systems across municipalities.
- Strengthen defaulter tracking within primary health care services.
- Integrate routine immunization status checks into all child health contacts.

Expected policy value: Improved dose completion reduces outbreak risk, increases the return on immunization investment, and strengthens caregiver trust in routine services[14,18].

5.3 Strengthen immunization data governance, triangulation, and use for decision-making

Policy recommendation: Immunization data systems should be strengthened to support actionable decision-making, not only reporting.

Evidence base: Administrative coverage data are essential but subject to limitations related to population denominators, reporting completeness, and lack of information on timeliness and equity. WHO recommends systematic triangulation of administrative data and household survey findings to support evidence-based planning and accountability[3,18].

Implementation considerations:

- Harmonize and regularly review population denominators at the municipal level.
- Institutionalize annual triangulation of administrative data, MICS, and WUENIC estimates.
- Introduce routine monitoring of timeliness in addition to coverage.
- Develop simple municipal dashboards linking coverage, dropout, and equity indicators to action.

Expected policy value: Improved data governance enhances targeting, accountability, and transparency, and reduces the risk of hidden coverage gaps[18].

5.4 Address equity gaps through targeted and community-responsive strategies

Policy recommendation: Equity should be treated as a measurable objective of routine immunization policy, with targeted strategies for populations and municipalities with persistently low coverage.

Evidence base: Household survey data demonstrate substantial disparities in immunization coverage among Roma, Ashkali, and Egyptian children compared with national averages[8]. IA2030

identifies zero-dose and under-immunized populations as a global priority, emphasizing targeted approaches to reach marginalized groups[9,14].

Implementation considerations:

- Use disaggregated data to identify priority populations and locations.
- Develop municipal micro-plans combining outreach, flexible service delivery, and culturally appropriate engagement.
- Strengthen coordination between health, social services, and education systems.

Expected policy value: Targeted equity actions reduce zero-dose prevalence, strengthen social inclusion, and improve overall population immunity[9,14].

5.5 Invest in health workforce capacity and trust-building

Policy recommendation: Health workers should be supported as trusted messengers and central actors in sustaining demand for routine immunization.

Evidence base: Global evidence shows that provider knowledge, communication skills, and consistency of messaging significantly influence caregiver decision-making and vaccine acceptance[21]. Trust in frontline health workers is particularly important for maintaining uptake and timely vaccination.

More broadly, vaccine acceptance is shaped not only by service availability but also by trust in institutions, health workers, and information sources. Following the COVID-19 pandemic, vaccine hesitancy has expanded to affect routine immunization in many settings, posing a systemic risk to coverage stability and outbreak prevention [19,20,21].

Implementation considerations:

- Provide continuous training on immunization schedules, contraindications, and interpersonal communication.
- Equip providers with standardized counselling tools to address misinformation.
- Embed immunization quality and communication indicators within supportive supervision systems.

Expected policy value: Stronger provider–caregiver relationships improve uptake, timeliness, and long-term confidence in public health services[7].

5.6 Integrate economic evidence into immunization financing and policy dialogue

Policy recommendation: Routine immunization investment decisions should be informed by economic evidence, including the costs of under-vaccination and outbreaks.

Evidence base: WHO and World Bank analyses consistently demonstrate that immunization delivers high economic returns and that outbreak response is more costly and less efficient than prevention [10,11,13]. Under-vaccination generates avoidable health system, household, and social costs.

Implementation considerations:

- Develop a Kosovo-specific analysis of the economic and social costs of under-vaccination.
- Use this evidence in budget negotiations and medium-term expenditure planning.
- Frame routine immunization as an investment in human capital and system resilience.

Expected policy value: Economic framing strengthens political commitment and protects preventive health spending during fiscal constraints[10,11,13].

5.7 Anchor routine immunization within Sustainable Development Goals (SDG) and governance accountability frameworks

Policy recommendation: Routine immunization should be embedded within national and municipal governance frameworks and linked explicitly to SDG 3 and universal health coverage accountability.

Evidence base: The 2030 Agenda for Sustainable Development recognizes immunization as central to child survival, Universal Health Coverage (UHC), and access to essential medicines and vaccines. WHO guidance emphasizes that embedding immunization within governance and accountability mechanisms is essential for sustainability[17,18].

Implementation considerations:

- Integrate routine immunization indicators into Sustainable Development Goal 3 reporting.
- Report annually to the Kosovo Parliament's Commission for Health.
- Publish annual immunisation performance summaries, disaggregated by municipalities and different groups, accessible to policymakers and the public.
- Clarify roles and accountability between national institutions and municipalities.

Expected policy value: Governance alignment ensures sustainability beyond crisis periods and reinforces immunization as a public good[15,17,18].

Concluding message

The evidence presented in this policy brief demonstrates that routine immunization in Kosovo is both a health priority and a system investment.

Sustaining high, equitable coverage, particularly for measles requires deliberate policy choices that strengthen continuity of care, data use, equity, trust, and financing.

Failure to act carries predictable and avoidable costs. By contrast, investing in routine immunization delivers long-term returns for health, education, social cohesion, and economic development. Restoring immunization coverage is not only a supply challenge.

It is a governance, trust, and system accountability challenge.

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