



## Perspective

## Why are missed opportunities for immunisation and immunisation defaulting among children indistinguishable?

## ARTICLE INFO

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## ABSTRACT

The two major global immunization agenda framings (Missed Opportunity for Immunisation (MOI) vs. Immunisation Defaulting) are interchangeably and inappropriately used in public health research and practice, with flawed or misleading strategies recommended and adopted in various settings around the world. This is demonstrated by the fact that many opportunities to incorporate findings from immunization coverage research into policy are squandered. The ineffectiveness of inappropriate interventions based on biased evidence can discourage and mislead policymakers to make radical decisions by discretion. This may explain why low- and middle-income countries are unable to vaccinate 80% of their children; it also poses a global health risk to capable countries. The current guidelines and information on MOI and immunization defaulting appear insufficient, and a little clarification would help immunisation forerunners achieve measurable progress in ensuring good coverage, particularly in low- and middle-income countries. The purpose of this paper is to provide appropriate recommendations to address this issue in immunization practice. Optimistically, this will stimulate further discussions, streamline differences, and gear global immunization governance on the subject to achieve the target coverage in low- and middle-income countries by 2030.

### 1. Immunisation in the global agenda

Every year, nearly a million African children, including newborns, die before reaching the age of five from vaccine-preventable diseases, and approximately 30 million children under the age of five become ill from vaccine-preventable diseases (VPDs) in Africa [1,2]. Since the introduction of vaccines, global mortality rates for vaccine-preventable diseases such as measles, mumps, rubella, polio, diphtheria, whooping cough (pertussis), and Haemophilus meningitis have decreased by more than 95% [3]. Thus, vaccination and immunization programs are highly effective and still needed in preventing illnesses, disabilities, and deaths among these age groups if they are appropriately and factually implemented in respective countries and contexts.

About 100,000 cases of diphtheria were estimated to have occurred in 1979, five (5) years after the establishment of the extended immunization program, while an estimated 8819 diphtheria cases were reported in 2017 using the World Health Organization's joint reporting form (JRF) [4,5]. This shows a significant reduction in diphtheria cases as a result of vaccination/immunization uptake. Although there have been a few noticeable halts and reversed progress since 1990. Consider the diphtheria epidemic of the 1990s, which resulted in over 39,000 cases in 1994. This surge was caused by a failed vaccination system in the former Soviet Union during the Union's dissolution (1988–1991). Furthermore, from 2006 to the present, there has been stalled progress of approximately 4300–7000 cases per year. This global immunization stagnation is the result of inadequate coverage and utilization of childhood disease immunization among high-burden and developing countries such as Nigeria, Indonesia, Ukraine, Madagascar, and Papua New Guinea [5].

Apparently, low- and middle-income countries' inability to vaccinate

90% of their children remains one of the most difficult challenges in global health, resulting in global health insecurity and a threat to capable nations. The Global Immunisation Agenda 2030 recommends that member states adopt appropriate global strategies to ensure that no one is left behind by extending the benefits of vaccines to everyone, everywhere, and at every eligible age in order to chart a course to control, eliminate, or eradicate vaccine-preventable diseases [6,7]. Reducing mortality and morbidity from vaccine-preventable diseases in developing countries entails successfully implementing strategies that ensure high vaccination coverage, low drop-out rates, and missed opportunities in their various and distinct contexts.

Although all countries have well-established immunization programs, the level of vaccination coverage achieved is frequently linked to the country's immunisation agenda framings and strategies, wherein the two global immunisation agenda framings (Missed Opportunity for Immunisation vs. Immunisation Defaulting) are interchangeably and inappropriately used with flawed or misleading strategies recommended and adopted in various settings around the world. As with pneumococcal diseases, immunisation programmes are more cost effective when compared to antibiotics usage and may indirectly reduce the antimicrobial resistance (AMR) trend in a country [8]. Understanding and differentiating the usage of these globally used agenda framings would assist not only policymakers and immunisation program managers, but also public health researchers in recommending, adopting, monitoring, and re-evaluating the most appropriate approach to immunisation agenda framings in their respective contexts within and between countries.

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## 2. Evidence of mis-usage

The Global Immunization Agenda 2030 charted a new course to address inequalities in vaccination coverage between and within countries [7]. The World Health Organization (WHO) has coined the phrases (missed opportunity for vaccination and immunisation defaulters) to direct country members on how and where to identify unvaccinated and undervaccinated children's immunisation needs. "Missed opportunity for immunization (MOI)," also known as "missed opportunity for vaccination (MOV)," is defined by WHO as a situation in which a child who is eligible for vaccination and has no valid contraindications visits a health facility but does not receive the scheduled vaccine doses [9]. While "defaulter" refers to individuals who fail to receive their scheduled vaccination(s) for any reason from society or the health system, including health facility issues such as unclear or lack of verbal communication from vaccinators to mothers on when next to visit, or even cancelled sessions due to vaccine stock-outs, absence of vaccinators at the health facility etc [10].

These definitions do not imply that one is a subset of the other, nor do they imply that they can be used interchangeably. These phrases are frequently misunderstood and misapplied by immunization program managers, health policymakers, and public health researchers. To begin, distinguishing between the two phrases entails understanding and distinguishing the appropriate methodologies to use when searching for zero- and under-immunized children, as recommended by WHO [11]. However, there is still a gap in the WHO-recommended methodology, such as the inclusion/exclusion criteria of participants, the choice of environment and settings required to conduct these methodologies, and so on, in order to propose the most appropriate interventions to problems in their various contexts. Among other things, the age group has been an increasing debate on the execution of the type of research/-assessment methodology to conduct, not to mention the time frame of the child's contact with the health service in the context of MOI.

Previous studies used 0–23 months as an inclusion criterion for their participants in determining factors associated with missed opportuned children for immunization, whereas many others continue to use 12–23 months for both MOI and immunization defaulters' assessment [12–17]. Defaulters, on the other hand, have recently been defined as a child who is off track with their immunization schedule (18) or a delayed immunized child [19], who has not received his eligible vaccine dose for 28 days or more of delay according to its country's recommended schedule. Nonetheless, these researchers included children aged 0–23 months in their study [18,19].

The WHO methodology for assessing missed opportunities for vaccination recommended using a health facility as the setting for conducting MOI assessments [20], whereas many research studies were conducted in the community; where a child can also have contact with the health service in the community (via the outreach immunisation session, mobile outreach clinics, supplementary immunization activities) and not necessarily at only the health facility in rural districts. If MOI is viewed as a sequel of a weak operation mechanism of a health-care service delivery facility with/without a triage system, immunization defaulting should also be viewed as a result of an infirm health facility operation, incompetent district health system, and weak local (district/county) governance from its inability to integrate health service programs into other non-health communal activities, which will address the politico-and social issues.

We should remember that immunization visits have evolved into well-child visits, where contact with the health system is used to add other preventive interventions (such as vitamin A and growth monitoring) [21,22]. Setting MOI on the national agenda would, without a doubt, improve immunization coverage and health service delivery while also encouraging program synergy [20]. The incorrect use of these two terms for one another will have a negative impact on the outcomes of interventions aimed at them. Interventions for immunization integration programs, for example, would be appropriate for targeting MOI

rather than defaulters [23–25]. MOI has been identified as the major impediment to achieving targeted immunization coverage in Sub-Saharan Africa. In this regard, it has been suggested that more effort be directed toward reducing MOI, which will aid these countries in meeting their immunization targets.

Without a doubt, lowering MOI will improve timeliness and immunization coverage by 30% [11,20]. When compared to infant and neonatal mortality, the global mortality data trend (1990–2019) recorded the greatest gain for under-5 mortality. The timing of interventions, including immunization, is critical and may have played a role in the outcome. If one of the primary goals of reducing MOI is to improve timeliness, studies should use 0–12 months as their age inclusion criteria for MOI research in countries where measles vaccine is scheduled to be given to children at 9 or 12 months of age, rather than the current target population of 23 months of age [11,20].

Regardless, when using the WHO recommended target population, this paper strongly recommends that children between 0 and 23 months old be sub-grouped into under-1 year-old and above-1 year-old, whereas most studies evaluating MOI preferentially used the age group 12–24 months, and few go so far as to use under-5-year-old children as their target population [26–28]. Arguably, using the wrong methodology to assess MOI and immunization defaulters will result in inappropriate research results, which has repeatedly led to limitations in conducting systematic reviews, follow-up by year, and so on; and misleading output from comparisons between studies and contexts [29,30]. Policymakers make inappropriate recommendations due to the lack of distinction between these two terms and the use of different methodologies and scopes by studies. This is demonstrated by the fact that many opportunities to incorporate evidence/findings from immunization coverage research into policy are squandered. The ineffectiveness of inappropriate interventions due to a lack of evidence can discourage and mislead governance into making radical decisions at their discretion.

The apparent overlap of factors seen in many studies that looked at risk factors for missed opportunity for immunization and immunization defaulting separately and even concurrently could have been different with a clearer understanding of the difference between the two terms. This would prompt deeper thought and a search for true risk factors, as well as better recommendations for improvement. A clearer distinction between the terms could aid in improving MOI accountability, which is critical, and could form part of periodic accountability for clinicians and health care providers, which is currently lacking or inadequate in many settings. Furthermore, the WHO guideline on MOI assessment is unclear as to whether MOI assessment should be a state-owned assessment. In such cases, what role will researchers play in the MOI agenda? How do we deal with the government's lack of commitment to conducting MOI assessments on a regular basis? If these questions are answered, there will undoubtedly be more progress toward achieving greater immunization coverage.

Although there have been significant gains in many areas of immunization, there is an increasing consensus that suggests the need for the current World Health Organization's information on the MOI and defaulters to be made more sufficient, particularly to guide studies, as a little more clarity on it would assist forerunners in immunization to achieve progress in ensuring timely and good coverage in low- and middle-income countries. This is because a shift in global perspective on immunization should begin at the highest levels of government; it should ideally be included in the Immunization Agenda 2030: A Global Strategy to Leave No One Behind. As a result, health policymakers, immunization managers, and researchers would need to be re-educated/re-oriented on the meaning and application of these two terms.

Funding, on the other hand, should not be directed toward immunization coverage assessments or research that employs flawed methodology. Allocating funds to well-defined research methodologies on these terms should have a broader geographical or context-based coverage. As seen in the WHO and UNICEF Estimates of National Immunization Coverage (WUENIC) by country, there is a need to have a

proportion of MOI and immunization defaulters by country; this would help us estimate our progress more accurately. A sub-agenda of research institutions should be to seek funding for systematic review studies on the current state of MOI and defaulters by context (humanitarian/non-humanitarian settings; non-conflict and conflicted regions; riverine and non-riverine areas) and geopolitical regions (such as high/LMICs; continents). WHO's committees on "immunization coverage and strategy" should focus on sorting all research repositories for high-quality research and then classifying works and strategies into different terms (MOI and defaulters), not to mention conducting modeling studies to estimate how far we need to go to achieve the target coverage by different contexts.

To achieve the above, countries must commit to strengthening their defaulter's tracking system and conducting coverage gap (MOI and immunization defaulter) assessments on a regular basis, so that each assessment finding can be translated into an adoptable intervention for use at both facility and (community) district levels where vaccination services are provided. Furthermore, if possible after 2030, there will be a need to shift from using the third-dose of Diphtheria-Tetanus-Pertussis (DPT-3) or the pentavalent vaccine to the third-dose of the pneumococcal conjugate vaccine (PCV) as a country target indicator for national coverage estimation; this will help keep us on track in the pursuit of better coverage beyond 2030.

The current (2014) WHO methodology for assessing MOV needs to be revisited. Efforts are also required to develop and implement programs that will improve immunization coverage and timing, strengthen community surveillance of vaccine-preventable diseases and adverse effects following immunization (AEFI), and reduce the risks of AEFI and improve its management.

### 3. Conclusion

In order to achieve better immunization coverage, global immunization governance must create a resourceful environment and allocate resources to conduct accurate methodological studies that will succinctly identify the predictors of MOI and immunization defaulting with respect to specific age groups, geographical areas, and immunization services delivery approach in countries with very low immunization coverage.

### Ethical approval

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### Author contribution

IOI conceptualized the study. IOI wrote the first draft of the manuscript. GOA, YAA and IOI revised the manuscript. The authors read and approved the final manuscript.

### 4. Registration of research studies

1. Name of the registry: Not Applicable
2. Unique Identifying number or registration ID: Not Applicable
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): Not Applicable

### Guarantor

Yusuff Adebayo Adebisi.

### Consent

Not required.

### Declaration of competing interest

We declare no competing interests. Views expressed in this article are those of the authors and do not necessarily represent the views of the affiliations of the authors including World Health Organization and Medair.

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Israel Oluwaseyidayo Idris

*MEDAIR-Sudan Country Office, MEDAIR, Khartoum, Sudan*

*Department of Social and Preventive Medicine, V.N Karazin Kharkiv*

*National University, Kharkiv, Ukraine*

*Health Policy and Governance Unit, Department of State Management and*

*Public Administration, Kharkiv National University of Economics, Ukraine*

*Department of Disease Surveillance and Control, NALJAHEALTH*

*INITIATIVE, Lagos State, Nigeria*

Gabriel Omoniyi Ayeni

*Department of Disease Surveillance and Control, NALJAHEALTH*

*INITIATIVE, Lagos State, Nigeria*

*Health Emergencies Programme (WHE) Department, World Health*

*Organization WHO, Genève, Switzerland*

Yusuff Adebayo Adebisi\*

*Faculty of Pharmacy, University of Ibadan, Ibadan, Oyo State, Nigeria*

\* Corresponding author.

*E-mail address: [adebisi.adebayo@ghfocus.org](mailto:adebisi.adebayo@ghfocus.org) (Y.A. Adebisi).*