Regional Malaria Modelling Translational FELLOWSHIP

2025 Inaugural Cohort Report

Funded by:
Gates Foundation

Regional Malaria Modelling Translational Fellowship

2025 Inaugural Cohort Report

Funded by:
Gates Foundation

Regional Malaria Modelling Translational Fellowship: Inaugural Fellowship Report

Suggested citation. Silal, SP., Hounsell, RA., Wanjala, S. (2026). *Regional Malaria Modelling Translational Fellowship: Inaugural Fellowship Report*. [online] https://science.uct.ac.za/masha/publications/technical-report/rmmt-fellowship-report

Table of Contents

Executive Summary

The Regional Malaria Modelling Translational (RMMT) Fellowship is a six-month executive programme designed to strengthen the use of modelling in malaria decision-making. Delivered from May to October 2025, the inaugural Fellowship brought together 21 fellows from seven countries—Angola, Eswatini, Ghana, Mozambique, Namibia, South Africa, and Zambia—nominated by their National Malaria Programmes (NMPs). The programme was implemented by the Modelling and Simulation Hub, Africa (MASHA) at the University of Cape Town, in partnership with the Southern African Development Community (SADC) Malaria Elimination 8 Initiative (E8) and the Clinton Health Access Initiative (CHAI) South Africa Office, and funded by the Gates Foundation (GF). The Fellowship addresses a critical gap between modelling evidence and its use in policy and programme decision-making. It builds the capacity of policymakers, programme leaders, and technical staff to interpret model-based insights as a practical decision-support tool in resource-constrained settings.

The Fellowship combined in-person and virtual learning across key areas, with three immersive, full-time in-person blocks held in May, August, and October 2025. The curriculum topics spanned the full modelling process—from framing policy-relevant questions and understanding systems, through model design, development, and critique, to interpreting outputs and communicating findings—while also addressing cross-cutting themes such as uncertainty, health economics, and stakeholder engagement. A central component was the Capstone Project, where fellows worked in country teams to develop proposals for modelling analyses to address priority policy questions. During the final week, fellows presented their Capstone Projects to senior representatives from their Ministries of Health and NMPs, strengthening country ownership and supporting pathways to uptake.

The RMMT Fellowship demonstrated strong early impact, including increased confidence in interpreting modelling outputs, strengthened collaboration between technical and policy stakeholders, and a pipeline of country-led modelling projects aligned with programme priorities. Fellows also reported substantial gains in their ability to apply model-based insights in decision-making processes, define policy-relevant questions, and translate findings into actionable recommendations. The inaugural implementation of the RMMT Fellowship has demonstrated its ability to strengthen capacity to bridge the gap between modelling and policy, supporting more informed, data-driven decision-making in malaria programmes. It also provides a framework that can be readily transferred to other areas of disease modelling for public health.

Foreword

Malaria remains a persistent and evolving public health challenge, placing a significant burden on communities, health systems, and economies across endemic regions. While important progress has been made over the past two decades, gains have plateaued in many settings, and emerging threats highlight the urgent need for more effective, data-driven approaches to accelerate control and elimination.

Modelling is a critical tool in this effort. It provides valuable insights into the potential impact of interventions, supports the prioritisation of limited resources, and enables countries to explore scenarios that would otherwise be difficult to assess. However, the true value of modelling lies not only in its technical rigour, but in its translation into actionable policies and programmes that reflect local realities.

Realising this potential requires strong collaboration across a diverse set of stakeholders, including national malaria control programmes, researchers and modellers, policymakers, funders, and implementing partners. Sustained engagement and dialogue are essential to ensure that modelling outputs are relevant, understood, and effectively used in decision-making. The Regional Malaria Modelling Translational Fellowship was established with this objective at its core—strengthening connections, building mutual understanding, and equipping leaders to apply complex evidence in practice.

The Fellowship aims to cultivate a cadre of professionals who can bridge the interface between modelling and policy, champion evidence-based decision-making, and drive impact within their respective countries and institutions. Through a structured programme of learning, mentorship, and practical application, fellows have deepened their engagement with modelling approaches while strengthening the leadership and communication skills required to influence policy and implementation.

It has been a privilege, as Co-Directors of the Fellowship, to work alongside this exceptional inaugural cohort. Over the course of the programme, we have witnessed not only significant technical growth, but also the development of confidence, critical thinking, and leadership among the fellows. Their willingness to engage deeply with complex concepts, challenge assumptions, and apply their learning to real-world policy questions has been particularly encouraging. We have been inspired by their commitment to advancing malaria control and elimination within their countries, and by the strong sense of collaboration and peer support that has emerged across the cohort. We are confident

that they will continue to play a pivotal role in strengthening evidence-informed decision-making in their respective contexts.

Looking ahead, strengthening the integration of data and modelling into malaria programmes is both a priority and an opportunity. Continued investment in capacity building, collaborative platforms, and country-led partnerships will be essential to ensure that modelling is embedded within routine planning and decision-making processes. This will enable more efficient use of resources, more targeted interventions, and ultimately, greater impact.

Through sustained collaboration, innovation, and leadership, we can accelerate progress and move closer to a world free of malaria.

Prof Sheetal Silal **Dr Rachel Hounsell** **Mr Sadiq Wanjala**

Co-Directors, *Regional Malaria Modelling Translational Fellowship*

Acknowledgements

The Regional Malaria Modelling Translational (RMMT) Fellowship was made possible through the generous support of the Gates Foundation, whose commitment to strengthening data-driven decision-making and building sustainable capacity in Africa underpins this work.

We acknowledge the leadership and collaboration of our implementing partners—Modelling and Simulation Hub, Africa (MASHA), University of Cape Town; SADC Malaria Elimination 8 Initiative (E8); Clinton Health Access Initiative (CHAI) South Africa Office—for their role in the design and delivery of the Fellowship.

We extend our appreciation to the Ministries of Health and National Malaria Control Programmes in Angola, Eswatini, Ghana, Mozambique, Namibia, South Africa, and Zambia, for their engagement and support, and for enabling fellows to participate and apply their learning within national programmes.

We recognise the contributions of the RMMT Fellows, whose commitment and engagement were central to the success of the programme, as well as the MMALA PhD cohort, whose participation strengthened linkages between modelling expertise and programme needs.

We also thank the faculty, facilitators, and guest speakers, for their valuable contributions, and the programme coordination team, for their support in delivering the Fellowship.

Abbreviations and acronyms

GF	Gates Foundation
CHAI	Clinton Health Access Initiative
E8	Malaria Elimination 8 Initiative
IRS	indoor residual spraying
ITN	insecticide-treated bed net
MASHA	Modelling and Simulation Hub, Africa
MMALA	Malaria Modelling and Analytics: Leaders in Africa
NMP	National Malaria Programme
NTD	neglected tropical diseases
RMMT	Regional Malaria Modelling Translational
SADC	Southern African Development Community
SSA	sub-Saharan Africa
SWOT	strengths, weaknesses, opportunities, and threats
UCT	University of Cape Town
WHO	World Health Organisation

RMMT Fellowship At a Glance

The Regional Malaria Modelling Translational (RMMT) Fellowship is a first of its kind, accredited, six-month executive fellowship programme targeted at building modelling translational capacity among policy-makers in Africa. The RMMT Fellowship focuses on bridging the gap between technical modelling outputs & actionable policy strategies to advance malaria control & elimination efforts.

FELLOWSHIP AIMS

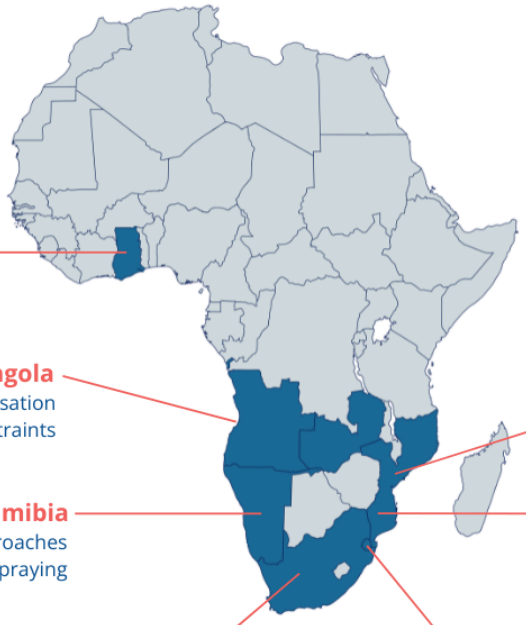
- **Bridge the gap** between modelling and effective decision-making.
- **Strengthen capacity** to interpret and utilise modelling outputs.
- **Build relationships** with modellers and decision-makers for impactful collaboration.
- **Develop actionable recommendations** tailored to countries' needs.
- **Strengthen technical leadership** to advance malaria control and elimination.
- **Enhance advocacy** for resource allocation using modelling and data-driven insights.

INAUGURAL COHORT 2025

21
Fellows

7
Countries

Capstone Project Topics



Ghana
Intervention mixes for elimination planning

Angola
Malaria control optimisation within financial constraints

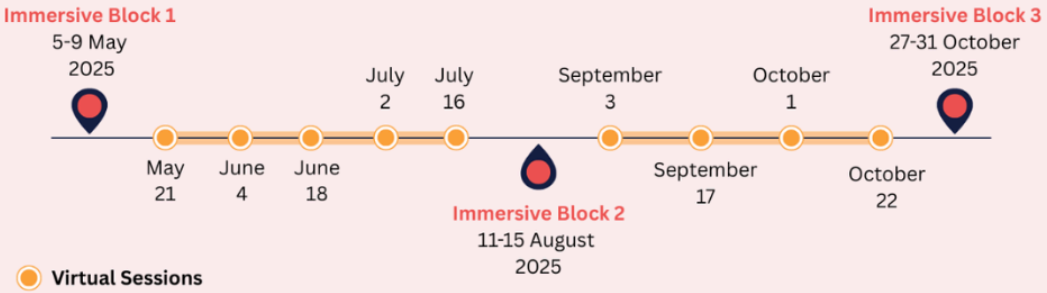
Namibia
Targeted vs blanket approaches to indoor residual spraying

South Africa
Microstratification of intervention packages

Zambia
Routine introduction of the malaria vaccine

Mozambique
Reducing geographical coverage of distribution campaigns for nets

Eswatini
Impact of climate change on malaria transmission



HYBRID PROGRAMME

3 In-person Weeks

9 Virtual Sessions

Funded by: Gates Foundation

1. Introduction

The Challenge

Malaria in Africa continues to be of great public health concern despite significant progress in recent years. To effectively address the malaria burden and achieve the goal of elimination, it is imperative to have robust, evidence-based strategies and policies. Disease modelling plays a crucial role in informing decision-making by providing insights into disease transmission and dynamics, evaluating the impact of different interventions, and identifying optimal strategies for malaria control and elimination.

To progress towards malaria elimination, a challenge often persists in translating modelling outputs into relevant policy and strategies for implementation.

Malaria Modelling and Analytics: Leaders in Africa

The Regional Malaria Modelling Translational (RMMT) Fellowship is part of the Malaria Modelling and Analytics: Leaders in Africa (MMALA) programme. MMALA seeks to develop a critical mass of African malaria modellers to meet the need for tailored quantitative malaria decision support in a sustainable way. It provides a nexus for the training and career development of local individuals who will be able to address the needs of their National Malaria Programmes (NMPs) to shape strategic plans, secure necessary funds, and evaluate and improve the impact of control programmes.

MMALA achieves this by building capacity in malaria modelling and working with strategic partners to increase the uptake of modelling in decision-making; facilitating the sharing of expertise among modellers in sub-Saharan Africa (SSA); providing holistic skills through training and active mentorship; and building an enabling environment to improve modellers' access to timely, high-quality data. A highly skilled cohort of African modellers, working in an enabling environment, facilitated by strategic partners, alongside NMPs who have developed the appetite and literacy for incorporating modelling approaches in strategic planning will culminate from this project.

The MMALA programme objectives are to:

- Increase local capacity for model development through increasing the number of PhD-trained mathematical modellers with malaria expertise based at SSA institutions.
- Address the modelling needs of and foster relationships with NMPs through PhD topics on applied modelling in target countries (Elimination 8 (E8) & MOSASWA countries - Angola, Botswana, Eswatini, Mozambique, Namibia, South Africa, Zambia, Zimbabwe - and Benin, Cameroon, and Ghana).
- Increase local capacity for the use of models in decision-making through improving NMP's understanding of and engagement with modelling approaches.
- Advance network building and expertise sharing between this cohort of African modellers, building on existing partnerships across the E8 countries in Southern Africa, Benin, Ghana and Cameroon

Regional Malaria Modelling Translational Fellowship

The RMMT Fellowship is an accredited, six-month executive fellowship programme targeted at building modelling translational capacity in Africa. Led by the Modelling and Simulation Hub, Africa (MASHA) at the University of Cape Town (UCT) in partnership with the Southern African Development Community (SADC) Malaria Elimination 8 Initiative (E8), and the Clinton Health Access Initiative (CHAI) South Africa Office, funded by the Gates Foundation, the fellowship targets key decision-makers, policymakers and implementers within the public sector working across various levels in health management. The inaugural RMMT Fellowship cohort consisted of 21 fellows from seven countries: Angola, Eswatini, Ghana, Mozambique, Namibia, South Africa, and Zambia.

The RMMT fellowship focuses on bridging the gap between technical modelling outputs and actionable policy strategies to advance malaria control and elimination efforts.

The inaugural RMMT Fellowship was held May to October 2025, in a hybrid format with three immersive in-person weeks and virtual sessions in between. Throughout the programme, fellows worked in country teams towards a Capstone Project, which was to develop a modelling project on a policy topic of priority for their country.

The Fellowship is co-directed and facilitated by Prof Sheetal Silal and Dr Rachel Hounsell from MASHA UCT and Sadiq Wanjala from CHAI South Africa Office. The facilitators bring a wealth of experience in policy-focused modelling and programme implementation.

Fellowship Aims & Objectives

- Bridge the gap between modelling and effective decision-making.
- Strengthen capacity to interpret and utilise modelling outputs.
- Build relationships with modellers and decision-makers for impactful collaboration.
- Develop actionable recommendations tailored to countries' needs.
- Strengthen technical leadership to advance malaria control and elimination.
- Enhance advocacy for resource allocation using modelling and data-driven insights.

Purpose of this Report

This report provides an overview of the inaugural RMMT Fellowship, including its design, implementation, and key outputs. It documents the structure and curriculum of the programme, highlights the Capstone Projects developed by fellows, and reflects on early outcomes and lessons learned. The report is intended for partners, funders, and stakeholders engaged in malaria control and elimination, and aims to demonstrate the value of strengthening in-country capacity to translate modelling into policy and practice. It also outlines opportunities for continued investment and collaboration to sustain and scale impact.

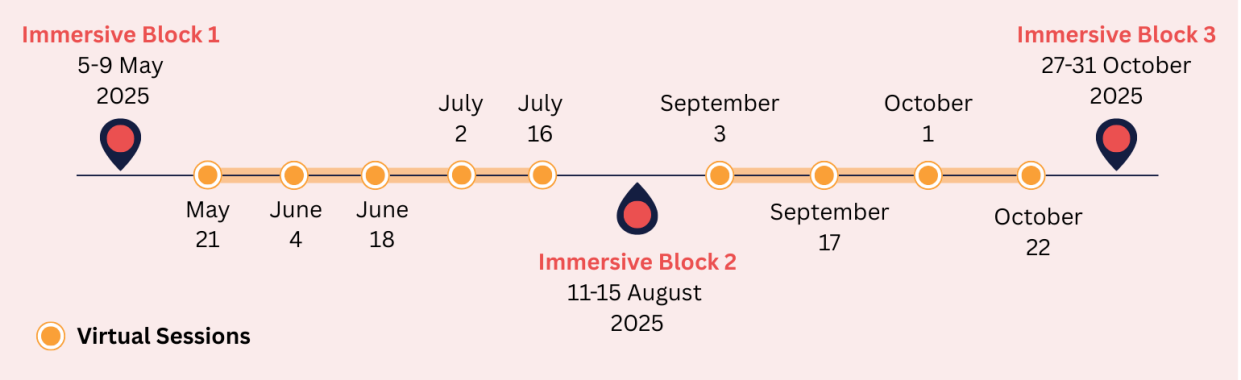
"The RMMT Fellowship has been an invaluable learning experience, deepening my understanding of malaria modeling and its application to evidence-based policy and program decisions. It strengthened my analytical and visualization skills, and boosted my confidence in engaging with technical and policy teams. I am inspired to apply these lessons to improve malaria and other health programs in [my country]."

- RMMT Fellow

2. Fellowship Structure and Curriculum

Fellowship Structure

The RMMT Fellowship was delivered through a hybrid structure to maximise contact time while fitting in with the demands of fellows' work schedules. Three immersive, full-time in-person blocks were held in May, August, and October 2025. In between blocks, virtual sessions were held twice a month (nine in total). Throughout the programme, fellows worked in country teams towards a Capstone Project (details below).



Curriculum Overview

The curriculum was designed to provide a comprehensive and practical foundation in the use of modelling for malaria policy and decision-making. It spans the full modelling process—from framing policy-relevant questions and understanding systems, through model design, development, and critique, to interpreting outputs and communicating findings—while also addressing cross-cutting themes such as uncertainty, health economics, and stakeholder engagement. The selection of topics reflects the needs of the fellowship audience, balancing technical understanding with practical application to ensure participants can both engage critically with models and use their results in real-world contexts. The modules are structured to build on one another, reinforcing key concepts while allowing space for reflection and application. A mix of teaching approaches was used throughout, including lectures to introduce core concepts, facilitated discussions to draw on participant experience, and interactive and group-based exercises to apply learning to relevant scenarios, fostering both technical confidence and collaborative application skills.

Curriculum Roadmap

1 Modelling: What, Why, & How

What is modelling, and what purposes does it serve in public health? When is modelling an appropriate approach compared to other methods? How are different types of models developed and applied?

2 Systems Thinking

What is systems thinking? How do interactions within complex systems influence disease outcomes? How can systems thinking improve modelling and decision-making for malaria?

3 The Model Building Process

What are the key steps in building a model from concept to application? How does iterative development improve the model building process?

4 Engaging with Modelling

What factors influence stakeholder engagement with modelling? What barriers limit the uptake of modelling in decision-making? How can funding mechanisms support sustainable modelling efforts?

5 Roles & Responsibilities

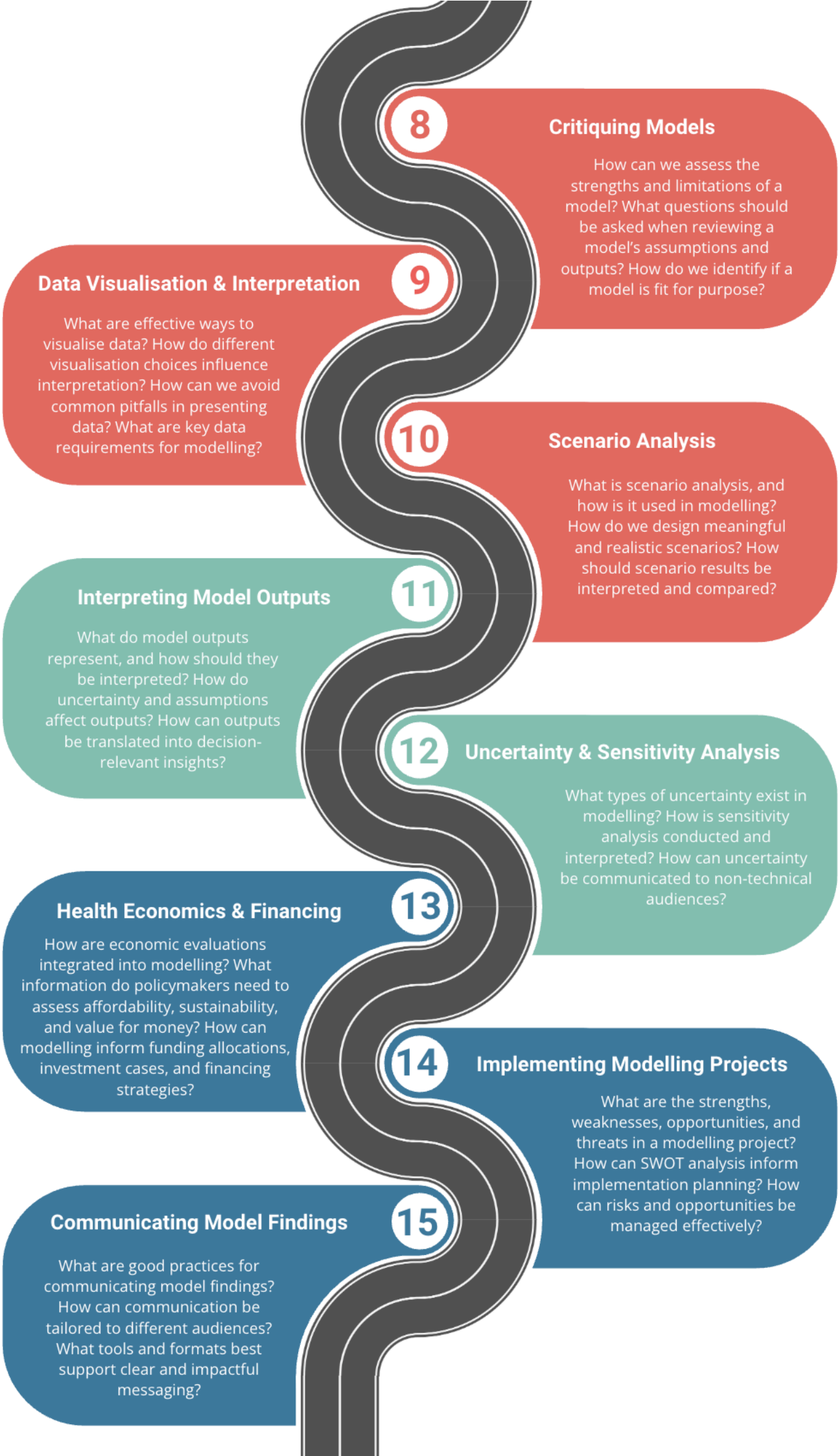
What roles do different stakeholders play in the modelling process? How can collaboration between modellers and decision-makers be structured effectively?

6 Question Formulation

What questions can be addressed by modelling? How do we define clear and relevant modelling questions? What makes a modelling question actionable and policy-relevant?

7 Designing Malaria Models

How do we prioritise model features to address specific malaria questions? What trade-offs are involved in model complexity versus usability? How does context influence model design choices?


8
Critiquing Models
How can we assess the strengths and limitations of a model? What questions should be asked when reviewing a model's assumptions and outputs? How do we identify if a model is fit for purpose?
9
Data Visualisation & Interpretation
What are effective ways to visualise data? How do different visualisation choices influence interpretation? How can we avoid common pitfalls in presenting data? What are key data requirements for modelling?
10
Scenario Analysis
What is scenario analysis, and how is it used in modelling? How do we design meaningful and realistic scenarios? How should scenario results be interpreted and compared?
11
Interpreting Model Outputs
What do model outputs represent, and how should they be interpreted? How do uncertainty and assumptions affect outputs? How can outputs be translated into decision-relevant insights?
12
Uncertainty & Sensitivity Analysis
What types of uncertainty exist in modelling? How is sensitivity analysis conducted and interpreted? How can uncertainty be communicated to non-technical audiences?
13
Health Economics & Financing
How are economic evaluations integrated into modelling? What information do policymakers need to assess affordability, sustainability, and value for money? How can modelling inform funding allocations, investment cases, and financing strategies?
14
Implementing Modelling Projects
What are the strengths, weaknesses, opportunities, and threats in a modelling project? How can SWOT analysis inform implementation planning? How can risks and opportunities be managed effectively?
15
Communicating Model Findings
What are good practices for communicating model findings? How can communication be tailored to different audiences? What tools and formats best support clear and impactful messaging?

Guest speakers

The RMMT Fellowship featured a series of guest speakers from leading regional and global institutions, providing fellows with strategic insights into the role of modelling, data, and evidence in malaria policy and programme implementation. These sessions were designed to complement the technical curriculum by grounding learning in real-world applications, highlighting best practices, and reinforcing the importance of leadership, collaboration, and evidence-informed decision-making. Some guest speaker highlights are showcased below.

Welcome Address: Dr John Chimumbwa, SADC Malaria Elimination 8

Dr John Chimumbwa, Executive Director of the SADC E8, delivered the official welcome address, setting the strategic context for the Fellowship. He emphasised the importance of regional collaboration and strengthening in-country capacity for data-driven decision-making to achieve malaria elimination. Framing malaria as both a public health and development challenge, he highlighted the need for coordinated, cross-border approaches, strong partnerships, and local ownership. He positioned the Fellowship as a key investment in sustainable capacity and encouraged participants to engage with a shared, impact-oriented purpose.

Modelling in Action: Dr Arnaud Le Menach, WHO Global Malaria Programme

Dr Arnaud Le Menach, Head of the Strategic Information for Response Unit at WHO's Global Malaria Programme, presented on the role of modelling in informing malaria strategy. He stressed that modelling should be grounded in national data and aligned with programme priorities, noting the missed opportunities when data are underutilised. He highlighted modelling's value in optimising interventions, while emphasising that its usefulness depends on selecting appropriate questions, clearly communicating results, and recognising the limitations and assumptions underlying model outputs.

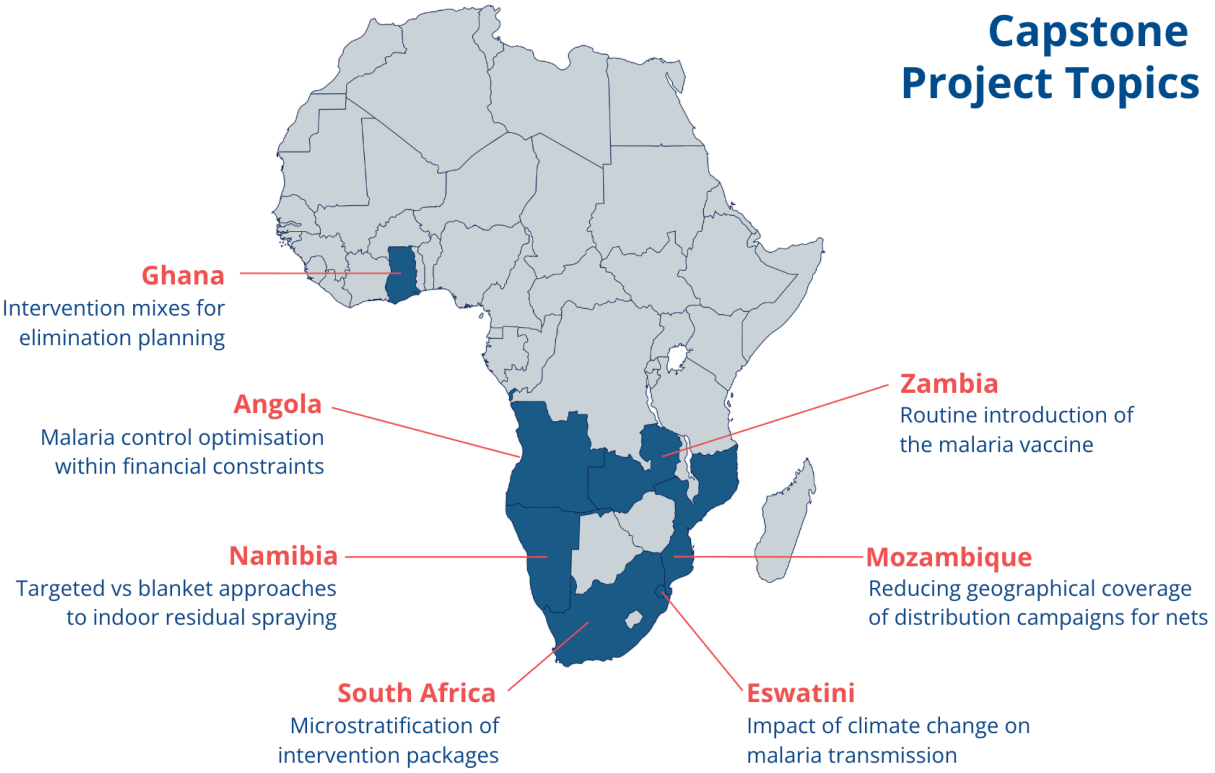
Modelling for Policy: Dr Patrick Moonasar, WHO South Africa Country Office

Dr Patrick Moonasar (WHO South Africa; former Director for Malaria, Vector and Zoonotic Diseases, South Africa NDoH) spoke on the role of modelling in policy and resource mobilisation. Drawing on South Africa's malaria investment case, he demonstrated how modelling can support advocacy and funding decisions in constrained environments. He emphasised aligning technical evidence with fiscal realities, leveraging political opportunities, and building strong partnerships. He also highlighted the importance of documentation for accountability and broader impact.

Capstone Projects

A central component of the RMMT Fellowship was the Capstone Project, through which fellows applied the knowledge and skills acquired during the programme to real-world policy challenges. Working collaboratively in country teams, fellows identified and developed modelling-focused projects addressing high-priority malaria policy and implementation questions relevant to their national contexts.

Each Capstone Project focused on a high-impact, policy-relevant question aligned with national malaria priorities. The process emphasised the practical application of modelling to inform intervention design, optimise resource allocation, and accelerate progress toward malaria control and elimination goals.



Teams developed structured proposals that integrated epidemiological and economic perspectives, including: a clearly defined policy problem, key modelling questions, required data inputs, priority outcomes, and scenario-based analyses of alternative intervention strategies. Proposals also incorporated economic evaluations to assess affordability and cost-effectiveness, alongside implementation considerations through Strengths, Weaknesses, Opportunities, and Threats (SWOT) analyses and defined next steps for policy uptake.

Capstone Project: Presentation Components

- **Background and policy context**, outlining the national malaria landscape and rationale for the selected priority question.
- **Definition of the policy problem**, clearly linking modelling needs to decision-making gaps.
- **Research needs**, incorporating both modelling and complementary non-modelling analyses required to inform the policy decision.
- **Key modelling questions**, spanning both health and economic perspectives.
- **Data requirements**, identifying necessary epidemiological, intervention, and cost data inputs and assessing the quality and availability of these inputs.
- **Outcomes of interest**, such as reductions in morbidity and mortality, progress toward elimination, and cost-effectiveness.
- **Scenario analyses**, exploring different intervention strategies, coverage levels, and implementation approaches.
- **Economic evaluations**, including cost and cost-effectiveness considerations to support resource allocation decisions.
- **Illustrative model outputs and visualisations**, used to communicate potential impacts and key policy messages.
- **SWOT analysis**, assessing the feasibility of implementing proposed strategies within each country's context.
- **Next steps**, outlining pathways for further analysis, stakeholder engagement, and policy uptake.

During the final week of the Fellowship, country teams presented their Capstone Project proposals to the full cohort as well as to invited representatives from Ministries of Health and NMPs, who joined virtually. These presentations served as a critical platform for fellows to demonstrate the knowledge and skills gained throughout the programme, particularly their ability to translate modelling concepts into clear, policy-relevant recommendations. Importantly, engagement with key national stakeholders helped to validate the relevance of the proposed analyses, build buy-in, and highlight the practical value of modelling in informing programme decisions. This interaction also laid the groundwork for continued collaboration and positioned the projects as a foundation for future modelling work within NMPs.

Collectively, the Capstone Projects demonstrate the value of embedding modelling within decision-making processes. They highlight how locally led, policy-driven analyses can generate actionable insights to guide programme planning, improve allocative efficiency, and support evidence-based advocacy for sustained investment in malaria programmes.

By the end of the Fellowship, country teams had developed a pipeline of modelling-informed policy questions positioned for further technical development and implementation. This establishes a strong foundation for continued collaboration between national programmes, modellers, and partners, and contributes to building sustainable in-country capacity to use data and modelling to drive impact at scale.

Integration with MMALA PhD Programme

The RMMT Fellowship provided a valuable opportunity for intentional integration with the MMALA PhD cohort, creating structured opportunities for engagement between emerging malaria modellers and national-level decision-makers. This interaction was central to MMALA's objective of fostering sustained collaboration between modellers and NMPs.

PhD students participated in several in-person Fellowship sessions, enabling direct exchange with fellows who are embedded within Ministries of Health and NMPs. These engagements provided students with valuable exposure to real-world policy contexts, including the operational constraints, priority questions, and decision-making processes that shape malaria programmes. At the same time, fellows gained insight into the scope, methods, and potential applications of ongoing modelling work within their countries.

A cornerstone of this engagement was the Country Connect session, where fellows and PhD students worked together in country groups to map the current landscape for modelling uptake. Discussions explored perceptions of modelling within Ministries of Health, priority policy questions, and key barriers to the use of modelling in decision-making. Participants also identified preferred modelling partners, funding opportunities, and effective modes of engagement. This collaborative process helped to align expectations between modellers and programme stakeholders and laid the foundation for developing country-specific modelling roadmaps.

In addition, MMALA PhD students presented their research projects to the fellows, followed by interactive discussion and feedback. This provided a practical platform for students to strengthen their ability to communicate complex modelling concepts to non-technical audiences—an essential competency for policy engagement. Fellows offered targeted input on how to enhance the relevance and usability of modelling studies, emphasising the importance of close collaboration with NMPs, incorporation of economic analyses, realistic and context-appropriate assumptions, and clear communication of model structure, data sources, and limitations.

These engagements demonstrated the mutual value of bringing together modellers and decision-makers early in the research and policy cycle. For students, it reinforced the importance of demand-driven, policy-relevant modelling. For fellows, it increased familiarity with modelling approaches and strengthened confidence in engaging with technical partners. Overall, the interaction between MMALA students and RMMT fellows contributed to building stronger, country-level linkages between modelling expertise and programme needs. This approach supports a more sustainable pathway to impact, where locally led modelling is co-developed, understood, and ultimately utilised to inform national malaria strategies.

"The fellowship provided a rare opportunity to engage deeply with malaria modelling, bridging technical rigour with policy relevance. It fostered a collaborative learning environment that challenged assumptions and expanded my strategic lens."

- RMMT Fellow

3. Fellowship Evaluation and Outcomes

Approach to Monitoring and Evaluation

This Monitoring and Evaluation (M&E) section presents a longitudinal assessment of the RMMT Fellowship, designed to track changes in fellows' competencies and perceptions over the course of the programme. The M&E approach was structured across three phases—baseline, midline, and final evaluations—each serving a distinct purpose, from establishing initial expectations and competencies to identifying areas for improvement and assessing overall learning outcomes. A mixed-methods approach was employed, combining quantitative analysis of a 14-item Likert scale across key thematic areas with qualitative insights gathered through interactive and open-ended feedback. Together, these methods provide a robust framework for understanding how fellows' ability to engage with and translate modelling into policy-relevant action evolved throughout the Fellowship.

The 14 closed questions used a Likert 5-point scale—scored from 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree—and were the same throughout the three surveys. They were grouped into three themes: Understanding and interpreting modelling outputs; Applying modelling to decision-making; and Collaboration, communication, and influence. The open-ended questions varied across surveys. The figure below shows the 14 scale questions from the survey and the corresponding competency area.

"My overall experience of the RMMT Fellowship was insightful and rewarding. It deepened my understanding of malaria modeling processes, from data collection and parameter estimation to scenario analysis and interpretation of outcomes. The fellowship enhanced my ability to translate model results into practical programmatic recommendations and strengthened my appreciation for the role of modeling in guiding evidence-based malaria interventions." - *RMMT Fellow*

Competency Area and Questions for the 14-Item Likert scale

Understanding and Interpreting Modelling Outputs

Distinguish Analyses
I can distinguish between different types of analyses, such as mathematical modelling, machine learning, exploratory data analysis and statistical forecasting.

Basic Principles
I understand the basic principles of malaria transmission modelling.

Interpret Key Outputs
I am confident in interpreting key outputs from malaria models (e.g., incidence projections, intervention impact).

Uncertainty
I understand how uncertainty in data is included in malaria models.

Assumptions & Limitations
I understand the assumptions and limitations underlying malaria modelling outputs.

Applying Modelling to Decision-Making

Identify Policy Questions
I can identify policy questions that could be informed by modelling.

Translation to Recommendations
I am confident in translating model results into actionable recommendations.

Align Outputs with Timelines
I understand how to align modelling outputs with policy and programmatic timelines.

Support Decision-making
I feel capable of using modelling evidence to support strategic decision-making.

Collaboration, Communication, and Influence

Communicate Technical Results
I can effectively communicate technical modelling results to non-technical stakeholders.

Collaborate with Modellers
I am confident in initiating and maintaining collaborations with modelling experts.

Facilitate Dialogue
I understand how to facilitate dialogue between modellers and policy-makers.

Advocate for Modelling Use
I can advocate for the use of modelling in malaria planning and resource allocation.

Advocate for Data-driven Decision-making
I am confident in advocating for data-driven decision-making within my organisation or country.

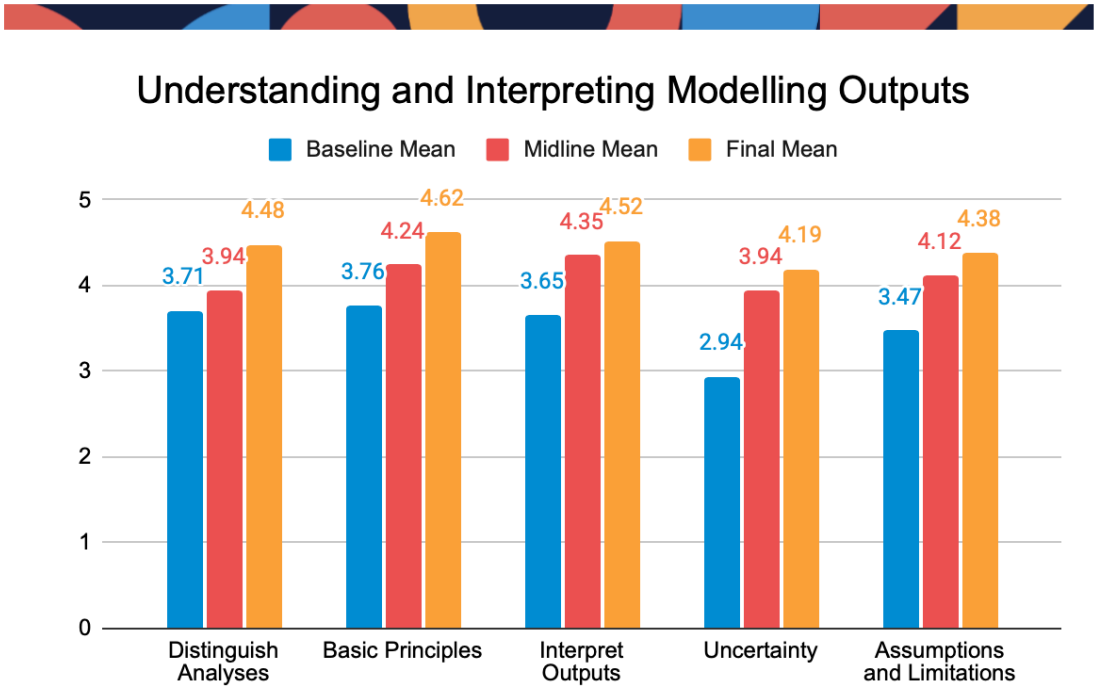
"The program largely exceeded my expectations. I gained a deeper appreciation for how modeling informs malaria program planning and evaluation. The structured learning, mentorship, and peer collaboration made the experience both educational and impactful."

- RMMT Fellow

Evaluation of Fellowship Competencies by Thematic Area

📊 Understanding and Interpreting Modelling Outputs

The first theme, *Understanding and Interpreting Modelling Outputs,* focuses on the fellows' technical literacy and ability to critically evaluate modelling outputs. This theme started with the lowest confidence (average score of 3.51) and had an average increase of +0.93 across the five questions. The competences with the biggest increase in confidence were *Q4: Uncertainty* (total change of +1.25) and *Q5: Assumptions & Limitations* (total change of 0.91), confirming a major increase in critical model literacy.



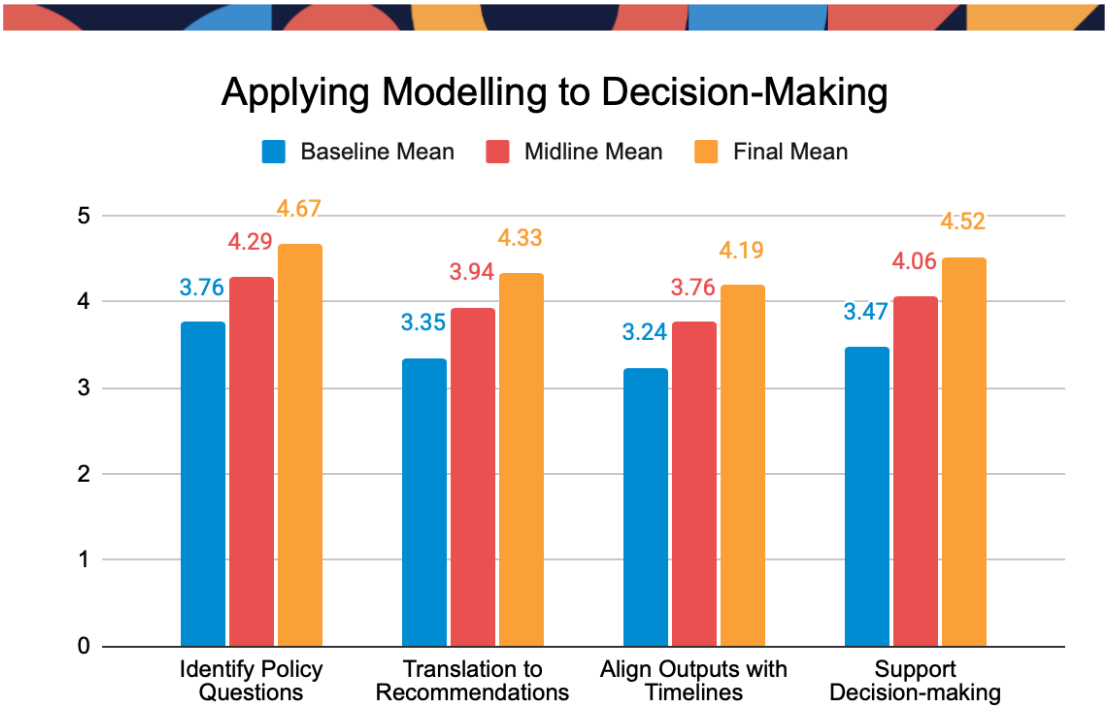
The final average score of 4.44 across these foundational competencies confirms fellows' feelings of increased confidence in understanding not just the outputs, but also some nuances and limitations of the models.

"I gained valuable skills in malaria modeling, data analysis, and policy interpretation. The visualization aspect was my favorite, as it allowed me to present findings in a clear and compelling way that supports evidence-based decision-making and also to interrogate visualization beyond first glance."

- RMMT Fellow

🧭 Applying Modelling to Decision-Making

The *Applying Modelling to Decision-making* theme assessed the fellows' ability to translate technical knowledge into policy and strategic choices, representing the core objective of the Fellowship. It achieved the highest thematic growth with a total change of +0.97, moving from 3.46 at baseline to 4.43 as the final average score.



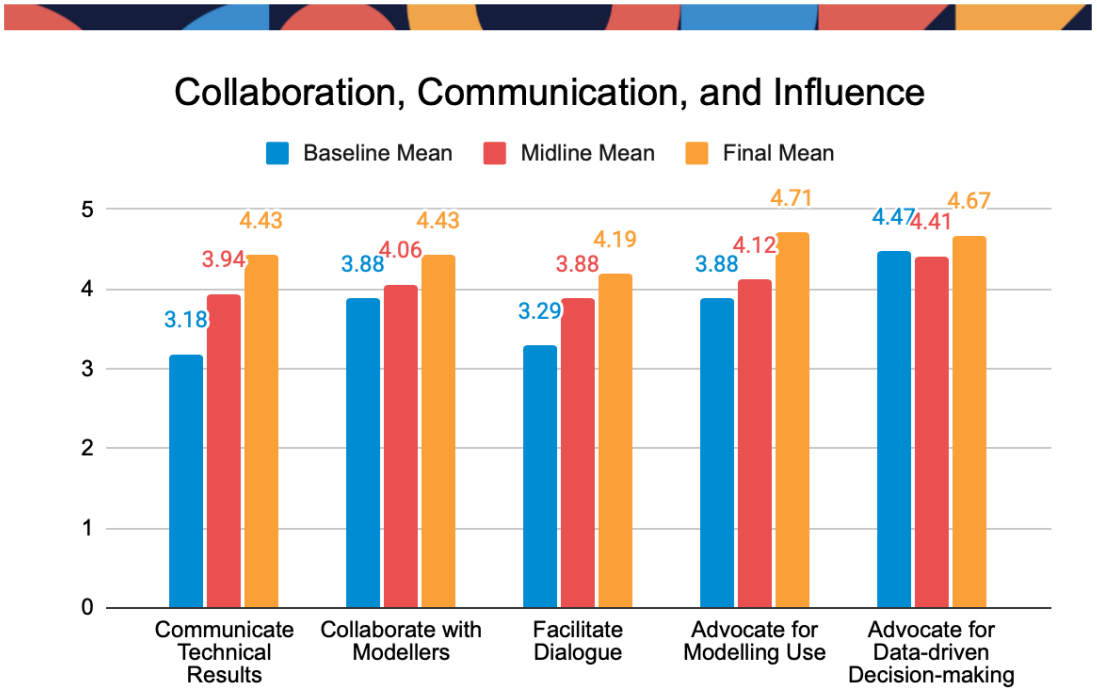
Two competencies in this theme showed over a full point increase: *Q9: Support Decision-making* (total change: +1.05) and *Q7: Translation to Recommendations* (total change: +0.98). This is an important finding for policymakers, showing that fellows believe they are now better equipped to use modelling to drive strategic choices. The highest final mean was for *Q6: Identify Policy Questions* (average final score of 4.67) indicating that fellows are confident at defining the impactful questions for models to address, ensuring the evidence generated is relevant to policy needs.

"Being part of the RMMT Fellowship has broadened my understanding of mathematical modelling and its application to malaria programming, and fostering data-driven decision making in the entire health sector (resource allocation, advocacy, and implementation of interventions)."

- RMMT Fellow

🤝 Collaboration, Communication, and Influence

The last theme, *Collaboration, Communication, and Influence*, captured the essential skills needed to bridge the policy-science divide and champion evidence-based decision-making. This theme concluded with the highest average final score of 4.49.



By the end of the fellowship, *Q10: Communicate Technical Results* (Total Change: +1.25) tied for the largest competency gain, demonstrating a substantial increase in the critical skill of translating complex technical information for non-technical stakeholders. There was also strong improvement in *Q12: Facilitate Dialogue* (Total Change: +0.90), indicating that fellows feel capable of managing constructive conversations between modellers and policy teams, fostering better collaboration and engagement. Fellow nominations prioritised those who were already working with data and making policy and implementation decisions. Thus, *Q14: Advocate for Data-Driven Decision-Making* had a high baseline (4.47) and was successfully maintained/slightly increased (4.67), reflecting a reinforced commitment to evidence use.

"The RMMT Fellowship has helped me understand mathematical modelling and how to translate it to data driven decision making, planning, and health programming. The course has taught me not only how to build different scenarios to model, but more importantly, how to communicate the results in a way that will drive real-world change." - *RMMT Fellow*

Fellows' Feedback

Based on the analysis of the open-ended questions in the final evaluation survey, the fellows' perceptions of the RMMT Fellowship were positive, transformative, and action-oriented. The qualitative results align with the improvements seen in the quantitative evaluation, confirming the programme's success in bridging the gap between technical modelling and policy application. The word cloud below summarises the top three words each fellow used to best capture their experience of the fellowship.

Fellows consistently described the RMMT Fellowship as a highly impactful and often "transformative" experience that exceeded expectations, shifting their perception of modelling from a purely technical exercise to a practical and essential tool for policy and decision-making. A key theme was the strengthening of both technical and applied skills, including modelling processes, data analysis, scenario development, visualisation, and interpretation of results, alongside increased confidence in translating evidence into programmatic and policy-relevant recommendations. Participants also highlighted a transformation in how they engage with modelling—moving from passive acceptance of results to critical evaluation of assumptions, outputs, and uncertainty.

"Before the fellowship, I viewed malaria modeling mainly as a technical exercise. Through hands-on experience, I now understand its critical role in influencing policy and guiding interventions. I've learned how models can quantify impact, identify cost-effective approaches, and support strategic planning within malaria programs."

- RMMT Fellow

The Fellowship's emphasis on real-world application, hands-on learning, and policy relevance was widely valued, particularly in supporting strategic planning, resource allocation, and advocacy. In addition, fellows underscored the importance of collaboration and networking, noting that the programme fostered strong cross-country relationships and a growing community of practice. Overall, the Fellowship was seen as a catalyst for advancing data-driven decision-making, strengthening local capacity, and bridging the gap between modelling and policy in malaria programmes.

"I expected to learn new software but instead learned more than I could comprehend, I learnt a new world and way of thinking, strategy and approach and possibilities."

"My understanding has evolved from wholly accepting modelling results as received, to being able to critically evaluate results and make meaningful inputs."

"This is an amazing programme that has given countries solid knowledge of modeling and also built a strong network of countries with willingness to collaborate and apply knowledge learned."

"The RMMT Fellowship has been a game-changer in my professional journey. It bridged the gap between technical modelling and strategic programme design."

"Mathematical Modelling fellowship has equipped me with the technical expertise to build and analyze complex systems and the strategic communication skills to translate results into data-driven policy recommendations and economic justifications for decision-makers."

"I now appreciate modelling not just as a technical tool but as a strategic asset for adaptive programme design. The fellowship clarified how to interpret outputs, assess assumptions, and communicate uncertainty."

"The programme exceeded my expectations by offering a well-curated blend of theory, practical modelling exercises, and policy dialogue. It was particularly impactful in contextualizing modelling within real-world decision-making frameworks."

4. Inaugural Cohort of RMMT Fellows

With 21 fellows from 7 countries, the inaugural cohort of the RMMT Fellowship represents a new cadre of leaders bridging modelling and policy.

The inaugural RMMT Fellowship cohort comprised 21 fellows nominated by their respective NMPs across seven countries: Angola, Eswatini, Ghana, Mozambique, Namibia, South Africa, and Zambia. Fellows were selected to reflect a diverse cross-section of technical and leadership roles within malaria programmes, including programme directors, monitoring and evaluation specialists, surveillance officers, data managers, clinicians, and policy advisors.

This diversity was a deliberate design feature of the Fellowship, recognising that effective translation of modelling into policy requires engagement across multiple functions within health systems. The cohort brought together individuals with expertise spanning epidemiology, medicine, statistics, data science, information technology, and public health, many of whom are directly involved in strategic planning, programme implementation, and performance monitoring at national and sub-national levels.

Several fellows hold senior leadership positions within Ministries of Health and NMPs, while others play critical technical roles in data management, surveillance, and operational research. Many have extensive experience working with routine health data, implementing malaria interventions, and contributing to national strategies, positioning them well to apply modelling insights in decision-making processes. Fellows' varied backgrounds and perspectives enriched peer learning and collaboration, while ensuring that modelling approaches explored during the Fellowship remained grounded in real-world programmatic needs.

Angola

Antonio da Silva
National M&E Coordinator of Public Health Programs

Antonio holds a degree in Economics and Management, with further qualifications in Applied Statistics in Health and an MBA in Project Management. He serves as the National Supervisor for the distribution, monitoring, and evaluation of mosquito net delivery across communities in Angola. His work focuses on ensuring effective public health interventions through strategic oversight and data-driven decision-making.

Belmira José Bondo
Public Health Technician and National Trainer, National Malaria Control Program

Belmira holds a degree in Clinical Analysis and Public Health, with a postgraduate qualification in One Health and specialized experience in malaria parasitology. For over five years, she has contributed to malaria research and project implementation, including supervising molecular surveillance studies and participating in therapeutic efficacy trials for antimalarials. Her academic and professional focus has been on strengthening health systems and promoting evidence-based decision-making.

Domingos Catraio
Data Manager, Ministry of Health

Domingos holds a degree in Computer Science and has experience in information technology, data management, and requirements analysis. He has worked across various IT functions, ensuring effective data handling and system development. His expertise supports the alignment of technical solutions with organizational needs.

Eswatini

Mbongiseni Nelson Mathobela
National Malaria Case Management Coordinator

Mbongiseni holds a BSc in Nursing and a Master of Public Health, with a strong technical background in healthcare service delivery, public health leadership, and disease control. His work in malaria case management includes analysing case data to understand transmission dynamics, contributing to policy through epidemiological surveillance, and participating in strategic planning for intervention programs.

Thabo Motsa
Monitoring and Evaluation Officer, Ministry of Health

Thabo holds a BA degree in Social Sciences, majoring in Statistics and Demography from the University of Eswatini. He has played a key role in monitoring health sector performance, including the Malaria Program. His work supports data-driven decision-making for planning and the development of effective health policies.

Sibonakaliso Vilakati
Data Manager – National Malaria Programme

Sibonakaliso holds a Master's degree in Information Technology (IT) from the University of Mysore and a Bachelor's degree in IT from the University of South Africa. His expertise lies in transforming complex datasets into actionable insights. He supports strategic planning and resource allocation through data-driven approaches.

Ghana

Nana Yaw Peprah

Deputy Programme Manager, National Malaria Elimination Programme

Nana is a Public Health Physician with a specialization in epidemiology. He formerly served as the Head of Research, Surveillance, Monitoring, and Evaluation at the National Malaria Elimination Program (NMEP). His work is driven by a strong passion for infectious disease research and control.

Paul Boateng

Malaria Case Management Focal Person, National Malaria Elimination Programme

Paul is trained in Medicine, Public Health, Applied Epidemiology, and Disease Control, with a specialized focus on Malaria Case Management. He is playing a key role in the sub-national stratification of malaria interventions for Ghana's National Malaria Elimination Strategic Plan (NMESP) 2024–2028. His work involves leveraging modelling data to inform targeted, context-specific strategies.

Wahjib Mohammed

Monitoring and Evaluation Specialist, National Malaria Elimination Programme

Wahjib has worked with the Ghana Health Service's National Malaria Elimination Programme for over 16 years. He has contributed to multiple technical working groups such as SME, Case Management, MAVCOC, and Advocacy. He holds a BSc in Statistics and Computer Science, an MSc in Statistics, and certifications in international applied epidemiology, M&E for development, and malaria control programme planning.

Mozambique

Baltazar Neves Candrinho

National Malaria Control Director in Mozambique

Baltazar is a Medical Doctor currently doing a PhD in International Medicine at the University of Barcelona. As Program Director of Mozambique's NMCP for over a decade, he has led national malaria activities, strategic evaluations, and impact assessments. His recent work focuses on mathematical modelling to guide evidence-based decisions and optimize malaria control and elimination strategies. He serves as principal investigator on multiple studies examining intervention efficacy, feasibility, and implementation.

Mariana Carmen Jonas da Silva

Technical Advisor for M&E of Digital Platforms in the NMCP

Mariana is a public health professional specializing in malaria control and epidemiology. She has held key positions within the Ministry of Health and international organizations, contributing to national strategy development, campaign digitization, and surveillance efforts. With a background in Biology, training in Epidemiology, and over a decade of field experience, she is completing a master's to deepen her public health knowledge.

Filipe Jose Basilio

NMCP M&E Provincial Focal Point, Nampula Province

Filipe is a healthcare professional specialising in malaria, serving as the Surveillance, M&E Focal Point for the NMCP and campaign digitization in Nampula Province. With a background in Statistics and Information Management, he has held various roles, including Planning and Statistics Officer, M&E Focal Point, and Coordinator for NGO partnerships. His work focuses on data collection, analysis, and interpretation to support evidence-based decision-making. He brings over five years of experience in M&E and research, including coordination of SMC activities and LQAS surveys.

Namibia

Francina Tjituka
Deputy Director of Malaria, TB & HIV Programs

Francina has worked as a nursing professional with expertise in program management, public health, and higher education as a lecturer. She currently serves as Deputy Director, overseeing the implementation and coordination of Malaria, TB, and HIV programs. Her leadership spans clinical, academic, and public health spheres, ensuring integrated service delivery and program effectiveness.

Jerobeam Hamunyela
Acting Programme Manager for the NVDCP

Jerobeam joined the National Vector-borne Diseases Control Programme (NVDCP) in February 2015 as a National Malaria Clinical Mentor. He is responsible for guiding malaria diagnosis and treatment practices, developing national malaria policies, and training trainers in malaria case management. His role supports the strengthening of clinical capacity and policy implementation across the country.

Peter Haufiku
Senior Surveillance, Monitoring and Evaluation Officer

Peter is a Data Scientist currently serving in the Ministry of Health and Social Services in Namibia, where he leads national health data analysis and reporting for malaria and other diseases. He holds a Master's degree in Data Science and a Bachelor's degree in Statistics. His expertise includes predictive modeling using logistic regression and time-series forecasting, as well as applying machine learning techniques to uncover gaps in the health system.

South Africa

Muthei Dombo
Deputy Director General: Health Care Services

Muthei is a medical doctor and senior researcher with public health training, currently serving as Deputy Director General for Health Care Services. Her portfolio includes oversight of district hospitals, primary health care, and community outreach services. She also manages health programmes such as HAST, communicable disease control (malaria and IPC), maternal and child health, environmental health, healthcare risk waste, as well as supplementing services like laundry and kitchen operations.

Ray Magagula
Malaria Information Officer in Mpumalanga Department of Health

Ray specializes in software development, database administration, GIS, and data analysis. His expertise includes SQL database development and management, with a strong focus on leveraging data for decision-making. He brings a technical and analytical approach to system design and data-driven solutions.

Nompumelelo Mdletshe
Assistant Director: Environmental Health, MCP KZN DoH

Nompumelelo currently serves as Assistant Director for Environmental Health within the Malaria Control Programme (MCP) at the KwaZulu-Natal Department of Health. Since 2015, she has focused on implementing malaria surveillance, control, and prevention strategies to support parasite elimination. She holds a PgDip in Public Health from the University of Pretoria and is pursuing a Master's in Public Health at the University of KwaZulu-Natal.

Zambia

Sampa Chitambala-Otiono

Programme Director, National Malaria Elimination Programme

Sampa is a Medical Doctor with advanced qualifications, including an MSc in Medical Parasitology and a Postgraduate Diploma in Public Health. She currently serves as the Programme Director of Zambia's National Malaria Elimination Programme. Her leadership is central to advancing national strategies aimed at malaria control and elimination.

Peter Kakonde

District Health Director of Rufunsa district in Lusaka province

Peter Kakonde is a Zambian medical doctor who graduated from the University of Zambia School of Medicine and holds an MBA in Health Administration. He has been serving in the health sector since 2020, combining clinical knowledge with managerial expertise. His focus lies in strengthening health systems through effective service delivery and leadership.

Ignatius Banda

Surveillance, Monitoring, Evaluation and Operations Research

Ignatius has eight years of experience with the Ministry of Health in Zambia through the National Malaria Elimination Centre (NMEC). He serves as the national focal point for surveillance, monitoring, and evaluation. His work plays a vital role in guiding malaria control efforts through data-driven insights and performance tracking.

5. Future Directions

The RMMT Fellowship represents an important step toward strengthening the integration of modelling into malaria policy and decision-making across the African region. A key outcome of the programme is the development of a comprehensive curriculum, which will be made publicly available to support broader uptake, adaptation, and institutionalisation. This provides a foundation for scaling the approach beyond malaria, with clear potential to extend the model to other priority areas such as immunisation and additional infectious diseases where data-driven decision-making is critical. The Fellowship has also catalysed ongoing relationships with the inaugural cohort, fostering a network of practitioners and policymakers who can continue to engage, collaborate, and share learning beyond the duration of the course.

Looking ahead, there remains a strong call to action to bridge the gap between modelling and policy. This will require sustained investment in building capacity not only among technical experts, but also within the policy-making space, ensuring that decision-makers are equipped to engage with, interpret, and apply modelling evidence effectively. Strengthening partnerships between modellers, national programmes, and regional bodies will be essential to embed modelling within routine planning and prioritisation processes. Continued efforts to translate technical insights into accessible, policy-relevant outputs will further support uptake and impact. Together, these next steps will be critical to realising the full potential of modelling as a tool for evidence-informed decision-making and accelerating progress toward malaria elimination and broader public health goals.