Using Modeled Evidence in Nigeria's Health System: understanding the gaps and promoting the value of evidence-based decision making

	Modeling Organizations	Boundary Organizations	Decision makers
Key Players	**Government parastals**, e.g., Nigerian Centre for Disease Control (NCDC) Nigerian Institute of Medical Research (NIMR) National Institute for Pharmaceutical Research and Development (NIPRD) **Non-governmental orgs**, e.g., Pro-Health Nigeria **Universities** (local and Int'l), e.g., Uni. of Ibadan, Uni. of Nigeria, Covenant Uni., Ahmadu Bello Uni. Uni College London; Imperial College London	**Government advisory gps**, e.g., National Council on Health (NCH) National COVID-19 Research Coalition (NCRC) **Non-governmental orgs**, e.g., Health Sector Reform Coalition (HSRC) Health Strategy and Delivery Foundation (HSDF)	Federal Ministry of Health and its agencies including, National Primary Health Care Development Agency (NPHCDA) National Agency for the Control of AIDS (NACA) NCDC
Int'l Players	US, CDC; World Bank, etc.	UNAIDS; UNICEF; WHO	
Sector & Disease area	Health, especially infectious diseases including COVID-19; HIV/AIDS; TB; Malaria		Health, all disease areas
Data sources	DHIS2; NDHS; LSMS; National surveys; World Bank; UNAIDS	Connections to other ecosystems in the sub-region - Africa CDC; West African CDC; WAHO; etc.	

Figure 1: Translation of Modeled Evidence to Policy: Nigeria's Ecosystem Canvas

Scientific evidence is recognized as highly useful for evidence-based decision making (EBDM)[1]. EBDM means using findings from scientific studies for policy-making and other decision-making activities.

Statistics makes it possible to simulate real life behaviors using models, and this is termed 'modeled evidence. Mathematical models that simulate different potential health scenarios around disease transmission, and/or the impact of policy interventions on health outcomes, can be valuable to decision makers. They can be used to prioritize and choose between complex trade-offs and ensure the best possible results in efficiency, effectiveness and impact of health policies and interventions.

WHAT IS AT STAKE?

Literature has shown that, although policymakers are aware of the need to make decisions that are based on scientific evidence, they do not regularly put this concept into practice[2, 3]. This is particularly the case with modeled evidence. Recent disease outbreaks and disasters have highlighted the need for a more proactive health system that anticipates and prepares ahead of health emergencies. At the onset of the COVID-19 pandemic, the Nigeria Center for Disease Control (NCDC) relied extensively on evidence from mathematical models to understand the trajectory of the epidemic and to develop an appropriate response strategy.

As the usefulness of modeled evidence gains more traction in the Nigerian health system, it is necessary to learn how policymakers can be supported to use modeled evidence in decision making. This could be achieved by examining the extent to which modeled-evidence is understood, valued and used by decision makers, as well as the factors/mechanisms that enable or constrain the translation of modeled-evidence to decision-making.

KEY MESSAGES

- Scientific-evidence is recognized as highly useful for evidence-based decision making in Nigeria's health system and has been used to inform COVID-19 and health system decisions.
- However, the level of awareness and use of evidence produced from models is low.
- There is a lack of capacity among health systems decision-makers to understand and use modeled-evidence for improved decision making in the health sector.
- Organizational capacity and culture that value evidence-based decision and policy-making that uses modeled-evidence along with other evidence for improved formulation of policies, strategic plans and other health system strengthening activities is needed to improve health outcomes.

The target audience for this policy brief comprises all the stakeholders in the modeling to decision making ecosystem, including modelers, decision makers, and knowledge brokers who facilitate exchange between them.

WHAT WE DID

- Data was collected through quantitative online survey and key-informant interviews (KIIs).
- The respondents comprised, (i) researchers who produce modeled evidence; (ii) knowledge brokers who help to translate evidence, distill findings, foster dialogue, and get the modeled evidence into policy and practice; and (iii) decision-makers who participate in making decisions for national and sub-national health policies & practice. (Figure 1).
- Thirty-eight (38) people completed the online survey in Open Data Kit software (ODK) from November 2021 to December 2022. A subset of the survey participants was approached for the key informant interviews. Some key informants who did not participate in the online survey were interviewed. A total of 24 KIIs were completed.
- Data from the survey were summarized using frequency distribution. Transcripts from the KIIs were coded in NVivo and findings were organized by theme.

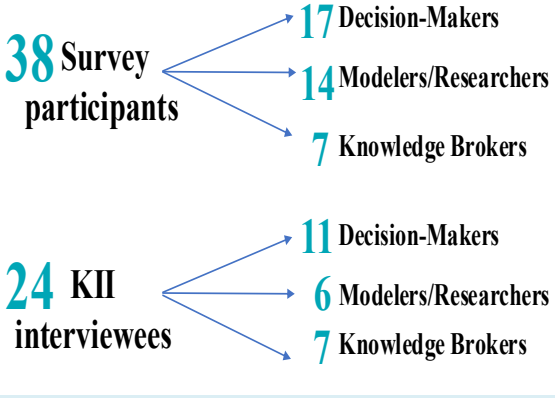

Figure 2: Distribution of respondents in the survey and key informant interviews

WHAT WE FOUND

The findings are presented in themes that answer the following questions,

(a) What facilitates or inhibits the use of modeled evidence in decision making?

(b) What available structures can be leveraged to enable the use of modeled evidence in decision making, and what are the strengths and challenges?

(c) What are the recommendations to improve EBDM in Nigeria's health sector using modeling?

Facilitators and barriers to the use of modeled evidence in decision making

Some stakeholders, including policymakers, are aware of modeled evidence, and consider it valuable for decision making.

The most recurrent factors that were identified across all of the research stakeholder groups that facilitate the use of modelled evidence in policy and decision making are, (i) presentation of modeled evidence in formats that are easy for decision makers to understand; (ii) capacity of decision makers to understand and use modeled evidence; and (iii) availability of modeled evidence that is contextually relevant (Figure 3).

Organizational factors such as inter- and intra-agency knowledge sharing and a culture of EBDM in government agencies were also highlighted in the KIIs as facilitators of the use of modeled evidence in decision making.

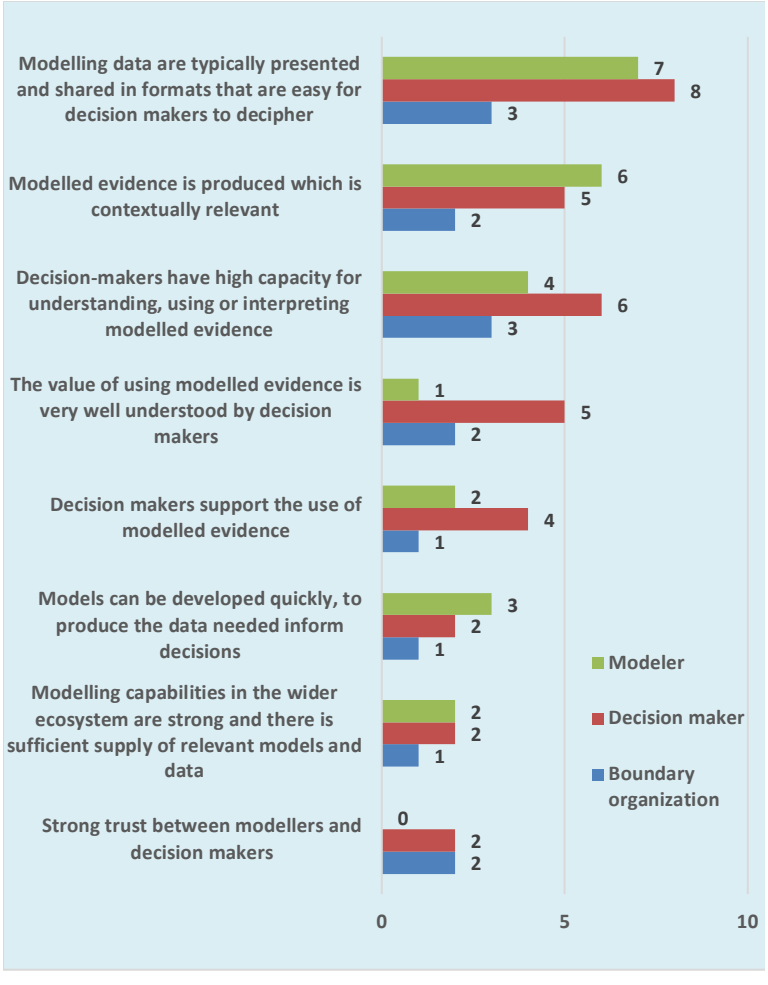

Figure 3: Stakeholders perspectives of the facilitators of use of modeled evidence in decision making in Nigeria

Although high capacity was occasionally mentioned as a facilitator, lack of capacity (of decision makers and knowledge brokers) to understand and interpret models was more commonly raised in the KIIs as a barrier to the translation and use of modeled evidence. Moreover, knowledge brokers stated that the formats in which modeled evidence is presented to decision makers make it difficult for them to interpret or understand.

> *"The models are there but [the] challenge is mainly in translation. There are some evidences that came out during the [COVID] pandemic [that] I even didn't understand. […]. If you put me on the spot to engage with policymakers, I will not be able to do that [because] I don't even understand the models" **(R11, Female, Knowledge broker)***

Other barriers include limited access to modeled evidence by decision makers, lack of or poor quality of data for building models, policymakers and researchers working in silos, lack of trust of decision makers in the models, and lack of funding for modeling work.

Existing structures that can be leveraged to promote the use of modeled evidence in decision making

There are various structures in Nigeria for ensuring that knowledge exchange between researchers and decision makers is formalized, consistent, sustained and continuous, in order for evidence to be translated to policy and practice. A few of these structures have engaged in the translation of modeled evidence for decision making. These structures can be broadly grouped into five (5) categories, based on the mechanisms of engagement (Figure 4).

Academic & Scientific alliances	The Nigerian Academy of Science and other scientific academies
Research consortia	Various research consortia, e.g. The Nigeria COVID-19 Research Coalition, etc
Advisory committees	Antimicrobial Resistant Coordination Committee National Health Research Committee
Advocacy and civil society coalitions	Health Sector Reform Coalition (HSRC)
Development partner alliances	Development Partners' Group for Health (DPG-Health)

Figure 4: Existing knowledge translation structures in Nigeria and their mechanism

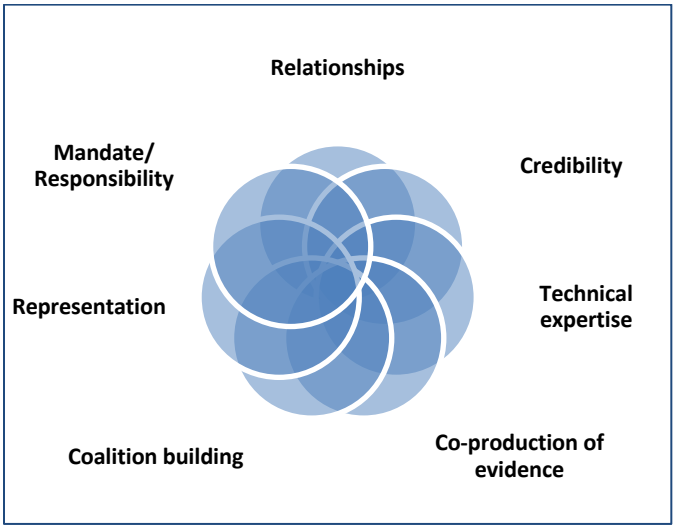

Figure 5: Strengths of existing knowledge translation structures

Figure 5 describes the key traits that make these mechanisms effective. The Nigerian Academy of Science (NAS) has built **relationships** with top-level decision makers and it has the **credibility** to attract funding from external and internal sources to facilitate knowledge exchange activities. The Academy also has the **technical expertise** to build the capacity of decision makers to understand and use modeled evidence, as well as the **capacity** of other knowledge brokers to interpret and communicate modeled evidence to decision makers.

The Health Sector Reform Coalition (HSRC) is a powerful **coalition** of over 50 powerful civil society organizations (CSO), development partners and international agencies that primarily advocate for health reforms in Nigeria. Its experience with modeled evidence is limited to date. However, it has recorded success in influencing policymaking and legislation at the national and subnational levels, including the legislators.

The Nigeria COVID-19 Research Coalition (NCRC) consists of **representatives** of major health organizations, research organizations and organized private sector that are tasked with the **responsibility** to synthesize research evidence on COVID-19, interpret the evidence and use it to make recommendations to policy makers. Through a process of **co-producing** mathematical models with policymakers, they influenced the use of modeled evidence in the health system response to COVID-19 in Nigeria.

Recommendations for improving the use of modeled evidence in decision making in Nigeria

We recommend the following high priority actions to promote (or strengthen) the use of modeled evidence in policy and practice.

For decision makers

- **Develop a national framework** that will guide and enhance the use of EBDM should be developed by stakeholders.
- **Build and strengthen in-country capacity** for model building, interpretation, and utilization across several Ministries, Departments, and Agencies.
- **Ensure sustainability of in-country capacity** by training mid-level managers to interpret and use modeled evidence for decision making.
- **Improve the data systems and repositories** across national and subnational levels and make them readily accessible for modeling.

For modelers

- **Ensure rapid and timely development of models** to address topical policy questions and engagement with decision makers throughout the process.
- **Ensure that modeled evidence is presented and communicated in easy-to-understand formats** for decision makers and knowledge brokers.

For knowledge brokers

- **Promote the value of using modeled evidence among decision makers, its** present usefulness within Nigeria's health space.
- **Facilitate the co-production of modeled-evidence** between modelers, knowledge brokers and decision makers.

For funders

- Optimize current structures through **consistent and strategic funding** and emphasize that they engage in knowledge translation.
- Insist that **all funded research proposals should include capacity building activities in EBDM,** and indicate tangible and measurable commitments to knowledge translation.

What do our findings mean for evidence-based decision and policy making?

Translating scientific evidence to decision making is an ongoing conversation in both the policy making and research communities. Although many decision makers are familiar with the traditional sources of evidence such as interviews, group discussions and demographic surveys, few are aware of modeled evidence and its usefulness and importance in EBDM.

It is important to develop capacities and organizational cultures that will appreciate the value and use modeled evidence for EBDM. This goal can be achieved by strategies that focus on developing the capacity of decision makers to appreciate, seek, and use modeled evidence, while pursuing the development of a national framework that will compel and guide decision makers through a step-by-step approach in the utilization of evidence.

There should be harnessing of strengths and optimization of already existing structures of modelers and knowledge brokers in the country. The need is to build communication connections between these structures and decision makers and frame their relationships in ways that will encourage interdependency and effective collaborations.

There should be prioritized funding of research-to-policy frameworks and structures as part of building an organizational culture of EBDM, with earmarking of dedicated funds for well-conceived studies that will be translated into policies and programs.

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RESULTS FOR DEVELOPMENT

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