

## Supplementary material A: Examples of how implementation science theories and the realist evaluation are applied in practice

Below we describe how different methodologies have been applied in practice.

### Implementation science methods

#### *Implementation science theory*

An example of an implementation theory is the Normalization Process Theory (NPT) that identifies four determinants required to embed a complex interventions into practice.<sup>(1)</sup> The determinants of the NPT include coherence, cognitive participation or engagement, collective action, and reflective monitoring. An example of using NPT in global health research is a feasibility study of community level interventions for pre-eclampsia in South Asia and sub-Saharan Africa.<sup>(2)</sup> The aim of the study was to understand barriers and enablers to implement an intervention to detect and treat pre-eclampsia using lay health workers within the existing health system. The NPT was used to explore enablers and barriers for the implementation of this intervention into everyday practice. E-Table 1 describes how this feasibility trial monitored the determinants of the NPT

**Table 1 Application of the NPT to a feasibility trial for the implementation of interventions for pre-eclampsia in South Asia and sub-Saharan Africa (2)**

Normalisation Process Theory determinant	How it was applied in the trial
Coherence – aspects of the intervention that are similar to existing practice	Review of the health workers curriculum, practice guidelines and policies.
Cognitive participation - understanding the dynamics of intervention and potential benefits/harms from participation	Providing the opportunity to discuss the importance and potential benefit/risk with wide range of stakeholders.
Collective action – collaboration between individuals and groups responsible to implement the intervention.	The implementation of this intervention was dependent on the collective action of all stakeholders. This was evaluated through discussion of participatory activities such as community engagement, capacity building and on-going support.
Reflexive monitoring – reflecting on enabling and impeding factors that could potentially normalize the intervention	Researchers provide feedback during data collection to assess the level of community and stakeholder support. Facilitators lead focus group discussions to explore the collective experiences of community members, health providers and policy makers.

### Realist evaluation

An example of applying realist theory to implementation research is a study that evaluated how different contexts influenced the mechanisms responsible for divergent outcomes for the implementation of a user fee exemption policy for caesarean section at two hospitals in Benin.<sup>(3)</sup> Table E-2 describes the findings from this study.

**Table E-2 Example of a realist evaluation to explain divergent outcomes in two different contexts<sup>(3)</sup>**

Context-mechanisms and outcomes	Faith based hospital	State owned hospital
Context	<p>Non-state-owned hospital; urban area with a monetary poverty index at 25%; limited public financial contribution to the recurrent costs.</p> <p>Inadequate organization and supervision support; 'laissez-faire' attitude about the programme.</p>	<p>State-owned hospital in a semi-rural area with a monetary poverty index at 46%; receive public funds to cover recurrent costs from multiple mechanisms.</p> <p>Strong perceived hierarchical pressure within the hospital.</p>
Mechanism	<p>Mistrust in the state; poor intrinsic adherence to the goals and values of the policy, fear of financial loss for the facility; weak perceived pressure to adopt the programme.</p> <p>Low adherence to the policy goals and values, poor perceived pressure to implement the appropriate practices.</p>	<p>Strong perceived top-down and bottom-up pressure to adopt the programme; fear of administrative and community penalties if not adopting the programme; adherence to the policy goals and values.</p> <p>Fear of administrative and community penalties if not implementing the policy.</p>

### References

1. Murray E, Treweek S, Pope C, et al. Normalisation process theory: a framework for developing, evaluating and implementing complex interventions. *BMC Med.* 2010;8:63.
2. Khowaja AR, Qureshi RN, Sawchuck D, et al. The feasibility of community level interventions for pre-eclampsia in South Asia and Sub-Saharan Africa: a mixed-methods design. *Reprod Health.* 2016;13 Suppl 1(Suppl 1):56.
3. Dossou JP, De Brouwere V, Van Belle S, et al. Opening the 'implementation black-box' of the user fee exemption policy for caesarean section in Benin: a realist evaluation. *Health Policy and Planning.* 2019;35(2):153-66.