Webinar: Applying a Systems Thinking Approach to Early Childhood Development

29th March 2023

Watch the recording here:

https://us02web.zoom.us/rec/share/-TSyrg56T4k5qOy_7DbWTAjWDjRHykE2IkY5f6Gw31M0XXTZ3qAev_IFhpLyib8m.UUUF8gN4USo5z2jm?startTime=1680087451000
Why explore systems thinking for Early Childhood Development?
Question:
What is impact of complex systems interventions on outcomes at scale across diverse sectors?
Papers

• Five complex systems interventions
• Implemented at subnational scale in 5 countries
  • Nepal, Vietnam, Ghana, Uganda, India
• Within existing government health (& other) systems
• Varied in application of systems thinking tools and methods
• Provided description of cross cutting – lessons, challenges, enablers
• All showed positive impact of multi-faceted systems interventions on population measures
Learning from the piloting and statewide scale-up of the *Ananya* maternal and child health program in Bihar, India, 2010-2017

*Ananya Study Group*

Learning from Ananya - publications

Ananya program area

Focus ("pilot") districts: n=8 (28 M), intensive NGO innovation and support to government implementation, 2012-2013.
Non-focus (scale-up) districts: n=30 (76 M), techno-managerial support to government implementation (47 “interventions” across reproductive, maternal, newborn and child health and nutrition), 2014-2017.
**Ananya program theory of change**

**SUPPLY SIDE**

- Capacity-Building for FLWs
  - Mobile tools for mapping families, and planning and tracking home visits
  - In person and audio-based training on health topics and communication skills
  - Job aids and teaching tools to facilitate topic discussions
  - VHSNDs for expanded IPA and vaccine distribution

- Quality Improvement in Facilities
  - Nurse mentoring and skills training for staff members
  - QI teams implemented to improve facility efficiency
  - Expanded distribution of family planning methods
  - Training provided for managing supply chain of drugs and equipment

**DEMAND SIDE**

- Multimedia Communications
  - Radio programmes, television ads and street theater focused on key health behaviors
  - Community groups convened and facilitated to amplify behavior change messages
  - Community celebrations and health fairs held to increase saturation of messaging

- Self Help Group Facilitation
  - Health education modules introduced into existing women’s community groups
  - Training the trainers model used to empower educators for better health messaging
  - Creation and strengthening of groups amongst most marginalised communities

**INTERVENTIONS**

- Improved FLW knowledge and communication skills
- Regular and timely FLW interactions with households
- Comprehensive and accurate information delivered to families
- Increased service provision in marginalised communities
- Improved quality of care and complication management at PHCs

- Increased awareness of critical health topics and best practices
- Expanded adoption of important health behaviors including the use of family planning services
- Creation of shifts in social norms and cultural practices to support long term adoption of healthy behaviors

**INTERMEDIATE OUTCOMES**

1. Reduced maternal, neonatal, infant and under-5 mortality
2. Reduced childhood malnutrition and stunting

**IMPACT GOALS**
Evaluation of Ananya

Implementation begins in focal districts
Peak implementation in focal districts
Outreach ends in focal districts
BTSP scale-up begins across the state
Transition to BTSP operations, with focus on supporting the Government of Bihar to implement interventions

8 Districts
8 Twin districts
38 Districts

Adapted from: CARE India, What change have we catalyzed in Bihar? IFHI/TSU Partners’ Meeting, February 2015 [unpublished].
Impact of the *Ananya* program on RMNCHN in Bihar, India: early results from a quasi-experimental study (difference-in-difference), 2012-2014

- 40% of indicators (20 of 51) changed significantly from baseline to midline in comparison districts unrelated to *Ananya*; two-thirds (n = 13) of secular indicator changes were in a direction expected to promote health.
- Statistically significant impact attributable to the *Ananya* program was found for 10% (five of 51) of RMNCHN indicators, mostly for mother’s uptake of contraception.
- Large-scale change is possible under conditions of intensive support to implementation.
- Structural health system constraints limit behavior change among providers and beneficiaries.
- Theory-informed, equity-sensitive, mixed-methods approaches can help elucidate pathways to population-level health outcomes.
Scale-up phase - Conclusions

- CARE India shifted focus from building capacity of the FLW platform to health system strengthening and quality improvement in facilities; this had implications for equity.
- During statewide scale-up, gains in RMNCHN that had been achieved in the pilot phase rapidly fell back to baseline for 33 of 52 indicators.
- Indicators in the eight original focus districts did not dip below baseline levels and the response to implementation at scale was similar in the former focus (14/50 indicators improved, 14 worsened) and non-focus (22/50 indicators improved, 13 worsened) districts, suggesting that health systems had been neither strengthened nor further destabilized in the pilot phase.
- Average trends at the district-level masked considerable differences in block-level trends.
Hierarchical Bayesian spatiotemporal modelling of change in 22 indicators, Bihar, 2014-17

- 19/22 indicators showed variations in trends at block level
- 15 indicators showed trends in opposite directions
- All blocks had >97.5% probability of rise in breastfeeding, pregnancy registration, 4+ ANC visits.
- All blocks had >97.5% probability of decline in seeking care for pregnancy complications.

- Contextual factors (e.g., night lighting and development) not targeted by the programme, and FLW visits were associated with favourable programme outcomes.
- Intervention design and intervention selection should be modified to fit the local context and expand collaborations beyond the health sector.
Conclusions – demand-side innovations & equity

• mHealth and health-layering of self-help groups showed strong evidence for impact at scale.
• Changes in indicators were driven largely by changes in the least marginalized subgroup (by wealth and caste).
• Disparity tended to widen for indicators dependent on access to health facility care, suggesting that focus on facility-based care without also addressing barriers to access may improve indicators overall at the expense of accentuated inequality.
• Intersectional equity analysis is challenging.
To gain precision in intervening in systems, we developed a system dynamics quantitative simulation model (institutional delivery rates by parity among marginalized women in West Champaran Districts, Bihar)
Reflections

• Multiple innovations were developed (e.g., processes & tools for improving FLW effectiveness in reaching and engaging with families in improving knowledge and behaviors; mHealth tools; health-layered SHGs; facility quality improvement through nurse mentoring, team building, simulations), however, health system dysfunction limited effectiveness.

• Health system performance can be improved by investments in technical and managerial innovations and use of data to enhance implementation effectiveness if integrated into evidence-based programs and implemented with sufficient governmental commitment, intensity and resources.

• Reach to the most marginalized must be intentional and monitored.

• Measure change at the lowest possible implementation unit. Summary measures may miss insights into contextual or programmatic factors associated with progress or lack thereof.

• Simulated policy experiments (eg, system dynamics modeling) may aid precision in linking implementation and contextual factors to health measures.
“Success in achieving wide-scale health impact requires maintaining focus on the achievement of shared goals through a unifying, measurable theory of change; balancing investments across the facility-community continuum; monitoring impacts at local (eg, block) level, disaggregated across intersecting aspects of marginalisation (eg, wealth, race, gender); and maintaining optimism, urgency, innovation, and flexibility to evolve in response to ever-emerging quantitative and qualitative evidence of what is being achieved, for whom, where, and why or why not.”
District Health Systems strengthening for child health through the CODES Study in Uganda
(Community and District Empowerment for Scale up)

29th March 2023
Webinar on "Applying a Systems Thinking Approach to Early Childhood development"
Prof Peter Waiswa
Prof Stefan Peterson,
Dr Flavia Mpanga Kaggwa
Objective and study design

• CODES was a large cRCT study that investigated the effect of a district management strategy informed by local data and community dialogue on child health outcomes in the Ugandan health system

• Eight (8) intervention and eight (8) control districts

• National oversight by government and partners
CODES Hypothesis

Areas receiving CODES intervention will perform “better” and show accelerated “improvement” on the key protective, preventive and curative quality coverage indicators for pneumonia, diarrhea and malaria compared to those that have not received the CODES intervention.

CODES PILLARS

- **Pillar 1**: Improved targeting of interventions to match disease burden
- **Pillar 2**: Regular review and improvement of district health team performance
- **Pillar 3**: Community oversight and inputs
Community and District Empowerment for Scale Up ‘In a nut shell’

Mortality reduction - Vision 2040, SDGs

Health Systems Strengthening

Smart Implementation CQI

District Management

Evidence Based planning

Data from households: Demand and supply
Key Steps under CODES

DATA: LQAS & DHIS2 - BNA/CA

Social accountability
U report
Community dialogue
Barazas

Evidence based planning and monitoring at District level

Health Systems Strengthening leading to increased coverage of Key interventions

Reduction in morbidity and mortality
Step 1: Identify Bottlenecks

The Tanahashi Model to assess system bottlenecks

Step 2: Causal analysis using the management analysis and 5 WHY’s

- **Bottleneck**
  - Managerial shortcoming
  - Decision space
    - Resources
      - Capacity
        - Motivation
  - What else?

Solutions:
- Advocacy
- Collection, advocacy
- Capacity building
- Incentives
Step 3: Identify Solutions and Strategies for District Annual Plans and then implement
Achievements: Supply side

- Improvement in child health indicators
- Improved reporting through DHIS 2
- Decrease in health worker absenteeism
- Evidence based work-plans in 13 districts led to increased funding for child health
Scaling up and sustaining the gains from CODES

Evidenced planning now scaled up to all 136 districts in 2021
Publications

• **Trials:** *Community and District Empowerment for Scale-up (CODES): a complex district-level management intervention to improve child survival in Uganda: study protocol for a randomized controlled trial* Peter Waiswa1,2*, Thomas O’Connell3, Danstan Bagenda1,4,5, Pricila Mullachery6, Flavia Mpanga7, Dorcus Kiwanuka Henriksson2,8, Anne Ruhweza Katahoire9, Eric Ssegujja1, Anthony K. Mbonye1,10 and Stefan Swartling Peterson1,8

• **BMC Public Health:** *Improving child survival through a district management strengthening and community empowerment intervention: early implementation experiences from Uganda* Anne Ruhweza Katahoire1, Dorcus Kiwanuka Henriksson2,3*, Eric Ssegujja4, Peter Waiswa4,2, Florence Ayebare4, Danstan Bagenda5,4,6, Anthony K. Mbonye7,4 and Stefan Swartling Peterson2,3,

• **BMJ:** *Child health and the implementation of Community and District-management Empowerment for Scale-up (CODES) in Uganda: a randomized controlled trial* Peter Waiswa1, Flavia Mpanga2, Danstan Bagenda3,4 Ronald Muhumuza Kananura,5 Thomas O’Connell,6 Dorcus Kiwanuka Henriksson,7,8 Theresa Diaz,9 Florence Ayebare,5 Anne Ruhweza Katahoire,10 Eric Ssegujja,5 Anthony Mbonye,11 Stefan Swartling Peterson1
**Example of Pneumonia treatment by VHTs**

- **Commodities**
- **Availability of the correct human resources**
- **Points of access/distribution**
- **Initial use of product or service**
- **Continuous use of product or service**

**For Mothers:** Too much $$$ (transport); quality is low

1. Bottleneck is too few access points for CHWs w/antibiotics
2. A 2nd major bottleneck is QUALITY: few children finish antibiotic course

<table>
<thead>
<tr>
<th>Stock of antibiotics in district</th>
<th># of fully trained VHTs vs. national target</th>
<th>% villages with complete VHT</th>
<th>Child with ARI seen by VHT</th>
<th>Child given antibiotics</th>
<th>Child completes full antibiotic treatment &lt; 24 hrs</th>
</tr>
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<tbody>
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</table>

Example of Pneumonia treatment by VHTs
<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>BOTTLENECK</th>
<th>CAUSES</th>
<th>PROPOSED SOLUTION</th>
</tr>
</thead>
</table>
| Pneumonia   | Stock out of antibiotics at 46%. | Over prescription of antibiotics because breath rate not taken  
Lack of respiratory timers  
Inadequate forecasting of needs | • Procurement of wall clocks for respiratory rate assessment for health facility  
• Refresher training on quantification; CQI |
Bugiri- Antibiotics for Pneumonia

**Commodities:** Proportion of health facilities with no stock-out of antibiotics lasting more than 1 week in previous 3 months

**Human resources:** Proportion of facilities with health workers trained on IMCI in the previous 12 months

**Geographic access:** Proportion of mothers of children ages 0-59 months living within less than 5km radius from the nearest health facility

**Initial utilization:** The proportion of children 0-59 months confirmed with pneumonia

**Continuous utilization:** The proportion of children 0-59 months with pneumonia for whom amoxicillin was prescribed

**Quality coverage:** The proportion of children 0-59 months with pneumonia who received the prescribed amoxicillin
Achievements: Supply side

• Intervention districts reported significant net increases in the treatment of:
  – Malaria (+23%)
  – Pneumonia (+19%)
  – Diarrhea (+13%)
  – Improved stool disposal (+10%)
  – Coverage rates for immunization and vitamin A consumption saw similar improvements.
Achievements: Supply side

✓ Improved reporting through DHIS 2 from 23.5% in 2013 to over 80% in 2016 across the 487 facilities in the 13 districts

✓ Decrease in health worker absenteeism from 44% to 29% in 2 years

✓ Evidence based work-plans in 13 districts increased funding for child health from 4% to 6% in 2 years
Achievements: Demand side

• Increased knowledge about the symptoms, causes, prevention and treatment of malaria, diarrhea and pneumonia -as per the national guidelines. Mostly in communities that participated in Community dialogues.
• Improved change in the conduct of health workers at government health facilities.
• Improved working relationship between the HW/HTs and the community.
• Increased uptake and completion of immunization schedules which was attributed better understanding of EPI programme.
• Community dialogue approach can potentially inform work plan activity in a tremendous way, the Baraza program under Office of the Prime Minister.
• Community owned schemes e.g., Transport voucher for pregnant women and sick children.
• Community led construction of Health facilities.
• Increased male involvement: ANC with spouses.
Continuous Quality Improvement - waiting times for U5 in Masaka

- Introduced attendance book and drawing of a redline after 8:30 am.
- Agreed with staff who were taking care of babies to hire maids
- Introduced group approach for testing
- Partitioned the rooms at health centre and created two rooms for staff on duty the following day to report in the evening.
LESSONS LEARNT

• Aligning the project to the already existing national planning and budgeting cycle strengthens the planning process

• Bottleneck and causal analysis useful for evidence-based planning

• Continuous Quality Improvement is important for QI

• Community dialogues should be aligned to already existing community structures to ensure sustainability

• Political and technical district leadership is necessary to influence real change in the communities

• Limited utility unless there is increased fiscal space at district level
Insights from Multiple Evaluations of Behavior Change Interventions on Improving Infant and Young Child Feeding Practices in Bangladesh and Vietnam

Phuong Hong Nguyen
International Food Policy Research Institute

March 29, 2023
Background

- Nutrition and development closely linked through both biology and behavior

- Promotion of adequate nutrition early in life through interventions aimed at improving infant and young child feeding (IYCF) has potential to contribute to cognitive, motor, and social-emotional development but limited evidence exists on what impact can be achieved

- In multiple evaluations of Alive & Thrive’s efforts, we examined impact on breastfeeding, complementary feeding practices, and child development in Bangladesh and Vietnam.
Bangladesh: Engaging frontline workers for delivering counseling through a large-scale NGO platform implemented by BRAC

+ Mass media + Social mobilization

Outreach through NGO platform; national TV-based mass media campaign
Vietnam: A social franchise model for delivering IYCF counseling at government health facilities + Mass media

Counseling at social franchise

Materials and mass media campaign

Facility-based counselling; national TV-based mass media campaign
Impacts on exclusive breastfeeding in Bangladesh and Vietnam (children 0-5 months)

Impacts on complementary feeding in Bangladesh and Vietnam (children 6-23 months)

Path analysis for language and motor development

Language development

- Program Intervention
  - Minimum meal frequency
    - Minimum dietary diversity
      - Language development
        - Consumption iron rich food
          - Indirect effect: 9% of total effect

Motor development

- Program Intervention
  - Minimum meal frequency
    - Minimum dietary diversity
      - Motor development
        - Consumption iron rich food
          - Indirect effect: 33% of total effect
Implementation research in Vietnam revealed potential wins and last-mile challenges

Incorporating elements of social franchising in government health services improves the quality of infant and young child feeding counselling services at commune health centres in Vietnam

Phuong H. Nguyen, Sunny S. Kim, Sarah C. Keithly, Nemat Hajeebhooy, Lan M. Tran, Marie T. Ruel, Rahul Rawat, and Purnima Menon

Program Impact Pathway Analysis of a Social Franchise Model Shows Potential to Improve Infant and Young Child Feeding Practices in Vietnam

Phuong H. Nguyen, Purnima Menon, Sarah C. Keithly, Sunny S. Kim, Nemat Hajeebhooy, Lan M. Tran, Marie T. Ruel, and Rahul Rawat

Showed impacts on (1) skills of health workers (2) quality of counseling services

Results suggested challenges would lie at end of chain on use of facility-based services
Policy analysis identified key shifts in national nutrition and IYCF policy environments

- **Shifts in policy discourse**, despite competing nutrition priorities such as acute malnutrition, food insecurity, and nutrition transitions.

- **Multiple actor groups engaged**, but conflicting interests, especially with formula industry/business

- **Targeted advocacy and policy support helped** with stakeholder alignment and implementation capacity

- **Lingering policy implementation challenges** on commitment to funding, implementation, and enforcement.

Harris et al., *BMC Public Health* 2017
Take-aways

- Intervention, delivered at large scale, was able to shift feeding practices and key developmental milestones.

- The experience and these results offer potential for further investment and exploration of the integration of more focused ECD interventions with infants into large-scale nutrition programs.
Scaling up breastfeeding through the systems thinking lens

Rafael Pérez-Escamilla, PhD
Professor of Public Health
Yale School of Public Health
Why are EBF rates so low globally?

Source: UNICEF
Breastfeeding Gear Model

Research & Evaluation
Advocacy
Political Will
Coordination
Goals & Monitoring
Legislation & Policies
Resources
Training & Delivery
Promotion
World BF Week
IBFAN
WABA
Maternity Leave
Work Day Breaks
WHO Code
Baby Friendly Hospital
Community BF support

Becoming Breastfeeding Friendly Index: Development and application for scaling-up breastfeeding programmes globally

Rafael Pérez-Escamilla1, Amber J. Hromi-Fiedler1, Muriel Bauermann Gubert2, Katie Doucet1, Sara Meyers3, Gabriela dos Santos Buccini1

Development and pretesting of “Becoming Breastfeeding Friendly”: Empowering governments for global scaling up of breastfeeding programmes

Amber J. Hromi-Fiedler1, Gabriela dos Santos Buccini1, Muriel Bauermann Gubert2, Katie Doucet1, Rafael Pérez-Escamilla1
Gearing to success with national breastfeeding programmes: The Becoming Breastfeeding Friendly (BBF) initiative experience

Rafael Pérez-Escamilla¹ | Fiona C. Dykes² | Sally Kendall³
Conclusions

- Systems thinking needed to design effective policy toolboxes to support multisectoral evidence-based decision making in the area of breastfeeding
Thank you!
Scaling up Neonatal Resuscitation using a quality improvement interventions in Nepal

Ashish KC, Senior Lecturer, Global Health, School of Public Health and Community Medicine, Sahlgrenska Academy, University of Gothenburg
Researcher, Department of Women’s and Children’s Health Uppsala University

Ashish.kc@gu.se twitter @Ashish_K_C
Health system bottlenecks for neonatal resuscitation

Intervention package

Structure
- Hospital leadership
- Health worker
- Facilitators and health workers

Standards
- Neonatal resuscitation

Self-assessment checklist

Measure
- Neonatal resuscitation
- Weekly meeting
- Daily Skill check
- Macerated still birth
- Fresh Still birth
- Neonatal Death
- Non-breathing baby
- Non-breathing with B & M
- Non-breathing with B & M within 1 minute
- Resuscitation corner available
- Adequate and functional suction
- Adequate and functional Bag and Mask
Implementation design in 12 hospitals to evaluate the intervention effect on mortality

- A stepped-wedge implementation design was be applied

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Deliveries</th>
<th>Stillbirth and neonatal death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Regional Hospital</td>
<td>13,000</td>
<td>273</td>
</tr>
<tr>
<td>Mid-Western Regional Hospital</td>
<td>3,139</td>
<td>66</td>
</tr>
<tr>
<td>Bardiya district hospital</td>
<td>1,065</td>
<td>22</td>
</tr>
<tr>
<td>Bharatpur Hospital</td>
<td>11,318</td>
<td>238</td>
</tr>
<tr>
<td>Seti Zonal Hospital</td>
<td>5,767</td>
<td>121</td>
</tr>
<tr>
<td>Nuwakot district hospital</td>
<td>1,438</td>
<td>30</td>
</tr>
<tr>
<td>Koshi Zonal Hospital</td>
<td>8,355</td>
<td>175</td>
</tr>
<tr>
<td>Rapti Sub Regional Hospital</td>
<td>3,280</td>
<td>69</td>
</tr>
<tr>
<td>Nawalparasi district hospital</td>
<td>1,374</td>
<td>29</td>
</tr>
<tr>
<td>Lumbini Zonal Hospital</td>
<td>9,007</td>
<td>189</td>
</tr>
<tr>
<td>Bheri Zonal Hospital</td>
<td>4,276</td>
<td>90</td>
</tr>
<tr>
<td>Pyuthan district hospital</td>
<td>1,194</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total estimate</strong></td>
<td><strong>63,213</strong></td>
<td><strong>1,327</strong></td>
</tr>
</tbody>
</table>
Change in intrapartum related mortality

Intrapartum related mortality - Intrapartum stillbirth and first day mortality

Intrapartum stillbirth - 22 week or gestation death during labour

- 21% reduction
- 10.7 per 1000 birth
- 7.8 per 1000 birth

Routine data collections

Baseline
Implementation
Sustainability
Understanding the results

• These findings suggest that a set of meso (hospital) and micro level (health facility) quality improvement interventions implemented adequately can improve the quality of neonatal resuscitation care and reduce intrapartum related mortality.

• Not all hospitals included in the trial displayed the same process and results, testifying to the diversity of contexts and conditions of scaled-up efforts. Further analyses to understand the contextual implications are needed.
Thank you
Additional resources shared

Additional papers about the social franchising:


Breastfeeding Gear Model:


Becoming Breastfeeding Friendly (BBF) initiative:

Systems thinking tools shared

Integrated approach named **MARVEL** (method to analyse relations between variables using enriched loops), TNO

**NetMap**
• [https://netmap.wordpress.com/](https://netmap.wordpress.com/)

**Geospatial analysis** and **System dynamics**
• Papers by Prof. Darmstadt on the use of these tools:

Mathematica **REACH** systems diagnostic