Queen Margaret University
INSTITUTE FOR GLOBAL HEALTH AND DEVELOPMENT

Mapping health service delivery in high burden settings

MAJOR CONSIDERATIONS FOR MODELS OF TB CASE DETECTION

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A bit of background

Systems dynamics methods

Using System Dynamics tools to gain insight into intervention options related to the interaction between tobacco and tuberculosis

Kristen Hassmiller Lich[1], Nathaniel D. Osgood[2,3] and Aziza Mahmoud[3]

Abstract: Tobacco exposure is an important risk factor for tuberculosis (TB) when considering its effects on population-level disease outcomes. If we hope to gain control over TB globally, we must begin to think 'outside of the box' to identify an extended and multi-faceted intervention strategy that is grounded in an understanding of the particular ways in which key risk factors worsen TB. In

ELSEVIER

Health Policy

Volume 81, Issues 2–3, May 2007, Pages 207-217

Impact of joined-up HIV harm reduction and multidrug resistant tuberculosis control programmes in Estonia: System dynamics simulation model

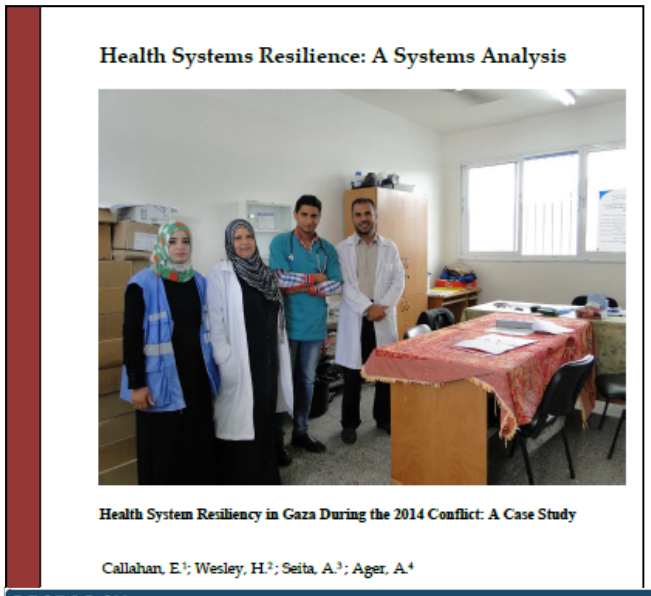
Rifat A. Atun [a], Reda M. Lebcir [b], Martin McKee [c], Jarno Habicht [d], Richard J. Coker [c]

Impact of an effective multidrug-resistant tuberculosis control programme in the setting of an immature HIV epidemic: system dynamics simulation model

Rifat A Atun, Reda Lebcir, Francis Drobniewski, Richard J Coker

First Published August 1, 2005 | Research Article

A bit of background



Health Systems Resilience: A Systems Analysis

Health System Resiliency in Gaza During the 2014 Conflict: A Case Study

Callahan, E.[1]; Wesley, H.[2]; Seita, A.[3]; Ager, A.[4]

RESEARCH Open Access

Health service resilience in Yobe state, Nigeria in the context of the Boko Haram insurgency: a systems dynamics analysis using group model building

Alastair K. Ager[1,2*], Martina Lembani[3], Abdulaziz Mohammed[4], Garba Mohammed Ashir[4], Ahmad Abdulwahab[4], Helen de Pinho[2], Peter Delobelle[3] and Christina Zarowsky[3,5]

Systems dynamics methods: humanitarian setting

1) Depict the 'reality' of diverse professionals (at all system levels)

2) Gain the buy-in of key stakeholders (*our* vs. *their* model)

3) Probe data availability (prompt collation, collection or generation)

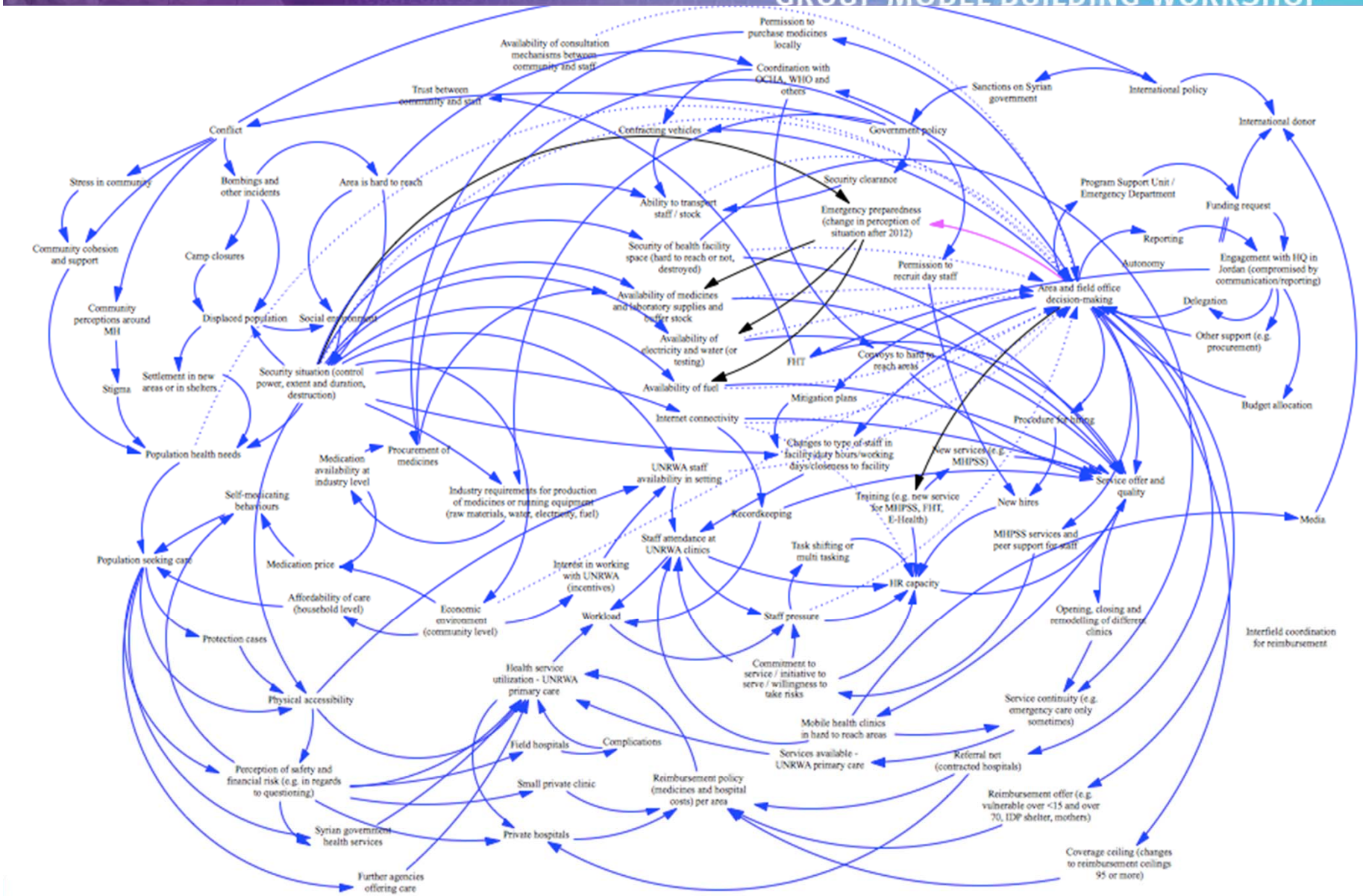
UNRWA JORDAN: *Delivery of Health Care in the Context of Displacement of Palestine Refugees Registered in Syria (PRS)*

RESEARCH METHODS AND INPUT

BACKGROUND

UNRWA LEBANON: *Delivery of Health Care in the Context of the Displacement of Palestine Refugees Registered in Syria (PRS)*

GROUP MODEL BUILDING WORKSHOP



Why is this relevant to TB case detection?

Methods could be transferable

There is value in explicitly deciding what you want to leave out

Make explicit likely intervention impact

Talk today:

Introducing a research project in Georgia

Unpacking policy influences

Illustrating the model building process

An incipient case detection model

What are we actually doing in Georgia?

- Country in the South Caucasus at crossroads between Western Asia and Eastern Europe
- Total population of 3.73 million (60% of the population lives in urban areas)
- Significant economic growth: PPP$ 2,590 in 2000 to PPP$ 9,599 in 2015
- Poverty and unemployment still substantial

Priority country for drug resistant TB in the region
Estimated incidence rate for all forms of TB:
99 per 100 000 in 2015
mortality = 3.9%

What are we actually doing in Georgia? (cont.)

Three principal challenges:

1. Case detection and diagnosis is a maze: limited referral of presumptive cases and issues with self-referral and late presentation
2. High rate of DR-TB and loss to follow-up: incidence is 9.8% in new cases and over 40% in those previously treated. Every third drug resistant TB patient interrupts treatment prematurely
3. Operational and systems constraints: expenses needed for enabling improved detection and treatment are lacking, substantial human resource gaps are predicted and current remuneration of TB professionals is under national average

What are we actually doing in Georgia? (cont.)

"Designing and evaluating provider results-based financing for tuberculosis care in Georgia: understanding costs, mechanisms of effect and impact"

- Incentivizing care providers via monetary incentives for improved treatment outcomes (DS-TB) and for better patient management (DR-TB)
- However, using mixed methods for evaluation:
  1. C-RCT or C-ITS to evaluate intervention effectiveness
  2. Realist methods to develop a programme theory
  3. Semi-structured qualitative interviews to 'check in' on the PT
  4. Leveraging costing surveys, CEA of entire thing

- Systems dynamics came in at step 2: structured way to combine insights across other methods and identify data needs

Unpacking policy influences

Initially conducted evidence reviews and synthesized findings across existing studies

What are the processes of detection, treatment initiation and side effect management?

How do patients and health care staff navigate and experience such processes?

What does evidence across other settings suggest regarding PBF interventions for TB management?

Intervention design

At the same time…

Detection is not ideal but being strengthened; problem is integration with primary care as main issue

Patients ‘should’ have a smooth journey but staff are underpaid

Already convinced PBF is the only way forward for dealing with the privatized system

Policy direction set

Illustrating model building

Vassall, A., Mangham-Jefferies, L., Gomez, G. B., Pitt, C., and Foster, N. (2016) Incorporating Demand and Supply Constraints into Economic Evaluations in Low-Income and Middle-Income Countries. Health Econ., 25: 95–115. doi: 10.1002/hec.3306.

What is the intervention?

Putting forward an integrated model of care:

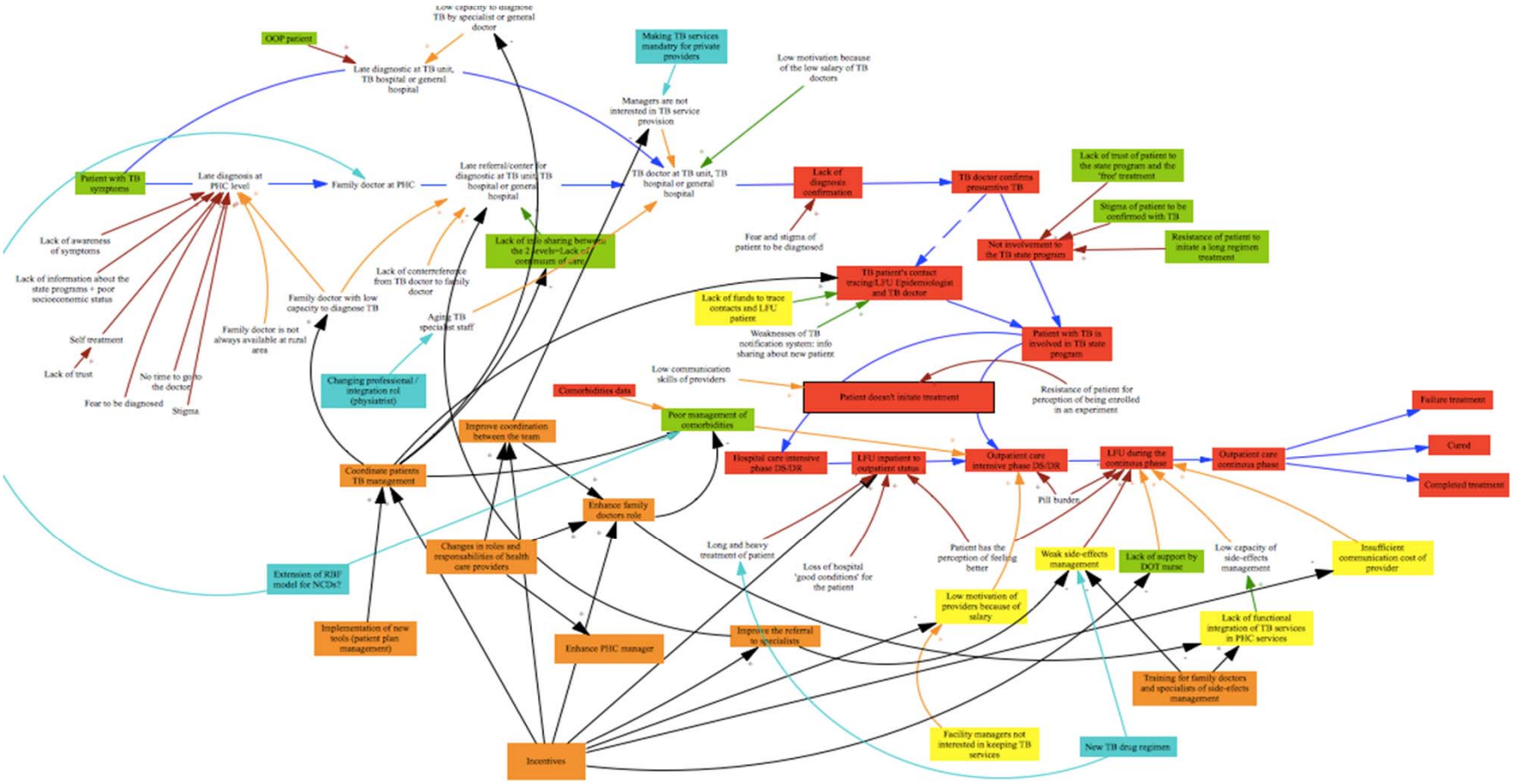
1. refining the role of the family doctor to more actively consider TB a priority for detection and for patients, for side-effect management;
2. improve the linkage between primary care family doctors to TB doctors/nurses;
3. ensuring managers of clinics have incentives to keep TB programs;

Providing performance payments every quarter based on outcomes: patients in treatment.

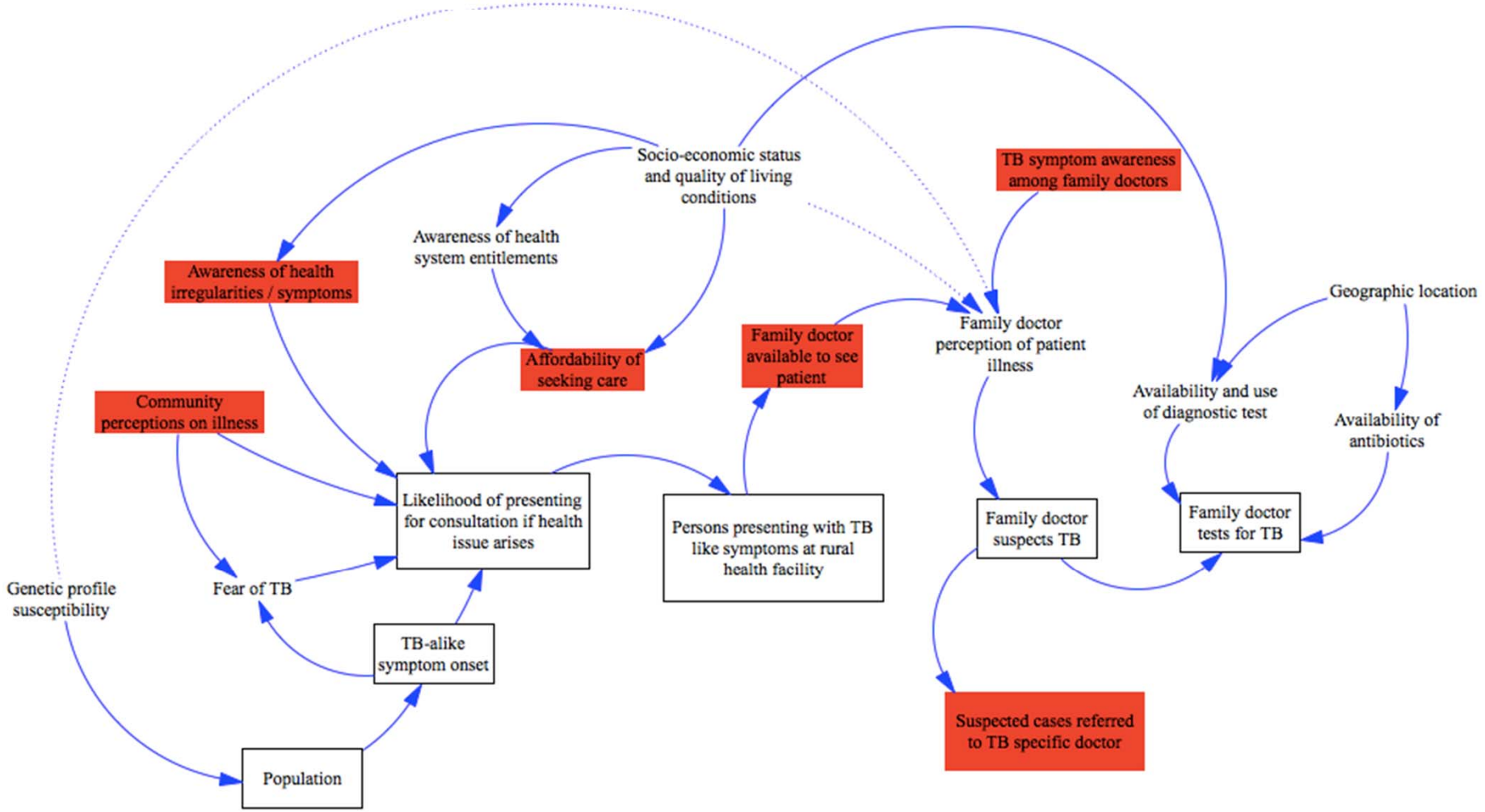
Illustrating model building (2)

Conditions that are necessary for intervention successful implementation
Rural doctors role and functions should be defined and different bonus payment should be created for them
Integrated team members roles and responsibilities need more specification
The amount of incentives should be increased, especially for rural doctors and family doctors
Fixed top up to salary could be established for family doctors vs incentives per patient
Facilities with low number of patients need better motivation then facilities with higher patients load
Establish additional bonus payments for completed treatment cases in facilities with low number of patients
TB detection should be enouraged (role of family doctors and epidmiologists)
TB state program budget needs revision to increase funds for routine tests and investigations
TB patient should be attached to PHC facility with integrated TB unit where the patient will recieve family doctors service as well. This could create geographical barrier to the patient, but will ensure integrated approach
Methodological guidence should be developed for integrated team (managment and team members) to ensure coordination at facility level
Integrated team should link the patient to social services as needed
Special system should be created to monitor implementation quality
Human and financial resources should be estimated for external monitoring of the intervention
Intervention should be incorporated into the National TB Program as one of its components

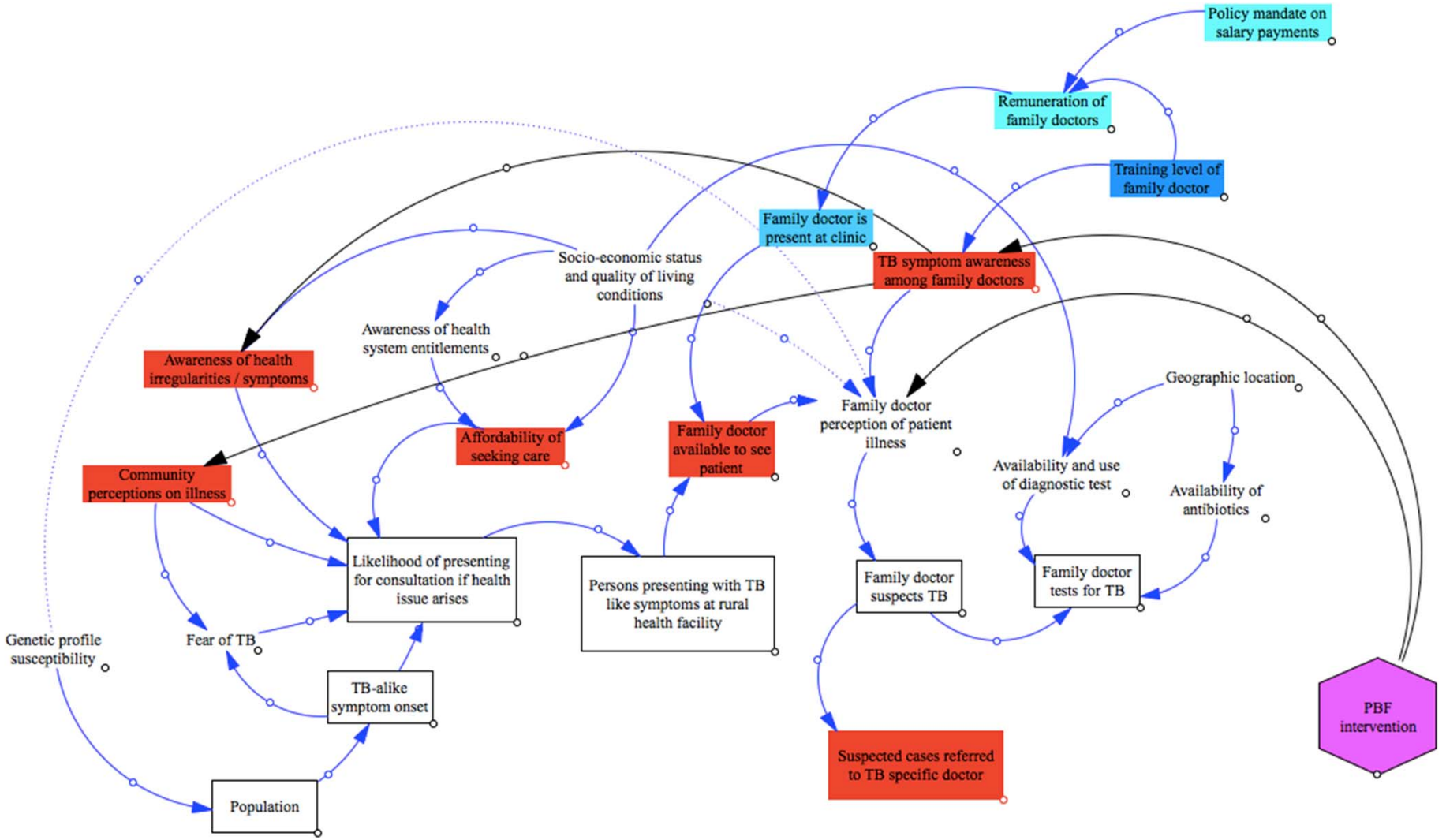
Illustrating model building (3)



Case detection model



Case detection model

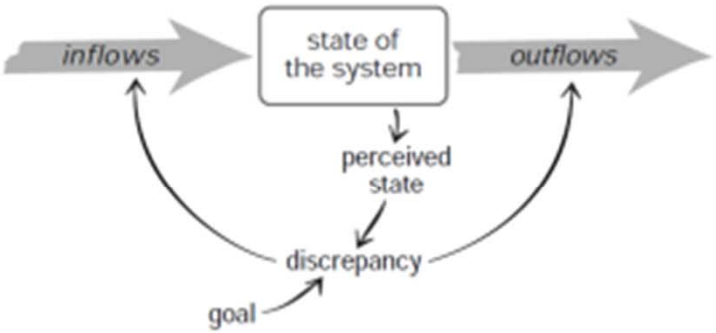


Is this all there is to SD?

PLACES TO INTERVENE IN A SYSTEM

(in increasing order of effectiveness)

12. Constants, parameters, numbers (such as subsidies, taxes, standards).
11. The sizes of buffers and other stabilizing stocks, relative to their flows.
10. The structure of material stocks and flows (such as transport networks, population age structures).
9. The lengths of delays, relative to the rate of system change.
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against.
7. The gain around driving positive feedback loops.
6. The structure of information flows (who does and does not have access to information).
5. The rules of the system (such as incentives, punishments, constraints).
4. The power to add, change, evolve, or self-organize system structure.
3. The goals of the system.
2. The mindset or paradigm out of which the system — its goals, structure, rules, delays, parameters — arises.
1. The power to transcend paradigms.



Source: Donella Meadows (http://donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/)

Acknowledgments

Thank you