ICTPH Health System Approach

by

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Introduction

WHO defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity[1].
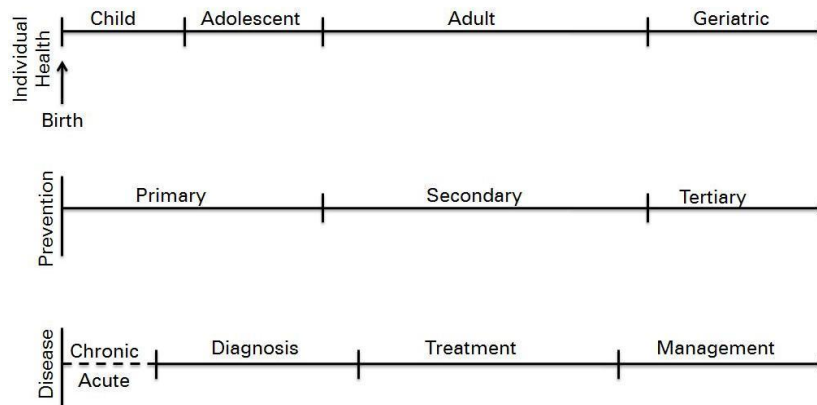

Figure 1: *Spectrum of individual health, stages of life, prevention strategies and disease management spectrum.*

In general a health system needs to provide for the requirements of an individual through various stages of life and states of health *(Fig. 1),* offering promotive, health-maintenance, preventive interventions for the entire population and disease management capability addressing the tail-end of population-health distribution. Primary prevention targets prevention of disease and disability at the level of the community (immunization and water and sanitation efforts for example need to be managed at the community level), while higher order preventive efforts at the secondary or tertiary level focus more on the individual. For accurate disease management, appropriate diagnostic capability, aided by evidence based administration of medicines and follow-up ensuring compliance, is crucial to ensure effective curative interventions.

In India the need for careful health systems design is urgent. While on the one hand children with anaemia increased from 74% in NFHS-2 to 79% in NFHS-3[2] and diarrhoea/dysentery (16.8%), fever of unknown origin (15.7%) and respiratory ailments (9.6%) have been reported as the top three causes for hospitalization[3]. On the other hand we are also experiencing, Diabetes[4] prevalence at 62.4 per 1000, increasing hypertension

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prevalence[5] and amongst adults, unipolar depressive disorder at 9.17% now ranks the highest in terms of DALYs lost.

IKP Centre for Technologies in Public Health (ICTPH)[7] a not-for-profit research organization with its mission to design inclusive health-systems for remote rural populations, is anchoring a pilot with a Thanjavur (Tamil Nadu) based partner organization: SughaVazhvu Healthcare[8]. The objective of this pilot is to design an inclusive health-system ensuring accessibility and affordability for all the members of the rural community in the remote rural parts of Thanjavur.

The Health System Pilot has four distinct design components:

    a. Human Resources Design
    b. Infrastructure Design
    c. Intervention Design
    d. Financing Design

The next section will describe the context within which the Thanjavur Health System Pilot is being designed and the subsequent sections will briefly outline the work sought to be done within each design component.

Thanjavur Rural Context

A census conducted by ICTPH in 2008 in Karambayam (one of the remote villages in Thanjavur where the pilot has recently begun work), indicated that around 80% of the households were nuclear families having only 4 members and the rest either extended or joint families. 42.1% of the dwellings were reported to be 'Kutcha' and 40.1% of the houses were reported to be 'Semi-pucca'. A majority (96.2%) owned the dwellings in which they lived. About 88.3% of the households had electricity connections; 58.4% of households reported that they had agriculture land, of whom 18.0% said that they had more than 2.5 acres of irrigated lands. 63.8% of the households reared livestock (primarily cows, buffaloes and chickens). A high literacy rate of 80.9% was also reported. 81.5% of the households reported seeking no treatment for out-patient care. ENT (3.0%), musculoskeletal (3.2%), gastrointestinal (1.9%) and cardiovascular (1.4%) were the chief reported illnesses for out-patient care. The smoking prevalence rate of 7.7% and alcohol consumption prevalence rate of 9.6% were observed in population ≥ 15 years of age. This is the context in which ICTPH set out to design its Health Systems Intervention.

Fig. 2 below is a geo-spatial map of the Karambayam village and four neighbouring villages – all of them very similar to Karambayam. From the map it can be seen that the five villages are divided up into as many as 13 distinct clusters of households (hamlets) and any Health System that is designed (whether public or private) would need to take this into account.
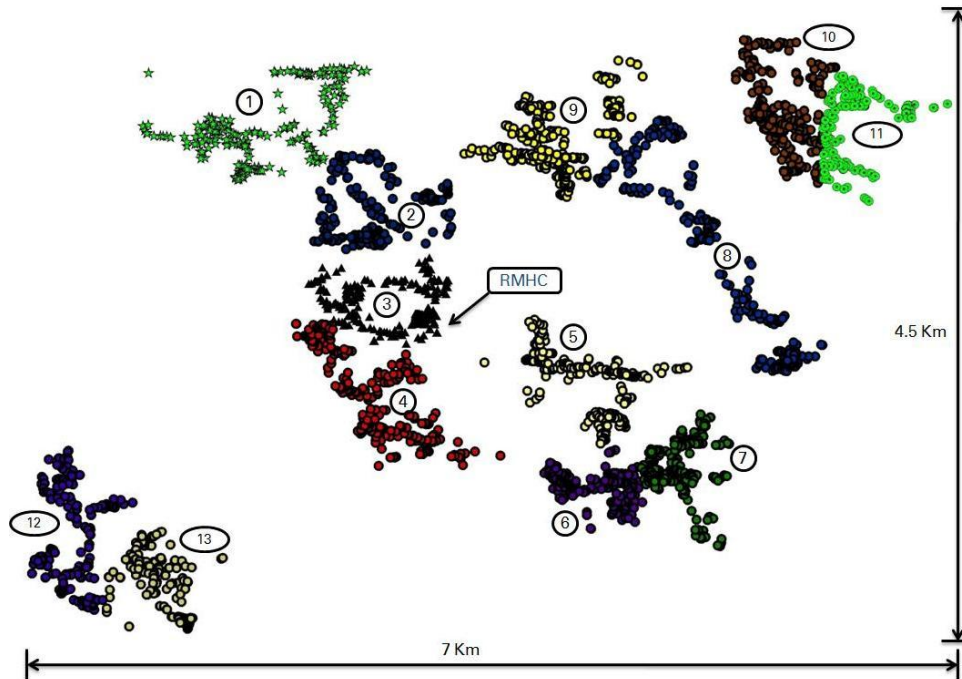
Figure 2: *Spatial distribution of the GPS tagged households (2700) defining the catchment area of a Rural Micro Health Centre (RMHC) in Karambayam Village, Thanjavur district, Tamil Nadu, India. The illustrated field represents five villages with a population of 11,000 individuals. Color coded 13 enumerated zones denote the areas allocation for a guide provisioning services to a sub-set population of a 1,000 individuals each. The five village catchment of the RMHC - Karambayam (illustrated area 2-5); Ettuplikadu (6-7); Sembalur (8); Ambalapattu (1 & 9-11); Veppankadu (12-13)*

Human Resources Design

Based on this (and other data) ICTPH and SughaVazhvu together decided that they would locate a nurse-managed-doctor-supervised clinic called a Rural Micro Health Centre (RMHC) with one locally resident full-time graduate nurse (with a B.Sc. Nursing degree) on the main street (easily accessible both on foot as well as by public transport from all the hamlets with no more than a half-hour travel time). The nurse would be supported by a network of thirteen locally hired and trained community health workers who would be full-time volunteers who would be reimbursed all their costs and paid a nominal honorarium. These community health workers are referred to as Guides within the pilot. While the nurse would be responsible for the wellbeing of the entire population of about 11,000 people (about 2,200 households), each Guide would serve about 200 households[‡].

Each Guide who serves an approximate population of a 1,000 individuals is responsible for three tasks – screening, follow-up, intervention implementation[9] and clinical assistance. The

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[‡] In the eventual rollout, if all goes well, each Doctor is expected to supervise anywhere between 5 to 20 RMHCs using a variety of instrumentalities.

rigorous selection process[10] of the Guide ensures an optimal skill set for the above specified tasks. An 85% time allocation towards field based activities and 15% towards clinical assistance at the RMHC under the supervision of a nurse allows for rigorous development of their competencies.

Infrastructure Design

In addition to the nurse, as per the current design specifications, each RMHC would be equipped with:

a. Diagnostics - haematology (complete blood picture), blood biochemistry – lipid profile (HDL, LDL, TC and TG[§]), glucose (random, fasting, GTT[**]), urea, creatinine, uric acid, liver function test (SGOT, SGPT[††], albumin, bilirubin (total and direct)

b. Ophthalmology – refractive errors (diagnosis and corrective glasses), cataract (detection and referral), and management of diabetic retinopathy, glaucoma and minor eye related ailments

c. Microscopy

d. Strip Tests: Pregnancy, Urine Analysis, Malaria

e. Examination Table and Autoclave

f. Web Based Electronic Health Records (EHR) combined with a Computer based Decision Support System (CDSS)

g. Licensed pharmacy[‡‡]

Intervention Design

There are broadly three sets of interventions being designed for offer within this Health System: (a) Curative -- within the RMHC; (b) Screening -- for each individual within the catchment area; and (c) Healthcare -- both within the RMHC and at the household level.

[§] HDL: High Density Lipoprotein; LDL: Low Density Lipoprotein; TC: Total Cholesterol; TG: Triglyceride
[**] GTT: Glucose Tolerance Test
[††] SGOT: Serum Glutamic Oxaloacetic Transaminase enzyme; SGPT: Serum Glutamic Pyruvic Transaminase enzyme
[‡‡] SughaVazhvu holds a drug distribution license to provide drugs to licensed medical practitioners at all RMHC's

<u>Curative Interventions</u>

The curative interventions envisioned at the RMHC are standardized evidence-based protocols evolved in partnership with the School of Nursing, University of Pennsylvania[11]. The protocols are based on the SOAP[§§] methodology - identifying symptoms, review of systems, confirmatory diagnostic testing, and differential diagnosis leading to either pre-approved medication dispensed at the RMHC or an appropriate referral to a network specialist[***]. The medications are all approved by the supervising medical doctor and the protocols are in the form of clearly defined 'Standing Instructions' to the resident nurse which have been authorised by the licensed doctor[†††].

<u>Screening Interventions</u>

The universal screening component is aligned with local and international guidelines[14,15,16] for identifying individual risk factors/indicators to be assessed for a range of conditions for which screening is advisable (such as cardio vascular disease, cervical cancer and mental illness).

As an example, for assessing the individual risk towards Cardio Vascular Diseases the parameters assessed by the Guide include family history, age, gender, smoking[17], BMI[18], waist circumference and Blood Pressure (BP)[19]. In order to maximize sensitivity of the screening tool, a combined score of the first four parameters along with deviation from any of one the anthropometric measurements (including BP) will yield a referral to the RMHC for a detailed risk assessment for hyper-dyslipidemia, hypertension[20] and diabetes.

Similarly other universal screening strategies being implemented by the Guide include visual acuity[21], alcohol[22] and nicotine dependence[23] along with tools to access existing acute illness, immunization and breastfeeding profile for the infants.

The universal screening strategy is stratified across four age groups - infant (0-2 years), child (>2-10years), adolescent (>10-18 years) and adult (>18 years). Currently all the forms are being processed using OMR (Optimal Mark Recognition)[28] technology but will soon move to each Guide operating a hand-held mobile device which contains all the necessary software for capture of the data and for the required follow-up.

[§§] SOAP: Subjective Objective Assessment Plan
[***] Which includes the PHC, the Government Hospital and private specialists chosen by the patient from a range of choices provided by the RMHC
[†††] Legal clarification is being sought on this issue to ensure consistency with the requirement that only a licensed physician may "practice" medicine while the nurse is free to "assist" the physician and only follow clear instructions given by the physician. Until the clarification is obtained the licensed physician also sits along with the nurse and directly prescribes (and dispenses)

Healthcare Interventions

For the high-risk individuals targeted cost effective strategies e.g. tobacco control, salt reduction and multi-drug interventions[29, 30, 31] will be implemented through the RMHC – Guide network defining their intervention implementation task. Appropriate drug regimens for the diseased individual, ensuring compliance through the Guide will encompass the follow-up role of a Guide. Currently the following interventions are being researched for potential implementation within the community:

1. Home based supplementation program for 6 month to 24 month infants through Sprinkles targeting iron deficiency anaemia[35, 36]

2. Marriage / pre-pregnancy (3 months prior to conception) to 6 months after delivery interventions targeting maternal nutrition and early foetal development

3. Chronic disease management (e.g. diabetes, hypertension) through LSM[§§§] and customized intervention programs

4. Implementing WHO[****] guidelines for BCC[††††] for containing spread of acute respiratory tract infections, and community based interventions for diagnosis and management of LRTI[‡‡‡‡] (pneumonia) and diarrhoeal diseases.

5. Implementing US Preventive Task Force Guidelines for Cervical cancer screening[37]

6. Fluoride supplementation and primary care screening for dental diseases

7. Population level screening for refractive errors and cataract

8. Screening for high prevalence mental-health related disorders, and long term drug compliance relating to mental illness.

Financing Design

This is an essential component of the Health Systems design that is still being worked out but is likely to have the following components with the eventual goal of a managed care (fixed price healthcare) model:

1. Annual membership based enrolment for those that chose it with a fixed price of say, Rs. 2,000 per household. Walk-ins to be charged at a much higher rate.

[§§§] Life Style Modification
[****] WHO: World Health Organization
[††††] BCC: Behavior Change Communication
[‡‡‡‡] LRTI: Lower Respiratory Tract Infections

2. Free memberships for identified poor households.

3. Free services provided by the Guide to every household irrespective of membership status.

4. Of this membership fee Rs. 1,000 per household to pay for all the RMHC services (including medicines, counselling, preventive interventions and free services for low-income households).

5. The balance Rs. 1,000 to pay the insurance premium to support non-catastrophic hospitalisation (Rs. 600) and for catastrophic hospitalisations (Rs. 400).

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