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Economic analysis of care models to address chronic disease

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Background

- Well recognized growing burden of CVD in low and middle income countries (LMICs)
- Also a source of widening inequity in health status between rich and poor
 - Cardiovascular mortality *decreased* by around 75% in past 3 decades in Aust, US, UK and USA
 - Rates in many LMIC have *increased*
 - Successful interventions deployed in high income setting still missing in most LMICs

Economic impact

- CVD more frequently affects working age adults
 - In LMIC approx 50% of CVD deaths before age of 70yrs vs. approx 25% in high income countries (HICs)
- Macroeconomic costs enormous
 - China, India and Russia over \$1 billion per year foregone from GDP due to CVD and increasing
- Catastrophic household impact
 - E.g. in China 71% of stroke patients hospitalized experienced catastrophic health care payments of >30% annual income

Treatment Gaps

- Despite proven benefits of secondary prevention:
 - One-fifth of patients with history of CVD on statins (WHO)
 - In Andhra Pradesh,
 - less than one-sixth with previous CV event were on antiplatelet therapy
 - less than 50% of people with diabetes were aware of their condition, and only 2/3 of these were receiving glucose lowering therapy
- In China treatment for acute coronary syndrome diverge substantially from guidelines

Reasons for treatment gaps

- Lack of availability of medicines, particularly in public sector
 - Often available in private sector at significantly higher cost
- Costs and stigma associated with long term adherence to treatment
 - 1 month course of combination therapy (generic aspirin, beta blocker, ACE inhibitor and statin) is 1.5 days wages in Sri Lanka; 18 days wages in Malawi
- Lack of awareness amongst providers of guidelines for treatment
- Limited availability of health care workers

Aim

- In resource poor settings, how would we design an *accessible* and *cost-effective* model of CVD treatment and prevention?

Addressing inequalities in access to CVD care

- Primary health care approach
 - Health systems with well-functioning primary care, better outcomes, lower disparities in health, lower costs (Starfield *et al*)
 - Reasons:
 - Facilitate access to deprived populations
 - Well placed to deliver preventative interventions
 - Where appropriate can substitute for more expensive hospital and specialist care
- Roles of primary care in CVD:
 - Targeted screening for high risk individuals for provision of cost-effective preventative care
 - Identification of individuals with symptomatic CVD for low cost treatment or where possible referral to specialist care

Addressing inequalities in access to CVD care

- However, many health systems in LMIC cater mainly for childbirth and infectious disease
 - Need to reorient to provide continuing as opposed to episodic care
 - Reliable systems of medical records
 - Separation of dispenser and prescriber (e.g. China)

Critical components of primary care model to address CVD

- Absolute risk approach in prevention based on multiple risk factors and CVD history
 - Level of risk in which treatment provided will depend on disease burden and available resources
- Can be delivered by non-physician health worker, ideally under supervision from physician
 - Historically many of the gains in child survival based on deployment lay health workers

Critical components of primary care model to address CVD

- Development of simple and appropriate screening tools focused on medical history, physical measurements (e.g. BMI and BP) without reliance on lab tests
- Specific treatment regimens need to be of proven cost-effectiveness and simple to administer w/out extensive titration e.g.:
 - ‘polypill’ with generic components incl. aspirin, a statin and 1 or more BP lowering drugs
 - nicotine replacement therapy
- Reliable medical records systems

Higher level policy change

- Drug distribution systems to enable access to generics through public system
- Legislative measures to ensure quality drug supplies and minimize counterfeiting
- Financing measures:
 - Minimize ‘out of pocket’ costs
 - Systems of pre-payment . e.g. community health insurance although evidence of sustainability is not strong
 - Coverage needed for outpatient care and medications; not just hospitalization
- Improved health information systems e.g. mortality surveillance

Primary health care strategy in rural Andhra Pradesh

- Conducted in 45 villages in East and West Godavari Districts
- Initial mortality surveillance identified leading causes of death (n=6000):
 - Diseases of circulatory system (32%)
 - Injury and external causes (13%)
 - Infectious and parasitic diseases (12%)
 - Neoplasms (7%)
 - Diseases of respiratory system 5%

Primary health care strategy in rural Andhra Pradesh

- Non-physician based primary care prevention strategy based on simple clinical algorithms (access to a part time physician)
 - identification of high risk individuals
 - free at the point of service
 - subsidized medications
- Population-based primary prevention strategy also tested
- Both interventions assessed in 2x2 cluster RCT against usual care (n= 44 villages; 3,300 individuals)
- Outcomes – high risk individuals identified and treated; knowledge and behavior regarding prevention; physical measures
- Results due mid-2009

Primary health care strategy in rural Andhra Pradesh – indicative costs

	Equivalent annual cost (\$USD)
Capital	
Equipment ^a (BP apparatus, measuring tape, weighing scale)	27
Training of non-physician health worker ^b	70
Staff	
Salary of non- physician health worker (0.5 per village)	840
Salary of physician (0.1 per village)	480
Infrastructure costs per patient	24
Drugs	
Aspirin	3
Beta blocker	9
Statin	45
ACE inhibitor	18
Drug costs per patient	75
<i>Polypill</i>	<i>10</i>
Total cost per patient (individual drugs)	99
<i>Total cost per patient (polypill)</i>	<i>34</i>

Interpretation and generalizability

- Average annual income USD \$600
- Potentially affordable particularly with a polypill-based strategy
- Key is the low infrastructure costs based on use of non-physician health workers
- Adherence and access to treatment here facilitated by subsidy provided by Byrraju Foundation
 - In other settings may be covered by community based/social health insurance schemes
- Plans for larger scale project in China (China Rural Health Initiative) based on similar low cost, non-physician base primary care model across 400 rural townships plus a population-based primary prevention strategy

The way forward

- Imbalance of funding at international level
 - E.g. WHO budget chronic disease \$0.50 per death vs communicable disease \$7.50 per death
 - Neglected by many other funding bodies and ignored in MDGs
- Critical step to addressing CVD burden is to establish locally relevant, affordable primary health care based on evidence-based, cost-effective strategies. This strategy would promote:
 - early diagnosis and treatment
 - improved access to care
 - reduced morbidity and mortality
 - lower levels of hospitalization
 - increased productivity
- Current gaps in knowledge
 - effectiveness in terms of morbidity and mortality
 - cost-effectiveness of alternative approaches to delivery
 - long term adherence to treatment / behavior change
 - long term sustainability of models of care
 - appropriate systems for financing models of care