



## Review

# Health sector demand-side financial incentives in low- and middle-income countries: A systematic review on demand- and supply-side effects



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## ARTICLE INFO

## Article history:

Available online 4 November 2013

## Keywords:

Health care delivery strategy

Primary healthcare

Demand-side financing

Low- and middle-income countries

## ABSTRACT

Demand-side financial incentive (DSF) is an emerging strategy to improve health seeking behavior and health status in many low- and middle-income countries. This narrative synthesis assessed the demand- and supply-side effects of DSF. Forty one electronic data bases were searched to screen relevant experimental and quasi-experimental study designs. Out of the 64 selected papers, 28 were eligible for this review and they described 19 DSF initiatives across Asia, Africa and Latin America. There were three categories of initiatives, namely long-run multi-sectoral programs or LMPs (governmental); long-run health-exclusive programs (governmental); and short-run health-exclusive initiatives (both governmental and non-governmental). Irrespective of the nature of incentives and initiatives, all DSF programs could achieve their expected behavioral outcomes on healthcare seeking and utilization substantially. However, there existed a few negative and perverse outcomes on health seeking behavior and DSF's impact on continuous health seeking choices (e.g. bed net use and routine adult health check-ups) was mixed. Their effects on maternal health status, diarrhea, malaria and out-of-pocket expenditure were under-explored; while chronic non-communicable diseases were not directly covered by any DSF programs. DSF could reduce HIV prevalence and child deaths, and enhance nutritional and growth status of children. The direction and magnitude of their effects on health status was elastic to the evaluation design employed. On health system benefits, despite prioritizing on vulnerable groups, DSF's substantial effect on the poorest of the poor was mixed compared to that on the relatively richer groups. Though DSF initiatives intended to improve service delivery status, many could not optimally do so, especially to meet the additionally generated demand for care. Causal pathways of DSF's effects should be explored in-depth for mid-course corrections and cross-country learning on their design, implementation and evaluation. More policy-specific analyses on LMPs are needed to assess how 'multi-sectoral' approaches can be cost-effective and sustainable in the long run compared to 'health exclusive' incentives.

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## Introduction

In recent times, many countries have adopted demand-side financing (DSF) as a complimentary strategy for supply-side financing (SSF) on certain publicly provided goods (Ensor 2004). Under DSF, public budget to purchase these goods such as health-care and nutrition goes directly to consumers instead of providers (Gupta, Joe, & Rudra, 2010). Consumers are typically entitled to purchase services from either public or private providers with the

money from the government. DSF introduced three key changes in the public financing approach (Standing, 2004). First, it envisages that the government should provide purchasing power to consumers than directly engaging in service provision. Secondly, it entitles the government with a supervisory role on service provision and purchase to ensure fairness and efficiency. Thirdly, it tunes public financing as 'output-based' instead of 'input-based' so that adequate consumer and provider accountability could be achieved.

### Demand side financing in health sector

DSF is a widely growing differential healthcare delivery approach to address unmet health needs (Gopalan & Varatharajan,

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2012; Savedoff, 2010). The underlying objective of DSF is to improve population health, and individual and social capabilities by addressing the population exposure on various risks such as social determinants of health (e.g. poverty, gender). The scope of DSF is more pronounced for under-served populations and regions. This prioritization is to augment the possibility of achieving many far-fledged health goals in a stipulated time-frame (Forde, Rasanathan, & Krech, 2012). There are two classifications for health sector DSF measures (Gopalan & Varatharajan, 2012). The first category is the consumer-led incentive to improve health related behaviors and health care utilization. These are mainly provided through cash transfers, vouchers and flat-rate subsidies. They usually pose conditionality on certain behaviors and are targeted on specific health goals (e.g. reducing maternal deaths). Since consumer-incentives are known for altering behavior changes, they are more deployed for merit goods with known externalities (e.g. vaccination) and essential primary healthcare services. The second type of DSF is health insurance (HI) or financial risk-protection measure. HI is usually not conditional on specific consumer health behaviors (except a few for maternal and chronic disease care) and is meant largely for secondary and tertiary care services.

## Aims

This review uses systematic methods to investigate the demand- and supply-side effects of consumer-led (or the first category of DSF) financial incentives. This review is pertinent as the existing synthesized evidence does not cover all types of consumer-incentives, by confining their focus on conditional cash transfers only. They have also mostly explored DSF initiatives which are part of the multi-sectoral social protection measures in Latin America. Unlike the Latin American model, vertical approaches i.e. incentives targeting only health aspects (health-exclusive) are now widespread, especially on maternal care in Asia and Africa (Gopalan & Varatharajan, 2012). Further, the prevailing evidence on DSF's supply-side impact is scanty (Frethtim, 2008; Lagarde, Haines, & Palmer, 2007; Ranganathan & Lagarde, 2012). Though projected to improve service delivery, DSF might affect system efficiency adversely (Ranganathan & Lagarde, 2012). In this context, it may be relevant to understand how different types of DSF respond to varied health and health care delivery system needs.

## Methods

This systematic review was designed and reported in line with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009) and a pre-designed review protocol.

### Data sources and search strategy

PubMed, Embase and CINAHL were the major electronic databases searched for peer-reviewed articles (Box 1). In addition, reports, discussion and working papers, and non-peer-reviewed articles were searched from various databases. A hand search enabled retrieval of relevant references from the selected papers. The literature search was conducted between October 2011 and March 2012, while papers published up to March 2012 were selected. We searched each database through a combination of MeSH and non-MeSH terms (Box 1) using Boolean operators "AND" and "OR". The thematic search centered on types of financial incentives, healthcare, and health or disease conditions. An adjunct search was conducted for different country settings or regions. SG

and AD conducted the search independently, and screened the title, abstract and subject headings against inclusion and exclusion criteria. Then, SG retrieved the full-text of potentially eligible studies and re-screened them for final eligibility. AD conducted a random verification of few records at each stage and disagreements were resolved by discussion.

### Study selection

Studies were included if they reported on; 1) any consumer incentive targeting a behavior change on healthcare or life style in a low and middle income country setting as classified by the World Bank (WB, 2011), 2) any outcome measures of DSF initiative confining to the broad-based themes (which were selected based on an initial literature review and explained in the results section), 3) either quantitative or mixed-methods tools and 4) English language. We excluded health insurance from the category of consumer incentives for two reasons; 1) it principally targets financial risk-protection rather than particular consumer behavior changes, and 2) its trajectory of functioning is different than that of other consumer incentives (Gopalan & Varatharajan, 2012). The literature base on DSF was found to be heterogeneous. Therefore, certain broad-based themes were derived to explore the potential effects of DSF initiatives. These themes selected based on an initial literature review enabled to provide consistency in reporting the results.

With respect to type of studies, we included studies reporting randomized experiments (where both treatment and control were randomly assigned) and quasi-experiments (where only treatment was randomized OR both control and treatment were non-randomized OR multiple measurements if there was no comparison group). In the latter category, we considered only 'controlled before and after interventions' (with the same population observed or intervened), 'cross-sectional studies using matching techniques', 'interrupted time-series' (at least three data collection points before and after the intervention), 'correlational designs using statistical controls', 'longitudinal designs' and 'panel designs'.

### Data extraction

The initial search identified 3221 records, but only 64 records were eligible for full-text review (Fig. 1). Finally 28 records met the inclusion criteria. Extracted information encompassed: (1) publication details- author, title, journal, and date; (2) study details- objectives, study design, sample selection, sample size, primary and secondary outcomes, data sources, outcome measures, findings and methodological limitations; (3) features of DSF initiatives-name, location, duration, objectives, target groups, type of financial incentives and conditionality.

### Critical appraisal

We used a customized appraisal tool to assess the potential source of bias on design, reporting, data analysis, and internal and external validity. In total, there were 22 criteria grouped under the above mentioned five components. Studies were given an indicative score for overall quality. This was calculated by summing the grades for each appraisal criterion (highest grade = 1; middle = 0.5; lowest = 0). All eligible studies were critically appraised by SG and checked by AD with any differences resolved by discussion. Under each component, we explored if the study incorporated or addressed the following aspects;

- (1) Design: similar baseline groups, random intervention allocation, and appropriate participant eligibility criteria

**Box 1**

Detailed search strategy (MeSH &amp; non-MeSH terms) and data bases

*Thematic search:*

"Incentives"[MeSH] OR "social protection" [MeSH] OR "vouchers" [MeSH] OR "pay for performance"[MeSH] OR "subsidy" [MeSH] OR "social marketing"[MeSH] OR "financial incentives/demand side incentives/demand side financial incentives/monetary incentives/provider incentives/consumer incentives" OR "demand side financing/results based financing/performance based financing" OR "cash transfer/conditional cash transfer" OR "safety nets" OR "output based aid"

## AND

"Primary healthcare" [MeSH] OR "rural health" [MeSH] OR "urban health" [MeSH] OR "preventive care" [MeSH] OR "patient adherence/compliance" [MeSH] OR "screening" [MeSH] OR "nutrition" [MeSH] OR "maternal and child health/maternal care [MeSH] OR "immunization/vaccination" [MeSH] OR "reproductive health" [MeSH] OR "family planning" [MeSH] OR "women's health" [MeSH] OR "malaria" [MeSH] OR "tuberculosis/DOTS" [MeSH] OR " HIV/AIDS/ART" [MeSH] OR "diabetes" [MeSH] OR "smoking"[MeSH] OR "hyper tension"[MeSH] OR "mental health" [MeSH] OR "cancer" [MeSH] OR "health improvements" OR "weight/diet control" OR "institution/facility deliveries/child birth" OR "sexual health" OR " bed net"

*Adjunct search:*

"Developing countries/less developed nations/third world countries"[MeSH] OR "developing health Systems" [MeSH] OR Africa/sub saharan africa" [MeSH] "Central/south/latin america"[MeSH] OR "asia/central/south east Asia"[MeSH] OR "commonwealth of independent states"[MeSH] OR "indian ocean islands"[MeSH] OR "eastern europe"[MeSH] OR "south asia" OR "low income countries/low and middle income Countries"

*Databases*

*Peer-reviewed articles:* Campbell, PubMed, EMBASE, CINAHL, The Cochrane Central Register of Controlled Trials, Journal Storage (Jstor), SAGE Journals, Inter-Science, Science Direct, Web of Science, Wiley, Elsevier, and Ovid Journals.

*Academic institute databases:* London School of Hygiene and Tropical Medicines-UK, Swiss Tropical Institute-Switzerland, Royal Tropical Institute-Netherlands, Karolinska Institute-Sweden, Harvard School of Public Health-USA, University of Cape town-South Africa, Johns Hopkins Bloomberg School of Public Health-USA, Institute of Tropical Medicine-Belgium.

*Research institute data bases:* Abt Associates-USA, Research for Development-USA, Oxfam-UK.

*Development agencies:* WHOLIS (WHO), JOLIS (the World Bank), USAID, NORAD, DFID, Unicef, Save the Children, Aus Aid, JICA.

*Other databases:* Google Scholar, International Bibliography of the Social Sciences (IBSS), British Library for Development Studies (BLDS), Latin American and Caribbean Health Sciences Literature (LILACS), Caribbean health sciences literature (MED-CARIB), The Institute of Development Studies (IDS), Virtual Library in Health (ADOLEC), IDEAS, 3ie.

*Hand search:* for the references retrieved from the selected papers.

- (2) Reporting: clear description of hypothesis/aim/objectives, main outcomes measures, background characteristics of population, interventions of interest, main findings and participant withdrawals
- (3) Statistical analysis: appropriate statistical tests to assess main outcomes, point estimates and measure of variability presented for primary outcome measures
- (4) Internal validity: an intention to treat analysis, same time period between intervention and outcome for treatment and control groups, reliable primary outcome measures, objective evaluation method, any incomplete outcome data and any unadjusted contamination, spillover and confounder
- (5) External validity: participants representative of the entire population from which they were recruited and generalizable to local population

status and out-of-pocket spending. For the supply-side, we mainly considered the changes brought in by the DSF initiatives on service delivery status, equity and public health expenditure. These outcome measures were considered after reviewing the objectives of the program and a preliminary review of the existing literature on DSF initiatives. Wherever, quantitative information was reported, we preferred either odds ratio (OR) or coefficient along with a confidence interval of 90%, 95% or 99% significance. We triangulated both quantitative and qualitative information and conducted a narrative synthesis as the interventions and their outcomes were heterogeneous and non-comparable.

**Results***Description of studies*

Out of the 28 studies, 15 were of experimental and 13 were of quasi-experimental designs (Table 1). They assessed 19 DSF initiatives across 16 countries from Asia ( $n = 6$ ), Africa ( $n = 5$ ) and Latin America ( $n = 8$ ). All studies provided quantitative outcomes predominantly. However, there was one study (Ahmad et al. 2007) which largely provided qualitative findings as it applied a mixed-

*Outcome measures and data analysis*

Primary outcome measures considered were DSF's consumer-side and supply-side effects. Among the consumer-side effects, our primary focus was on healthcare service utilization, health

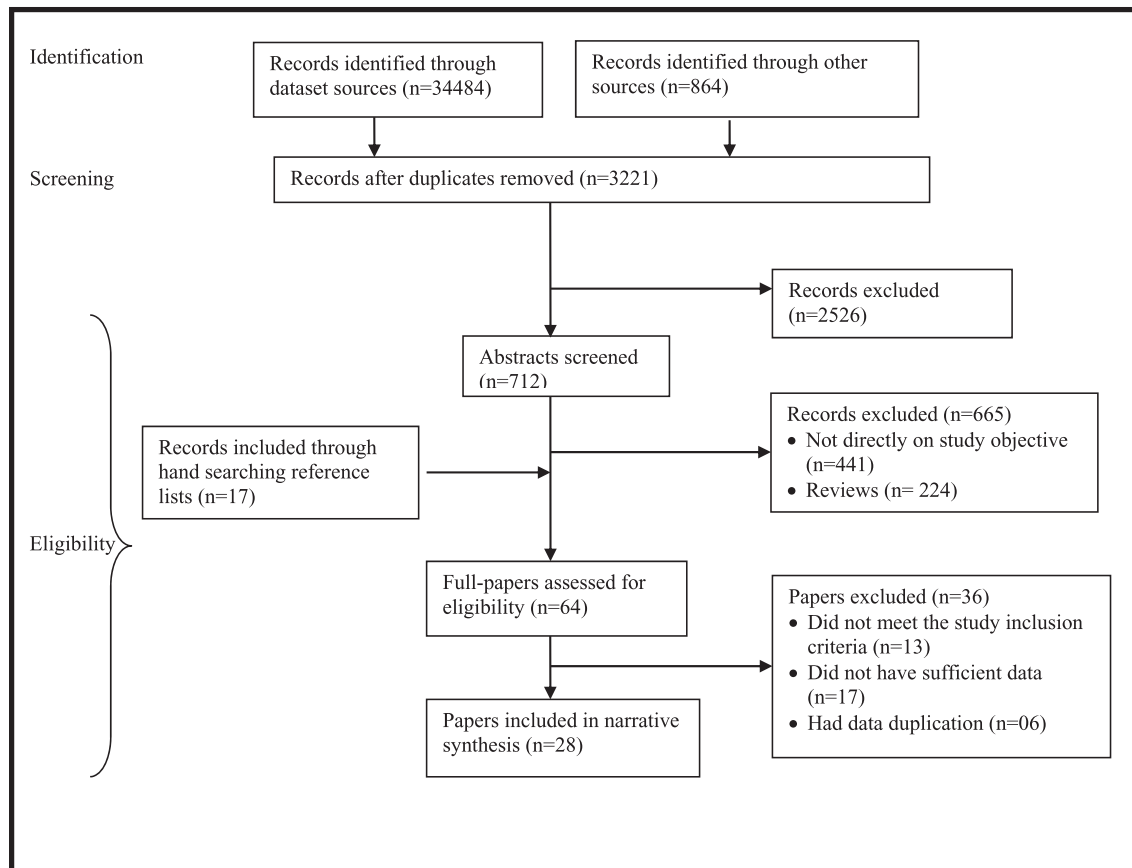


Fig. 1. PRISMA diagram on selection of studies.

**Table 1**  
Study characteristics and quality score.

Author (year)	Country	Design	Quality
Gertler and Boyce (2001)	Mexico	Experimental: cluster randomized controlled	16.5
Rivera et al. (2004)	Mexico	Experimental: cluster randomized controlled	16
Morris, Flores, et al. (2004)	Honduras	Experimental: cluster randomized controlled	16
Morris, Olinto, et al. (2004)	Brazil	Quasi-experimental :cluster quasi-randomized control	18
Attanasio et al. (2005)	Columbia	Quasi-experimental: controlled before and after	14.5
Maluccio and Flores, (2005)	Nicaragua	Experimental: Cluster randomized controlled	16.5
Galasso (2011)	Chile	Quasi-experimental: panel design with matched comparison group	13
Ahmed et al. (2007)	Turkey	Quasi-experimental: multi-cross section through matching technique	12.5
Levy & Ohls (2007)	Jamaica	Quasi-experimental: panel design with matched comparison group	13.5
Stecklov et al. (2007)	Latin America	Experimental : cluster randomized controlled	17
Barber and Gertler (2008)	Mexico	Experimental: cluster randomized controlled	16
Fernald, Gertler, and Neufeld (2008)	Mexico	Experimental: cluster randomized controlled	17
Fernald, Gertler, and Hou (2008)	Mexico	Experimental: cluster randomized controlled	16
Paxson and Shady (2008)	Ecuador	Experimental: cluster randomized controlled	16
Thornton (2008)	Malawi	Experimental: cluster randomized controlled	19
Yao et al. (2008)	China	Quasi-experimental: controlled before and after	13.5
Barber (2009)	Mexico	Experimental: cluster randomized controlled	16
Fernald et al. (2009)	Mexico	Experimental: cluster randomized controlled	18
Hanson et al. (2009)	Tanzania	Quasi-experimental: interrupted time series	18
Patnaik et al. (2009)	India	Experimental: cluster randomized controlled trial	20
Lim et al. (2010)	India	Quasi-experimental: panel design with matched comparison group	14.5
Behrman and Parker (2011)	Mexico	Quasi-experimental: cluster-quasi randomized controlled	15
Ozer et al. (2011)	Mexico	Quasi-experimental: controlled before and after	17
Jackson-Powell and Hanson (2012)	Nepal	Quasi-experimental: cross-sectional design with matched comparison group	14.5
Nguyen et al.(2012)	Bangladesh	Quasi experimental: cross-sectional design with matched comparison group	14
Baird et al. (2012)	Malawi	Experimental: cluster randomized controlled	21
de Walque et al. (2012)	Tanzania	Experimental: individually randomized controlled trial	18
Kreznoski et al. (2010)	Madagascar	Experimental: cluster randomized controlled trial	18

methods approach. All studies covered more than one behavioral or health outcomes. Only one study (Stecklov, Winters, Todd, & Regalia 2007) sampled population groups from more than one country. The majority of studies varied treatment at the cluster level, either randomized or non-randomized. Two studies scored  $\geq 20$ , 16 studies scored between 15 and 19 and the rest scored between 10 and 14. Many of the studies presented outcomes with reporting bias or confounder.

#### Features of DSF initiatives

##### Type of initiatives

There were three broad categories of DSF initiatives, namely long-run multi-sectoral programs (LMP) ( $n = 8$ ); long-run initiatives exclusively for health or allied aspects such as sanitation ( $n = 5$ ); and short-run health-exclusive initiatives ( $n = 6$ ). The first two categories of initiatives were exclusively governmental, while the latter was run by both government and non-government agencies (Table 2). We considered an initiative as long-run, if it had been in existence at least for three years at the time of review, crossed the pilot phase and had an uninterrupted implementation since inception. These selection criteria were based on our assumption that government programs need a longer gestation to yield results as they are mostly large scale, tested in heterogeneous conditions and with uncertainty in its course of development. For short-run programs, we considered both pilot and non-pilot phase programs (if less than three years). This rationale was based on the assumption that the trajectory of a public intervention differs between the pilot and non-pilot phase and hence perhaps its effectiveness. In contrast, private-run initiatives mostly work in controlled situations and hence can yield results in a short-term. The first two categories of initiatives predominantly covered maternal and child health, followed by malaria and sanitation. The third type (i.e. short-run non-governmental programs) was exclusively for either sexually transmitted diseases or malaria. The LMP category was a multi-sectoral social protection measure to poor households, which provided an integrated package of incentives on education, nutrition, and preventive healthcare upon meeting cross-conditionality on several aspects. Cross-conditionality implies that a consumer is eligible to receive the benefits on one aspect (e.g. healthcare) only upon meeting the behavior compliance on another aspect (e.g. education).

##### Type of incentives

There were thirteen initiatives on conditional cash transfers or CCTs (direct transfer of money upon meeting conditionality) and four on vouchers (redeemable coupons with pre-fixed value for particular goods or services). The rest of the incentives included price subsidies, where consumers need to pay only a fixed percentage of the cost of goods or services ( $n = 1$ ), unconditional cash transfer ( $n = 1$ ) and in-kind transfers ( $n = 2$ ). An in-kind transfer was not a standalone incentive as it was combined with either CCT or voucher.

##### Consumer effects

The demand-side effects considered were level of behavior changes (health awareness and health seeking), health status, out-of-pocket expenditure, and individual and community empowerment. These behavioral and health outcomes were assessed for different disease classifications or health conditions separately. All studies reported that DSFs could achieve their intended behavioral outcomes, but the evidence on the magnitude of achievement was limited (only 24 are presented in Table 3). Eight studies reported a neutral or negative result where the expected outcome remained either unchanged or became negative directional. Four studies

mentioned about perverse outcomes, where DSFs fetched unintended harmful effects to consumers (Table 4).

#### Maternal and Child Health (MCH)

As per the evidence, maternal care benefitted from both LMPs and long-run health exclusive governmental programs. Morris, Flores, Olinto and Medina (2004); Morris, Olinto, Flores, Nilson and Figueiro (2004), Lim et al. (2010), Nguyen et al. (2012) and Jackson-Powell and Hanson (2012) mentioned that these programs increased ante natal care (ANC) in Honduras (+18%) and skilled birth attendance (SBA) in India (+39%), Bangladesh (+46.4%) and Nepal (+17%) respectively. However, DSF did not contribute comprehensively to maternal care as the effects on some of its essential components or aspects (e.g. ante- and post-natal care) were limited. As per Morris, Flores, et al. (2004); Morris, Olinto, et al. (2004), Honduras reported a reduced post partum care (−5%). The achievement of at least three ANC visits was not reported anywhere except in India and Bangladesh (Lim et al., 2010; Nguyen et al., 2012). Yet, the proportionate improvement in ANC was lesser than that of SBA in these countries (e.g. India showed ANC visits at +11.1% vs. institutional delivery at +63.8%). On perverse outcomes, the beneficiary status increased the possibility of caesarian sections in Nepal (+38%) and Mexico (+5%) as reported respectively by Jackson-Powell and Hanson (2012) and Barber (2009). In Honduras, the birth rate increased (+3.9%) and beneficiaries had a lesser rate of decline in reported pregnancy (−10.4%).

CCTs provided through LMPs could substantially improve children's access to care and health status by addressing nutrition, immunization and preventive checkups. Growth monitoring (+20%), health checkups (+20%) and on-time vaccination (+10%) increased over two years in Honduras (Morris, Flores, et al., 2004; Morris, Olinto, et al., 2004). The Mexican children's probability of illnesses (−23%), anemia (−18%) and stunting ( $\beta -0.10$ ) reduced (Stecklov et al. 2007). Further, their cognitive score ( $\beta +0.47$ ) and height (+1.1 CM/year) improved (Gertler & Boyce, 2001; Fernald, Gertler, & Hou, 2008; Fernald, Gertler, & Neufeld, 2008; Fernald, Gertler, & Neufeld, 2009; Rivera, Sotres-Alvarez, Habicht, Shamah, & Villalpando, 2004).

As per Attanasio, Gomez, Heredia, and Vera-Hernández, 2005, in Colombia, chronic under-2 malnourishment reduced ( $\beta -0.069$ ) and their height-for age z score improved ( $\beta +0.16$ ). Peri-natal deaths (−3.7/1000) and neonatal deaths (−2.3/1000) came down in India through the health-exclusive government program (Lim et al., 2010). On the negative side, Brazilian under-7 children's growth rate ( $31 \pm 7$  g SE) declined with their each additional month's exposure to the program (Morris, Flores, et al., 2004; Morris, Olinto, et al., 2004).

#### Communicable diseases

A short-term incentive on sexually transmitted infections (STIs) gave positive results. HIV status learning improved by 50% in rural Malawi through small incentives (Thornton, 2008). Another short-term non-governmental pilot reduced the weighted prevalence of HIV (+1.7%) and HSV-2 (+2.3%), and improved sexual behavior among Malawian girls (Baird, Garfein, McIntosh, & Özler, 2012). de Walque et al. (2012) had reported that the combined prevalence of four kinds of STIs declined in Tanzania (unadjusted RR 0.80). Similarly, tuberculosis detection was improved by 5% in China through a government run short-term trial (Yao et al., 2008). Incentives on bed nets gave mixed results. As per Hanson et al., 2009, the Tanzanian household ownership of any bed net (+19%) improved and further, each extra year of program exposure enhanced their insecticide treated net (ITN) ownership (+9%). On the contrary, Krezanoski, Comfort, and Hamer, 2010 had reported



**Table 2**  
Features of DSF initiatives on health.

Initiative (country; year)	Type of incentive	Target groups (selection criteria)	Health coverage <sup>a</sup>
<i>Long term multi-sectoral programs of Government (LMPs)<sup>a</sup></i> Progressa/Oportunidades (Mexico; since 1997)	CCT	<ul style="list-style-type: none"> <li>Poor households</li> </ul> <i>(Geographic coverage of lower income groups)</i>	<ul style="list-style-type: none"> <li>Preventive checkups for household</li> <li>Nutrition and growth monitoring</li> <li>Vaccination</li> <li>Maternal care</li> <li>Health awareness seminars</li> </ul>
Family Allowance Programme (Honduras; since 1998)	CCT (provided as vouchers)	<ul style="list-style-type: none"> <li>Pregnant and lactating women</li> <li>0–3 years children</li> </ul> <i>(Municipalities with the highest levels of malnutrition)</i>	<ul style="list-style-type: none"> <li>Preventive checkups for households</li> <li>Nutrition and growth monitoring</li> <li>Vaccinations</li> <li>Maternal care</li> </ul>
Red de Protección Social (Nicaragua; since 2000)	CCT	<ul style="list-style-type: none"> <li>Pregnant and lactating women</li> <li>Women in child bearing age</li> <li>0–5 years children</li> </ul> <i>(Geographic coverage of lower socio-economic groups)</i>	<ul style="list-style-type: none"> <li>Nutrition and growth monitoring</li> <li>Vaccination</li> <li>Vitamin supplements</li> <li>Pre-and post-natal checkups</li> <li>Health awareness seminars</li> </ul>
Bolsa Alimentação/Bolsa Família (Brazil; since 2001)	CCT	<ul style="list-style-type: none"> <li>Pregnant and lactating women</li> <li>0–6 years children</li> </ul> <i>(Geographic coverage of lower income groups)</i>	<ul style="list-style-type: none"> <li>Nutrition, growth monitoring and health check ups</li> <li>Vaccination</li> <li>Pre-and post-natal checkups</li> <li>Health awareness seminars</li> </ul>
Familias en Acción (Colombia; since 2001)	CCT	<ul style="list-style-type: none"> <li>Under-7 children</li> </ul> <i>(Municipalities with poor income households)</i>	<ul style="list-style-type: none"> <li>Nutrition</li> <li>Growth monitoring</li> <li>Child health checkups</li> <li>Preventive health checkups</li> </ul>
PATH (Jamaica; since 2002)	CCT (except for adults)	<ul style="list-style-type: none"> <li>Children</li> <li>Pregnant and lactating women</li> <li>Adults</li> </ul> <i>(Poor households through proxy means score)</i>	
Chile Solidario (Chile; since 2002)	CCT (conditional on participation in the program)	<ul style="list-style-type: none"> <li>Children</li> <li>Pregnant and lactating women</li> <li>Adults</li> </ul> <i>(Extremely poor households through proxy-means score)</i>	<ul style="list-style-type: none"> <li>Preventive health checkups in public sector</li> </ul>
Bono de Desarrollo Humano (Ecuador; since 2003)	Unconditional cash transfer	<ul style="list-style-type: none"> <li>0–5 children</li> </ul> <i>(Poor households through proxy means score)</i>	<ul style="list-style-type: none"> <li>Growth and development checkups</li> <li>Vaccination</li> </ul>
Social Risk Mitigation Project (Turkey; since 2004)	CCT	<ul style="list-style-type: none"> <li>0–6 ears children</li> <li>Women in child bearing age</li> </ul> <i>(Low income groups through proxy means score)</i>	<ul style="list-style-type: none"> <li>Maternal care</li> <li>Vaccinations</li> <li>Child check ups</li> </ul>
<i>Long term health-exclusive initiatives of Government</i> National Maternal Voucher Program (Bangladesh; since 2004)	Voucher for free care; cash incentive for travel and skilled birth; a gift box	<ul style="list-style-type: none"> <li>Pregnant women</li> </ul> <i>(All income groups in poorest sub-districts and only poor in other 46 sub-districts)</i>	<ul style="list-style-type: none"> <li>Maternal care</li> </ul>
National Voucher Scheme (Tanzania; since 2004)	Voucher (for part-payment)	<ul style="list-style-type: none"> <li>Pregnant women (Low income households)</li> </ul>	<ul style="list-style-type: none"> <li>Bed net ownership and usage</li> <li>Maternal care</li> </ul>
Janani Suraksha Yojana (India; since 2005)	CCT for Skilled birth attendance (in-facility and home)	<ul style="list-style-type: none"> <li>Pregnant women (All income groups in poorest states and only poor in other states)</li> </ul>	
Safe-delivery Incentive Program (SDIP) (Nepal; since 2005)	CCT for in-facility birth and obstetric complications	<ul style="list-style-type: none"> <li>Pregnant women (Universalization of incentives and free care in only backward districts)</li> </ul>	<ul style="list-style-type: none"> <li>Delivery care in public facilities</li> </ul>
National Sanitation Subsidy (India; since 2006)	Fixed percentage subsidies	<ul style="list-style-type: none"> <li>Households (More subsidy for poor and less for the well-off)</li> </ul>	<ul style="list-style-type: none"> <li>Ownership of latrine</li> </ul>
<i>Short term health-exclusive initiatives of Government</i> Fidelis Project (China; 2004–05)	CCT (travel)	<ul style="list-style-type: none"> <li>Individuals (50 low income counties of Shanxi)</li> </ul>	<ul style="list-style-type: none"> <li>Tuberculosis case detection and treatment</li> </ul>
<i>Short term health-exclusive initiatives of Non-government agencies</i> Zomba CCT (Malawi; 2008–09)	CCT	<ul style="list-style-type: none"> <li>Women aged 13–22 and guardians</li> </ul> <i>(Low income groups)</i>	<ul style="list-style-type: none"> <li>STI prevention (through 80% of school time retention)</li> </ul>
Tanzania CCT (Tanzania; 2009 for a year)	CCT	<ul style="list-style-type: none"> <li>Adults aged 18–30 years (2399 from 10 villages)</li> </ul>	<ul style="list-style-type: none"> <li>STI prevention (through safer sex and upon testing negative)</li> </ul>

(continued on next page)

Table 2 (continued)

Initiative (country; year)	Type of incentive	Target groups (selection criteria)	Health coverage <sup>a</sup>
Malaria Coupons (Madagascar; 2007–08)	Voucher for purchase; a kit (household items) upon net use	Households (21 villages in resource constraint settings)	Insecticide treated Net (ITN) ownership and use
Malawi Diffusion and Ideational Change Project (Malawi; 1998–2004)	Randomly assigned Vouchers	Adults (in rural areas)	Free HIV test Free treatment for non-HIV STIs Subsidized condoms to HIV+

<sup>a</sup> Only the health related objectives of the LMPs are mentioned in the table.

that the household ITN ownership (–3.3%) and use (–6%) declined in Madagascar.

#### Non-communicable diseases (NCDs)

There was no substantial evidence on DSF's contribution to NCDs. NCDs were not incentivized directly except being covered through annual adult preventive checkups in Mexico, Honduras and Jamaica (Levy & Ohls, 2007; Morris, Flores, et al., 2004; Morris, Olinto, et al., 2004; Ozer, Fernald, Weber, Flynn, & VanderWeele, 2011) through LMPs. In Turkey, CCTs under the LMP provided a complementary channel to mobilize women for cervical cancer screening (Ahmed et al. 2007). Mexico experienced mixed results on NCDs. For instance, women's reported depressive symptoms reduced ( $\beta = 1.7$ ) and preventive checkups of elderly men ( $\beta + 0.179$ ) and women ( $\beta + 0.193$ ) increased (Behrman & Parker, 2011). On the contrary, Fernald, Gertler, & Hou, 2008; Fernald, Gertler, & Neufeld, 2008 had reported that a doubling of cumulative cash transfer increased Mexican's adult BMI ( $\beta$  0.83), hypertension ( $\beta$  11.19) and obesity (OR 1.41).

#### Out-of-pocket expenditure (OOPs)

Currently, it is difficult to conclude how DSF impacted OOPs and financial access to healthcare. However, an evidence from Bangladesh indicated that DSF reduced the odds of incurring any OOPs as well as the amount (Nguyen et al., 2012). Similarly, in Tanzania DSF reduced the cost of bed nets through a price negotiation with the commercial bed net providers and it ultimately reduced the consumer price of bed nets. It is also worth noting that in general the overall intent of LMPs was to enhance the financial status of households through social assistance.

#### Individual and community empowerment

In principle, the key intent of DSF was to address social determinants of health and the LMPs were able to address them more comprehensively. Among the social determinants, the major focus was on nutrition and economic vulnerabilities (Ahmed et al. 2007; Behrman & Parker, 2011; Gertler & Boyce, 2001; Morris, Flores, et al., 2004; Morris, Olinto, et al., 2004; ). LMPs inculcated a sense of social rights and entitlements among beneficiaries, especially among women (Ahmed et al. 2007; Attanasio et al., 2005). DSF gave a room for enhancing individual and social capabilities on health seeking and access to care. The element of social cohesion improved especially among women (Ahmed et al. 2007; Gertler & Boyce, 2001). Incentives enabled Mexican and Ecuadorian women to balance their intra-household power structure and conditionality enhanced their bargaining power for better utilization of money (Ozer et al., 2011; Paxson & Shady, 2008). However, community mediation was largely utilized for sensitization and enhancing social cohesion on client behavior changes. Current evidence did not indicate that the design and implementation of DSFs were bottom-up and demand-driven.

#### Supply-side effects

The supply-side effects assessed were improvement in service delivery status, equity, and public expenditure and sustainability.

#### Service delivery status

Parallel to the incentive component, many DSF initiatives tried to mainstream the availability and quality of care and preventive public goods at peripheral levels through innovations, supply-side incentives, community mediation, private sector accreditation and supplier negotiations. Some of the examples in this regard were the establishment of peripheral health facilities leading to improved elderly care in Honduras (Morris, Flores, et al., 2004;

**Table 3**  
Positive Health and Behavioral outcomes.

Author, country	Health/behavioral outcomes	Net treatment effect <sup>a</sup>	Role of confounders/reporting bias on the outcomes considered
<b>Maternal health</b>			
Morris, Flores, et al., 2004, Honduras Nguyen et al.,2012, Bangladesh	Antenatal care visits (%) Skilled birth attendance (%) Institutional deliveries (%) At least 3 ante natal visits	+18.7%; 95% CI 7.4–30.0 +46.4%; $\beta$ +0.464; SE0.043, $P$ < 0.01 +13.6%; $\beta$ +0.136, SE0.047, $P$ < 0.01 $\beta$ +0.241; SE0.076, $P$ < 0.01	Confounders mentioned
Barber & Gertler, 2008, Mexico Lim et al., 2010, India	Average quality score of pre-natal care Skilled birth attendance (%) Pregnant women with minimum 3 antenatal care visits (%) (Difference-in-difference estimates)	$\beta$ + 5.96; SD 21.37, $P$ < 0.01 +39.3%; 95% CI 33.7–45.0, $P$ < 0.01 +10.9%; 95% CI 4.6–17.2, $P$ < 0.01	Reporting bias + confounders mentioned
Jackson-Powell & Hanson, 2012, Nepal	Institutional deliveries (%) Skilled birth attendance (%)	+18%; $t$ , 2.70, 95% CI 5–31, $P$ < 0.1 +17%; $t$ , 2.72, 95% CI 4–29, $P$ < 0.1	Confounders mentioned
<b>Child health</b>			
Morris, Flores, et al., 2004, Honduras	Children got health checkups last month(%) Children vaccinated DPT/pentavalent (%) (Effect size are absolute percentage change in prevalence)	+20.2%; 95% CI 10.9–29.6, $P$ < 0.001 +15.6%; 95% CI 6.4–24.8, $P$ < 0.001	
Rivera et al., 2004, Mexico	Under-1 incremental height difference Under-1 incremental mean hemoglobin value	+1.1 CM; $P$ < 0.01 +11.12 g/dl; 95% CI 10.9–11.3 g/dl, $P$ < 0.01	Confounders mentioned
Attanasio et al., 2005, Columbia	Under-2 height-for age Z score Under-2 chronic under-nourishment	$\beta$ +0.16; SE 0.005, $P$ < 0.01 $\beta$ –0.069; SE 0.034, $P$ < 0.05	
Galasso, 2011, Chile Ahmed et al., 2007,Turkey	Urban under-6 preventive health visits Fully immunized pre-school children (%) Per-capita calorie consumption of children (%)	$\beta$ +0.059; SE0.029, $P$ < 0.001 +13.6%; 95% CI not mentioned +22.6%; 95% CI not mentioned	Confounders mentioned
Levy & Ohls, 2007, Jamaica Fernald, Gertler, & Neufeld, 2008, Mexico	Under-6 got checkups in last 6 months 2–6 aged stunting prevalence 2–6 aged overweight prevalence	$\beta$ +0.307; SE0.080, $P$ < 0.001) $\beta$ –0.10; 95% CI –0.16 to –0.05, $P$ < 0.05 ( $\beta$ –0.08; 95% CI –0.13 to –0.03, $P$ < 0.05	
Paxson & Shady, 2008, Ecuador	3–7 aged cognitive & behavioral measure z score 3–7 aged physical measure z score(controlled for age, gender and SES)	$\beta$ +0.116; SE 0.060 $\beta$ +0.105; SE 0.039	Confounders mentioned
Fernald et al., 2009, Mexico	8–10 aged height-for-age Z score 8–10 aged verbal assessment score 8-10 aged cognitive assessment score	$\beta$ +0.03; 95% CI 0.01–0.05, $P$ < 0.01 $\beta$ +0.73; 95% CI 0.48–0.99, $P$ < 0.01 $\beta$ +0.47; CI 0.19–0.74, $P$ < 0.01	
Lim et al., 2010, India	Perinatal deaths per 1000 pregnancies Neonatal deaths per 1000 live births (Difference-in-difference estimates)	$\beta$ –14.2; 95% CI –31 to –2.7, $P$ < 0.01 $\beta$ –6.2; 95% CI –20.4 to –8.1, $P$ < 0.01	Reporting bias + confounders mentioned
<b>Communicable diseases/health issues</b>			
Thornton, 2008, Malawi	Individual HIV learning with any monetary incentive Individual HIV learning with the amount of incentive Individuals purchased condom upon HIV status learning	$\beta$ +0.273; SE 0.028, $P$ < 0.1 $\beta$ +0.088; SE 0.012, $P$ < 0.1 $\beta$ +0.472; SE0.159, $P$ < 0.01	Confounders mentioned
Hanson et al., 2009, Tanzania	Household insecticide treated net ownership (%) Household net ownership on longer exposure (%)	+18%; 95% CI 33–39, $P$ < 0.01 +9%; 95% CI 1.6–20, $P$ < 0.01	Many parallel interventions existed
Patnaik et al.2009, India	Household latrine ownership through IEC + subsidy Household latrine ownership through IEC alone	$\beta$ +23.7; 95% CI 6.7–40.7, $P$ < 0.05 $\beta$ +12.0; 95% CI 1.9–25.8, $P$ < 0.05	
Baird et al., 2012, Malawi	HIV prevalence among 13–22 aged women HSV-2 Prevalence among 13–22 aged women Adult Syphilis prevalence among 13–22 aged women 13–22 aged women having a sexual partner aged $\geq 25$ with less frequent intercourse	OR 0.36; 95% CI 0.14–0.91, $P$ < 0.011 OR 0.24; 95% CI 0.09–0.65, $P$ < 0.011 OR 0.92; 95% CI 0.12–6.85, $P$ < 0.011 OR 0.21; 95% CI 0.07–0.62, $P$ < 0.011	Not adjusted for baseline
<b>Adult health issues/care utilization</b>			
Ozer et al., 2011, Mexico	Self-reported depressive symptoms among 24–66 aged women Clinically reported depressive symptoms among 24–66 aged women	$\beta$ –1.7; 95% CI –2.46 to –0.96 $P$ < 0.001 RR = 0.74; 95% CI 0.67–0.83, $P$ < 0.001	
Behrman & Parker, 2011, Mexico	>50 women got health checkups in last 2 months >50 women unable on normal activities >50 men got health checkups in last 2 months	$\beta$ +0.193; SE 0.031, $P$ < 0.05 $\beta$ –0.655; SE 0.304, $P$ < 0.05 $\beta$ +0.179; SE 0.028, $P$ < 0.05	

<sup>a</sup> Only the net treatment effects are presented here as many studies did not report the average control and treatment effects separately.



**Table 4**  
Negative and Perverse Health and Behavioral outcomes.

Author, country	Health/behavioral outcomes	Net treatment effect <sup>a</sup>	Role of confounders/reporting bias on the outcomes considered
<i>Negative/neutral outcomes</i>			
Morris, Flores, et al., 2004, Honduras	10-day post-partum check-up	$\beta$ -5.7%; 95% CI -16.0 to -4.5	Confounders mentioned
	Under-5 got checkup last month	$\beta$ -1.8%; 95% CI -13.4 to -9.8	
Morris, Olinto, et al., 2004, Brazil	Under-7 weight-for age Z score	-0.21; $\pm$ 0.08, $P < 0.05$	
	Under-7 height-for age Z score	-0.19; $\pm$ 0.09, $P < 0.05$	
Galasso, 2011, Chile	Elderly got checkups in last 6 months	$\beta$ -0.014; SE 0.200, $P < 0.001$	
Levy & Ohls, 2007, Jamaica	Urban>50women got checkups	$\beta$ -0.110; SE0.026, $P < 0.001$	
Fernald, Gertler, & Hou, 2008, Mexico	Adult BMI	$\beta$ + 0.83; 95% CI 0.46-1.20, $P < 0.05$	
	Adult diastolic blood pressure	$\beta$ + 11.19; 95% CI 0.09-2.29, $P < 0.05$	
	Prevalence of adult overweight	OR 1.41; 95% CI 1.14-1.75, $P < 0.05$	
	Adult Grade I obesity	OR 1.41; 95% CI 1.14-1.75, $P < 0.05$	
	Adult Grade II obesity	OR 1.57; 95% CI 1.05-2.36, $P < 0.05$	
Yao et al., 2008, China	Case detection of Tuberculosis	+5%; $P < 0.01$ , 95% CI not mentioned	
de Walque et al., 2012, Tanzania	Prevalence of STIs in lower value CCT areas	OR 1.03; 95% CI 0.71-1.35, $P < 0.011$	
Krezanoski et al., 2010, Madagascar	Household ITN ownership at 1st month	OR 0.97; 95% CI 0.95-0.99, $P < 0.01$	
	Household ITN use at 6th month	OR 1.01; 95% CI 0.96-1.08, $P < 0.01$	
<i>Perverse outcomes</i>			
Morris, Flores, et al., 2004, Honduras	Reduction in reported pregnancy among incentivized women	-10.4%; $P < 0.05$ , 95% CI not mentioned	Reporting bias + confounders mentioned
	Reduction in reported pregnancy among non-incentivized women	-26.3%; $P < 0.05$ , 95% CI not mentioned	
Stecklov et al. 2007, Latin America	Fertility among incentivized women	$\beta$ + 3.9; SE 0.258, $P < 0.01$ , 95% CI not mentioned	
Barber, 2009, Mexico	C-section on longer exposure to CCTs	$\beta$ +7.52; $P < 0.01$ , 95% CI not mentioned	
Jackson-Powell & Hanson, 2012, Nepal	Caesarean section rate among incentivized women	+36%; $t$ , 1.83, 95% CI, -3.1 to -74.1, $P < 0.01$	
	C-sections among SBA assisted deliveries	+24%; $t$ , 2.02, 95% CI 0.1-48.1, $P < 0.05$	

<sup>a</sup> Only the net treatment effects are presented here as many studies did not report the average control and treatment effects separately.

Morris, Olinto, et al., 2004); innovative transportation facilities to address distance barriers in India (Lim et al., 2010); improvement of human resources and supplies in Mexico (Ozer et al., 2011); low-cost bed net provision in Tanzania (Hanson et al. 2007); deployment of lay nutrition workers in Honduras (Morris, Flores, et al., 2004; Morris, Olinto, et al., 2004); and home-based HIV testing and counseling in Malawi (Thornton, 2008).

Yet, the service delivery capacity was often not optimal to meet the increased demand for care under DSF. For example, distance barriers still existed in Turkey, Mexico, and Honduras as the preventive care at convenient locations were irregular (Ahmed et al., 2007; Gertler & Boyce, 2001; Morris, Flores, et al., 2004; Morris, Olinto, et al., 2004). Indian mothers were early discharged from hospitals without sufficient post-partum care due to limited

**Table 5**  
DSFs on health equity.

Author, country	Equity outcomes	Net treatment effect <sup>a</sup>	Role of confounders/reporting bias on the outcomes considered
<i>Equitable</i>			
Maluccio & Flores, 2005, Nicaragua	Highest under-3 health checkups was among the poorest quintile children	+31.3; $P < 0.05$ , 95% CI not mentioned	Many parallel interventions existed
Paxson & Shady, 2008, Ecuador	Highest 3–7 aged cognitive and behavioral measure z score was among bottom quartile children	$\beta$ +0.220; SE 0.092, 95% CI not mentioned	
	Highest 3–7 aged physical measure z score was among bottom quartile children (controlled for age, gender and SES)	$\beta$ +0.226, SE 0.062, 95% CI not mentioned	
Hanson et al., 2009, Tanzania	Highest bed net use was among the Q1 quintile children	+0.18%; 95% CI 37–53, $P < 0.01$	
Fernald et al., 2009, Mexico	Highest under-10 height-for-age z score was among non-literate mother's children	+1.5 cm; $\beta$ +0.23; 95% CI 0.02–0.44	
<i>Inequitable</i>			
Patnaik et al.2009, India	Highest reported latrine use was among men	+25.6%; 95% CI 13.5–37.8, $P < 0.05$	Confounders + reporting bias mentioned
Lim et al., 2010, India	Highest CCT uptake was among the most educated women	OR 1.42; 95% CI 1.35–1.50, $P < 0.01$ )	
Ozer et al., 2011, Mexico	Highest CCT uptake was among middle income quintile women	OR 1.113; 95% CI 1.04–1.23, $P < 0.01$	
	Highest reduced clinically reported depressive symptoms was among wealthier women	$\beta$ –2.05; 95%, CI not mentioned	
Nguyen et al.,2012, Bangladesh	Least educated women had the most unskilled child birth	$\beta$ –0.125; SE 0.052, $P < 0.05$	

<sup>a</sup> Only the net treatment effects are presented here as many studies did not report the average control and treatment effects separately.

capacities at the health facilities (Lim et al., 2010). Vaccine shortages prevented immunization of one-fifths of the Nicaraguan children (Maluccio & Flores, 2005). Despite the efforts on public sector strengthening, crowding out of the private sector in service utilization was not substantially reported. Two studies reported that the public sector use increased considerably, as the conditionality was posed on its utilization. As per Galasso, 2011 and Jackson-Powell and Hanson (2012), the public sector patient enrollment in Chile (+3%) and childbirth in Nepal (+26%) had increased respectively.

### Equity

DSFs in general primarily catered to vulnerable groups such as elderly, women, lower socio-economic groups and remote area habitants (Table 5). However, in practice, the evidence indicates that DSF could not cater to all the needy among the vulnerable groups. Further, there were chances of relatively wealthier groups (either among the poor or non-poor groups) receiving more benefits compared to their poorer or the poorest counterparts. For instance, though the Turkish CCT program targeted the poorest of the country, yet it could not include all the poorest and therefore, around 59% of the poorest of the country (Ahmed et al., 2007) were excluded. Nepal reported a disproportionate utilization of incentives by the relatively wealthier households (Jackson-Powell & Hanson, 2012). In India, the highest uptake of JSY benefits was among the middle income quintile women (Lim et al., 2010).

### Public expenditure and sustainability

Effects on the public financing system and the fiscal space to finance the DSF programs were not explored widely. LMPs demonstrated substantial initial establishment costs (on monitoring, conditioning, targeting and supply coordination) and then gradual decrement. Mexico's first year administrative cost was US\$ 1.34 per for each dollar spent on the beneficiary and it came down to 5 cents by the third year (Gertler & Boyce, 2001). In Latin American countries, LMP's spending as a proportion of GDP varied from 0.5 to 1.5% and they could cover 4%–20% of the monthly household consumption expenditure of their beneficiaries (Gertler & Boyce, 2001). Among the short-run experiments, the Malawian trials costed US\$12,500 and \$26,904 to avert a primary HIV infection (Thornton, 2008; Baird et al., 2012 respectively).

### Evaluation methods and DSF's effects

The nature of evaluation design was related to the direction and magnitude of the particular effects of each DSF initiative. As DSF was an output-based strategy, evaluation questions explored primarily how an incentive resulted into its intended outcome. Conditionality in DSF was always tied to an activity than improving health status. Hence, evaluation questions largely assessed behavioral outcomes than final health outcomes. However, a few experimental studies had explored the health status effects of DSFs compared to quasi-experimental designs. Nine experimental studies (Baird et al., 2012; Gertler & Boyce, 2001; Fernald, Gertler, & Hou, 2008; Fernald, Gertler, & Neufeld, 2008; Fernald et al. 2009; Maluccio & Flores, 2005; Paxson & Shady, 2008; Stecklov et al., 2007; Thornton, 2008; de Walque, Dow, Medline, & Nathan, 2012) had assessed health outcomes. Among them six examined child health status and three assessed HIV status. Except one, all five studies highlighted the positive impact of DSF on child health status such as nutrition and growth indicators. Adult morbidity status had a mixed effect in Mexico; while HIV status was positively affected by DSF in all three studies. The impact on maternal status, malaria and diarrhea was not explored by the respective evaluation studies. One study in India (Lim et al., 2010) through a quasi-

experimental design with matched comparison groups demonstrated the positive effect of DSF on peri-natal and neo natal deaths.

### Differential effects among various initiatives, incentives and design features

As the outcomes were heterogeneous among studies, we could not statistically explore if any differential performance occurred among various types of incentives and initiatives. Otherwise, irrespective of the nature of initiatives and incentives, all studies reported that DSF could improve behavioral outcomes. However, their impact on consumer behavior which requires continuous adherence (e.g. bed net use and adult checkups) was mixed and varied between countries, irrespective of the type of initiatives. On health status, none of the initiatives was reported to have improved maternal health status, though one study on LMP reported the improvements in the quality of maternal care. LMPs could improve the child health status especially nutrition largely. Among the Government health exclusive programs, the Indian program highlighted reduced child deaths (Lim et al., 2010). Though the short-run non-governmental initiatives addressed malaria and STIs, none of them reported on any reduced incidence for malaria. However, they could substantially reduce the prevalence of STIs in a short timeframe. Improvement in service delivery was brought in by many initiatives. However, the inadequacy of service availability and managerial capacity and the mixed-effects on equity were only reported for the government-run programs. All categories of initiatives reported negative directional outcomes, while short-run non-governmental programs did not report any perverse behavioral outcomes.

Both in India and Latin America, there was evidence that the design of programs affected health seeking behavior. For instance, the Indian JSY program enforced conditionality only on institutional delivery and hence the improvement in ante- and post-natal care was much lower (3.6% and 5% respectively), compared to that of the former (18%) (Lim et al., 2010). Similarly, certain implementation impediments adversely affected the program success. In Mexico, the inadequate monitoring of consumer behavior compliance led to irrational behaviors (Behrman & Parker, 2011). The conventional approaches in 'targeting' led to the exclusion of the poorest groups in Turkey (Ahmed et al. 2007).

### Discussion

#### Summary of findings

We conducted an extensive search and assessed several papers and reports on demand-side financial incentives. We found that DSF initiatives, irrespective of the nature of incentive, initiative and duration were effective on improving consumer behavioral outcomes. The effect on continuous client behavior choices were mixed and varied across countries. Existing evidence is confined to consumer behavioral and a few health outcomes, and the deeper effects (e.g. cost-effectiveness and final health status) on demand- and supply-side were under-investigated. The effect of DSF on health status was elastic to the evaluation design employed to assess the initiatives. Design features and implementation status did direct the effect of DSF programs.

The experimental evaluation studies indicated that DSF was effective on improving nutritional status, child growth indicators, HIV status and adult morbidity status. However, their effects on maternal health, diarrhea and malaria status were unknown. They also fetched positive externalities on addressing social determinants of health and improving healthcare delivery status and social and individual capabilities. The focus of long-run

governmental programs was mostly on maternal and child health, followed by adult primary care and malaria. The non-governmental short-term trials focused on malaria and STIs, but could only improve health outcomes on STIs. All kinds of initiatives fetched negative directional outcomes, but short-run initiatives did not report any perverse behavioral outcomes.

DSF was a catalyst for preventive care, followed by promotive (e.g. nutrition) and curative (e.g. maternal health complications) care. Their current focus is primarily on millennium development goal (MDG) related health goals. LMPs only targeted MCH and other programs covered MCH, HIV, malaria and tuberculosis. None of the programs directly covered NCDs though LMPs in Mexico, Honduras, and Jamaica facilitated NCD checkups. Largely, DSFs did not exhibit a comprehensive approach on any of the health aspects or components (e.g. maternal care) they catered to, so that a particular MDG goal could be achieved systematically.

Since DSF is an output driven approach, the objectives of the evaluations were to understand the causality between a particular incentive and an intended outcome. Hence, prolonged behavior changes, impact on morbidities, mortalities, OOPs, cost-effectiveness and sustainability were under-explored. Further, many quasi-experimental evaluation designs were inadequately powered to explore health status outcomes. Many of them did not have proper comparison groups or measurements. Even some experimental designs reported the difficulties of obtaining a comparable control group.

### Policy implications

DSF appears to be a reliable healthcare delivery strategy to improve preventive, promotive and certain curative healthcare aspects (Soares, Osório, Soares, Medeiros, & Zepeda, 2007; WHO 2010). However, DSF initiatives need some amendments in their design, objectives and implementation strategies to enable them to address primary healthcare comprehensively. One major structural change could be in their objective and design. They need to rationally cover primary healthcare issues and go beyond MDGs. DSF's focus on one particular health aspect should not adversely affect another health aspect (e.g. obesity in Mexico). In the given scenario, DSF could be one of the potential strategies to augment universal healthcare access, especially for vulnerable groups. They also need to exercise conditionality rationally so that behavior compliance will be optimum to achieve a specific health status improvement. For example, if DSF wants to improve maternal health status, conditionality should be exercised for all components of maternal care than only skilled birth attendance.

LMPs have proved that multi-sectoral approaches could provide a comprehensive dimension, even covering the numerous social determinants of health widely (e.g. nutrition, sanitation etc.). If all primary preventive aspects are not coordinated under multi-sectoral programs, there could be possibility of mutual detriments. For instance, an increment in household disposable income could induce the intake of higher calorie food and eventually more obesity in Mexico (Fernald, Gertler, & Hou, 2008; Fernald, Gertler, & Neufeld, 2008). Multi-sectoral approaches might achieve economies of scale as they can minimize the establishment and administrative costs in the long-run (Vaitsman, Andrade, & Farias, 2009).

The OOP effects of DSF need to be assessed substantially. Since enhanced purchasing power is certainly a key target of DSF, to what extent they address OOPs is relevant. The current explorations on user fees also demonstrate that the odds of OOPs play a role in formulating consumer health behaviors (McPake, Brikci, Cometto, Schmidt, & Araujo, 2011; Schmidt et al., 2011 and Ridde & Morestin, 2011). Exploration of this OOP effect might give additional information on provider motivations (e.g. informal

payments), systemic issues (e.g. transportation) and income-elasticity of care (Gopalan & Varatharajan, 2012).

The principles of welfare and paternalism demand differential approach such as DSF from the government (Eldridge & Palmer, 2009). However, in order to project DSF as a sustained strategy, it is essential for the governments to understand its cost-benefit ratio compared to other social transfers or healthcare delivery approaches. The Latin American experience shows that CCTs are less costly compared to price subsidies (Gertler & Boyce, 2001). The initial investments on ancillary components (e.g. MIS) would have larger externalities on system strengthening as many other programs could use them. However, it is essential to investigate how a targeted intervention such as DSF can be multi-sectoral in the current health sector context of many LMICs (Atun, de Jongh, Secci, Ohiri, & Adeyi, 2010). Sustainability of DSF also depends on the effectiveness of implementation and monitoring.

More mixed-methods exploration on the causal pathways of DSF's effects is essential to navigate their scale-up. Such an exploration may reveal what kind of initiative and incentive would be cost-effective and sustainable for a particular country setting.

### Strengths and limitations of the review

This review looked at consumer-led incentives comprehensively and synthesized their unknown elements such as supply-side effects. The findings are relevant for the design and scale up of DSF initiatives in many LMIC settings. It included a comprehensive set of existing data bases and incorporated qualitative findings. However, it incorporated several studies with methodological limitations and a few of the outcome variables assessed were subjected to potential bias. So, robustness of some of the evidence is dubious for generalizability. The selection criteria of studies, especially the exclusion of records in non-English language might have omitted many existing evidence on DSF's effects. Hence the review outcomes need to be carefully interpreted for generalizability and policy recommendations. It also did not explore the causal pathways of DSF's effects and the role of 'contextual factors' in their effectiveness, without which DSF initiatives' impact cannot be comprehended in-depth.

### Acknowledgments

We would like to thank the authors of the papers we have reviewed for the prompt response to our queries. We are also indebted to the anonymous reviewers and the Editorial Board for their valuable comments.

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