HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH | HARVARD Kennedy School JOHN F. KENNEDY SCHOOL OF GOVERNMENT

MINISTERIAL LEADERSHIP

Improving health systems efficiency through task shifting and better procurement and supply chain management

Forum for Finance Ministers 2016

Authors

Gabriel Seidman, DrPH Candidate, Harvard T.H. Chan School of Public Health
Dr. Rifat Atun, Professor of Global Health Systems, Harvard T.H. Chan School of Public Health

April 9, 2016

Acknowledgements

This paper was commissioned by the Ministerial Leadership in Health Program at Harvard University with the funding support of Big Win Philanthropy, the Bill & Melinda Gates Foundation,

Bloomberg Philanthropies, the GE Foundation and the Rockefeller Foundation. We thank Michael Sinclair and Brian Dugan, for their support in preparation of this report.

Introduction

Efficient and effective health systems are critical for managing healthcare costs. In low and middle income countries (LMICs) of Africa, Asia, and the Middle East, increasing the efficiency of health spending could increase health-adjusted life expectancy by 1-2 years.[1] Effective management of human resources and competent procurement and supply chain management of medicines, which together account for the largest costs in any health system, are critical for improving health systems efficiency.

Task shifting enables more efficient use of the human resources[2] and can produce equivalent or superior outcomes for many diseases and health interventions including non-communicable diseases,[3] HIV/AIDS,[4,5] contraceptive distribution,[6] and others[7]. Community health workers can accelerate task shifting and to close the gap in healthcare access in LMICs.[8] Improved procurement and supply chain management can reduce costs and diminish drug shortages[9], which adversely affect health outcomes especially in LMICs with weak procurement and supply chain management systems[10].

Task shifting

Evidence strongly points to benefits of task shifting, which can reduce health costs to the health system or the patient with 6.9% to 98% reduction in costs per patient treated or overall programmatic costs, The benefits of task shifting to CHWs are demonstrated when managing general health system activities[11] or specific conditions. Management of tuberculosis, which leads to 1.5 million new cases worldwide each year[12] and requires medication under supportive observation for many months[13] has been shifted to health workers in the community with 57-74% reduction in the cost per patient treated in Ethiopia, South Africa and Uganda, and by 32-44% in Bangladesh and Pakistan[14-19]. In Brazil supervision of medication has been shifted to close relatives with reduced program costs[20], or in Bangladesh entrusted to patients[21].

For HIV/AIDS where around 15 million people receive life-long antiretroviral treatment (ART) and require regular follow up to monitor response[22], task shifting has produced cost savings without adverse effect on care. In China, community based detection of HIV in high-risk groups led to a 97% reduction in cost per case detected.[23] In Ethiopia treatment initiation and monitoring of ART was shifted from physicians to nurses with cost savings.[24] In Nigeria shifting ART care to less expensive cadres of health workers lowered costs[25,] and in South Africa and Uganda moving dispensing of ART from pharmacists to pharmacy assistants reduced human resource costs[26-28].

Task shifting has also produced cost savings while maintaining service quality for surveillance and treatment of malaria,[29,30] controlling blood pressure,[31] management of acute malnutrition,[32]

detection of sleeping sickness,[33] treatment of mental illness,[34] management of major obstetric procedures,[35] treatment of severe pneumonia in Pakistan with 81% reduction in costs,[36] surveillance to reduce transmission of Chagas disease,[37] and diagnosis and treatment of schistosomiasis.[38]

Supply chain management and procurement

Improved procurement and supply chain management has enabled different countries to reduce drug prices by 7.7% - 79.4%, increase drug availability and to reduce drug stock outs.

Brazil has introduced national policies to promote multiple sources for procured drugs, develop national pharmaceutical industry, and improve procurement. Between 1997 and 2003 Brazil achieved an 80% reduction in the annual cost of antiretroviral drugs.[39] In India, development of an essential drugs list, centralized procurement, and promotion of rational drug use among physicians resulted in around 30% cost savings and increased drug availability.[40] The National Essential Medicines Scheme in China created an essential medicines list, improved public procurement of drugs, and achieved cost savings of up to 40% for patients in rural districts.[41]

Centralized or pooled procurement of drugs has produced significant cost savings, as shown by group purchasing by neighboring countries in the Middle East,[42] by different government agencies in Jordan,[43] by different municipalities in Brazil,[44] or by hospital networks in Serbia and Brazil[45,46]. Centralized procurement by Mexican government has lowered drug prices for ART by 38%, but not as much as benchmark prices obtained by other upper middle-income countries.[47,48] Centralised procurement can have unintended consequences. In Kenya, centralised procurement for anti-malarial medicines resulted in increased stock outs, as the sole supplier selected could not meet demand.[49] Procurement of locally procured drugs can also lower costs, but not always as monopolies emerge.[50]

In LMIC, better supply chain management improves drug availability and reduces stock outs, including in disaster settings,[51] for primary care drugs,[52-54] for contraceptives,[55] for drugs related to HIV care other than antiretroviral medicines[56], and reduces energy costs associated with the supply[57], though minor increase in procurement costs could occur.[58]

Revolving drug funds, where users make an initial financial contribution for procuring drugs and regular re-stocking of supplies, which users then pay to purchase,[59] can produce cost savings when introduced with enhanced procurement or supply chain management, as shown in Sudan,[60] or improve drug availability, as shown in Guinea[61] and Nigeria.[62]

Innovations in financing and supply chain management, such as the Affordable Medicines Facility-malaria, where the Global Fund negotiated bulk discounts from manufacturers and used

both public and private sector for distribution[63] resulted in reduced manufacturer and end-user prices[64] and rapidly increased the availability of artemisinin based combination treatments[64,65].

Discussion

Countries have used different approaches to introduce task shifting when managing different diseases with notable improvements in efficiency and no adverse effects on patient care or outcomes. Similarly, investing in improved procurement and supply chain management have led to substantial efficiency gains and improved availability of medicines.

The evidence points to substantial opportunities for policymakers to promote better management of human resources and to strengthen procurement and supply chain management in order to improve health system efficiency and enhance health outcomes.

References

1. Grigoli F, Kapsoli J. Waste not, want not: the efficiency of health expenditure in emerging and developing economies. 2013.
2. World Health Organization. First Global Conference on Task Shifting. 2008; http://www.who.int/healthsystems/task_shifting/en/. Accessed March 15, 2016.
3. Joshi R, Alim M, Kengne AP, et al. Task shifting for non-communicable disease management in low and middle income countries--a systematic review. *PloS one.* 2014;9(8):e103754.
4. Kredo T, Adeniyi FB, Bateganya M, Pienaar ED. Task shifting from doctors to non-doctors for initiation and maintenance of antiretroviral therapy. *The Cochrane database of systematic reviews.* 2014;7:Cd007331.
5. Penazzato M, Davies MA, Apollo T, Negussie E, Ford N. Task shifting for the delivery of pediatric antiretroviral treatment: a systematic review. *Journal of acquired immune deficiency syndromes (1999).* 2014;65(4):414-422.
6. Polus S, Lewin S, Glenton C, Lerberg PM, Rehfuess E, Gulmezoglu AM. Optimizing the delivery of contraceptives in low- and middle-income countries through task shifting: a systematic review of effectiveness and safety. *Reproductive health.* 2015;12:27.
7. Martinez-Gonzalez NA, Tandjung R, Djalali S, Rosemann T. The impact of physician-nurse task shifting in primary care on the course of disease: a systematic review. *Human resources for health.* 2015;13:55.
8. One Million Community Health Workers Campaign. About Us. 2016; http://1millionhealthworkers.org/about-us/. Accessed March 15, 2016.
9. WHO. Addressing the global shortage of medicines and the safety and accessibility of children's medication. 2015; http://apps.who.int/gb/ebwha/pdf_files/EB138/B138_41-en.pdf. Accessed March 15, 2016.
10. Committee on Understanding the Global Public Health Implications of Substandard F, and Counterfeit Medical Products; Board on Global Health; Institute of Medicine,. Weaknesses in the Drug Distribution Chain. In: Buckley G, Gostin L, eds. *Countering the Problem of Falsified and Substandard Drugs*. Washington (DC): National Academies Press (US); 2013.
11. Munyaneza FH, Amoroso LR, Nyirazinyoye CL, et al. Leveraging community health worker system to map a mountainous rural district in low resource setting: a low-cost approach to expand use of geographic information systems for public health. *Int J Health Geogr.* 2014;13:49.
12. WHO. Tuberculosis: Fact Sheet No. 104. 2015; http://www.who.int/mediacentre/factsheets/fs104/en/. Accessed March 14, 2016.
13. WHO. What is DOTS (Directly Observed Chemotherapy, Short Course). 2016; http://www.searo.who.int/tb/topics/what_dots/en/. Accessed March 14, 2016.
14. Datiko DGL, B. Cost and cost-effectiveness of smear-positive tuberculosis treatment by Health Extension Workers in Southern Ethiopia: a community randomized trial. *PloS one.* 2010;5(2):e9158.
15. Islam MAW, S.Ishikawa, N.Chowdhury, A. M.Vaughan, J. P. Cost-effectiveness of community health workers in tuberculosis control in Bangladesh. *Bull World Health Organ.* 2002;80(6):445-450.
16. Dick JC, M.van Zyl, H.Daniels, K. Primary health care nurses implement and evaluate a community outreach approach to health care in the South African agricultural sector. *Int Nurs Rev.* 2007;54:383-390.
17. Okello D, Floyd K, Adatu F, Odeke R, Gargioni G. Cost and cost-effectiveness of community-based care for tuberculosis patients in rural Uganda. *Int Journal Tuberculs Lung Dis.* 2003;7(9s1):S72-S79.
18. Clarke MD, J.Bogg, L. Cost-effectiveness analysis of an alternative tuberculosis management strategy for permanent farm dwellers in South Africa amidst health service contraction. *Scand J Public Health.* 2006;34(1):83-91.
19. Khan MAW, Witter JD, Imran SN, Safdar AN. Costs and cost-effectiveness of different DOT strategies for the treatment of tuberculosis in Pakistan. *Health Policy Plan.* 2002;17:178-186.
20. Prado TNW, Guidoni LM, Golub JE, Dietze R.Maciel EL. Cost-effectiveness of community health worker versus home-based guardians for directly observed treatment of tuberculosis in Vitoria, Espirito Santo State, Brazil. *Cad Saude Publica.* 2011;27(5):944-952.

21. Alam KK, J. A.Walker, D. G. Impact of dropout of female volunteer community health workers: an exploration in Dhaka urban slums. *BMC Health Serv Res.* 2012;12:260.
22. WHO. Treat all people living with HIV, offer antiretrovirals as additional prevention choice for people "at substantial risk". 2015; http://www.who.int/mediacentre/news/releases/2015/hiv-treat-all-recommendation/en/. Accessed March 14, 2016.
23. Yan HZ, Zhao M, Huan J, et al. The increased effectiveness of HIV preventive intervention among men who have sex with men and of follow-up care for people living with HIV after 'task-shifting' to community-based organizations: a 'cash on service delivery' model in China. *PloS one.* 2014;9(7):e103146.
24. Johns BA, E.Wong, W.Bekele, A.Minior, T.Kebede, A.Palen, J. Assessing the costs and effects of antiretroviral therapy task shifting from physicians to other health professionals in Ethiopia. *Journal of acquired immune deficiency syndromes* 2014;65(4):e140-147.
25. Johns B, Baruwa E. The effects of decentralizing anti-retroviral services in Nigeria on costs and service utilization: two case studies. *Health Policy Plan.* 2016; 3: 182-91
26. Fatti GM, Monteith L, Shaikh N, Kapp E, Foster N, Grimwood A. A Comparison of Two Task-Shifting Models of Pharmaceutical Care in Antiretroviral Treatment Programs in South Africa. *Journal of acquired immune deficiency syndromes 2016; 71: e107-113*.
27. Babigumira JBC, Stergachis B,Kiragga A, et al.. Cost effectiveness of a pharmacy-only refill program in a large urban HIV/AIDS clinic in Uganda. *PloS one.* 2011;6(3):e18193.
28. J Foster NM, D. Economic evaluation of task-shifting approaches to the dispensing of anti-retroviral therapy. *Human resources for health.* 2012;10:32..
29. Ruebush TK, Zeissig, R.Koplan, J. P.Klein, R. E.Godoy, H. A. Community participation in malaria surveillance and treatment. III. An evaluation of modifications in the Volunteer Collaborator Network of Guatemala. *Am J Trop Med Hyg.* 1994;50(1):85-98.
30. Sikaala CHC, Chanda D, Hamainza J, et al. A cost-effective, community-based, mosquito-trapping scheme that captures spatial and temporal heterogeneities of malaria transmission in rural Zambia. *Malar J.* 2014;13:225.
31. Jafar THI, Bux M, Poulter R, et al. Cost-effectiveness of community-based strategies for blood pressure control in a low-income developing country: findings from a cluster-randomized, factorial-controlled trial. *Circulation.* 2011;124(15):1615-1625.
32. Puett CS, K.Alderman, H.Coates, J.Fiedler, J. L.Myatt, M. Cost-effectiveness of the community-based management of severe acute malnutrition by community health workers in southern Bangladesh. *Health Policy Plan.* 2013;28(4):386-399.
33. Laveissiere CM, A. H.Doua, F.Sane, B. Detecting sleeping sickness: comparative efficacy of mobile teams and community health workers. *Bull World Health Organ.* 1998;76(6):559-564.
34. Buttorff CH,.Weiss RS, Naik HA, et al. Economic evaluation of a task-shifting intervention for common mental disorders in India. *Bull World Health Organ.* 2012;90(11):813-821.
35. Kruk MEP, C.Vaz, F.Bergstrom, S.Galea, S. Economic evaluation of surgically trained assistant medical officers in performing major obstetric surgery in Mozambique. *Bjog.* 2007;114(10):1253-1260.
36. Sadruddin SS, S.Bari, A.Khan, A.Ibad ul, HaqueKhan, A.Qazi, S. Household costs for treatment of severe pneumonia in Pakistan. *Am J Trop Med Hyg.* 2012;87(5 Suppl):137-143.
37. Chuit RP, I.Wisnivesky-Colli, C.Bo, R.Perez, A. C.Sosa-Stani, S.Segura, E. L. Result of a first step toward community-based surveillance of transmission of Chagas' disease with appropriate technology in rural areas. *Am J Trop Med Hyg.* 1992;46(4):444-450.
38. Cline BLH, B. S. Community-based approach to schistosomiasis control. *Acta tropica.* 1996;61:107-119.
39. Homedes N, Ugalde A. Improving access to pharmaceuticals in Brazil and Argentina. *Health policy and planning.* 2006;21(2):123-131.
40. Chaudhury RR, Parameswar R, Gupta U, Sharma S, Tekur U, Bapna JS. Quality medicines for the poor: experience of the Delhi programme on rational use of drugs. *Health policy and planning.* 2005;20:124-136.
41. Li Y, Ying C, Sufang G, Brant P, Bin L, Hipgrave D. Evaluation, in three provinces, of the introduction and impact of China's National Essential Medicines Scheme. *Bulletin of the World Health Organization.* 2013;91(3):184-194.
42. Khoja TA, Bawazir SA. Group purchasing of pharmaceuticals and medical supplies by the Gulf Cooperation Council states. *Eastern Mediterranean health journal* 2005;11(1-2):217-225.
43. Al-Abbadi I, Qawwas A, Jaafreh M, Abosamen T, Saket M. One-year assessment of joint procurement of pharmaceuticals in the public health sector in Jordan. *Clinical therapeutics.* 2009;31(6):1335-1344.

44. Amaral SM, Blatt CR. Municipal consortia for medicine procurement: impact on the stock-out and budget. *Revista de saude publica.* 2011;45(4):799-801.
45. Milovanovic DR, Pavlovic R, Folic M, Jankovic SM. Public drug procurement: the lessons from a drug tender in a teaching hospital of a transition country. *European journal of clinical pharmacology.* 2004;60(3):149-153.
46. Sigulem F, Zucchi P. E-procurement in the Brazilian healthcare system: the impact of joint drug purchases by a hospital network. *Pan American journal of public health.* 2009;26(5):429-434.
47. Adesina A, Wirtz VJ, Dratler S. Reforming antiretroviral price negotiations and public procurement: the Mexican experience. *Health policy and planning.* 2013;28(1):1-10.
48. Chaumont C, Bautista-Arredondo S, Calva JJ, et al. Antiretroviral purchasing and prescription practices in Mexico: constraints, challenges and opportunities. *Salud publica de Mexico.* 2015;57 Suppl 2:s171-182.
49. Tren RH, K.Bate, R. Drug procurement, the Global Fund and misguided competition policies. *Malaria journal.* 2009;8:305.
50. Ewen M, Al Sakit M, Saadeh R, et al. Comparative assessment of medicine procurement prices in the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). *Journal of pharmaceutical policy and practice.* 2014;7(1):13..
51. Bukhari SKQ, J. A.Jooma, R.Bile, K. M.Kazi, G. N.Zaibi, W. A.Zafar, A. Essential medicines management during emergencies in Pakistan. *Eastern Mediterranean health journal.* 2010;16 Suppl:S106-113.
52. Berger EJJ, Sauveur D, Manasse M, et al. Implementation and evaluation of a web based system for pharmacy stock management in rural Haiti. *AMIA Symposium.* 2007:46-50.
53. Shieshia MN, Andersson M, Felling S, e al. Strengthening community health supply chain performance through an integrated approach: Using mHealth technology and multilevel teams in Malawi. *Journal of global health.* 2014;4(2):020406.
54. Mikkelsen-Lopez IC, P.Kasale, H.Mbuya, C.Reid, G.de Savigny, D. Essential medicines in Tanzania: does the new delivery system improve supply and accountability? *Health systems* 2014;3(1):74-81.
55. Daff BMS, C.Belkhayat, H.Sutton, P. Informed push distribution of contraceptives in Senegal reduces stockouts and improves quality of family planning services. *Global health, science and practice.* 2014;2(2):245-252.
56. Steyn FS, H.Engelbrecht, M. C.van Rensburg-Bonthuyzen, E. J.Jacobs, N.van Rensburg, D. H. Scaling up access to antiretroviral drugs in a middle-income country: public sector drug delivery in the Free State, South Africa. *AIDS care.* 2009;21(1):1-6.
57. Lloyd J, McCarney S, Ouhichi R, Lydon P, Zaffran M. Optimizing energy for a 'green' vaccine supply chain. *Vaccine.* 2015;33(7):908-913.
58. Riewpaiboon A, Sooksriwong C, Chaiyakunapruk N, et al. Optimizing national immunization program supply chain management in Thailand: an economic analysis. *Public health.* 2015;129(7):899-906.
59. Management Sciences for Health. Revolving drug funds and user fees. 2012; http://apps.who.int/medicinedocs/documents/s19589en/s19589en.pdf. Accessed March 15, 2016.
60. Witter S. Achieving sustainability, quality and access: lessons from the world's largest revolving drug fund in Khartoum. *Eastern Mediterranean health journal* 2007;13(6):1476-1485.
61. Knippenberg R, Alihonou E, Soucat A, et al. Implementation of the Bamako Initiative: strategies in Benin and Guinea. *The International journal of health planning and management.* 1997;12 Suppl 1:S29-47.
62. Uzochukwu BSO, O. E.Akpala, C. O. Effect of the Bamako-Initiative drug revolving fund on availability and rational use of essential drugs in primary health care facilities in south-east Nigeria. *Health policy and planning.* 2002;17(4):378-383.
63. The Global Fund to Fight AIDS Tuberculosis and Malaria.AMFM Phase 1 Independent Evaluation. 2016; http://www.theglobalfund.org/en/privatesectorcopayment/amfmindependentevaluation/#related-resources. Accessed February 18, 2016.
64. Tougher S, Ye Y, Amuasi JH, et al. Effect of the Affordable Medicines Facility-malaria (AMFm) on the availability, price, and market share of quality-assured artemisinin-based combination therapies in seven countries: a before-and-after analysis of outlet survey data. *Lancet.* 2012;380(9857):1916-1926.
65. Sabot OJ, Cohen A, Mipuge J. Piloting the global subsidy: the impact of subsidized artemisinin-based combination therapies distributed through private drug shops in rural Tanzania. *PloS one.* 2009;4(9):e6857.