



HEALTH AS A PRODUCTIVE SECTOR: INTEGRATING HEALTH AND INDUSTRIAL POLICY

By: Maureen Mackintosh and Paula Tibandebage

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ABSTRACT

Health care is often represented as a purely “social” sector, implying that health care expenditure is a burden on the economy. We argue in this paper that on the contrary, health care is economically productive, and that health care in Tanzania could be much *more* economically and socially productive if health policy and industrial policy were more closely integrated. Increasing the depth and breadth of domestic economic linkages between the health services and industrial and commercial suppliers within the Tanzanian economy can strengthen economic development while improving health care. The paper begins by defining what we mean in this paper by “health services”, “health care” and “health sector”. It then examines the economic size of health care (production and financing), the employment it generates, and its linkages to the wider economy through procurement and wholesaling. It demonstrates that the health sector, broadly defined, is economically important as a major service sector, a location of investment, a generator of employment and income, a sector of skilled training and employment, and a location for industrial growth.

The health of the health sector is very important for the health of the wider economy. The rest of the paper analyses the linkages between health care and manufacturing in Tanzania in more detail. It traces the declining share of local manufacturers of medicines and other health supplies in the expanding Tanzanian domestic market, quantifies the scale of this missed opportunity for industrial development to supply the needs of health care, and examines its causes. Finally, the paper looks at the scope for integrating health and industrial policy, arguing that reconstruction of these domestic economic linkages is both possible and desirable. Health policy strongly influences industrial development. Furthermore, the Tanzanian public health services suffer severely from shortages of essential supplies. We argue that it is possible for economic and social policy, working together, to strengthen and deepen economic ties within the economy, to the benefit of both the effectiveness of health services and public health, and manufacturing employment and development.

1. INTRODUCTION: HEALTH, PRODUCTION, AND THE ECONOMY

This background paper takes as its starting point the framing of the THDR 2017 in the initial Concept Note (Kida and Wuyts, 2015) as aiming to develop an understanding of social and economic policy as mutually constitutive. We aim to contribute to the development of that argument for the case of health. We examine the productive nature of health care in Tanzania, identifying interlocking ways in which investment in the health sector, using a broad definition of that sector, is economically and socially productive for the Tanzanian economy and population. We argue that the so-called “social sector” of health care is actually a key economic sector in its own right, contributing to economic development, as well as an important sector directly influencing human well-being through the services it provides. We build on the overview and historical analysis of the evolution of the sector provided in the Background Paper for the THDR 2014 on health sector reforms and health services (Mujinja and Kida, 2014), to argue that the mutually constitutive nature of health and industrial policy could be strengthened greatly, with considerable economic and social benefits for the Tanzanian population.

1.1 The Productive Impact of Health Care: Health Services, Employment, and Industrial Linkages

Health care is often represented as a purely “social” sector, implying that health care expenditure is a burden on the economy. We argue in this paper that, on the contrary, health care is economically productive, and that health care in Tanzania could be much *more* economically and socially productive if health policy and industrial policy were more closely integrated. Increasing the depth and breadth of domestic economic linkages between health services and industrial and commercial suppliers within the Tanzanian economy can strengthen economic development while improving health care.

Health care delivered by public health facilities, by faith-based and private facilities, and by private shops plays two distinctive economic roles in the development of the domestic market. First, health service employment generates an important element of domestic demand via the multiplier effect. This is a macroeconomic impact. Health facilities, pharmacies, and drug shops employ large numbers of people (see Section 2). Government expenditure on health is largely spent on wages and salaries, and this has an important multiplier effect, generating a second round of spending on wage goods, much of it within the domestic economy. In the faith-based and private sectors, investment in facilities and shops generates employment that again has a multiplier effect on domestic demand. Since personal savings rates from wages and salaries are quite low, the multiplier effect of government health spending and private and faith-based investment on final demand in the economy is likely to be quite large. Health care also attracts large aid inflows that also boost employment and hence demand through the same route (see Section 2).

Second, health care has a sectoral impact that also generates positive macroeconomic effects. Health care requires large amounts of goods and services as inputs to its production.

These inputs include medicines, a wide range of other medical supplies and equipment, and many other basic supplies such as packaging and cleaning materials (see Section 3; Tibandebage et al., 2016). As a result, the procurement activities of government health care providers and the government wholesaler (the Medical Stores Department, MSD), as well as purchasing from private wholesalers by all sectors of health care, generate high levels of demand for goods and services. The more that this demand is supplied by domestic producers, the more the demand generates employment in the non-health industrial and service sectors. In other words, health service procurement opens up opportunities for industrial investment and commercial investment (see Sections 3 and 4), generating economic growth. Furthermore, the health sector acts as a locus and stimulator for research, innovation, investment, and growth in the wider economy, through its ability to use effectively inputs of knowledge, services and supplies; health facilities also provide sites for research, and for the effective use of appropriate manufacturing investment and innovation. Improved purchasing, and closer links to education, training, and research, can increase the productive sectoral and macroeconomic impact of health care in the wider economy (see Section 4). Furthermore, reducing the very high import-dependence of health care – by reducing the ratio of imports to domestic production in supplying health services' demands – may also help to tackle the national trade deficit in the medium term.

These two economic impacts of health care are very poorly documented and studied in the international literature and national policy debates at present. Our aim in this paper is to contribute to highlighting the developmental opportunities that arise from health-industrial linkages. Inclusive economic development requires the expansion of the domestic market – that is, the expansion of local production of goods and services for consumption within the country. Only by deepening these internal economic linkages, between the consumption of essential goods and services and the employment of people to produce them, can the inclusion of the population in economic growth be pursued. Production for export is also developmentally essential to reduce the trade gap and bring foreign exchange into the economy, but exporting alone cannot sustain inclusive development. We argue here for strengthening the domestic linkages between health services and industrial development as one important route to improved economic *and* social development.

There is also a third route by which health care influences economic and social development, namely through its direct impact in improving health status. If health care, including public health, is effective in improving population health, then it contributes importantly to creating a more capable, energetic, skilled, and productive workforce. This is the best documented economic impact of health care. It helps to sustain the health and strength of people of working age, raising their productivity in work, helping to ensure their energy to develop skills and knowledge, to run businesses, hence contributing to productivity and economic growth. Effective health care supports women of child-bearing age to sustain and regain their health through childbirth, helping to ensure healthy children who can benefit from education; it also increases longevity and helps to maintain people through economically and socially active older ages. Conversely, therefore, bad health care that lowers population health undermines the productivity of the economy as a whole.

Econometric work confirms this impact of improvements in health status on economic growth and productivity, especially at low income levels (López-Casasnovas et al., 2005). In African contexts researchers have found a positive association between health expenditure

and population health (with public health expenditure effects being stronger than private), and between population health and labour force participation (Anyanwu and Erhijakpor, 2007; Novignon et al., 2012, 2015). There are also cumulative feedback effects, since socio-economic status is found to have a causal effect on health status (Ajakaiye and Mwabu, 2012, using Kenyan data). Conversely, maternal mortality, which remains high across much of Africa, has major negative effects on non-health GDP (Kirigia et al., 2014). We do not survey this substantial literature further here, nor discuss in any more depth this well documented impact, noting only that it underscores the productive effects of improved health status through increases in effective health care expenditure.

1.2 Sources and Methods

This paper draws mainly on a DFID-ESRC funded research project hosted in 2012–15 by REPOA in Tanzania. Entitled *Industrial productivity, health sector performance, and policy synergies for inclusive growth: A study in Tanzania and Kenya*, the hypothesis addressed by the research project was that there are unexploited synergies between upgraded local industrial supply of pharmaceuticals, equipment, and other essential medical supplies, and the improvement of health services' quality and inclusiveness; and that there is scope for effective policy intervention. The research in Tanzania included a quantitative and qualitative study of the supply chains into health care, in public, faith-based and private facilities and shops (Tibandebage et al., 2014). In total, those responsible for procurement were interviewed in 42 facilities and shops in four districts in two regions of Tanzania. Semi-structured interviews on procurement experience, practices, and challenges were supplemented in each facility or shop with data on the availability of a set of “tracer” essential medicines and other essential supplies (see list in Appendix to this paper). All interviewees were asked about the balance of locally produced vs. imports in their supply chain, and their opinions on locally manufactured supplies.

In a second round of research, all active pharmaceutical firms in Tanzania were interviewed about their experience of supplying the Tanzanian health sector; in addition, six firms supplying non-pharmaceuticals were also interviewed, including suppliers of bed nets, mattresses, cleaning equipment, and plastic packaging. Finally, wholesalers and policy makers were also interviewed. High-level policy dialogues in Tanzania reviewed the findings and fed into recommendations.

In addition to findings from this project, this THDR background paper is based on document searches concerning health sector funding in Tanzania, a literature review on the economic effects of health care investment, and the collection of health sector and relevant industrial data. Tables and figures are from the authors' primary research except where indicated.

1.3 Organization of the Paper

Section 2, “The Economic Importance of the Health Sector”, defines what we mean in this paper by “health services”, “health care” and “health sector”. It then outlines the economic size of health care (production and financing), the employment it generates, and its linkages to the wider economy through procurement and wholesaling. It demonstrates that the health sector, broadly defined, is economically important as a major service sector, a location of investment, a generator of employment and income, a sector of skilled training and

employment, and a location for industrial growth. The health of the health sector is very important for the health of the wider economy.

Section 3, “Linkages between Health care and Manufacturing”, examines in more detail the impact of health care on manufacturing in Tanzania. It traces the declining share of local manufacturers of medicines and other health supplies in the expanding Tanzanian domestic market, quantifies the scale of this missed opportunity for industrial development to supply the needs of health care, and examines its causes.

Finally, Section 4, “Integrating Health and Industrial Policy”, argues that reconstruction of these domestic economic linkages is both possible and desirable. Health policy operates, necessarily, as ‘implicit’ industrial policy, strongly influencing industrial development. Furthermore, the Tanzanian public health services suffer severely from shortages of essential supplies. Given these findings, we argue that it is possible for economic and social policy, working together, to strengthen and deepen economic ties within the economy, to the benefit of both the effectiveness of health services and public health, and manufacturing employment and development.

2. THE ECONOMIC IMPORTANCE OF THE HEALTH SECTOR

By “health services” we mean the care provided to the population by health facilities (public, faith-based, and private). By “health care” we mean those health services *plus* retail medicines sales in pharmacies and shops. By “health sector” we mean health care *plus* public health activities (such as surveillance and prevention), industrial and commercial supply of inputs to health service providers (and those firms’ inputs in turn), the higher education and training institutions for health-related skills and knowledge, and the scientific, technical, and regulatory institutions that support health care quality and improvement. In itself that list makes clear the importance of the sector. (Yet even this extensive list does not include many health-related activities in the economy, from traditional healers to providers of clean water and sanitation and changes in quality and availability of food. We do not discuss those latter activities further here.)

Measuring and describing the economic importance of the health sector in that broad sense is difficult because of data limitations; estimates of its size are generally underestimates. This section argues that health care, as measured by financial flows, is a large, productive element of the economy (see Section 2.1), that it employs large numbers of skilled staff, including those in industrial supply sectors and medicines distribution (see Section 2.2), and that its linkages to industrial and commercial suppliers generate an important developmental impact in the wider economy. Each section identifies areas where the productive impact of health care in the economy could be enhanced, with particular emphasis on strengthening the linkages between health care and the wider economy.

2.1 Production and financing of health care

How economically important is health care? A standard indicator from the Tanzanian national accounts is the share of health services’ value added in GDP. However, this provides a misleadingly small estimate: Table 1 shows that, measured by value added, the Tanzanian economy has a large services sector, but less than 2% of GDP is provided by health services.

This low share of value added arises in part from the productive structure of health care, and in part from industrial classifications. As outlined below, health facilities are predominantly public and non-profit, while private facilities frequently report low or no profits, so health facilities’ value added consists mainly of labour costs. Furthermore, the large public administration category (10.61% of GDP in 2012) will include health sector administration, just as education will include training for the health sector, and trade will include pharmacies, all therefore not included in Table 1, columns 2 and 5.

Table 1: Tanzanian health services and all services: Sectoral value added as % GDP at market prices (2004, 2008, 2012)

	Health services* value added (TZS millions)		All services value added (TZS millions)	GDP Current market prices (TZS millions)	Health services* share of GDP (%)	All services share of GDP (%)
2004	200,933		5,870,447	13,971,592	1.44	42.02
2008	210,525		7,085,136	14,828,345	1.42	47.78
2012	737,964		19,618,090	44,717,663	1.65	43.87

Source: Ministry of Finance (2012), Table 3, p. 13.

*"Health services" in this table does not appear to include retail pharmacies and shops selling medicines; they are likely to be included in the Trade services category.

By measuring only value added in health services, Table 1 therefore sharply underestimates the importance of health care in the national economy. As Table 2 shows, measures of health care financing indicate that health care makes up a substantially higher share of national economic activity. The National Health Accounts (NHA) give Tanzania's most complete assessment of health spending in the economy; the draft NHA for 2011/12 estimates health spending at 8.3% of the national economy (see Table 2, row 1): this is a substantial share of all economic activity in Tanzania. Alternative figures for the ratio of total health spending to national income vary according to the methodology used between 5.8% and 7.1% (Table 2, rows 2 and 3). Furthermore, health spending by households was estimated at 3.1% of consumption spending and 7% of non-food spending in 2011/12 (see Table 2, rows 4 and 5).

However, there are many constraints on the productive use of Tanzanian health care financing. Financing is fragmented, and is dominated by non-government (donor and private household) spending. By contrast, the provision of health services is dominated by public and non-profit (mainly faith-based) providers. This creates a complex and financially constrained health care system, undermining access and quality of care.

The National Health Accounts show that health care is financed from three major sources: government funds; donor funds (some of which go to the government budget while some are spent directly – see below); and private spending which is largely spent out-of-pocket by households on a fee-for-service basis and for medicines, with a small insurance contribution (see Table 3, row 4). The major shift in spending shares over the last decade (see Table 3) was from public to donor financing: by 2011/12, donors were funding nearly half of health care spending (see Table 3, row 2), a share that looks unsustainable. The shares fluctuate over time, but the dominance of non-government funding persists: WHO data for 2013 indicate 33.2% of health funding from external sources, and 36.3% private, mainly out-of-pocket spending.¹ Furthermore, according to the most recent NHA data, the public sector *spent* 38.4% of total health funding in 2011/12, while *raising* only 20.7% from public funds. This implies limited government leverage over the use of public health expenditure.

Table 2: Financing indicators for the size of Tanzanian health care relative to the national economy, various years

	Indicator and units	Year	Health	National or total	Health %
1	Total health spending /nominal GDP (TZS million/year) (NHA)	2011/12	3,127,221	37,532,962	8.3
2	Total health spending /GNI (US\$/head PPP basis) (WHO)	2012	117	1650	7.1
3	Total health spending/GNI (US\$/head exchange rate method) (WHO/World Bank)	2013	49	850	5.8
4	Mean household health spending/mean household consumption expenditure (TZS/month) (Tanzania mainland)	2011/12	8,021	258,751	3.1
5	Mean household health spending/mean non-food household consumption expenditure (TZS/month) (Tanzania mainland)	2011/12	8,021	115,239	7.0

Sources:

1. Tanzania National Health Accounts (NHA) data for 2011/12; data obtained from the Department of Policy and Planning, Ministry of Health, Community Development, Gender, the Elderly, and Children (MHCDGEC).
2. World Health Organization, <http://apps.who.int/gho/data/node.country.country-TZA>.
3. World Health Organization, <http://apps.who.int/gho/data/node.country.country-TZA>, accessed 04.03.16; World Bank, <http://databank.worldbank.org/data/reports.aspx?source=2&country=TZA&series=&period=>, accessed 04.03.16.
4. NBS (2014).
5. NBS (2014).

The Tanzanian health facilities on which the population relies, however, are mainly owned and run by government or faith-based organizations (FBOs), though the private sector has been expanding since the early 1990s when for-profit private practice was re-introduced after being banned in 1977. The rural areas continue to be served mainly by public health facilities. The public sector has, in principle, a pyramidal structure with referral from dispensaries at the lowest level to zonal specialized consultant and national hospitals, though patients often go straight to higher levels for serious illnesses. Table 4 shows the current distribution of health facilities in Tanzania mainland by level and ownership of health facility.

Some faith-based hospitals operate as District Designated Hospitals, with salaried staff supported by government funds. The dominance of the public and FBO sectors is greater than Table 4 suggests, and is better indicated by the high share of total beds found in these two sub-sectors (see Table 5). The private hospitals are generally small. Furthermore, the last Tanzanian *Demographic and Health Survey* (2010) estimated that of women delivering in health facilities, 97% went to public or FBO facilities (NBS, 2011), and of children with diarrhoea taken for treatment of some kind, 22% went to shops and pharmacies and most of the rest to public facilities.² Meanwhile the private sector has tended to bifurcate into two sub-sectors: low level (often low quality) facilities that serve very low income populations such as high density urban areas that have few public dispensaries, and small higher quality

facilities serving the small percentage of the population with some form of insurance and somewhat higher income levels (Kida, 2009).

Table 3: Percentages of financing source for health care (total health expenditure), 2002/3, 2005/6, 2009/10, 2011/12

Financing source	2002/03	2005/06	2009/10	2011/12
Households	25.4	28.0	26.0	24.7
Donors	27.4	44.0	39.6	48.3
Ministry of Finance	42.0	25.0	32.3	20.7
Other private	5.1	3.0	2.1	6.3
Total	100	100	100	100

Source: MoHSW (2011), National Health Accounts (2002/3–2009/10); draft NHA tables (2011/12).³

*Data for 2002/3 - 2009/10 as published in 2009/10 NHA.

Table 4: Distribution of health facilities by level and ownership (number of facilities) 2015

Level	Ownership			Private	Total
	Government	FBOs	Parastatal		
Dispensary	4,502	626	116	716	5,960
Health Centre	484	141	12	79	716
Hospital	129	79	15	34	257
Total	5,115	846	143	829	6,933

Source: Desk officer, MoHSW; data as of July 2015.

Table 5: Distribution of available health facility beds by level and ownership 2011

Level	Ownership			Private	Total
	Government	FBOs	Parastatal		
Health Centre	8,766	5,286	271	800	15,123
Hospital	15,697	14,677	800	1,187	32,361
Total beds	24,463	19,963	1,071	1,987	47,484
% of total	51.5	42.0	2.3	4.2	100

Source: MoHSW (2012a).

Given the importance of the public sector, public financing constraint is particularly important for health care availability and quality. Ministry of Health data show that public spending on health care via the government budget (including donor support) actually fell in real terms from 2009/10 to 2011/12 (see Table 6); the fall is particularly sharp in dollar terms (see Table 6, row 5), a matter of particular concern given the reliance of the sector on imported inputs (see further below). In 2010/11 and 2011/12 the under-spend (“actual” relative to the budget) was also large (see Table 6). In 2011/12 the actual public spending on health was 2.56% of GDP, down from over 3% in 2009/10; in real terms (2001 prices) it fell to UD\$6.9

per head, down from US\$9.55 in 2009/10 (see Table 6, row 5).

In 2012/13 nominal spending per head fell again, and although it rose in 2013/14 it fell back almost to 2011/12 levels in 2014/15,⁴ implying a continuing and worsening squeeze on underfunded public health services as the population rose. Furthermore, at 8.6% in 2014/15,⁵ the share of health care in total government spending is far below the 15% recommended in the Abuja Declaration. The government has also persistently underspent its health budget (including donor support): the PER (MoHSW, 2012b) notes difficulties in expending allocated donor funds, because “cumbersome procurement procedures” delay expenditure (p.17).

Table 6: Public health spending in nominal and real terms, 2008/9–2012/13

Indicator	2008/9		2009/10		2010/11		2011/12		2012/13
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
Nominal (TZS billion)	734	707	925	918	1,220	920	1,209	1,051	1,289
Nominal per head (TZS)	18,460	17,781	22,655	22,483	29,098	21,943	28,075	24,409	29,150
Real (TZS billion)	424	408	496	493	605	456	545	474	520
Real per head (TZS)	10,651	10,259	12,160	12,068	14,431	10,883	12,653	11,001	11,769
Real per head (US\$)	8.86	8.54	9.62	9.55	10.90	8.22	7.94	6.90	7.38
Exchange rate		1,202		1,264		1,324		1,594	1,594
Deflator (2001 prices)		1.73		1.86		2.02		2.22	2.48

Source: MoHSW (2014b).

Of this public spending, around two thirds is funded by the government of Tanzania, and around a third by donors (see Table 7, rows 1 and 2). Of the donor spending, rather less half goes into a “basket” fund that health facilities can draw upon at District and Regional level for medicines and other expenses; the rest is on-budget, donor supported public spending which does not go through the basket (see Table 7). There is also a small “off budget” contribution to public health spending (see Table 7, row 5) which consists of user fees and charges (“cost sharing”) and spending by the Community Health Funds.⁶

Table 7: Percentages of public health funding (actuals) by source and year

Source of funding	2008/9	2009/10	2010/11	2011/12
Government of Tanzania	65.3	63.0	61.9	66.9
Foreign	33.9	35.8	36.6	32.1
Of which: Basket	12.1	14.0	13.6	14.2
Non-basket	21.8	21.8	23.0	17.9
Off-budget	0.8	1.2	1.5	1.0
Total	100.0	100.0	100.0	100.0

Source: MoHSW (2014b).

The small element of public health spending arising from cost sharing is consolidated in the Health Service Fund (HSF). User fees in the public sector were introduced in 1991 after the government realized that it was no longer able to provide free essential health care services of acceptable quality to all Tanzanians. It was thus expected that user fees would generate additional revenues to improve the availability of quality health services. The introduction of user fees proceeded in phases, starting with the referral, regional, and district hospitals in 1993/94. By 2004 user fees had been rolled out to the primary level of health care provision – health centres and dispensaries. Contribution of this cost-sharing money to the budget in LGAs remains significantly low: receipts were below TZS10 billion in 2011/12 (MoHSW, 2014b), but the funds are nevertheless an important source of operating expenses for public health facilities that otherwise lack any access to cash for day-to-day items.

The other source of off-budget expenditure included in public health spending, the Community Health Fund (CHF) and its urban version Tiba kwa Kadi (TIKA), had very low coverage in 2011/12, at 641,753 and 5,951 households respectively (MoHSW, 2014b). Assuming membership of six people per household, population coverage was then less than four million. Recent figures show rising enrolment to over 1.1 million households in 2014/15, representing over 14% of the population, with widely varying regional coverage.⁷ There is room, therefore, for this complementary source of funding to increase enrolment, generate much more revenue, and enhance the capacity of lower-level health facilities to improve the quality of health services while catering for a larger population.

Finally, the National Health Insurance Fund (NHIF) is a social insurance fund taking contributions as a share of wages and salaries from employers and employees; it constitutes the largest source of insurance-based health expenditure. Data on NHIF reimbursements to health facilities in 2011/12 showed a large majority of expenditure at hospital level: 50% of all spending went to referral hospitals, with just 7% each to dispensaries and health centres. By ownership, 45% went to faith-based facilities, 29% to government, and 26% to private facilities (MoHSW, 2014b). The rough equivalence in reimbursements between government and private sector is worth noting, given a disproportionately larger number of government health facilities. The fragmented financing system creates a problematic public/private interface, and undermines value for money from each financing stream (Tibandebage et al., 2013). The government's medium-term aim in health financing is to move to full national health insurance coverage with subsidy for those unable to contribute.⁸

Most private and donor health financing spending is thus not included in Table 7's "off budget" category. Private funding consists mainly of private purchase of medicines in shops and pharmacies; donor funding goes to vertical programmes and NGO projects; and private fees go to faith-based and private facilities. The government has recognized that retail shops and pharmacies are an important source of medicines for the population, and require better regulation. It has invested heavily with donor support in developing a regulated network of drug shops, called Accredited Drug Distribution Outlets (ADDOs). There are currently 7,697 ADDOs in Tanzania, eclipsing in numbers the 1099 regular pharmacies of which over half are in Dar es Salaam.⁹

All sub-sectors of Tanzanian health care are thus severely cash-strapped. The financial constraints on health services and retail medicine sales reflect low incomes and generalized poverty, and undermine their core role of ensuring a healthy and productive population.

The financing constraint on public health services outlined above is particularly damaging in this regard, and reduce the employment and industrial linkages traced in the next two sub-sections.

2.2 The Health Sector as an Employer

The health sector as a whole – health care and its wider linkages in the economy – is a major employer, notably providing valuable skilled employment in a generally low-skill economy. Employment in health services was registered at just below 5% of total regular employment in the economy in 2013 (see Table 8, row 1). Of the approximately 70,000 regular health services employees, 78% were working in the public sector, 20% in the faith-based sector, and just 2% in the private sector, emphasising again the dominance of the public and faith-based providers of health services (MoHSW, 2014a). Furthermore, 66% were women; the health services are an important employer of skilled female labour. Row 2 in Table 8 adds regular employment in the pharmaceutical industries. Since many people seek first-line health advice and medicines in shops and pharmacies, an estimate of that additional employment, added in row 3, takes the health sector workforce over 5% of regular employment.

Table 8: Health sector employment as a share of total regular employment 2013

	Indicator and units	Year	Health	National or total	Health %
1	Health service employees/total regular employment (MoHSW/NBS)	2013	70,244	1,547,337	4.5
2	Health service plus pharmaceutical production employees/total regular employment (MoHSW/NBS)	2013	71,540	1,547,337	4.6
3	Health service plus pharmaceutical production employees plus ADDO and pharmacy employees (estimate)/total regular employment	2013	81,435	1,547,337	5.3

1. Ministry of Finance (2012), p. 94; MoHSW (2014a); NBS (2013a).

2. As 1, plus National Bureau of Statistics (Annual Survey of Industrial Production) Statistical Abstract, (NBS, 2013b).

3. As 2, plus Pharmacy Council of Tanzania, data extracted from files (estimated employment: 1 per ADDO plus 2 per pharmacy).

Investments in health care and training, by both the government and the non-government sectors, are potentially expanding employment in the health sector. The government's Primary Health Services Development Programme (MoHSW, 2007) aims to expand sharply the capacity of the public health sector, by providing every village with a dispensary, every ward with a health centre, and every district with a district hospital. This facility investment programme will be productive only if the current constraints on health service staffing can be broken. At present there is severe understaffing, putting the efficiency and efficacy of the health sector investment at increasing risk, with huge shortages registered across almost all professional categories in the public sector. The Human Resources for Health deployment tracking study, in 103 districts in 2009, found an overall HRH gap in these districts was about 54% (Sikika, 2010). NHA data at that date found a more or less stagnant trend in the

number of clinical staff (physicians, Assistant Medical Officers, nurses, and nurse-midwives) (MoHSW, 2011). The recorded number of health workers in the 2012 HRH profile (64,449) was only 52% of requirements using the 1999 staffing norms, or 36% of the need using the new staffing norms (MoHSW, 2013).

The latest data (MoHSW, 2014a) show these shortages in stark terms compared to the numbers required to provide quality health services to the Tanzanian population. For example, at the dispensary level only 4,121 enrolled nurses were available compared to the required 11,826, and only 408 Assistant Health Laboratory Technologists were available compared to the required 5,913. At the health centre level, examples of huge shortages include those for enrolled nurses (2,267 available compared to the required 6,399), Medical Assistants (2,820 available compared to the required 4,977), and Health Laboratory Technologists (132 available compared to the required 711). At the dispensary level, total workforce available (including support staff) was 15,620 compared to the required workforce of 53,217 (MoHSW, 2014a). This was less than one third of the required workforce.

This HRH crisis has deep roots, but was exacerbated by a government-imposed public sector employment freeze from 1993 to 1999 as part of the measures to address the financial crisis in the public sector, and the retrenchment exercise as part of the civil service reforms. Between 1994/95 and 2001/02 the number of public sector health workers fell from 67,000 to 49,900 (MoH, 2004). Cumulative causes of continuing crisis have included some health workers opting to work outside the health sector both locally and abroad. For example, while numbers of pharmacists graduating have increased, pharmacists/pharmacy technicians per 10,000 population fell from 0.15 in 2008 to 0.13 in 2012. These inconsistent trends are attributed to employment in private pharmacies (MoHSW, 2013). Table 9 documents the persistence of a gap between demand and supply of trained health workers in the public sector. The non-public sector also suffers from shortages of trained personnel (MoHSW, 2014a, pp. 38, 39).

Table 9: Percent of recruited public sector health workers against permitted posts 2009/10–2013/14

Year	New positions granted by PO-PSM	Number of graduates posted by MoHSW	%
2009/10	6,257	4,090	65
2010/11	7,471	5,704	76
2011/12	9,391	6,704	68
2012/13	8,002	5,702	67
2013/14	11,221	7,677	68

Source: MoHSW (2014a).

Paradoxically, however, these acute shortages sit alongside unemployment among graduates of some health-related training courses, including medical doctors (MoHSW, 2014a). Both government and the private sector are investing in training institutions (Table 10). By 2014, private training institutions (FBO and for-profit) accounted for 46.4% of the total, including medical and other related sciences up to degree level, including Doctor of Medicine, Clinical Officer, Clinical Assistant, pharmacy, nursing and midwifery, paramedical, laboratory, and health medical records training. By 2011, of the eight medical schools

only two were government-run, with the remaining owned by FBOs (four) and for-profit training institutions (two) (MoHSW, 2013). The MoHSW is responsible for all non-degree level programmes that offer mid-level cadre programmes for health professionals. In 2014 there were a total of 82 government-owned training institutions under the Ministry of Health (MoHSW, 2014b). The Ministry is also entrusted with the task of supervising health training institutions in the private sector. Furthermore, the government sponsors students pursuing higher-level health-related training in universities, both public and private. In-service training including Continuing Professional Development (CPD) is also provided for different cadres to enable them to keep up with new demands on skills.

Table 10: Number of training institutions by ownership: 2007–2014

Ownership	Number of Training Institutions		
	2007	2009	2014
Government	62	82	82
FBO	61	49	54
Private	3	3	17
Total	126	134	153

Source: MoHSW (2014b).

There are a number of interlocking reasons for these shortages alongside unemployment. They include fiscal constraints, poor fiscal management, human resource management failings in the sector, poor wages and working conditions that discourage career commitment, and options for migration and for non-health sector employment of graduates. With a population of about 45 million people, the health sector needs to employ more skilled health workers to cope effectively with the high burden of disease and to support a more capable and productive national workforce. Increased employment will improve health services productivity, and create multiplier effects in the economy as employed staff spend wages and salaries. For example, health workers' salaries account for over 60% of LGA-level public health spending (MoHSW, 2014a), and these workers spend their salaries and other monetary benefits on goods, other services, and even small business investments that generate further economic growth.

2.3 Buying Medicines and Supplies

Health care, in addition to providing essential services for the population's well-being and creating employment and multiplier effects on demand in the national economy, has one other major economic impact in the national economy: through the purchase of inputs. Like the economic benefits from health services, and health care employment and its impact on domestic demand in the economy, the procurement of inputs also has major economic benefits which could be still larger and more productive if better managed.

Health care thus provides an important market for manufacturers of medicines and supplies that address some of the population's basic needs. These medicines and other supplies are essential inputs for the provision of quality health services. The availability of essential supplies within the public sector fluctuates, but there are many gaps, obliging patients to struggle to buy medicines in shops and pharmacies at higher prices. The *Industrial Productivity and Health Sector Performance* research project (see Section 1) undertook

exploratory interviews about supply chain experiences that support other evidence in this regard. Shortages of supplies were particularly notable in this study in lower level public facilities (health centres and dispensaries) visited during the survey in 2012/13. Tables 11 and 12 show the data for the availability of the set of tracer essential medicines and a set of essential supplies including basic equipment and medical supplies, cleaning materials, and basic laboratory items (see Appendix for the list of tracer items). Availability was consistently better in the faith-based facilities.

The items ‘never ordered’ by more than 50% of lower level public sector facilities included most of the medicines used to treat chronic conditions and mental illness: atenolol (hypertension), omeprazole (ulcers), amitriptyline (depression), metformin (diabetes), and glibenclamide (diabetes). Furthermore, one of our tracer medicines was injectable oxytocin, used for treating post-partum bleeding: 38% of lower level facilities were either waiting for supplies or did not stock it (spread across all sectors). Medical supplies, equipment, and other basic supplies also showed relatively low availability in both public and private dispensaries and health centres (see Table 12), despite the essential nature of these items. The supplies and equipment ‘never ordered’ did not appear to be unnecessary. Nearly half of public health centres had no glucometer to test blood sugar for diabetes, and a majority had never had glucometer strips to use with it; one had never had microscope slides required for e.g. malaria tests; nearly half had no sharps box; a quarter had never had bed nets (though all health centres have beds); a majority had never ordered hydrogen peroxide for wound cleaning; and one had never had a weighing scale for paediatrics. A majority of public dispensaries lacked a microscope – and even more lacked the slides for it – and while all the public facilities had surgical gloves when visited, we know from other evidence (Tibandebage et al., 2015) as well as interviews for this project that protective gloves are periodically out of stock.

Table 11: Availability of tracer medicines in lower level facilities, by sector (% of all tracers)

Facility/shop sector	Availability			Total
	Available	On order	Never ordered	
Public	58	9	32	100
Faith-based	72	7	22	100
Private	63	6	31	100
Total	62	8	26	100

n=624

Source: project data; Tibandebage et al. (2014).

Table 12: Availability of tracer supplies in lower level facilities, by sector (% of all tracers)

Facility/shop sector	Availability				Total
	Available	On order	Never ordered	Not functioning	
Public	62	5	32	1	100
Faith-based	79	3	17	1	100
Private	64	3	33	0	100
Total	66	4	29	1	100

n=781

Source: project data; Tibandebage et al. (2014).

Interviews with staff members in health facilities who ordered and managed supplies confirmed problems and gaps in availability, including lengthy supply chains, especially in public dispensaries and all health facilities in the more remote districts; long delays from order to delivery; and incomplete supply of orders. Here are a few representative examples of respondents' problems:

Box 1

Medicines from [the public wholesaler] do not come on time. For example, at our centre the batch that was to be delivered in December 2012 was delivered on 1 February 2013. There was no medicine at this centre the whole of January. We wrote to DMO and we were told there was no stock. (In-charge, public dispensary, District 3)

[The public wholesaler] delays delivery of supplies. So it's so challenging, because we are dealing with human beings whose lives we need to save. We don't have much choice other than waiting for [the public wholesaler] to deliver supplies. (Hospital pharmacist, public hospital, District 1)

Sometimes up to 45% of the order is reported missing... [The public wholesaler] writes 'out of stock' on so many items on the sales invoice. For example, on 13 January 2013 the batch from [the public wholesaler] which was ordered in October 2012 had 107 items but 57 were missing... (Hospital pharmacist, public hospital, District 3)

Persistent supply shortages – and the resultant shift to purchase in shops – thus badly undermine the productivity of the public health services. Nurses and doctors cannot provide good quality care without reliable access to essential medicines and supplies. Health service medicines and supplies rely very heavily on the two main non-government sources of funding: donors and private OOP payment. Donors have greatly increased their funding for medicines and supplies in recent years, notably for HIV/AIDS, TB and malaria medicines, and subsidized bed nets. Data on the size and funding of the medicines market as a whole are poor, but it is clear that the Tanzanian government now relies heavily on this donor funding, using domestic health public expenditure for salaries and other items instead (see Table 13). While the estimates in Table 13 have a margin of error, and while the percentages vary substantially from year to year, the implication that the Tanzanian government currently has little funding leverage over health sector supplies seems to be robust. There have been some negative consequences of this loss of policy leverage for the wider impact of the health services on the Tanzanian economy as a whole, discussed in Section 3.

Table 13: Estimate of the approximate share of domestic public expenditure in the domestic medicines market (year to which data refer in brackets)

	US\$ millions	% of total market
Estimate of total market size*	250	100% (2011/12)
Public wholesaler total sales**	125	50% (2011)
Public wholesaler sales not Vertical Programme/directly donor-funded **	37.2	15% (2011)
Tax-funded share of treasury funds to public wholesaler***	11.3	5% (2011/12)

Sources: *Interviews; **MSD (2013); ***MoHSW (2013, pp. 4–5).

As Table 13 illustrates, about half of the Tanzanian medicines market consists of largely donor-funded public purchasing, while as much again is spent privately, by patients and (a small share) by insurers. The health sector market for other supplies is also large. It follows that so long as these supplies are produced domestically, health care potentially generates further employment within the domestic economy through these industrial linkages: direct employment in manufacturing, and then further employment in the “upstream” suppliers of those items. So, for example, Table 8 showed that there were approximately 1300 regular employees in the Tanzanian pharmaceutical industry in 2013. In addition, the jobs of employees in the Arusha bed nets producer, A–Z, and of some of those working in businesses such as those producing hospital furniture, mattresses, textiles, packaging (card and plastic), brushes and recycled plastics, and detergents and other cleaning items, also partly depend on health sector demand.

The public wholesaler, MSD, is an important buyer of both medicines and other essential supplies. Tables 14 and 15 show two measures of the size of the public sector market. Table 14 shows the value of medicines and supplies distributed by MSD to health facilities, including a projection for 2015/16. Table 15 shows the breakdown of funding sources: these data are for calendar year, not fiscal year, and refer to funded procurement, not distribution, so the two sets of figures complement each other. The share of donor funding to domestic funding fluctuates according to donor funding schedules. However, both sets of data suggest considerable fluctuations in medicine and supplies procurement and distribution and hence in availability at the local level.

Table 14: Value of pharmaceuticals and medical supplies distributed to zones and finally to customers, 2012/13–2015/6 (projected)

Year	Value (TZS million)	Exchange rate	Value (US\$ million)
2012/2013	163,915.6	1571.62	104.3
2013/2014	234,002.8	1574.01	148.7
2014/2015	168,251.4	1725.85	97.5
2015/2016 projected	266,147.2	2148.52	123.9

Source: MSD office records.

Notes: The value is inclusive of special orders, normal stock (catalogue), and vertical programmes. Exchange rates 31 December, Bank of Tanzania average buying/selling prices: <https://www.bot-tz.org/FinancialMarkets/ExchangeRates/ShowExchangeRates.asp>.

Table 15: MSD: Procurement of pharmaceuticals and supplies, 2013 and 2014 (US\$ million)

Category of procurement	2013	2014
Pharmaceuticals	19.2	28.6
Medical supplies and lab reagents	36.1	16.3
Special procurement (pharmaceuticals and medical supplies)	12.4	7.2
Vertical Programme (donor funded)	30.5	169.5
Opportunistic infections (donor funded)	-	30.5
Total	98.1	252.2
Share domestic (non-donor) funding (%)	68.9%	20.7%

Source: MSD office records. Note: TZS /US\$ exchange rates 30th June of relevant year, BoT as above.

The private market has also been expanding in recent years, in terms of the availability and variety of supplies and medicines. Our recent research sought to gain understanding of interviewees' impressions of market trends – specifically, whether supplies availability on the market and from wholesalers had improved or declined recently, with detail. Interviewees in all sectors replied that availability of pharmaceuticals and other supplies in the Tanzanian private market had increased in recent years, as compared to some years back. In public and FBO facilities, donations were also said to play a role in filling the gap in supply shortages. The majority of respondents firmly stated that pharmaceuticals and other supplies had become more readily available in recent years. However, some respondents explained that this liberalization of the medicines market was a threat to local pharmaceutical manufacturers, and others said public facilities were not benefiting from this situation. Box 2 contains illustrative examples of what they said.

Box 2

This has also contributed to low consumption of the locally made items, and I think even some of the manufacturers have been kicked out of the market. (Private dispensary, District 1)

Yes. There are so many medical supplies on the market if you compare with what was there 10 to 15 years ago. The only challenge that I see is that the availability is not controlled today, and so we have so many sub-standard or fake things, including drugs and equipment. ... The local manufacturers have faced competition from imported supplies, and as a result, either most of them have been forced out of the market, or their production has gone down because very few locally manufactured goods are seen in the market. (Public district hospital, District 3)

This has not brought any changes to this centre because it is a public facility and gets medical items from the DMO and [the public wholesaler]. But for patients it has had a positive effect, because there are so many pharmacies in town and drug shops all around. If you do not wish to use the public dispensary medicines, you can easily get alternative medicines somewhere else. (Public dispensary, District 3)

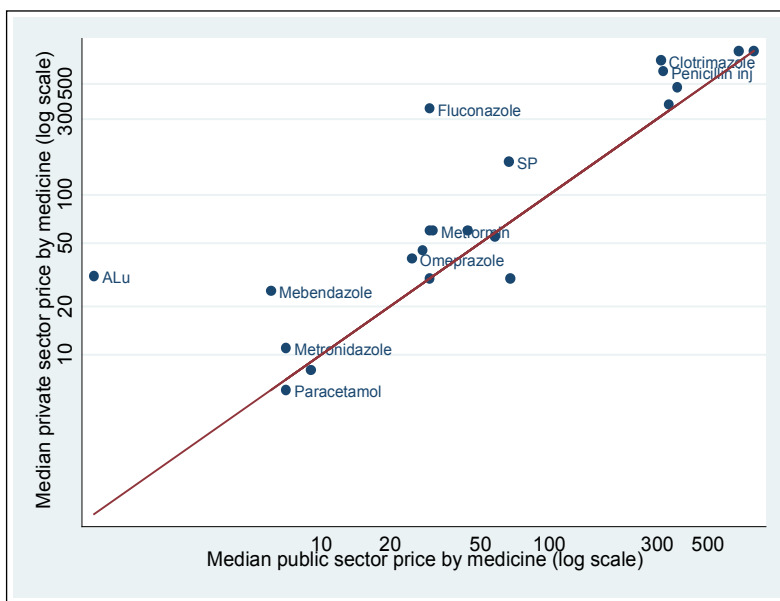
These changes in medical item supply have not brought any change to this dispensary because it's a government entity with a long supply chain from [the public wholesaler], but it has been a very good opportunity for patients. They are able to get medical items from private pharmacies and drug shops if they are able to [pay]. This is a good thing. (Public dispensary, District 3)

The private sector was also experiencing rapid price fluctuations. For medicines, prices in the private sector were found to be generally higher than those in the public supply chain, as price data on median purchase prices for the tracer medicines show (see Figure 1). MSD procurement was thus successfully reducing medicine prices for patients below private market levels. However, for other essential supplies this effect was much less marked: a number of items could be purchased more cheaply on the private market (see Figure 2).

This section has demonstrated the economic importance and productive impacts of health care. It has also argued that the full potential of these economic impacts is constrained by a number of factors including inadequate and fragmented health care financing. More coherent funding, better management of human resources, well directed investment, and improved procurement management could pay economic dividends. The economic scale

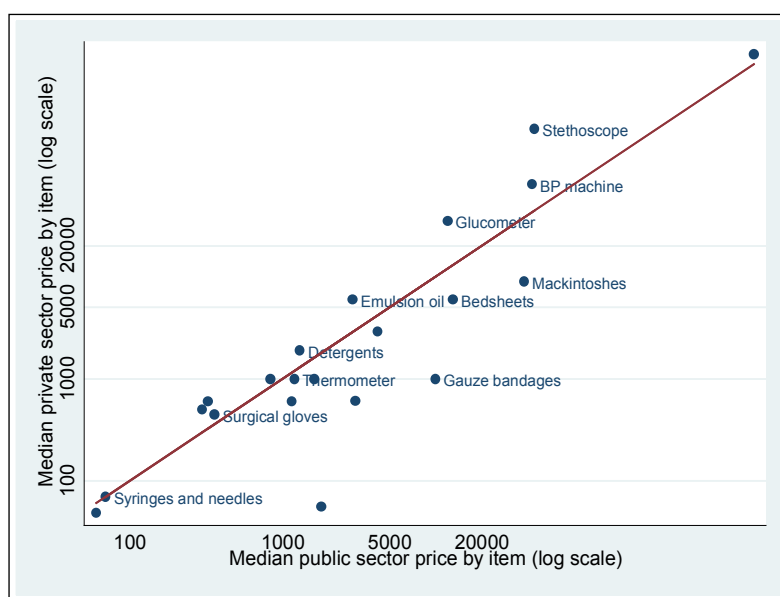
and impact of health care in the Tanzanian economy is both very large, and also much less productive than it could be. The services could provide better health care and better health; health care employment could generate more domestic demand; and the procurement of inputs for health care could be improved, resulting in better services and more manufacturing employment. Section 3 explores the manufacturing impact – a very under-studied aspect of health care’s productive impact – in more detail.

Figure 1: Median purchase prices for tracer medicines from public and private sources (selected medicines identified), log scale



Note: the diagonal line is the 45° line: points above the line show items for which the private sector price exceeded the public sector price.

Figure 2: Median purchase prices for tracer essential supplies and equipment from public and private sources (selected items identified), log scale



Note: the diagonal line is the 45° line: points above the line show items for which the private sector price exceeded the public sector price.

3. LINKAGES BETWEEN HEALTH CARE AND MANUFACTURING

As Section 2 showed, Tanzanian health care is an import market for manufacturers of medicines and supplies that form part of the population's basic needs. Table 13 showed that about half of the Tanzanian medicines market consists of public purchasing (by MSD), predominantly donor-funded, while as much again is spent privately by patients and (a small share) by insurers. The health care market for other essential medical and infection-control supplies is also large. It follows that, so long as these supplies are produced domestically, health care generates manufacturing employment within the domestic economy: direct employment in manufacturing and then further employment in the "upstream" suppliers of inputs to producing those items.

It is hard to quantify this impact because of lack of data. Table 8 showed that there were approximately 1300 employees in the Tanzanian pharmaceutical industry alone in 2013. In addition, the jobs of employees in, for example, the Arusha bed nets producer, A-Z, and some of those working in businesses producing items such as hospital furniture, mattresses, textiles, packaging (card and plastic), brushes and recycled plastics, and detergents and other cleaning items, also partly depended on health sector demand. There were also many more people employed on a casual or semi-casual basis, not registered as regularly employed, whose livelihoods nevertheless depended on health care demand for those goods. Finally, though not studied further here, we should note that services such as accounting and business services also serve health care demand.

3.1 Declining Local Manufacturers' Share of the Health Sector Market

To what extent is the large health care market in fact supplied by local manufacturers? At present, health care relies predominantly on imported goods. It is difficult to obtain precise figures, but the available data all indicate that manufacturers based in Tanzania supply a low and declining share of this expanding market (Israel et al., 2014; Wangwe et al., 2014).

Table 16 shows the data for local production of pharmaceuticals obtained from the official Tanzanian manufacturing survey data, plus data for imports and exports, for 2009 and 2013. The final column is an estimate of the total market for medicines in Tanzania in each year, estimated as net imports plus local production:

imports + local production - exports

In Table 16 we have included the equivalent Kenyan data for comparison. The table shows that despite Kenya's much larger pharmaceutical industry, Tanzania was supplying a similar share of its domestic market in pharmaceuticals in 2009. However, by 2013 the Kenyan local share of their domestic market had continued to rise, while the Tanzanian share had halved.

Table 16: Tanzanian and Kenyan pharmaceutical markets, 2009 and 2013: imports, exports, local production (million current US\$), and market share of local manufacturers

Country and year	(1) Imports (US\$ m)	(2) Exports (US\$ m)	(3) Local production (US\$ m)	Local market share (%)*
Tanzania				
2009	99.4	7.9	49.2	35
2013	286.1	1.7	48.7	15
Kenya				
2009	298.6	67.3	99.9	30
2013	466.4	82.1	193.1	33

*Calculated as (3) / ((1) + (3) - (2)).

Sources: Tanzania: imports and exports: Comtrade database <http://comtrade.un.org/data/>, accessed 05.08.14; local production: NBS (2012, 2013). Mid-year exchange rates from Bank of Tanzania, <https://www.bot-tz.org/>, accessed 12.02.16.

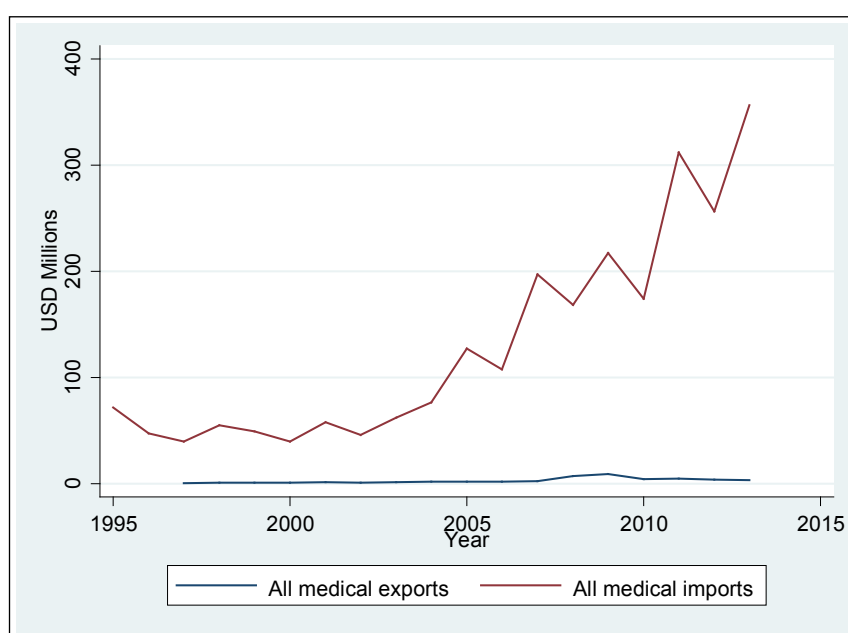
Kenya: Imports, exports, and local production: KNBS (2014, 2015). Mid-year exchange rates from Central Bank of Kenya, <https://www.centralbank.go.ke>, accessed 17.02.16.

In part, this outcome results from the particularly rapid market expansion in Tanzania (see Figure 3). The upper line in Figure 3 is imports of both medicines and medical supplies. The import trend has been sharply upwards since about 2004, driven particularly by increased (if uneven) donor funding for medicines (especially for HIV/AIDS, tuberculosis, and combination anti-malarial therapies) and for some other essential supplies such as bed nets. The lower line is exports by manufacturers in Tanzania to the regional market (to the DRC, Malawi, and elsewhere). As the graph shows, exports started to increase up to 2009 but then fell back. The widening gap on the graph represents net imports: the market opportunity of which local manufacturers have failed (or been unable) to take advantage.

One key reason for the loss of market share is therefore the direct international procurement by donors of large volumes of medicines and supplies. For these supplies for “vertical programmes”, MSD acts as the logistics supplier, receiving, clearing, and delivering the supplies. The decisions by donors to procure internationally thus restrict the extent to which the Tanzanian economy can benefit from linkages from health care funding to manufacturing development. MSD also undertakes its procurement through large international tenders which are highly price-competitive. Finally, the sharp loss of market share by local firms is also the result of declining output for the local private market, and loss of competitiveness against the prices charged by wholesale importers for private market sales.

As Table 16 conveys, the value of pharmaceutical manufacturing output has been approximately flat in current dollar terms: allowing for inflation, output was therefore substantially lower in real terms in 2013 than in 2009.

Figure 3: The expanding local health market gap (and opportunity)



Source: Comtrade data, <http://comtrade.un.org/data/>, downloaded 5.8.14.

Other evidence, and also our interviews with wholesalers, facilities, and retail shops in 2012/13, confirmed the same trend. Table 17 shows WHO/Health Action International sample data on the manufacturing origin of medicines in Tanzania, collected as panel data from facilities and shops at three-year intervals from 2006. Using a sample of essential medicines, the data confirm the considerable decline in the share of local manufacturers in their domestic market in Tanzania; they also show that the imports have risen predominantly from outside East Africa, not from Kenya, the largest regional supplier.

Table 17: Country of origin of a tracer set of essential medicines, by year, public and faith-based facilities, and private shops: Tanzania 2006, 2009, 2012

Year	Country of origin			Total
	Tanzania	Kenya	Other	
2006	33	14	53	100
2009	21	13	66	100
2012	12	11	78	100

Source: WHO/HAI survey data 2006, 2009, 2012, supplied by Mary Justin Temu; 2006 sample of facilities and medicines only, for comparability.

Finally, our own sample data from our 2012 survey show a similarly negative story. In our survey of facilities and shops in four districts of Tanzania, just 16% of the tracer medicines found on the shelves had been manufactured in Tanzania: 23% of the medicines in the public sector, 12% in FBOs and only 9% in private facilities and shops (Israel et al., 2014). Table 18 furthermore confirms that this decline is in part the result of the vertical programmes and associated procurement decisions of donors: almost all of the artemisinin combination anti-malarial medicines (ACTs) and HIV/AIDS medication (anti-retrovirals, ARTs) had been imported from outside East Africa. However, chronic disease medication (e.g. diabetes and hypertension medicines) was also largely imported; while Tanzanian manufacturers retained

19%, and East African suppliers all together 27%, of the “other” medicines, including basics such as paracetamol and anti-worm treatments.

**Table 18: Country of origin of tracer medicines, by type of medicines
(% by type): Tanzania, 2012**

Source country	ACTs (ALu)	ARTs	Chronic disease	Other
Tanzania		10		19
Kenya			12	18
India	37	90	41	46
China	8			8
HICs	55		47	7
Other				2
Total	100	100	100	100

Source: authors' survey data. Note that numbers may not add to 100 because of rounding.

Table 19 shows a comparable breakdown of the sources of medical equipment and other health care supplies, by the same country categories of supplier. Just 23% overall of the non-medicine tracer items available were found to be made in Tanzania (Israel et al., 2014). These supplies were more difficult to trace to manufacturing source than the medicines, so the data are incomplete. They indicate, however, that Tanzania-based firms had produced almost none of the laboratory supplies, and no basic medical equipment. These generalizations are backed up by the qualitative interviews. Some medical supplies and the majority of other basic supplies had come from Tanzania (see Table 19). Most equipment was from high income countries (HICs) (often donated) with a share from China and India; laboratory supplies were similarly from HICs, along with over 40% of medical supplies.

**Table 19: Country source of medical equipment and health sector supplies,
% by category of supplies, Tanzania 2012**

Source country	Medical equipment	Supplies		
		Medical	Lab	Other
Tanzania		31	3	63
Kenya		5	4	13
India	7	2	4	17
China	15	20	3	3
HICs	75	41	85	3
Other	3	1		1
Total	100	100	100	100

Note that numbers may not add to 100 because of rounding.

Table 20 lists the items found to have been manufactured in Tanzania. These were mainly textiles, white spirit, and cleaning items. There is thus substantial scope for expanding local manufacturing of health care supplies other than pharmaceuticals.

**Table 20: Non-medicine tracer items manufactured in Tanzania
(% by country of origin)**

Item name	Country of manufacture			
	Tanzania	Kenya	Other	Total
Alcohol/ spirit for wound cleaning	100	0	0	100
Bed net	100	0	0	100
Bed sheet	100	0	0	100
Detergents	64	28	8	100
Disinfectants (Hibitane, Savlon)	38	17	46	100
Emulsion oil for laboratory	6	18	76	100
Hydrogen peroxide	100	0	0	100
Mop or broom	82	0	19	100

n=109

These data demonstrate, however, the relatively low technological level of the manufacturers supplying the health sector in Tanzania. The more complex categories of medical equipment and laboratory reagents came largely from China and other countries outside East Africa. Kenyan manufacturers were, by contrast, supplying a larger range of non-pharmaceutical supplies, including gloves, syringes and needles, and microscope slides; Giemsa stain and emulsion oil for laboratories; and plasticized bed sheeting (Kariuki et al., 2015).

Similarly, the pharmaceuticals manufacturers were supplying largely basic formulations plus some amoxicillin syrup for children. Injectables were wholly imported from Kenya and other countries, as were creams and IV fluids (see Table 21). This suggests that the pattern of imports is determined in part by the currently limited technical capabilities of Tanzania-based firms.

**Table 21: Country source of tracer medicines by dosage form
(% of tracers from each country category)**

Dosage form	Country of origin					Total
	Tanzania	Kenya	India	China	Other	
Tablet/capsule	22	9	53	1	15	100
Injectable	0	1	31	43	25	100
Syrup	9	81	6	0	3	100
Cream	0	82	6	0	3	100
IV Fluids	0	3	91	0	6	

n=646

3.2 Sources of Manufacturing Decline and Constraint

Given the expanding opportunities, why have manufacturers based in Tanzania been so relatively unsuccessful in serving their own domestic market? Our recently completed study identifies four sets of strongly interrelated factors and pressures: increasing import competition; problems in sustaining manufacturing competitiveness through upgrading and cost reduction; procurement practices in all sectors that create barriers to market entry for local firms; and domestic policies that reinforce manufacturers' disadvantage vis à vis overseas exporters and local importers.

There is evidence of rising import competition in the Tanzanian medicines market. The number of applications for the import of medicines submitted to TFDA (21,194: 20,233 approved, 961 rejected) over the period 2008/09 to 2012/13 (TFDA, 2013) is a good illustration of the level of competition local pharmaceutical manufacturers have to cope with. In our interviews, three firms reported particular problems with import price competition in basic antibiotics. One firm calculated that some import prices for final formulations of amoxicillin – a widely-used broad spectrum antibiotic – were below their import costs for inputs before manufacture, strongly suggesting dumping by overseas exporters. As a result, only one of the firms previously supplying antibiotics to the local market was still supplying substantial amounts in 2013; one was thinking of ceasing to produce them; and the largest firm had ceased all production of beta lactams, the group of medicines that includes amoxicillin.

While up to 2009 the WHO data showed a high market share for local producers of amoxicillin capsules, our own (non-comparable) survey in 2012 found not one amoxicillin tablet or capsule manufactured in Tanzania in our sample facilities and shops. This raises worries concerning the security of supply, since it implies increasing reliance on a small number of overseas suppliers able to provide large volumes at very low prices, a situation that may not be sustainable. When gaps in overseas supply occur, local suppliers may no longer be unavailable to plug those gaps.

The narrowing of the spectrum of medicines produced in Tanzania, represented by the loss of basic antibiotics, has been reinforced by the switch from the previous first line anti-malarial medication, sulphadoxine pyremethanine (SP), to the newer WHO-recommended artemisinin combination therapy (ACTs). SP was largely produced in Tanzania, and very widely distributed. ACTs, which use a more complex technology to produce hard combination tablets, are much more expensive, and have been heavily subsidized by donors. The procurement has been done internationally, a donor requirement, and MSD provides the logistics. Local manufacturers are able to produce the formulation and can upgrade (expensively) to produce the combination tablets, but they are unable to meet the procurement requirements. This is because the procurement volumes funded by donors are very large and the tender prices are highly competitive. Local firms, if offered manageable procurement volumes, could develop their manufacturing capabilities and lower their prices in the medium term, but they need market access in order to earn revenue, learn, and develop the capability to compete.

More generally, the manufacturers in Tanzania face steadily rising quality hurdles. All the firms interviewed were actively upgrading and instituting new processes and/or products. In pharmaceuticals, regulatory standards of Good Manufacturing Practice (GMP) strongly shape market access and business strategy. In Tanzania the TFDA actively pressures and supports firms to upgrade to its GMP standards; these are currently being harmonized at the EAC level. Furthermore, GMP standards rise with technological change over time. The result is financial pressure on firms to find sources of investment finance to support continuous upgrading, in conditions of sharpening price competition – a difficult challenge where loan funds are expensive.

The same challenge faces the producers of other essential supplies. These firms too are under pressure from competition. Among producers of brushes and related cleaning equipment, one firm had fought off Chinese import competition by switching to locally recycled plastic,

requiring new machinery and upgrading of local plastic suppliers. A furniture firm whose product range included specialized hospital furniture had upgraded its powder coating and sandblasting machinery. Finally, a large successful bed-nets supplier was using Japanese technology and the Japanese no-fault manufacturing processes to try to fight off what they described as “cut-throat” international competition.

In these circumstances, procurement processes are key to market access and business survival. Given the large size of the public procurement market, the public sector procurement rules will strongly influence manufacturing: in effect, health sector procurement is part of industrial strategy. Public procurement is undertaken by MSD, which has a near monopoly in organizing procurement through tendering processes, and in receiving orders and aggregating supplies for more than half of the health sector’s consumption. During the interviews for our study, local manufacturers of pharmaceuticals and other supplies said that they experienced tendering to supply MSD as increasingly risky. The main tendering risks manufacturers identified were: very low margins, delayed payment putting cash flow at risk, very large tender size straining production capacity, incomplete purchase of contracted orders creating losses, delayed notification of delivery dates creating unmanageable lead times, high tendering costs with low probability of success, lack of trade credit increasing working capital financing costs, and short (one- or two-year) contracts that provided insufficient market access guarantees to support financing of required investment and acquisition of the requisite technology. Not all these factors were under MSD’s control. For example, Ministry of Finance delays in funding have undermined MSD’s performance and that of the broader health sector (MSD, 2013).

Our survey data suggest, however, that, despite these problems, public sector procurement is still more likely to source medicines locally than are private buyers. Our data show that procurement and wholesaling for the health sector in Tanzania is quite segmented: most medicines and supplies in public facilities are from the public wholesaler (MSD) while almost all supplies and medicines in private facilities and shops were bought privately; only the FBO sector had mixed suppliers. Tables 22 and 23 show procurement patterns by country and by wholesale sector. For medicines (see Table 22), similar percentages came from outside East Africa, but the private wholesalers showed a relative preference for Kenyan suppliers. Many private wholesaler/importers represent large exporters from India and Kenya. For supplies the pattern was reversed (Table 23), reflecting the sourcing of basics such as cleaning items in local shops, as well as locally manufactured textile products.

**Table 22: Country of origin of tracer medicines, by wholesale source sector
(% of all tracers)**

Country of origin	Sector where sourced (wholesale)			Total
	Public	Donation	Private	
Tanzania	22	0	11	16
Kenya	10	25	20	15
Other	68	75	69	68
Total	100	100	100	100

n=609

Note: totals may not add to 100 because of rounding.

Table 23: Country of origin of other tracer commodities, by source of items (wholesale sector) (% of all tracers by sector)

Country of origin	Type of source			Total
	Public sector	Donation	Private wholesaler	
Tanzania	18	2	33	23
Kenya	5	2	5	5
Other	77	96	62	73
Total	100	100	100	100

n=453

Our interviews also identified tax and tariff structures that tended to disadvantage and discourage local producers. Medicines and medical supplies enter the country at zero tariff rates and are zero rated for VAT. In principle, according to the Tanzania Revenue Authority (TRA), a “level playing field” with importers has been created for local manufacturers by also exempting inputs for local production of the same items. In practice, manufacturers and the TRA agreed that it is too complicated to achieve this outcome. The main reason lies in the complexity of identifying the relevant inputs beyond items such as bulk active pharmaceutical ingredients (APIs). The manufacturers interviewed documented in detail the tax and tariff disadvantages they effectively suffer relative to importers. Explaining the disincentive nature of the tariff system to local producers, a respondent with long-term experience with pharmaceutical issues in the health system said: “at present when you import medicines you do not pay taxes. So why should a businessman import raw materials that are taxed so as to produce pharmaceuticals locally?” This is a key reason why local firms were moving out of basic affordable medicines and other supplies, because they were no longer profitable.

In terms of industrial support, the interviews identified serious gaps in accessing technological information and support as well as access to support to build the marketing and commercial capabilities in smaller firms. Some respondents in health facilities and pharmacies complained about the poor quality of some of locally-produced medicines, citing low technological capability as a contributory factor. The manufacturers also experienced a shortage of workers with appropriate skills. Pharmaceuticals are a higher skill area and constant upgrading requires matching skills, but pharmaceutical firms were facing shortages of skilled staff such as industrial pharmacists and pharmaceutical technicians. Furthermore, firms reported high turnover of skilled staff and complained of the difficulty and cost of obtaining work permits for experts from outside the country.

Finally, there are the well-known problems of power and infrastructure constraints: production in the pharmaceutical sector, as in the whole industrial sector, faces high power prices and unpredictable power outages that damage machinery, as well as having to use water that requires expensive purification.

4. INTEGRATING HEALTH AND INDUSTRIAL POLICY

Section 3 has documented a major human development opportunity that is being largely missed in Tanzania. Meanwhile other countries, such as Ethiopia and Ghana, are seizing this opportunity. Health care, as Section 2 showed, generates large social and economic benefits through its contribution to domestic demand, employment, industrial growth, and, not least, improved health. However, the economic benefits of health care for Tanzanian development could be greatly increased by paying closer attention to the impact of health policy on industrial development, and in turn, industrial development could help to break the health care supplies constraints documented in Section 2, improving health care as a result. Health policies concerning the funding and procurement of medicines necessarily constitute an industrial policy – they influence industrial development. The question is whether that industrial impact is positive or negative, and how to institute and sustain a virtuous circle of mutual benefit between industrial and health policy to support human development.

The potential benefits of sourcing more medicines and other essential supplies locally are immense, not only for local manufacturers but for the growth of the economy as a whole. They include increased employment in one of Tanzania's higher-skill sectors, reducing the trade deficit, and reinforcing development synergies between health needs, health financing, and industrial growth (Wangwe et al., 2014).

Strikingly, other African countries are seizing this opportunity. Ethiopia is a leading example. Ethiopian health and national drug policies recognize the development of local capability in manufacturing pharmaceuticals and other medical supplies as key to increasingly assuring the availability of those items, including associated skills and scientific capability development. The country has generated rapid growth in the local production of pharmaceuticals and medical supplies manufacturing since 2007, based notably in industrial joint ventures; the country now has 13 pharmaceutical manufacturers, nine producing medicines including antibiotics and large volume parenterals, one manufacturing empty gelatine capsules, and the rest producing medical supplies such as syringes, absorbent cottons, gauzes, bandages, and sanitary products (Gebre-Mariam et al., 2016).

Ghana has also created policies to strengthen its pharmaceutical manufacturing capabilities. It has banned the imports of finished formulations of 14 widely used products including ampicillin, tetracycline, chlorthalidone, indomethacin, paracetamol, aspirin, and diazepam. Ghana also offers selective industrial protection to pharmaceuticals by combining zero import duties on their materials and machinery requirements with 10% import duty on finished formulations (Chaudhuri, 2016).

This section outlines a policy framework to create a more positive interaction between health and industrial policy, based on our recent research and the experience of competing countries such as Ghana and Ethiopia. Our interviews with Tanzanian health facility and shop personnel responsible for procurement showed substantial support for policies to encourage more local manufacturing for the health sector. Box 3 gives some representative

examples of their views. A number of health sector respondents in all sectors felt there was a need to increase the local production and supply of pharmaceuticals and essential supplies. Potential benefits that were mentioned included lower prices, shorter supply chains, closer regulatory supervision, and hence improved speed of delivery and better quality.

Box 3:

This [more locally manufactured supplies] is very important for the private [health] sector. We are facing a big problem and we cannot afford to pay high salaries. If medicines and supplies were cheaper, we could manage to increase salaries. Also, if supplies were locally produced, it would be easier to control quality. We are facing a big problem of financing. Donations are now very rare, so having more local supplies would help. (Facility in-charge, faith-based health centre, District 3)

It is possible for the health system to source more from local manufacturers than it does now because the process of ordering and delivering will be much easier. For example, ordering and delivering will be within the same locality. ... The monitoring process would also be easy, since the health system will be in a position to monitor right from the primary stage of production, and quality of drugs would be assured right at the factory level. The effect of damages, delays in ordering and actual supplying, issues of transport, and quality checks of drugs for quality after delivery would all be avoided. (In-charge, public health centre, District 4)

If industrial and health policy can be brought closer together, locally manufactured supplies of pharmaceuticals and other essential health care supplies can be improved. Manufacturers can exploit the domestic market opportunities more effectively, while improving supplies for health care. To achieve this, elements of both industrial policy and health policy would have to change. Participants in a high-level consultative workshop in Tanzania at the end of our study emphasized the need for a policy vision, prioritizing industrial development in this sector in order to deliver interconnected benefits including: new manufacturing investment and rising employment; rising skill levels; improving technical and scientific capability to address health needs; fewer stock-outs of essential supplies in health facilities; rising exports; and a health system and economy with greater security and the ability to cope with emergencies, and which is less reliant on the vagaries of import suppliers and donors.

We summarize here our recommendations for health policy changes, and for changes in industrial policies towards pharmaceuticals and towards other supplies.

On the health sector side, the main challenges are improved domestic financing for health sector supplies, allied to more local-industry-friendly procurement rules. The private sector wholesalers have strong institutional ties to exporters in India and Kenya, acting as their local sales representatives in Tanzania, and in pharmaceuticals private wholesalers are even less likely to buy essential medicines locally than is the public sector. A twin shift to a lower share of out-of-pocket payment in health supplies financing and a set of public procurement policies supporting stable development of competitive local suppliers can improve the availability of supplies in public facilities, reduce costs to patients, and facilitate higher health sector productivity with broad economic benefits.

Such a shift in procurement policies requires a recognition that while the high volume of donor funding is, as has been shown, currently very important in providing the material inputs for health care, the form in which aid is currently provided has had negative implications for local industrial development. Donors' reliance on the external procurement of medicines and supplies for import has restricted the scope for backward industrial linkages from health care to manufacturing in the Tanzanian domestic market. Collaborative work between government and donors, to revise these procurement practices in order to reduce the barriers to market entry facing local manufacturers, can turn valued donors' medicine funding into a vehicle for change to rebuild and strengthen linkages between health policy and industrial policy.

In pharmaceuticals there has been a clear problem of deindustrialization. In a commissioned report to COSTECH on promoting local pharmaceutical production (REPOA, 2015), building on the workshop discussion, the research team made five sets of policy recommendations, as follows.

First, we recommended that the government prioritize support for the industrial firms producing pharmaceuticals and medical supplies as a strategy for realizing a vibrant health sector. In order to ensure coordination the government should put in place a lead or champion in the form of an organization or unit that can take the lead within government.

Second, we proposed that the government should support the development of the pharmaceutical industrial base by adopting a selective import protection policy for the pharmaceuticals industry. This is needed, we argued, because the industry requires sustained market access, and cash flow, in order to facilitate the building up of larger scale and higher technical capabilities to serve the expanding national and regional markets.

Third, building on the findings summarized in Section 3, we argued that the approach to public sector procurement should be reviewed with a view to making public procurement an instrument for supporting local manufacturing and a positive element of domestic business development.

Fourth, in addition to selective import protection, we argued that support – technical and financial – should be provided to the pharmaceutical industry to enable it to engage in continuous technological upgrading, technological learning, and access to technological information with a view to facilitating the industry to move up the technology ladder.

Finally, but central to the chances of success, we argued that government intervention to facilitate access to the requisite skills for the pharmaceutical industry should address the current skill gaps through innovative public-private sector collaborations and the subsidization of training in scarce skills for the industry.

Many of these industrial policy recommendations apply also to the non-pharmaceutical supplies sector. As outlined, that sector also faces a challenge of industrial upgrading to meet external competition, and to move into new and more technically advanced products. A number of our supply chain interviewees noted a recurrent problem in the supply of clinical gloves, and argued that it was strange that Tanzania could not produce gloves. One interviewee discussed the possibility of assembling diagnostic kits in Tanzania. A plastics firm

commented that they could produce plastic bottles for syrups – replacing imported glass – if they had a long enough supply contract to justify the investment. Shifting the tax and trade rules to favour local production over importing, and providing trade credit, technical support, and skills training, could support a shift towards more industrial employment in the non-pharmaceutical health supplies industries.

The importance of rebuilding the pharmaceutical industry in Tanzania has now been clearly recognized in government policy. Tanzania’s second Five Year Development Plan (URT, 2016) entitled “Nurturing Industrialization for Economic Transformation and Human Development” identifies pharmaceuticals as a priority sector. One of the three key interventions in manufacturing is stated as:

Developing productive capacities in the following industries: petro and chemicals, pharmaceutical, building and construction, agro and agro-processing (cotton to clothing, textiles and garments, leather) coal, iron and steel. (p.48)

This recognition of the importance of pharmaceutical development forms one of the building blocks required for establishing much greater policy coherence between health and industrial policies. On the health side, the first strategy on medicines and supplies in the Tanzanian Health Sector Strategic Plan III 2009–2015 was to “ensure accessibility at all levels of safe, efficacious pharmaceuticals, medical supplies and equipment”. Health policy documents can now clearly state that one way of ensuring constant and adequate availability of pharmaceuticals and other medical supplies is to encourage local production. Health-industry collaboration to increase the developmental benefits from the health sector requires institutional changes and rethinking in both health and industrial policy and implementation – changes that are now underway (Mackintosh et al., 2016b). Each sector needs to build collaborative capabilities – that is, the capability to respond effectively to the opportunities offered by the other sector, and to create incentives for extracting mutual benefit.

5. CONCLUSION: HEALTH AND INDUSTRIAL POLICY FOR HUMAN DEVELOPMENT

Strengthening synergies between health policy and industrial policy can yield mutual benefits between health care and industrial development to support human development. We have argued that Tanzania has been missing out on a major opportunity for promoting human development, by failing to exploit the domestic market benefits of health care. By improving and integrating the local financing of health care (public financing and social insurance); by integrating training and employment with health care infrastructure investment; by working with donors to ensure that valuable external funding for medicine and supplies supports Tanzanian industrial development, and by instituting an active industrial policy to support industrial suppliers of medicines and other essential health care supplies before the industrial capabilities are lost, Tanzanian policy makers can multiply dramatically the impact of health care on Tanzanian industrial development.

The policy challenge is to change the ways of working to achieve policy collaboration and integration, which requires changing the mind-set of viewing health policy and industrial policy as separate and mutually exclusive spheres, instead recognizing and building on the synergies between them. We have documented the fragmentation of financing in health care, creating “silos” of independent decision making on, for example, procurement strategies and industrial policy priorities. However, there is now a clear emerging recognition in Tanzania that more collaboration among policy makers towards shared goals of industrial and health care development is desirable. We hope that this paper contributes to identifying a route to better health-industrial integration for human development.

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APPENDICES

Appendix Table A1: Tracer medicines list, Tanzania

ARTEMETHER + LUMEFANTRINE (AL/ALU: adult); 120+20mg
SULFADOXINE + PYRIMETHAMINE (SP); 500+25mg
QUININE; 600mg/2ml
AMOXICILLIN (adult); 250mg/500mg
AMOXICILLIN SYRUP (child); 125mg/5ml
BENZL PENICILLIN; 5000000IU (5MU)
CIPROFLOXACIN; 250/mg500mg
ATENOLOL; 50mg/100mg
PARACETAMOL; 500mg
DICLOFENAC; 50mg/100mg
ZIDOVIDINE/LAMIVUDINE/EFAVIRENZ (AZT+3TC+EFV); 300mg+150mg+6000mg
ZIDOVIDINE/LAMIVUDINE/NIVERAPINE (AZT+3TC+NVP); 399mg+150mg+200mg
TENOFOVIR/ENTRICITABINE/Lpv/r; 200mg+200mg+200/50mg
OXYTOCIN; 10iu & 5iu per ml
METRONIDAZOLE; 200mg/400mg
FLUCONAZOLE; 50mg/150mg/200mg
MEBENDAZOLE; 100mg
OMEPRAZOLE; 20mg
CLOTRIMAZOLE cream; 1%
AMITRIPTYLLINE; 25mg
METFORMIN; 500mg
GLIBENCLAMIDE; 5mg
LOPERAMIDE HYDROCHLORIDE; 2mg
NORMAL SALINE AND 5% DEXTROSE (IV fluid)

Appendix Table A2: List of other tracer supplies, Tanzania

EQUIPMENT	MEDICAL/OTHER SUPPLIES	LABORATORY SUPPLIES
THERMOMETER	SURGICAL GLOVES	GIEMSA STAIN
BLOOD PRESSURE MACHINE	GAUZE BANDAGES	EMULSION OIL
MICROSCOPE	CREPE BANDAGES	DETERMINE HIV TEST KIT
SLIDES (FOR MICROSCOPE)	SYRINGES AND NEEDLES	RAPID DIAGNOSTIC TEST FOR MALARIA
STETHOSCOPE	HYDROGEN PEROXIDE (H ₂ O ₂)	GRAME STAIN REAGENT FOR TESTING BACTERIAL INFECTION
FOETOSCOPE FOR MIDWIFERY	ALCOHOL/SPIRIT FOR WOUND CLEANING	HAEMOQUE FOR HB LEVEL
GLUCOMETER	DISINFECTANTS (HIBITANE OR SAVLON)	SD BIOLINE FOR SYPHILIS
STRIPS (FOR GLUCOMETER)	MACKINTOSHES/PLASTICIZED SHEETING	
WEIGHING SCALES (FOR PAEDIATRICS)	BED NET	
CD4 MACHINE	BED SHEETS	
SHARPS BOX	MOP OR BROOM	
	DETERGENTS	

(Endnotes)

- 1 Source: World Health Organization data, <http://apps.who.int/gho/data/node.country.country-TZA>.
- 2 Calculation supplied by A.R. Channon; data from Mackintosh et al. (2016b).
- 3 Data obtained from the Department of Policy and Planning, Ministry of Health, Community Development, Gender, the Elderly, and Children (MHCDGEC).
- 4 Draft PER estimates for FY 2014/15: data obtained from the Department of Policy and Planning, Ministry of Health, Community Development, Gender, the Elderly, and Children (MHCDGEC).
- 5 Draft PER estimates for FY 2014/15: data obtained from the Department of Policy and Planning, Ministry of Health, Community Development, Gender, the Elderly, and Children (MHCDGEC).
- 6 Note that the National Health Insurance fund does not count as public spending.
- 7 Draft PER estimates for FY 2014/15: data obtained from the Department of Policy and Planning, Ministry of Health, Community Development, Gender, the Elderly, and Children (MHCDGEC).
- 8 Data obtained from the Department of Policy and Planning, Ministry of Health, Community Development, Gender, the Elderly, and Children (MHCDGEC).
- 9 Information supplied by the Pharmacy Council of Tanzania.

The Economic and Social Research Foundation (ESRF) is an independent policy research institution based in Dar es Salaam, Tanzania. ESRF was established in 1994 to respond to the growing need for a research think tank with a mandate to conduct research for policy analysis and capacity building. The Foundation's primary objectives are therefore to undertake policy-enhancing research, strengthen capabilities in policy analysis and decision making, as well as articulate and improve the understanding of policy options in government, the public sector, the donor community, and the growing private sector, and civil society.

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Advancing knowledge to serve the public, the government, CSOs, and the private sector through sound policy research, capacity development initiatives, and advocating good development management practices.

Mission:

To become a national and regional centre of excellence in policy research and capacity development for policy analysis and development management.

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