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Conclusion: Better Cancer Care and Greater Local Health Security: Lessons, Opportunities and Ways Forward

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CORE THEMES

There are (at least) five core themes within this research-based book.

First, there is a growing recognition of the rising healthcare challenges for non-communicable diseases exemplified by cancer in this book. Non-communicable diseases require urgent policy and practice attention, at the

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level of public policy urgency and agency demonstrated during the Covid-19 pandemic. Structuring responses to non-communicable diseases entails careful consideration of aspects of health system organisation, as well as the types and costs of diagnostic tools, medical devices and therapies and the role of local production.

Second, building better cancer care in Africa and India implies identifying and tackling the huge gaps between needs for care, and the extent of available, affordable care. Listening to patients, carers and cancer survivors is, as we learned, the essential starting point for understanding their needs and priorities, finding the gaps inherent in the system, and seeking ways to address those gaps.

Third, inter-linking health care with industrial development, via many “bridging” institutions that include research centres, regulators, professional and industrial associations, and a wide range of policy actors, is an essential way forward to better care and greater local health security. It can be done, and can serve to strengthen the impact of moves towards universal health coverage (UHC).

Fourth, the Covid-19 pandemic has transformed the political, technological and innovation space for building stronger local health security in lower resource contexts including African countries and India, and space for demonstrating trust in local technological capabilities. Sustaining that social, political and technological space and using it to accelerate development of broad industrial capabilities for local health benefit and broader development, is a major opportunity and challenge. Health industrial projects are technological and political projects. Their promotion will generate resistance from incumbents, as such national governments need to be prepared for an international backlash, as well as local political and economic contestations.

And fifth, solving the rising non-communicable and current infectious disease challenges requires collective socio-technical visions of the

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future that involve governments, industrialists and other stakeholders in the health care field. Framing these socio-technical imaginaries can be supported by methodological approaches such as scenario-building, as presented in the previous chapter of this book.

As cancer care rises up global and local health priorities, its difficult challenges help to identify routes to improvement that have wider implications across the healthcare spectrum in low- and middle-income countries. And as the immediate pandemic crisis recedes, this book shows ways to learn from and build upon the cross-sectoral collaborations and innovations achieved in the worst of the crisis years.

This final chapter briefly summarises and reflects on themes and lessons in the book. We argue for policy reframing, using interdisciplinary frameworks and methodologies that can break open the policy and intellectual “silos” of health and of industry and generate cross-sectoral understanding and collaboration for local health security.

LOCAL HEALTH SECURITY: PANDEMIC LESSONS

This book aims to widen and rework current international understandings of how to build local health security. Health security is often understood, in definition and practice, to refer to national responses to health emergencies arising from infectious disease (Brown et al., 2022). Current work also recognises the importance of health system strengthening as underpinning pandemic preparedness (Brown et al., 2022; WHO, 2021a). This book greatly widens this frame of reference, arguing that building local health security in low- and middle-income countries, and specifically in Africa, requires the integration of broader industrial and economic developments with health outcome improvements (Chapters 1 and 2). Consequently, public policy is an important factor for achieving these goals.

This argument is supported by the pandemic experience of collapsing global supply chains (Chapter 2). As had been widely predicted, African countries found themselves at the back of the queue, not just for vaccines—the current global focus—but for the full range of essential medicines, equipment and commodities required to tackle the epidemic. At the same time, local responses demonstrated how much could be achieved in such a crisis by countries with greater depth of industrial and technological capabilities.

Local health security must therefore be understood in a broader political economy framework. There are major developmental advantages to be drawn from geographical and relational proximity: they include shared knowledge, common resource pools, short supply lines, shared culture, and feedback from economic spillovers from local upskilling and knowledge development (Chapter 2). These are the historic roots of local economic development across the world, and they form the groundwork for building local health security. They help to build the synergies and linkages between industrial investment and innovation, regulatory changes and adaptability, research, market creation and shaping through consolidating health system demand and procurement, and interactions with health system organisation. At the same time positionality—the locus of power, agency and responsibility—generates specific local priorities and contextualised interventions that are likely to differ systematically from high-income countries’ focus.

The authors of Chapter 2 argue that achieving these developmental benefits allied to health care improvement requires not only better cross-sectoral linkages and dialogue, but also a sharp leap of imagination. What is needed are new “socio-technical imaginaries” about what is desirable and possible: envisaging technological futures and generating the local agency and legitimacy to work towards them over the medium term, including the legitimisation of channelling of public funds to these long-term technical projects. Later chapters develop this theme of new imaginaries in practical terms for Eastern and Southern African contexts, including routes to greater industrial ambition in the local health industries (Chapter 7), and the exploitation of the momentum in local vaccine development to extend African capabilities in the biotechnology platforms (Chapter 10).

Crises disrupt conventional traditions, paradigms and wisdom (Nohrstedt & Weible, 2010) and they force a re-thinking of the status quo. The Covid-19 pandemic opened up political, policy, technological and institutional spaces for innovation and technological developments. Many authors of this book and their professional networks became deeply involved in building these linkages and innovations under acute pressure in both India (Chapter 6) and East Africa (Chapter 7). Maintaining this momentum is now a major challenge for governments and industrial and health system stakeholders, in the face of exhaustion, backlogs and continuing crises.

This book explores in depth how the lessons about what is possible—learned or reinforced during the pandemic—can be taken forward to build not just greater preparedness for the next pandemic, but greater local health-related capability and security in addressing the range of health challenges faced. In this effort, renewed momentum towards UHC can be supported by strengthened and shortened supply chains and improved broader local industrial capabilities. Cancer care improvement—one of the most difficult challenges among the rising tide of non-communicable disease burdens—provides us with a powerful “lens” to study how to take these lessons forward.

NEED, DEMAND, SUPPLY, ACCESS: TACKLING INSTITUTIONAL GAPS IN CANCER CARE

The cancer “explosion” in African countries (Ngwa et al., 2022b) is increasingly well documented in the international literature, and concern to tackle the crisis in cancer care has been rising up the international agenda (Boyle et al., 2019) (Chapter 1). This book aims to contribute to further understanding of the nature of that crisis, and to situate the scope for achieving improvements within a broad understanding of cross-sectoral linkages between health and industrial change.

Interviews with over 450 cancer patients and survivors in East Africa generated new understandings of their perspectives and experiences. The research team learned, first, the importance participants gave to issues perceived to be under-valued: issues of dignity, survivorship, palliative care, family cohesion, addressing stigma, and support for continuing social and economic activity (Chapter 3). The interviews and discussions also with carers, activists and health professionals broadened our understanding of need, and charted the social pain generated by cancer for all those involved, including communities, families and individuals, carers and health professionals. Improving access to diagnosis and treatment were relocated as very important elements within a broader spectrum of response to cancer care needs.

Participants shared experiences of a health sector in Tanzania and Kenya which, while trying hard to improve cancer care, still presented a maze-like face to people seeking help (Chapter 4). The aim of describing these experiences of navigating a maze largely unaided—and providing examples of where maps and guides had helped to smooth patients’ pathways—is to improve understanding of the current health systems as

encountered by patients. It also helped to identify affordable approaches that could reduce pain and delay.

Evidence from these experiences about reasons for delayed diagnosis—and hence the risk of poorer outcomes—showed that most recorded delay occurred after these patients went to facilities with worrying symptoms. Caution is needed therefore before framing the cancer challenge as one of late presentation by patients to the health system, a framing that tends to foist responsibility for delay largely on the patient. Rather, these patients' experiences identified multiple interconnected health system factors contributing to the scourge of late-stage cancer diagnosis, including a lack of diagnostic capabilities at lower levels of the health system and the need for a concerted improvement in referral processes. Analysing these experiences can support professionals and policymakers to prioritise specific improvements (Chapter 5).

Through all these documented experiences, lack of access to essential medicines, diagnostics and treatments was a recurrent theme. These gaps between established needs and access to requirements occur not only in East Africa, where most required cancer supplies are imported, but also in India, where most essentials can be and are locally produced (Chapters 6, 11). A huge range of uncertainties—about what is needed for inclusive health care in general, and cancer in particular, and therefore what should be produced and supplied—were exposed and mapped during the Covid-19 crisis. This research fed into improving health-industrial communication, mutual understanding and joint activity, aiming to shrink some of these “institutional gaps” (Chapters 6, 11).

The institutional nature of the gaps between industrial decision making, procurement and supply decisions and health care needs is well documented in this book for the case of cancer care requirements. While financial constraint is often central to explaining lack of access to essential supplies, this is by no means always the case. Essential basic commodities such as colostomy bags and prostheses were hard to find in the Kenyan private market, were available only as expensive imports, and were not covered by insurance nor widely supplied through public procurement (Chapters 3, 7, 12). Yet industrial capabilities existed locally to produce these items, and industrialists stated that they were unaware of demand.

This need-demand gap, resulting from a failure of market consolidation and organisation, was found to extend in Kenya and Tanzania far beyond these basic commodities. The local supply gaps for items that were well within local industrial capabilities to produce included bandages

and swabs, diagnostic kits, IV fluids, basic equipment and a range of medication including antibiotics and pain medication (Chapters 7, 8, 12). These gaps were thrown into relief by the pandemic, and some efforts to tackle them were underway at the time of writing (Chapter 7). Consolidating demand to respond to identified needs, through improved public procurement, public–private collaboration and regional market integration, offers routes to generate affordable improvements in supply and access to essential cancer care, including less expensive oncology medication (Chapter 8).

SCOPE FOR INVESTMENT IN LOCAL MANUFACTURE OF DRUGS, VACCINES, BIOLOGICS AND MEDICAL TECHNOLOGIES

This book extends our previous arguments that there is a need to consider the political economy of industrialising for local health, and that local production of medicines is a critical component for enhancing local health security (Mackintosh et al., 2016). As discussed in Chapters 2, and 7–10, there is great scope for investment in local manufacture of drugs, vaccines, diagnostics and medical devices. However, there are contextual and innovation ecosystem hurdles or opportunities that need to be considered.

Investment in building broad industrial capabilities is a long-term venture that requires patient capital especially in the nascent stages of developing or localising new technologies. Chapter 9 demonstrates how the state, other funders and a constellation of science, technology and innovation institutes collaborated to support an innovative medical devices and diagnostic sector in India. However, this innovative Indian MedTech (medical technology) sector still faces a policy vacuum, regulatory lag and small market for low-value products. The scope for investment in local manufacture should structure the policy environment that supports entrepreneurship, faster pathways to market and innovative procurement regimes that actively use health policy as active industry development policy.

The book highlights the need to leverage market and non-market relationships that encompass supplier—buyer linkage capabilities, procurement agencies actively pursuing innovative procurement, active guidance

of search and knowledge transfer for emerging technologies that purposively links research institutes and innovators, and bridging institutions in the innovation ecosystem.

Incremental innovation offers a faster pathway for technology upgrading. In the drugs sector the Indian pharmaceutical sector developed through backwards linkages as distributors turned to production. We argue that it is easier for current vaccine manufacturers than for chemical drug manufacturers to transition to biologics production in Africa. They have similar production and quality assurance processes as well as the skills sets. For a more rapid technology transfer route, countries can actively pursue joint ventures for transition to radical innovations embodied in manufacturing more complex technologies. Achieving these transitions requires strategic interlinkages between health policy and industrial policy, as well as industrial organisation.

Evidence from India suggests that the emergence of entrepreneurship, technology development and business model options are driven by funding and policy infrastructures that shape the sectoral innovation ecosystem. However, last mile challenges for MedTech still need to be resolved.

Turning to biologics manufacture on the continent, Chapter 10 argued that local production of biologics therapies for oncology is feasible. This is important because future diagnosis and treatment of cancer will most likely be based on exploitation of a range of platform technologies (Bargahi et al., 2022; Klinghoffer et al., 2015; Ohannesian et al., 2020), some of which will be based on biotechnology. A number of African countries possess the foundational technological capabilities in research institutions, the private sector and universities to enhance local production of biologics. Building these capabilities will require concomitant building of capabilities in biologics regulation.

INTERLINKING HEALTH CARE AND INDUSTRIAL DEVELOPMENT: REFRAMING POLICY

As the discussion of socio-technical imaginaries and the identification of institutional gaps suggests, exploiting the potential synergies between industrial development and better health care starts from an exercise in reframing policy. The intellectual and institutional “silos” of industrial policy and health policy are hard wired, locally and internationally. The pandemic forced onto the policy agenda the need to address collapsing

supply chains and resolve mutual incomprehension between industry and health actors (Chapters 2, 6). The implied need to align broad industrial development much more closely to public health goals was strongly argued to the G20 in 2021 (Srinivas, 2021a). Yet even now, recent international work on local health security, cited above, does not address the organisation of the health industries. And what international attention is currently given to localisation of industrial production for health needs within African countries is limited to vaccine production.

Policy reframing is therefore a key requirement for building local health security. The understanding of institutions in this book is evolutionary: different industrial, health and other key institutions develop within their own trajectories and policy frames (Chapter 6). To generate the innovations in products and processes needed to deepen and upgrade local manufacturing, supporting networks of actors are required, sometimes called an innovation ecosystem (Chapter 7). The relevant actors include industrial and health service producers, regulators, standard setting bodies, policy makers, researchers and civil society organisations.

One analytical framing used here builds on the large literature on national systems of innovation (NIS) (Chapter 7). Over the last three decades, NIS has been influential as a conceptual framework for understanding the relationship between innovation, policy and institutional environments. Conjoined analysis of health systems with industrial structures using this framework reveals opportunities for industrial deepening and backward linkages in the drugs, vaccines, biologics, medical devices and diagnostic value chains. A wide range of industrial sectors link to healthcare, encompassing, among many others, metals and plastics fabrication, metrology, precision manufacturing, poppy plant growth and extraction of morphine, chemical synthesis, and biological drug substance production using fermentation and other techniques.

Lundvall's (1992) NIS framework has three building blocks, namely sources of innovation, non-market institutions and types of innovation. We use this framework as a foundation to distinguish between incremental and disruptive (radical) innovations (Chapter 10). Incremental innovations are less disruptive to business models, production processes and regulatory pathways (Tait & Wield, 2021). Thus, biologics production in African contexts can build incrementally on vaccine manufacturing capabilities, however, biologics are a disruptive innovation in the wider health-industrial innovation ecosystem, demanding sharp changes in regulatory rules and processes and new capabilities in local standards bodies

(Chapter 10). NIS literature has typically used retrospective analysis to capture insights into ways in which national contexts, institutions, organisations and policies have shaped how innovation occurs or does not in specific environments.

However, a growing strand of NIS literature has sought to look forward, at ways to reshape innovation and innovative environments to directly address social challenges (Arocena & Sutz, 2014; Chataway et al., 2014). This trend is associated with more recent demands to aim innovation and innovation policy directly at creating more inclusive and equal societies (transformative innovation). Rather than assuming that the benefits of innovation will automatically lead to progress of various kinds, there is a need to steer innovation to address head-on pressing social, institutional and environmental problems.

For this purpose, scenarios, as a tool and an approach to policy and problem framing, build effectively on the strengths and integrity of NIS analysis of specific contexts as they evolve. Scenario creation starts from this type of landscape mapping (Chapter 12). It then offers a practical way to look forward and deal explicitly with uncertainty (Chapter 13). Looking forward aims to generate directionality in steering innovation across sectors. That requires in turn uncovering mutually desirable directions among the diverse sectors and institutions mapped and invited.

Scenario building then provides tools with which health and industrial actors can share and explore their respective visions, policy frames, agendas and plans for the future. Using scenarios frameworks and techniques has the advantage that the focus is very much on agency and on the complex dynamics associated with agendas for change and policy interventions. Chapter 13 provides two examples—developed collaboratively within tight pandemic constraints—and aims to illustrate the scope for scenario building to help to tackle cross-sectoral innovation and problem solving for cancer care and for wider health security.

CONCLUDING REFLECTION

The project in which this book is rooted set out to study cancer care in East Africa and India—and the researchers then found themselves embroiled in pandemic demands. The pandemic experience was both highly stressful, and also deeply illuminating in intellectual and policy terms. This book has set out to capture both the lessons from the research on cancer care, and also the unforeseen lessons learned while studying that

“wicked problem” (Chapter 1) in the midst of the pandemic. In so many ways, these lessons formed a coherent whole. We had started out, based on past work, to embed our research and understanding of cancer care within the broader political economy of healthcare and industrial development in two East African countries and in India. The pandemic hugely reinforced for us the importance of that broad developmental view.

Cancer care is a crisis that local policies aim to tackle within the context, in India, Tanzania and Kenya as elsewhere, of moves towards universal health coverage to generate more inclusive health systems. The pandemic years undermined progress on cancer care and UHC. However, the pandemic has also helped illuminate the possibilities for legitimating active public policy to allocate resources to support systemic improvement, investment in local manufacturing capabilities and promotion of strategic inter-sectoral interlinkages that drive local health security. The findings on improving cancer care align with the longer-term requirements of building local health security, which we have argued earlier are the precursor and foundation for global health security.

Achieving local health security entails purposive structuring of health-industrial linkages. This requires a legitimate role for public policy during non-pandemic times in resource mobilisation to stimulate knowledge development and diffusion, entrepreneurship and market formation. Public action is also needed to legitimate new technologies and create markets through innovative procurement, and to counter local and international institutional resistance by engaging in political and economic contestations with incumbents.

We argue in this book that health industry development projects are not only technical projects, but by virtue of international economic competitiveness contestations and global production value chain power asymmetries, also embody political and economic aspects. They are political-technical projects. It is conceivable that local production arguments will be met with counter arguments for dependence on global pharmaceutical value chains based on scale, efficiency, intellectual property rights as well as patient safety. These arguments are long standing: India, Bangladesh, Sri Lanka (Lall & Bibile, 1978; Reich, 1994) and China faced them.

The urgency of dealing with rising non-communicable diseases exemplified with cancer in this book cannot be over-emphasised. Most of the therapies required are off-patent and global production systems may de-emphasise them because of low profit margins. Consequently, this calls for

public policy to be bold in solving local health challenges in order to build robust local health security. The Covid-19 pandemic amply demonstrated the risk of not having broad local industrial capabilities (Banda et al., 2022). Broad industrial capabilities are important for solving current local health challenges and generating future pandemic preparedness and agility.

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