

Gaps in public health training in Ethiopia: Insights from a qualitative study

Mirgissa Kaba¹, Makonnen Assefa², Tegbar Yigzaw³, Yayehirad Kitaw⁴, Solomon Worku⁵, Tesfaye Bulto⁶

Abstract

Background: The challenges public health encounters in the 21st century in relation to social, economic, political and climatic dynamism are widely documented. Endeavors are under way at different levels to contain the challenges and ensure healthy living. However, the extent to which public health training is aligned with the demands of the century remains unclear. This study aims to explore efforts made by public health training institutions in Ethiopia to equip public health professionals with competencies that meet contemporary expectations, gaps and suggestions.

Methods: Sixteen public health experts who hold advisory and decision-making positions in the public health sector, local and international development partners and public health training institutions of higher learning were purposively selected to participate in the study. A key informant interview technique was employed to collect data on what are perceived to be the gaps in public health graduates' competencies, and suggested improvements. A topic guide was developed to elicit the competences of graduates, identify gaps in their competences, and extract suggestions on how to fill those gaps so as to contribute to the development of public health endeavours. Interviews were held at a time and place of convenience for the experts. Data collected were categorized under key themes: training, research, and future directions. Under each of these themes, knowledge and skills on leadership and management, community practice, design and conduct of problem-solving research were specified to compile and interpret the data. Efforts were made to faithfully represent the opinion of participants, and verbatim quotes of dominant opinions were collected without identifiers.

Findings: There were four participants from training institutions, seven from public sector organizations, and five from development partners. The findings reveal limitations of graduates to be able to take up public health functions. It was unanimously agreed that irrespective of the level of training, graduates need time to acquaint themselves with what is expected of them as a professional. It was found that public health graduates at master's and PhD level failed to fit into the existing system fast enough to take on leadership responsibilities. Participants unanimously argued that public health training encounters major challenges in empowering students with the necessary knowledge and skills to meet contemporary public health challenges. The problem of a curriculum that does not change in line with changing public health needs, the lack of competence of teaching staff, lack of contemporary references, and lack of time and money to engage students in community practice, were identified as major drawbacks in training. The fact that the curricula of the different schools of public health were adapted from the same sources and has not been revised to fit the demands of the day was particularly emphasized by participants from universities. Students' skill in planning and conducting problem-solving research, and skills to mobilize and engage the community to recognize and solve their own problems, were reported as limited, irrespective of the level of training and management.

Conclusions: Public health training in Ethiopia is perceived to have major limitations, particularly where graduates, irrespective of their level of training, fail to contribute to public health functions. Curricula are not revised to meet current demands. This calls for concerted action by the education and health sectors and like-minded stakeholders to improve the curricula for the different levels of training in public health education. [*Ethiop.J. Health Dev.* 2020; 34(Special issue 1):4-10]

Key words: Public health training, public health competencies, community practice, problem-solving research

Introduction

Public health training has been critically rated in terms of its lack of dynamism and awareness of the changing world, not only in relation to science and technology, but also in terms of the growing population, the debilitating physical environment and consequent climate change, economic realities and growing inequalities (1). According to Frenk *et al.*, public health training is based on "fragmentary, outdated and static curricula", and is responsible for "producing ill-equipped graduates across the globe" (2).

A seminal report by the Institute of Medicine (IOM) in

2003 (3) and publication from *The Lancet* in 2010 (2) call for schools of public health to prepare graduates who can meet the challenges of 21st-century public health needs.

The Lancet Global Independent Commission on education of health professionals for the 21st century reiterated that health professionals' education, including public health, has not kept pace with the complex health systems challenges of the 21st century. The commission recommended a series of reforms, including competency-driven instructional design to develop health leaders and change agents (3).

¹School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia, E- mail mirgissk@yahoo.com

²Addis Ababa University, Addis Ababa, Ethiopia

³Jhpiego Ethiopia. Adjunct Faculty, Jimma University. Email: tegbar.yigzaw@jhpigo.org

⁴Private consultant. Email: yayehiradkitaw@gmail.com

⁵Ministry of health, human resource for health directorate Email: solomonwb@gmail.com

⁶Private consultant

Commensurate with such recommendations, there has been global advocacy to develop competency-based education (4). The Council on Linkages between Academia and Public Health Practice in the USA, for example, has worked on public health competencies for public health professionals for more than two decades. The latest version those competencies is organized into eight domains, reflecting knowledge, attitudes and the skills of three-tier public health educational levels (5). Similarly, the Public Health Agency of Canada (6) and the Association of Schools of Public Health in the European Region (7) have also developed lists of competencies for senior-level public health professionals to raise the standard of public health education, practice and research. Although the level of emphasis given to competencies needed is based on the contexts of the respective settings, it is evident that common features of the public health educational curricula include competence in policy design and programming, communication, community practice, financial and human resource management, leadership and systems thinking, policy analysis, public health teaching and learning methods, team work, collaboration and partnership.

Recently, the Harvard School of Public Health unveiled its commitment to ‘deepen the educational experience by combining the values of excellence and relevance’. This requires a revision of curricula that in most schools of public health are traditional (offered within campus environs and which ‘fill students with knowledge’) to help students acquire knowledge, a positive attitude and broader skills, including leadership, teamwork and negotiation skills, and knowledge to address upstream determinants (1). Building such competencies requires engagement with sectors other than health and education.

There are national public health competencies with clear objectives and alignment to standard global public health functions, expected outcomes, methods of delivery, and assessment of pre-service education at different levels of public health education (8,9). However, current public health curricula are discipline-based, with no clear, measurable or comprehensive list of learning outcomes aligned with essential public health functions (10). Teaching-learning and assessment methods are largely teacher-centered, are not grounded in real-life experiences, emphasize knowledge rather than performance, and memorization of facts rather than a deep understanding of concepts, principles, patterns, causes and effects. Teaching and assessment of public health values and attitudes is almost non-existent. As a result, pre-service education

is believed to have failed to prepare public health professionals to be able to fit for leadership, problem-solving research, community engagement and meeting communication skills requirements.

Thus, despite laudable strides in the accomplishments of the health sector, the question as to whether public health education in Ethiopia is in line with the expectations of the 21st century rests on multiple health concerns emerging in connection with social, economic, climatic and technological change. Accordingly, this paper aims to explore endeavors made by public health training institutions in Ethiopia in equipping public health professionals with competencies that aim to meet contemporary expectations, bridge gaps and satisfy suggestions for improvement.

Methods

An iterative process was followed from March to May 2016 to generate evidence to address the objectives of this paper. Participants were selected from public health organizations, public health training institutions, local and international organizations engaged in public health research and practice, on the basis of participants’ positions at decision-making and/or advisory level during the time of data collection. A total of 16 such experts were involved from the Federal Ministry of Health, Oromia and Addis Ababa Regional Health Bureaus, public health schools at Jimma, Debre Birhan, Gondar and Addis Ababa universities, as well as development partners: WHO, UNFPA, UNICEF, Pathfinder and Save the Children International.

A checklist was developed to generate evidence on competencies gained by participants during training and contributions they make to research and community practices. The checklist was enriched with expert opinion in terms of whether public health professionals are up to expectations at policy and program level, what are believed to be the gaps in training, research and community practice, and suggestions on what improvement looks like. Data were collected by the investigators through face-to-face interviews. The interviews lasted from 90 to 108 minutes, and were carried out at locations indicated by participants.

Data generated were read and re-read to ensure familiarity, and were categorized under five themes: training; research, human and financial resource management; communications; and community practice. The competencies of graduates with first degrees, master’s degrees and PhDs were explored using these categories.

Table 1: Themes and sub-themes defined based on the research questions and findings

S. no	Themes	Sub themes
1	Public health training	Relevance
		Timing of course offering
2	Research	Relevance
		Quality
3	Community practices	Orientation
		Problem solving
		Community attachment
		Communication
4	Human and financial resource management	Planning
		Monitoring
		Implementation
5	Suggestions for improvement	Periodic curriculum review
		Orientation on contemporary public health
		Integrated training

Common arguments were categorized together, while differing views were treated in their own right. Findings were interpreted and triangulated to address the objectives of the study. Research participants statements were anonymized.

Findings

a) Public health training

Academic institution level: Evidence on training of public health professionals revealed diverse views from program- and policy-level participants and those from educational institutions. While those from academic institutions argue from a training point of view, those at the program and policy level argued in terms of the limitations of public health graduates in program design, management and decision-making.

Participants from academic institutions claim to have approved curricula for their routine academic teaching of health in general, and public health professionals in particular. It was found that the balance between theoretical and practical teaching was not uniform, with variations between universities. Participants argued, however, that all universities are expected to work in partnership with local public health facilities, where students carry out their short- or long-term attachment to gain practical skills related to what they gained in classrooms. Yet, it was gathered that all of those who participated in this study invariably argued that the size of students admitted to the training institutions affected not only the quality of teaching but also the level of skill-building endeavor. One of the respondents argued:

“We have a lot of students divided into groups in their attachment to health facility. Each group often has as many as 30 students. Imagine what this means for practical/skill building” Senior teaching staff, University

It was argued that students graduate without many skills. The problem is further jeopardized by the limited number of senior teaching staff at most of the public health schools/departments who have public health competencies and pedagogical skills to facilitate,

supervise, coach and mentor students during their learning process.

In terms of the timing of courses offered to undergraduate students, participants from the different academic institutions pointed out that health officer, nursing and environmental health training generally share a common problem in terms of how much public health knowledge and skills they impart by the end of their training. Public health courses are offered early on and as an addendum that students don't give as much attention to. One of the participants noted:

“I think in all academic institutions, public health courses are offered during the first and second years, while clinical courses are offered during subsequent years leading to graduation. As a result, students could easily forget public health knowledge and skills gained, since they took courses early on. As a result, upon graduation, students have only a blink of public health concepts and skills.” Senior academic and management, University

This problem is further amplified by the differing status of public health staff compared to clinical staff in terms of benefit packages such allowances and opportunities. The fact that students are aware of such differences affects the level of recognition students give to public health programs.

Although health officer training is assumed to focus on public health, and graduates from such fields are expected to play more public health functions, our finding show the contrary. First, health officers' training is argued to be inconsistent across all the training institutions. Second, training is said to be clinically focused. One of the participants pointed out that:

“The training program for health officers is not uniform. There are differences in course content, timing, community practice and evaluations, which make inter-university student transfer difficult.” Head, Public health department, University

Participants argued that health officer graduates are engaged more in clinical service provision at health facilities, instead of their expected public health functions.

Public health courses were found to be theoretical, with limited community practices, making it difficult for graduates to mobilize communities to solve practical problems. This, however, was argued as contrary to established experiences in community-based training programs, where students are empowered with problem-solving knowledge and skills. Jimma University's training philosophy and those of field epidemiology at different universities were frequently mentioned as good examples. One of the participants stated:

"At Jimma University, training is community oriented, where students are offered an opportunity to translate their classroom learning to identify problems, plan and implement interventions by mobilizing resources from community settings." Program advisor, Development partner

Similarly, field epidemiology was found to play an important role in equipping students with problem-solving knowledge and skills. One of the participants noted:

"Field epidemiology is a community-based training, where students stay in the community for an extended time to identify public health problems, use their theoretical knowledge to plan, mobilize resources to solve problems." Program coordinator, University

Insofar as community attachment is valued to enable students to gain problem-solving knowledge and skills, two of the participants in this study were worried that field attachments will overcrowd the already crowded training program:

"Given the overcrowding of courses, there is not enough time to accommodate community-level training." Head, Public health department, University

Findings on PhD level training show expectations to include contributions to policy making, advice on strategies, and undertaking research that could inform decisions. Such expectations were not met, however. One of the participants noted:

"PhD training is challenged in Ethiopia. The quality of graduates in terms of their contributions to strategy and program development, as well as meeting expectations.. I think the curriculum, as well as how we train, has limitations. I did not participate in curriculum development although I did on the reviews. I feel the health sector's contribution is not there in the process of both development and reviews. The way we deliver has also remained lecture based." Senior teaching staff, University

Another participant added:

"Community practice is not well articulated for PhD-level training. Thus, I don't expect graduates to have strong problem-solving knowledge and skills at community level." Senior teaching staff, University

Public health practice-level participants: Findings on training from policy-level participants show that the training curriculum is viewed as grossly deficient and theoretical. Participants from the Ministry of Health and those working at advisory level with development partners unanimously argued that graduates generally lack basic orientation on the context within which they are going to work and contribute after graduation. One of the participants pointed out:

"For me, the theoretical orientation of students remains the case since staff members themselves went through the same process. Graduates who join our office find it difficult to fit into routine operations of the health sector right after graduation. They lack basic orientation on the country's health policy, strategy and programs." Senior management, Public health sector

In agreement with this, a respondent from one of the donor organizations emphasized:

"Most graduates, I feel, did not acquire public health knowledge and skill that would have enabled them to contribute to prevention interventions at community level. Let alone undergraduates in public health, nursing, environmental health, and physicians, those at master's and PhD level lack such basic knowledge and skills in identification of problems, planning, resource mobilization, management and monitoring interventions." Senior officer, Development partner

Findings revealed that all health undergraduates are oriented more towards clinical practices, irrespective of their field of study. Understandably, due to their facility-level attachment as part of their training program, undergraduate health trainees are more well-acquainted with clinical knowledge and skills compared to public health knowledge and skills. Master's and PhD-level graduates are not up to expectations in terms of their role in management, community practice, and decision-making. One of the participants emphasized that:

"Based on my experience working with master's graduates of public health as well as PhDs, I noticed a major gap in planning, management and communication skills and knowledge. Apparently, they are comfortable as middle-level experts instead of taking initiatives to plan and manage programs." Senior advisor, Development partner

b) Research

Training institution level: Findings show that the research competency of students has declined over the

years. Although students are taking research courses and senior ones are required to plan and implement research projects before graduation, this is merely an 'academic exercise'. It was gathered that students take research courses and are examined, although they do not have competence on how to translate evidence and to apply it to policies and programs. One of the participants pointed out:

"Every year thousands of health science students graduate at different levels. As part of their training, students are expected to carry out research. However, how many of these students produce 'good' research whose outcome could have useful implication remains contentious."
Teaching staff, University

Multitudes of factors determine the quality of master's and PhD research studies. Size of student body, limited number and competence of staff/supervisors and limited availability of financial resources were commonly identified as affecting the quality of research. Participants agree that graduates at every level have limited research competence. One of the participants emphasized that:

"Limitation of financial resource and technical supervisory support has affected the quality of research outcome. Enrollment of large numbers of students without consideration of the number and mix of teaching staff affects the quality of support provided during the research process. As a result, research outcomes are poor ... [and] only serve educational formalities to graduate."
Dean, School of public health, University

Although there has been an improvement in the availability of financial support for research in the universities in recent years, it is not yet sufficient to conduct rigorous research with strong support from advisors. One of the participants elaborated:

"There has been a relative improvement in the availability of resources for research. It is, however, too small for a proper research activity. I think even staff members are not engaged in meaningful research that could contribute to policies and programs, let alone students, due to the limitation of financial resources." Senior academic and management, University

Policy-level participants: Participants at policy level felt that research undertakings at universities have gross limitations. Inasmuch as the health sector and development partners expect concrete evidence that could inform policies, strategies and programs, the research outcomes fell short of such expectations. A participant stated:

"Research outcomes from universities are often cross-sectional in design, missing contexts and realities; objectives are not in line with critical strategic and programmatic challenges of public health programs. Furthermore... I did not come across mature, multi-disciplinary research from our universities, including from staff members. In consequence, the country's public health programs have to be based on anecdotes and

rapid assessments." Senior management, Public health sector

It was also gathered that research focused on a few infectious and communicable diseases, while today non-communicable diseases and injuries are becoming major public health challenges. In view of the fact that undergraduate students learn research in training institutions as a course, their roles in research after graduation is quite weak, so much so that their engagement is limited to data collection instead of design and analyzing the findings. Even those at master's and PhD level lack mature knowledge and skills. A participant pointed out that:

"Even those who graduate with master's [degrees] and PhDs in public health tend to participate in data collection and, at best, as supervisors of research activities at different levels. They were found to lack confidence to initiate research on their own." Senior advisor, Development partner

c) Suggestions to improve public health education

It was argued by all participants at all levels that to make current public health training relevant for public health policies and programs of the country, periodic curriculum revision is necessary to ensure relevance to contemporary expectations. It was argued that:

"Most public health training institutions have adopted similar curricula, irrespective of working in different contexts and public health needs. Furthermore, regular curriculum reviews did not benefit from global, regional, national and local dynamism." Head, Public health department, University

Participants unanimously agreed that because teaching staff at the universities have passed through the same training system, their public health orientation is lacking. This is believed to affect the quality of the public health knowledge and skills they transfer to their students. This was further elaborated by one of the participants:

"I did not receive additional training or orientation on contemporary public health challenges and expectations. I have role models from among my teachers whose style I adopted in my teaching. This mean, there is no common standard in teaching public health in every university, nor have public health experts at university level obtained additional training or orientation on how to ensure public health contributes to the health development agenda of the country. In view of this, I do not know what miracle we should expect from our graduates both in terms of contemporary public health knowledge, research skills and community practice." Senior academic and management, University

Participants from training institutions argue that there is a need to integrate public health and clinical training at facility and community levels. Dedicated time for

community practice, with clearly defined community roles and benefits, may improve public health's contribution at community level. Although health officers' training should have more public health orientation, the reality at teaching institutions is contrary to such assumptions. One of the participants argued:

"For health officers' training, there is an ongoing debate among public health staff at our institution on whether the health officer training should continue as confusing as it is now, where trainees are more clinical than public health programs. I think both the Ministries of Health and Education should consult training institutions and initiate a revision of the curriculum in line with the type of health officers needed in this country." Senior academic and management, University

Those in public health practice argued that current public health graduates lack basic public health skills, passion and commitment. This is a critical concern – new graduates cannot plan and implement problem-solving research, or get involved in management and contribute to public health programs. This is commonly argued as worrisome. Inasmuch as the curriculum is limiting, how and at what stage in the training process should public health courses be offered affects graduates' relative interest in public health as a discipline. The fact that public health courses are offered early on, while clinical courses are offered toward the end of their training, make students much more conversant with clinical medicine compared to public health. For those at master's and PhD level, however, the limitation is on the extent to which the curriculum is in line with emerging contexts and expectations on the one hand, and problem-solving skills and knowledge on the other. One of the participants from the Ministry of Health argued:

"It is now time to organize and run policy-level dialogue on how to improve public health education that caters for emerging demands." Senior management, Public health sector

In a similar tone, participants from training institutions argued that the curriculum should be revised to meet contemporary expectations. One of the participants pointed out:

"The training curriculum for different levels should be revised to empower graduates as future health planners, researchers, decision-makers, managers, communicators. Design and revision of the public health curriculum requires involvement of senior policy- and program-level experts and community leaders." Senior management, Public health sector

Discussion

Findings from this study demonstrated the limitations of public health training at schools of public health in Ethiopia. This was well reflected by the weaknesses in designing and undertaking relevant research, weak public health program management, poor community orientation and weak communication skills. It is widely documented that the 21st century has brought opportunities, but that these are marred by concerns

surrounding social, economic and climate change, as well as epidemiologic and demographic transition (11). The political landscape of the world and competition over resources between the poor and the rich, as well as a lack of transparency in governance (12), have further complicated public health.

From the study findings, it was evident that graduates lack competencies to address the multi-faceted problems they encounter in addressing the triple burden of diseases – infectious and communicable diseases; non-communicable diseases; and trauma and injuries. Preventing and containing these problems requires the right mix of knowledge, positive attitude and broader skills, including leadership, teamwork and negotiation skills, and knowledge to address causes instead of consequences (1). Building on such competencies requires a mix of professionals who are equipped with contemporary knowledge and skills to deal with existing and emerging public health problems (13).

Public health in the 21st century requires such competencies as critical thinking, problem solving, reasoning, analysis, interpretation and synthesizing information (14). The findings, unfortunately, reveal that graduates are limited in these areas. It is nearly a decade since Frenk *et al.* highlighted the fragmented educational curricula and called for public health training to keep pace with the challenges posed by the new century. Ethiopia is yet to review its public health curricula. Participants from the different sectors assert that existing curricula have failed to equip public health professionals at different tiers with competencies expected by employers.

The Council on Linkages between the Academia and Public Health Practice in the USA (5), Public Health Agency of Canada (6) and Association of Schools of Public Health in the European Region (15), and recently the Harvard School of Public Health (1), have taken concrete measures to revisit existing curricula to meet the public health demands of the 21st century. Perspectives from medical students from Europe has also underscored the need for strong prevention knowledge and skills (16).

Public health educational curricula in Ethiopia have yet to define competencies for the different educational levels. Commensurate with this is the vicious cycle where faculty need to be reoriented with the appropriate mix of knowledge and instructional skills.

Future public health professionals are expected to make use of technologies to generate evidence to solve public health problems, and inform policy and programs (17). Findings revealed that public health courses are offered early on, as a result of which students often do not even remember what they learned. As a result, their contributions to designing and implementing problem-solving research at both master's and PhD level remain weak.

The World Federation of Public Health Associations is advocating for harmonized basic public health functions, services and operations for mutual

understanding and community orientations (18). Although community practice as part of public health training lacks clarity and consistency in schools of public health, experiences from Jimma University's community-based educational and recent field epidemiology training by several public health schools may provide useful insights on how to equip future public health professionals with problem-solving and communication skills, among others.

Furthermore, the Ministry of Health and Ministry of Education are expected to take immediate measures to organize forums for further dialogue among stakeholders on the future of public health education at different tiers. Such forums may chart critical public health competencies for the different tiers and align existing curricula with required competencies so as to train public health professionals to meet the public health expectations of the 21st century.

References

1. Oni T, Yudkin JS, Fonn S, Adongo P, Kaseje M, Ajuwon A, *et al.* Global public health starts at home: upstream approaches to global health training. *The Lancet Global Health.* 2019;7(3):PE301-2.
2. Frenk J, Hunter DJ, Lapp I. A renewed vision for higher education in public health. *Am J Public Health.* 2015;105;Suppl 1:S09-13.
3. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, *et al.* Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *The Lancet.* 2010;376(9756):1923-58.
4. Haileamlak A. How Can Ethiopia mitigate the health workforce gap to meet universal health coverage? *Ethiop J Health Sci.* 2018;28(3):249-50.
5. Council on Linkages between Academia and Public Health Practice. Core competencies for public health professionals. Version 2014. Council on Linkages between Academia and Public Health Practice; 2014. www.phf.org/resourcestools/Documents/Core_Competencies_for_Public_Health_Professionals_2014June.pdf
6. National Collaborating Centre for Determinants of Health. Core competencies for public health in Canada: An assessment and comparison of determinants of health content. St. Francis Xavier University: Antigonish, NS: National Collaborating Centre for Determinants of Health; 2012. http://nccdh.ca/images/uploads/Core_competencies_EN_121001.pdf
7. Foldspang A, Birt CA, Otok R (eds). ASPHER's European list of core competences for the public health professional. 5th ed. Brussels: The Association of Schools of Public Health in the European Region (ASPHER); 2018. www.aspher.org/download/199/04-06-2018_aspher_s_european_list_of_core_competences_for_the_public_health_professional.pdf
8. Kaba M, Kitaw Y. Public health research in Ethiopia: Facing the challenge. *Ethiop J Health Dev.* 2018;32(2):72-4.
9. WHO. Global strategy on human resources for health: Workforce 2030. Geneva: WHO; 2016.
9. Zwanniken PA, Huong NT, Ying XH, Alexander L, Wadidi MS, Magaña-Valledares L, *et al.* Outcome and impact of Master of Public Health programs across six countries: education for change. *Human Resources for Health.* 2014;12(40):1-10.
10. Kaku M. The future of the mind: The scientific quest to understand, enhance, empower the mind. 1st ed. New York: Doubleday; 2014.
11. Sharma R. The rise and fall of nations: Forces of change in the post-crisis world. 1st ed. New York: W. W. Norton & Company; 2016.
12. Public Health England. Review of the Public Health Skills and Knowledge Framework (PHSKF) report on a series of consultations. Spring 2015. London: PHE Publications Gateway; July 2015.
13. Great Schools Partnership. The glossary of education reform. Definition of '21st century skills'. August 2016. www.edglossary.org/21st-century-skills/.
14. Bjegovic-Mikanovic V, Otok R. Preparation of European public health professionals in the twenty-first century. *Public Health.* 2017;5(18):1-6.
15. Oded B, Jeries N, Ofrat B, Dvir S. The future of medicine: A student perspective. *The Lancet.* 2016;387(10016):340.
16. Sipido K, Degos L, Frackowiak R, Ganten D, Hofstraat H, Horvath I, *et al.* Scientific panel for health: better research for better health. *The Lancet.* 2016;388(10047):865-6
17. Laaser U, Brand H. Global health in the 21st century. *Glob Health Action.* 2014;7:23694.