Findings from a Survey of an Uncategorized Cadre of Clinicians in 46 Countries –

Increasing Access to Medical Care with a Focus on Regional Needs Since the 17th Century

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Abstract

With the United Nations Development Programme (UNDP) Post-2015 Development Agenda upon us, it is increasingly important to address the worldwide deficit of human resources for health. Ironically, there is a unique subset of regionally trained healthcare providers that has existed for centuries, functioning often as an "invisible" workforce. These practitioners have been trained in an accelerated medical model and serve their communities in over 46 countries worldwide. For the purpose of this paper, "medical model" is defined as the evidence-based and scientific manner of training and practice that defines physicians globally.

Inconsistent nomenclature, however, has resulted in these workers practicing as a virtually unidentified and disjointed cadre on the margins of health policy planning. We use the term Accelerated Medically Trained Clinician (AMTC) here as a categorical designation to encompass these professionals who have been referred to by various titles.

We conducted an exploratory, systematic review for AMTCs in over 70 counties to asses if there is such a cadre, the name or title of their cadre, period of and curricula of training and existence of credentialing. This paper reports our findings and aims to serve as a springboard for future, in-depth studies on how we can better categorize and utilize these clinicians.

Introduction

The escalating global crisis of the health workforce shortage is alarming. The Global Health Workforce Alliance (GHWA) estimates that by 2035, the global shortage of healthcare providers will be well over 12.9 million (Global Health Workforce Alliance Strategy 2013-2016 2012). Current estimates indicate that over one billion people do not have access to healthcare providers today (Crisp and Chen 2014). The paucity of appropriately trained healthcare providers worldwide limits access to fit-for-purpose healthcare. Maldistribution and migration of skilled healthcare workers, as well as limited-skills training, also contribute to the current health workforce deficit. The International Labour Organization (2015) recently published *Global Evidence on Inequities in Rural Health Protection: New Data on Rural Deficits in Health Coverage for 174 Countries*, noting that the "fundamental rights to health and social protection remains largely unfulfilled for rural populations." It goes on to note, "while 56% of the global rural population lacks health coverage, only 22% of urban populations are not covered." They estimate that "23% of the worlds' health workforce are sent to rural areas, while more than 50% of the population live there." One of the most significant inferences of this paper is a worldwide call for additional fit-for-purpose health workers to meet this basic fundamental right (Scheil-Adlung 2015). The importance of a more harmonized system for data collection of human resources for health was also a key point.

Figure 1. Global distribution of AMTCs as reported in this study

Dots denote country of confirmed AMTC

To promote quality-driven, efficient healthcare, we must make best use of existing assets. Limited resources necessitate a collaborative approach and a clearer understanding of the roles and scope of practice of clinicians. For decades, Accelerated Medically Trained Clinicians (AMTCs) have existed worldwide under various titles: physician assistant, clinical officer, medical assistant, associate clinician, health assistant, medex, community health officer, feldshers and so on, depending on where they practice. These professionals are trained in a medical model framework, typically focused on diagnostic, therapeutic and preventive care in a condensed time frame of study that is regionally specific, flexible and cost-effective. Accelerated and regionally specific trained clinicians are responsive to their host health system, which makes them invaluable to the community they serve.

AMTCs are trained to perform various functions traditionally under the purview of physicians, but their training is shorter in duration. It stresses medical science and clinical decision-making with a focus on patient history, physical examination, diagnosis and treatment. In many countries, the focus of education has been on primary care, as this is where they often practice as the only providers. Their education often includes public health, epidemiology and medical practice management. In some countries, the training focus narrows rapidly during their clinical training to the specialty area of practice. For example in India, they have become vital team members in subspecialty surgery, where they can be seen in surgical roles as first assist as well as coordinators in areas such as transplant. In some African countries, career ladders have been developed to provide services closer to the rural population needs, and AMTCs are further trained in emergency obstetric care, surgery, ophthalmology and psychiatry. They are trained to work within teams to maximize team member roles and increase access to care. While their scope of practice has broadened globally, they share a common training in the medical model.

Designating a categorical title for a cadre of clinicians, one must consider what already exists. The categories "physician" and "'nurse" are globally recognized, and yet, can vary widely in training, scope and title. Table 1 displays examples of physician and nurse training and titles in several countries. Yet, despite the variation in training and titles, physicians and nurses are categorically linked and recognized by the public and policymakers, allowing their clinical capacity to be considered within health systems planning.

AMTCs are unique in that they have historical and cultural identities in the countries they serve. Many have originated independently out of need, yet are remarkably similar

in the services they are trained to provide. In the majority of African countries, they are the front-line clinician and the link between rural and the next level of care. Often referred to as "non-physician clinicians" or "mid-level workers" (Dovlo 2004; Cobb et al. 2015; Lehman 2008; Global Health Workforce Alliance 2013; McKimm et al. 2013; Mullan and Frehywot 2007), there is much uncertainty surrounding the training, scope and global representation of this cadre of health workers. In some instances, these terms

Table 1. Examples of physician and nurse training and titles

Country	Education	Degree/title awarded
Global examples of training/titles for cadre = physician		
New Zealand	6-year undergraduate	MBBS=Bachelor of Medicine, Bachelor of Surgery
	2-year rotations	House Officer/House Surgeon/Intern FY1/FY2/PGY1/PGY2/RMO/junior doctor
	3+-year training program	Registrar/Resident/Registrar Medical Officer
	Specialist or consultant	Specialist Medical Officer/Specialist/Consultant Medical Officer/MOSS/Staff Grade/Board Eligible
US***	Post 4-year undergraduate degree 4 years medical school	Medical Doctor – MD
	Residency/fellowship: 3–8+ years	Medical Doctor – MD
	Doctor of Osteopathy – DO/Chiropractic Doctor – DC all recognized as "doctor"	
India	5.5 years undergraduate	MBBS=Bachelor of Medicine, Bachelor of Surgery
	3 years post grad	Doctor of Medicine – MD General practice
	2–3 years post MD	Doctor of Medicine – DM Super specialty
	3 years post grad	Master of Surgery – MS Surgery
	2-3 years post MS	Magister Chirurgiae – MCh Super specialty surgery
	Allopathy, Homoeopathy, Siddha, Naturopathy and Unani all recognized as "doctor"	
Global examples of training/titles for cadre = nurse		
USA	1 year program vocational/technical school/ community colleges	Licensed Practical Nurse: LPN* Licensed Vocational Nurse: LVN*
	2 years	Associate Degree Nursing: ADN
	Assoc + 2 years or 4 years	Bachelor of Science in Nursing: BSN
	BSN + 2 years**	Master of Science in Nursing: MSN
	Variable 2-4+ years DNP 2 years post MSN 3-4 years post BSN PhD 3-7 years post MSN or other MS degree	Advanced Practice Nurses: nurse-midwives, nurse anaesthetists, clinical nurse specialist Also Doctoral: DNP DP – focus on evidence-based practice [EBP] research, stress physical assessment skills Typically sought as terminal degree for APNs PhD – research and nursing science-based education Considered more academic, scholarly with strong research methods training, preferred faculty prep

Table 1. continued

Country	Education	Degree/title awarded
India India Nursing Council	Training in College of Nursing Graduate 12th class + 2 years	Multi Purpose Health Worker Female training (ANM or MPHW-F)
	Graduate 10th class + 1.5 years	Female Health Supervisor training (HV or MPHS-F)
	Graduate 12th class 3.5 years = 2 years practice/1 year community health nursing and midwifery/6 month administration or 6 months research	General nursing and midwifery (GNM)
	4 years	Bachelor of Nursing Course – B.Sc Nursing
	Regular: GNM + 2 years Distance: GNM +3 years	Bachelor of Nursing Course (post certificate) Regular B.Sc (post basic) Distance B.Sc (post basic)
	BSc + 1 year exp/ BSc + nursing post certificate	Master of Nursing MScN Nursing Medical Surgical Nursing, ob/gyn nursing, pediatric nursing, mental health nursing, community health nursing
	Full time 1 year with thesis	Master of Philosophy Program in Nursing -MPhil
	3 years	Doctorate of Philosophy in Nursing – PhD in Nursing
Ghana	Graduate 12th class + 3 years	RN (diploma)
	Graduate 12th class + 4 years	RN (bachelor's degree)
	Graduate 12 class + 3 years	Registered Psychiatric Nursing (RPN)
	Graduate 12th class + 2 years	Community Health Nurse (CHN)
	Graduate 12th class + 3 years	Registered Midwife
	RN +3 years working experience +1.5 years	Post Basic Diploma: critical care, operating room, ophthalmic nursing, ENT nursing, psychiatric
	RN + 2 years	Post Basic University Diploma: nursing education, nursing management
	RN + 1st degree/diploma + 2 year sandwich course	Master's degree in: education, management
	RN + 2 years	Registered Psychiatry Nurse – RPN
	Graduate 12th class +RN + 2 years	Registered Midwife – RM (post RN)
	Graduate 12th class +2 years CHN training + 2 years	Registered Midwife (post enrolled CHN)

*LPN /LVN are non-professionals with limited scope of practice and brief training
**US select BSN programs offer accelerated BSN to PhD program
***US growing number of medical students earn a master's in Public Health or PhD as part of their medical education

combine nursing professionals and AMTCs. This increases ambiguity; leads to fragmentation, underutilization and inadvertent omission of an already existing core of skilled medical personnel, in the human resources for health "count"; as well as calls for increased numbers of fit-for-purpose clinicians.

AMTCs have been termed "agents of change," as they often were introduced, and in many regions organically developed, as a health workforce to serve in the most rural and impoverished areas. Historically, AMTCs can be appreciated as early as the 17th century, when Peter the Great introduced them into the Russian armies to provide primary care to rural areas (Zdravoohranenija et al. 1974). Today, they continue to be recruited for training from areas of need in the hope that they will return to serve their home communities. Regionally specific training and titles often prevent AMTCs from migrating across borders, where a neighbouring country lacking in resources could utilize their skills. There have been no international recognition

or educational standards developed for these clinicians, unlike physicians and nurses, so the exodus from developing to developed countries does not apply to this cadre.

The WHO (2008) reports that the literature on outcome studies on mid-level health workers is sparse. While Mullan and Frehywot (2007) and Dovlo (2004) studied the use of the non-physician clinician, their research was limited to Africa and included nurse-based clinicians. McKimm et al. (2013) explored the "expanded and extended healthcare workforce" in the Pacific region, separating out the non-nurse and nurse mid-level practitioners. They agreed that the "one size fits all" approach for these clinicians is *not* appropriate and that regional and community diversity will necessitate unique approaches. The distinctions between professional Advanced Practice Nurses (APNs) and AMTCs are their distinct practice frameworks and education and training. APNs are educated and trained within a nursing science framework. Nursing science views patients as unique individuals, in constant interaction with their environment. This "systems approach" views disease and illness as deviations from health. Nursing interventions aim to promote and return patients to a maximum state of health. Nurses use a holistic approach in their practice, as they assess, plan, intervene and evaluate their patients' needs and responses to care disease and illness. APN curricula prepare nurses for more independent practice and include physical assessment, pharmacology and care management, typically for a specialty practice such family health, mental health or paediatrics. AMTCs are trained in a model based on physician training. In the United States, they are the only other profession, other than physicians (MD and DO), licensed to "practice medicine." While there is lack of standardization of curricula for these clinicians, flexibility often facilitates training responsive to regionally specific needs (Lehman 2008), while compounding the lack of consistent categorization of these practitioners.

This study inventoried the global distribution of AMTCs across 46 countries and describes the various regional titles, when the profession was established, the duration of training, scope of practice and the governing regulatory body by region. The research attempts to identify and unite an existing clinical workforce and categorizes them to enable them to be distinguished and fully utilized within the healthcare team and health systems.

Methods

This descriptive, exploratory study systematically reviewed the education, training, scope of practice and credentialing of a group of front-line clinicians workforce that has not been consistently designated. We conducted a literature review using the following databases: *Pubmed*, *Medline* and *Google Scholar*. Keyword search terms included assorted AMTC nomenclature: "non-physician clinician," "midlevel clinician," "health workforce," "physician assistant," "clinical officer," "medical assistant," "health assistant," "clinical associate," "feldsher," "human resources for health (HRH) strategy," "auxiliary health worker" and "medex". Source inclusion criteria encompassed publications in peer-reviewed journals, country reports by the World Health Organization and World Bank and other country reports from well-known international professional bodies. Literature within a maximum time frame of 10 years from (2005 to 2015) was included, except when researching the history of a specific assembly of workers, in which case the time frame was extended. We included only published works written in English. The literature search revealed matches of various AMTC analogues in over 45 countries.

We accessed contacts in the 46 countries, primarily through government health professionals and websites, country-specific health professional associations and websites and the professional networking service LinkedIn®. The contacts included AMTCs who served as clinicians, educators and AMTC organization

representatives. Regional and national policy makers also provided assistance. Data were collected through communication by email or phone and queried for: (1) title of the profession, (2) year it was established, (3) education and training, (4) scope of practice, (5) regulation and (6) number of AMTC professional cohorts in each respective country.
One researcher verified the accuracy of the data collected.

We used a snowball sampling technique to continue gathering information about AMTCs by country and region. We used this technique, as it was difficult to locate subjects who practice in remote rural areas. Researchers asked subjects whether they would be willing to recommend other potential contacts. They were informed that they had the right to decline to provide this information.

In the event that an in-country contact was not identified or available, the researchers gathered data from resources such as WHO or local government reports on health professionals. For two countries, researchers uncovered a health workforce that was previously operational, but now defunct. WHO in-country offices and the country's Ministry of Health confirmed these findings.

We cleaned the data using a three-step process involving repeated cycles of screening, assessing and editing data with suspected abnormalities. In the screen step, data were evaluated for lack/excess of data and inconsistencies. In the assessment step, data were evaluated for errors as well as true extremes or norms. In the final editing step, data were corrected, deleted or left unchanged. Data were then assembled by query question: (1) title of the profession, (2) year profession was established, (3) education and training, (4) scope of practice, (5) regulation and (6) number of AMTC professional cohorts in each respective country to allow comparison of the AMTCs across countries that were surveyed.

Findings

Africa (See Table A at longwoods.com/content/24296)
Africa has 20 AMTC-type providers. The titles vary widely on this continent and include health officer, medical assistant, clinical officer, physician assistant, community health officer, community healthcare officer, clinical associate, associate clinician and medical licentiate. The earliest noted AMTCs in Africa are Malawi's Medical Assistants, established in the 1890s (Muula 2009). Next, the Ugandan medical assistant was introduced in 1918 and the Kenyan Clinical Officer was introduced in 1928 by the British colonial government to provide health services in remote and less developed rural areas (Clinical Officer Council, website 2015). Overall, AMTC training in African countries is a minimum of three years, with some countries, such as Kenya, Malawi, Tanzania and Zambia, having formal paths for more advanced training that include surgery (emergency obstetric), ophthalmology and psychiatry. Gabon's Assistant Medicals are trained in neighbouring countries such as Togo and return to practice in their communities in Gabon. There is a varied range of degree- as well as non-degree-granting educational processes; however, all are focused on the allopathic medical model of education in both public and private AMTC training institutions.

Generally, the scope of practice for African AMTCs is primary care, with the majority of AMTCs working in rural areas or with marginalized populations in community health centres. In larger cities, AMTCs can be found working in secondary and tertiary care centres providing specialized care in more progressive settings. In many African countries, AMTCs are not only responsible for providing primary care for entire villages but they are also responsible for organizing and

managing the resources necessary to oversee their local community health structure. Regulation of AMTCs, although varied, was existent in all African countries surveyed.

Asia (See Table B at longwoods.com/content/24296)

Asia has over 13 AMTC-type providers. Titles of the AMTC in Asia include the feldsher, baga emch, physician assistant, medical assistant, sub-assistant community medical officer and health assistant. The earliest known AMTCs began in the USSR in 1600s as apprentice physicians or physician assistants (Farmer et al. 2003). The feldsher training schools were established in the 1870s (Farmer et al. 2003). Russia, Armenia, Kazakhstan, Kyrgyzstan, Mongolia and Uzbekistan have continued to utilize feldshers/baga emchs since the fall of the USSR (Kulzhanov and Healy 1999.; Hakobyan et al. 2006; Roberts et al. 2011; World Health Organization and Ministry of Health Kyrgyzstan 2005; World Health Organization and Ministry of Health Mongolia 2012; World Health Organization and Ministry of Health Uzbekistan 2007). Training ranges from two to four years, with some training programs awarding degrees upon completion. The scope of practice in Afghanistan, Bangladesh, Nepal, Russia, Armenia, Kazakhstan, Kyrgyzstan, Mongolia and Uzbekistan is most often providing primary care in rural communities. India's AMTCs were established secondary to the brain drain of Indian cardiothoracic physicians over 20 years ago, and have largely served in specialty care since then. There is a resurgence of primary care focus for the Indian AMTCs currently (Abraham et al 2014). Of the Asian countries surveyed, AMTCs have regulatory oversight, except in Afghanistan, India and in the Kingdom of Saudi Arabia, where it is pending.

Europe/North America/South America (See Table C at longwoods.com/content/24296)

Europe has over four AMTC types working in Germany, The Netherlands, Ukraine and the United Kingdom, recently including in Scotland. In North America, both the United States and Canada employ AMTCs. Although programs vary, most offer two to three years of postgraduate training and award master's degrees. Most functioning AMTCs in Europe, Canada and South America work in the primary care capacity, with the exception of The Netherlands, where AMTCs function in the surgical capacity. All have oversight bodies.

Most recently, the UK's Faculty of Physician Associates at the Royal College of Physicians assumed this function (July 2015).

The United States has over 100,000 physician assistants practicing in all areas of medicine. In the United States, the AMTC profession was developed when highly skilled medics returned from war in Vietnam to civilian life. The medics, with relatively little training, were positioned to provide effective and efficient much-needed primary care.

In South America, Guyana has AMTCs called medex, who, with governmental oversight, serve the primary care needs of the country (Goede 2014). While there are mentions of "community health technicians" in Colombia, Mexico and Peru (Yokwe Online 2011), the authors were unable to confirm the current practice, training, scope or regulation of such practitioners.

Oceania (See Table D at longwoods.com/content/24296)

Oceania has at least six AMTC types that have been identified. The AMTCs provide primary care in the remote regions and outlying islands (Lane 2008). Their titles include physician assistants, physician associates, health extension officers, health assistants, health officers and medex (Keni 2006; Lassi et al. 2013; Lehman 2008; World Health

Organization Western Pacific Region 2001). Training in the medical model varies from 18 months to 4 years. Owing to limited resources, some AMTC students are trained in neighbouring countries before returning to their home country to work. The University of Hawaii was training AMTCs in the medex model for Chuuk, Kiribati, Pohnpei and the Marshall Islands (Lassi et al. 2013). Regulation of Australia's AMTCs is pending, while Fiji is currently utilizing nurse practitioners after phasing out the use of medical assistants in 1984. The AMTCs in New Zealand, Papua New Guinea and Marshall Islands have processes in place for regulation. The literature surveyed was limited and often more than 10 years old at the time of this publication. Countries that were unable to be verified were not included in the tables.

Discussion

It is critical to account for and understand the variations across cadres of the health workforce. Effective and regionally fitting health systems planning requires a clear understanding of the workforce in terms of stock, skill-mix and distribution. While the roles of physicians, nurses, midwives, pharmacists and dentists are clearly defined by entities such as the Global Health Workforce Statistics database (WHO), International Labour Organization and the International Standard Classification of Occupations, they often vary in training, regional titles and scope of practice. Cadres trained in an accelerated medical model that encompass the AMTC category have historically been either excluded or placed in categories that do not adequately represent their training and skills. Many of them have served on the margins of the health sector and their contributions to healthcare delivery continue to be largely overlooked. As countries strive to strengthen and reconstruct their health systems, it is critical to include AMTCs as vital members of the global health workforce. They are a flexible workforce that can rapidly and cost-effectively be morphed based on the health system's needs that they are part of. They work within teams and are culturally engaged within the countries they serve.

For centuries, the AMTC workforce has provided primary care services to rural and marginalized populations (Cobb et al. 2015; Crisp and Chen; 2014; Dovlo 2004; Global Health Workforce Alliance 2013; Lehman 2008; Mullan and Frehywot 2007). In 1978, the International Conference of Primary Health Care and the WHO issued the Declaration of Alma-Ata, expressing the need for "all governments and the world community to protect and promote the health of all the people of the world" (Global Health Workforce Alliance 2013; Lehman 2008; Health Bulletin 2013.) The Third Global Forum on Human Resources for Health (2013) was the largest attended convening to date focused on HRH. Dr. Etienne (WHO Regional Director, Americas) highlighted that "One of the challenges for achieving universal health coverage is ensuring that everyone – especially people in vulnerable communities and remote areas – has access to well-trained, culturally-sensitive and competent health staff…The best strategy for achieving this is by strengthening multidisciplinary teams at the primary health care level… Training of health professionals must be aligned with the health needs of the country."

Overall, AMTCs are valued in high- to low-income countries alike – from the 2,000 medical licentiates who serve in Zambia (doctor to population ratio 0.1/1,000) to the 100,000 physician assistants who serve in the United States (doctor to population ratio 2.5/1,000) (World Bank 2015). Their places in health systems are in line with the Declaration of Alma-Ata and The Third Global Forum on HRH.

While the midlevel workforce has been broadly documented in Africa (Dovlo 2004; Lehman 2008; Mullan and Frehywot 2007), and more recently in the Pacific region

(McKimm et al. 2013), comparing titles, education, scope of practice and regulation produces discordant findings. By identifying and clarifying this "invisible" global workforce, governments, policymakers and communities can begin to unite and mobilize these healthcare providers to meet the current health worker crisis. Broad and non-descriptive nomenclature such as "non-physician clinician" or "mid-level" has also contributed to the obscure classification of AMTCs (Lassi et al. 2013; Lehman 2008). The ambiguity of this profession is further compounded because of variations in training, degrees procured, scope of practice and the presence (or absence) of a regulatory body. This overview sought to differentiate and define the AMTC with the initiation of a census.

The training outlined in Tables A through D (at longwoods.com/content/24296) provides basic information on topical focus within AMTC training. They include basic diagnosis, treatment and prescriptive ability. The majority of programs offer post-secondary education, ranging from 18 months to 4 years. Those programs that offered training in less than two years generally drew from an existing pool of clinically experienced nurses. Of note, African AMTCs have been vocational pioneers, offering progressive training in emergency obstetric care, ophthalmology, psychiatry and dermatology to individuals seeking career advancement. However, as Lehman (2008) and Mullan and Frehywot (2007) note, fragmentation in training necessitates standardization of international AMTC core competencies to further unite and advance these health professionals. Similar work is ongoing, yet much advanced, within the nursing and physician professions (Royal College of Physicians and Surgeons Canada 2015; World Health Organization 2009).

Understandably, ever-changing political climates and lack of infrastructure sometimes necessitate that AMTCs receive training from nearby countries. This non-nationally-based training can not only leave a void in regulatory processes, but can lead to a lack of support for the AMTC, as he/she returns to home communities to meet a critical healthcare need. Gabon is facing such challenges, as their Assistant Medical Officers are trained in Togo. In Fiji (Keni 2006; World Health Organization Western Pacific Region 2001), the profession was not maintainable and ended nine years after its establishment.

Regulation and management of AMTCs vary widely. In some countries, the Ministry of Health guides both training and practice oversight. In others, it is the Ministry of Education that is engaged in the clinician's didactic training, but provides no regulation for practicing AMTCs. Some countries have non-governmental professional bodies involved in training and practice supervision. Ghana began regulation of its AMTCs (physician assistants) through the Medical and Dental Council 40 years after the AMTCs were established and were providing primary care services to populations in rural communities (Adjase and Cobb 2014; Cobb et al. 2009). Countries like India and Sierra Leone are seeking authoritative medical supervision after the AMTCs have been a part of the workforce for more than five years.

Physician involvement and oversight of the AMTC is variable and merits further exploration. In some countries (United States, Canada, The Netherlands and South Africa, for example), AMTCs function under the supervision of a physician. Globally (particularly in the rural areas where AMTCs serve), direct physician supervision may not always be feasible owing to the shortage of physicians, geographical location and resources available in the clinical setting.

In the post-2015 era, integrating AMTCs into health systems will provide a vital addition, in building a health workforce to meet current and future population needs.

Study Limitations

There were many challenges collecting data for this study. The peer-reviewed literature and websites that provide information on ATMC training and regulation are sparse. There is a general paucity of published information for many of these professions, particularly in resource-poor countries. Published information utilized for this study was not always available from primary sources, but instead came from external sources such as WHO country documents, non-governmental organization aid agency reports and foreign journal articles. There is simply not enough published primary source information regarding this cadre of health professionals within respective countries.

Verification of existing AMTCs reported in literature was challenging, as the information was often outdated. Accurately identifying comparable AMTCs was difficult owing to the numerous country-specific titles given to this workforce. Inconsistent designations could suggest a gross under-representation of actual personnel available. There were several limitations to the snowball sampling technique. First, the researchers had to rely on the recommendations from their existing contacts. Therefore, representativeness of this cadre of healthcare workers was not guaranteed. Next, there was a concern for sampling bias. As the researchers' contacts tended to nominate people they knew well, it was possible that the nominees obtained only a small subgroup of the existing cadre.

The challenges of desk research are numerous, especially in terms of validity and timeliness. Primary in-country data collection would allow for a broader informational structure. Primary research and data gathering would allow for greater understanding of the skills and contribution of AMTCs as healthcare providers and their capacity to positively impact and improve national health indicators.

Recommendations: The Way Forward

The GHWA "Global Key Messages" (January 2014) forecasts a global deficit of 12.9 million health workers by 2035 using an arbitrary threshold of 34.5 skilled health professionals per 10,000 population. Their proposed solutions are critical when considering the AMTC workforce.

- "Health begins with health workers" – the support and empowerment of *all* health workers is essential.
- Assembly of a health workforce is a priority.
- "The role of the *mid-level* and community health workers should be maximized in order to make frontline health services more accessible and acceptable in support of Universal Health Coverage (UHC) plan."
- Improved HRH databases are critical and will aid in the planning and improvement the workforce.

The GHWA Board (February 2015) statement on the post-2015 health workforce agenda stresses that "substantive and strategic investments in HRH are needed in order to ensure the right to universal access to safe and quality healthcare, a life of dignity for all, and to attain the health, education, employment, equity, gender and wider development targets under consideration in the Sustainable Development Goals (SDGs)." AMTCs are ideally suited to contribute to the post-2015 agenda, expansion of universal health coverage and equity. They function as members of an interprofessional, multi-cadre team, and are rapidly and medically trained and regionally specific with skills and competencies that can contribute to improving population health while they bridge the socio-cultural dynamics of the local healthcare systems.

Identifying and clarifying the various roles within the health workforce is key to moving forward to meet the challenge posed by the Declaration of the Alma-Ata. Engaging WHO's Department of Human Resources for Health or GHWA to request member

countries to participate in comprehensive human resources for health studies could dramatically assist in broadening the global understanding of available resources. This could be particularly important to reinforce the post-2015 agenda of the WHO, and the United Nations Sustainable Development Goals, which will serve all countries. As we seek to improve and strengthen current health systems, we are reminded of countries like Liberia who, during the Ebola crisis, suffered unimaginable losses, as 150 Liberian physicians struggled to give adequate care to a population of 4.3 million. Sadly, there was little mention of the over 1,000 Liberian AMTCs who served and continue to serve in the most remote parts of their country.

This research not only inaugurates a current census of global AMTC categories of health workers, but also aims to propose an official designation for AMTCs as the "encompassing" classification for this professional workforce. While the "Accelerated Medically Trained Clinician" terminology is primarily descriptive of the training process, it considers the regional titles these professionals have held for years, while acknowledging core similarities. Future work needs to establish regulatory parameters for education, training and competencies. A categorical designation can enable conversations with stakeholders around these aims and facilitate policymakers, stakeholders and national officials to fully utilize AMTCs as vital members of regionally specific healthcare teams, especially when exploring existing resources for health and health systems planning.

The Future Considerations table (Table 2) provides examples of the various stages and processes for sample regions with AMTCs. Regional, national and global organizations should bring forward best practices, lessons learned and work as advocates. As this process occurs, the ability to track and collect data in a thoughtful manner that encompasses each of the variables listed in Table 2 and assess the economic and health impacts realized by scaling up of this cadre will help guide future regulatory policy.

The post-2015 agenda calls for a paradigm shift to increase access to care, with a focus on primary care that is patient-centred and

Table 2. Future considerations

Pre-training	Education	Scope	Regulation
Student, faculty recruitment from areas of need – to return to area	Global/ regional competencies	Regionally specific, driven by health system they are in	Accreditation and standardized of regional curricula
Public awareness of the AMTC so applicants understand profession	Regional accreditation of educational programs	Adequate support (experts, physicians) available	Regulation of practice, regionally/nationally
Development of bridge-type programs to enable success in formal training program for students from rural, marginalized populations	Social determinants of health and primary care at core of training to enable this workforce to be versatile in where they work	In-service training opportunities Access to continuing medical and professional education	Formal organizations at regional, national and global levels
	Team-based training with interdisciplinary learners, faculty and practitioners	Career ladder options	Advocacy at policy levels for health teams with integration of social determinants of health
	Community-engaged transformational experiences throughout training		
	Consider degree levels of training globally		
Scholarly activities led by the AMTC cadre	Scholarly activities led by the AMTC cadre	Scholarly activities led by the AMTC cadre	Scholarly activities led by the AMTC cadre

personal. Care across the life span with attention to the social determinants of health starting with health teams at the very most rural community level will not only empower the communities, but will enable them to be more productive. This will ultimately increase their socioeconomic status, opportunities for their children and development of a less divided society.

Indeed, AMTCs have broad impact and provide proven quality healthcare with global and regional variation. They are well-aligned and must be included in the post-2015 global health workforce agenda. It is vital that this essential cadre within the health team is summoned from the fringes of the health sector, categorized and fully utilized. To achieve universal health coverage and be part of the solution to the current health workforce crisis and the development of future health systems, it is time for AMTCs to rise and be regarded.

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Findings from a Survey of an Uncategorized Cadre of Clinicians in 46 Countries – Increasing Access to Medical Care with a Focus on Regional Needs Since the 17th Century

Nadia Cobb, Marie Meckel, Jennifer Nyoni, Karen Mulitalo, Hoonani Cuadrado, Jeri Sumitani, Gerald Kayingo, and David Fahringer

TABLE A. African Accelerated Medically Trained Clinicians

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Angola	Clinical Officer	– secondary school – Education– 3 yrs. (Emigration of Drs 71% based on early 2000 data)	Medicine minor surgery obstetrics (no CS) Work in rural and urban areas	Information not available	Info not available on # CO in Angola MD ratio .011/10,000 Population: 19 million
Burkina Faso	Clinical Officer – 1942 Also : – attaché's desanté' Medical assistant – Attaché de santé' en chirurgie – 1965	Secondary school – 3 years Medical officers can upgrade to CO's with 6 month curriculum in emergency medicine	Medicine, minor surgery – General practitioners – Emergency obstetrics at district hospital – Can deal with obstructive labor – C sections – Work in urban and rural areas	Organization – the Association Health Attaché in surgery	1241 Clinical Officers as of March 2015 MD ratio .0047/10,000 Population: 18 million
Cabo Verde	Health Officer per literature review– per WHO and MOH in Cabo Verde these do not exist – no other info available				MD ratio 2010 .3/1,000 Population: 538,535
Ethiopia	Health Officer 1954 discontinued in 1974 started again 2004	4 years According to Health Sector Development Program: accelerated program of Health Officer training (generic and upgrading) began in 2005.	95% practice in primary Health care unit (District HC) both in rural and urban Manage health center & district health offices	Directorate of Health Facilities and Professionals Licensing under Health and Health Related Services and Products Regulation Agency	Health Officers 2008 > 900 had graduated 3,168 were under training– per WHO Health Sector Development program MD ratio 2009 .025 /1000 Population: 96 mil

TABLE A. African Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Gabon	Assistant Medical Officer 1995	Clinicians trained in Togo– no training institution in Gabon	Primary Care– rural and urban health centers – first level of health system	Ministry of Health	14 Assistant Medical April 2015 MD ratio 2004 0.29/1,000 Population: 1.67 million
Ghana	Medical Assistant 1969	Direct entry: 4 years Post RN 3 yrs: 18 months training Bachelors: 4 years 7 training programs	Primary Care: rural/under-served areas 80– 120 patients/day Specialty training in psychiatry, dermatology post graduate	Ghana Medical and Dental Council regulatory body Physician Assistant (PA) umbrella of PA– Medical =Medical Assistant PA Dental =Community Oral Health Officer PA– Anesthesia= Nurse Anesthetist	2,500 in service 72% PA– Medical MD ratio 2010 .1/1,000 Population: 25.7 million
Guinea– Bissau	Clinical Officer Unclear on year of profes-sion establishment	Secondary school finishers 3 years pre– service/ 1 year internship	Medicine – rural and urban areas	Information not available on regulation	Information not available on # CO in Guinea– Bissau MD ratio 0.07/1,000 (2009) Population: 1.7 million (2014)
Kenya	Clinical Officer 1928 Originally: hospital assis-tants, clinical assistants, medical assistants	2 levels: *3 yr. diploma in clinical medicine and surgery, *4 yr. bachelor of clinical medicine and community health. mandatory 1– 1.5 years internship – 18 Diploma 6 BSc Clinical Medicine	Primary Care, pediatrics, reproductive health (c–sections), ophthalmology, orthopedics	The training, registration, and licensing is regulated by the Clinical Officers Council Registered licensed as independent practitioners.	Over 15, 000 have been registered by Clinical Officer Council MD ratio 2011 .2/1,000 Population: 45 million
Liberia	Physician Assistant 1960's	Apply post high school. 3 years didactic and clinical training 3 programs – but all on hold because of ebola epidemic	Primary care	Ministry of Health and Social Welfare	Liberian MD : 50– 150 total PA= 1,000 approx Population: 4 million
Malawi	Medical assistant 1890's	Medical Assistant: 2 years formal Medical assistants can upgrade to CO's after completing a 2 year bridging course 18– month training program in orthopedic, ophthal-mology or anesthesia CO programs.	Primary Care	MOH administrative control only	MA 1,262 MD ratio 2009 .019/1,000 Population: 17 million

TABLE A. African Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
	Clinical Officer 1979	CO – 3 year training—post MA extensive surgical focus	surgical skills– hernia repair, abdominal surgeries and cesarean sections tertiary and district hospitals.	MOH administrative control only	2011– 2016 Malawi Health Sector strategic plan CO 2,726
Mozambique	Tecnicos de Medicina (Clinical Officers) 1975 Tecnicos de Cirurgia 1984	TM: prior RN, MW TC: 3– 2.5 years of pre– service, 1– 1.5 year internship	TM: Primary care Rural and Urban care TC: Rural hospitals Surgery/ obstetric/ trauma care (are the backbone of emergency surgical care – 90% 57	Ministry of Health Mozambique regulates health workers	Information not available on # TM, TC in Mozambique MD ratio 2008 0.03/1,000 Population: 25 million (2015)
Mauritius	Community Health Care Officer	Secondary school finishers 3 years pre– service/ 1 year internship	Rural clinical care/ obstetrics but no c– sections	Information not available on regulation	Information not available on # CHCO in Mauritius MD ratio 2010 .1/1,000 Population: 1.3 million
Rwanda	Physician Assistant 1996	4 years Bachelor of Science in Clinical Medicine and Community health	Primary Care & Manage health centers	Rwanda Allied Health Professional Council and the Ministry of Health.	176 Physician Assistants December 2014 MD ratio 2010 .1/1,000 Population: 12 million
Senegal	Health Officer Unclear on year established – the National School of Social and Health Development started in 1992 to consolidate schools, paramedical and social to better interate and coordinate these professionals	National School of Social and Health Development attached to the MOH. State diploma Training in 18 Sections through 3 depts: Dept of Basic Studies in Health Sciences Dept of Special Studies in Health Sciences Dept of Studies in Social Science	Primary care – rural and urban centers and district hospitals	Director of Human Resources within the Ministry of Health and Social Action oversees regulation	953 March 2015 HRH MOH Senegal MD ratio 2010 .1/1,000 Population: 13.6 million
Sierra Leone	Community Health Officer: 1980 Originally Medical Assistant	3 years plan to upgrade to Bachelor of Science (BSc)	Primary Care as well as management of Community Health Centers Surgical and mental health CHO being piloted	Draft CHO licensing act for CHOs recently submitted to Parliament for approval All CHOs appointed into Primary Health Units under Ministry of Health and Sanitation.	500 CHOs MD ratio 2010 0.02/1,000 Population 2015 5.7 million

TABLE A. African Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
	Clinical Officer	4 years Bachelor of Clinical Medicine – shorter courses for those w' diploma of nursing/ Community Health Sciences	At District Hospital : provide in– patient and surgical care vs. primary health	Pending further information from MOH	Training curriculum and facility developed – pending matriculation of first class. Currently roll– out on hold as Makeni facility converted into an Ebola Holding Unit as part of national Ebola response plan.
South Africa	Clinical Associate 2008	3 years with a BCMP earned 3 programs	Primarily in district health centers, scope of practice under the delegation of the physician	Medical and Dental Board of the Health Professions Council of SA registers qualified graduates	2015: 516 CA MD ratio 2013 .8/1,000 Population: 48 million
Republic of Southern Sudan	Clinical Officer 1998 Govt helps recruit students from rural areas	3 years internship after the program	Primary care perform minor surgical procedures 99% end up working in rural health centers	COs are regulated by the MOH, Republic of South Sudan.	Clinical Officers – – 475 December 2014 MD ratio – not available = 189 total in– country MOH Strategic Plan 2011– 2015 Population: 11.5 million
Tanzania	Clinical officer (CO) Associate Medical Officer (AMO) 1960's	CO– 3 year training preparing clinicians to work in rural areas Assistant Medical Officer –CO + 2 years advanced training in curative and preventative medicine	AMO usually found in district hospitals, health centers, training institutions and PHC programs.	Tanganyika Medical council under the Medical Practitioners and Dentists Ordinance of 1968 Cap 409.	940 medical officers, 1400 assistant medical officers, 6900 clinical officers 2004 MD ratio 2006 0.01/1,000 Population 2014: 49.6 million
Togo	Medical Assistant 1972 Togo Ministry of Health has requested specialization as seen in scope column	3 year training – post secondary education	Rural health centers; urban health centers and hospitals – initially all primary care – now with specialties: – Surgical assistant – Radiology Assistant – Hygiene and Environmental Health Assistant – Ophthalmology assistant – Laboratory assistant	Association des Assistants Medicaux du Togo	1390 Medical Assistants in December 2014 MD ratio 2010 .1/1,000 Population: 7 million

TABLE A. African Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Uganda	Clinical Officer Started after World War 1 as Medical Assistant – 1918 In 1996, name changed to Clinical Officer	3 yr. post secondary education. – Graduate with a diploma in clinical medicine and community health.	Primary healthcare Specialty Psychiatry and Ophthalmology	Allied Health Professionals Council and Ministry of Education	Total enrollment per year 2,100 MD ratio 2010 .1/1,000 Population: 35.9 million
Zambia	Associate Clinician 1936 Medical Licentiate 1989	Assoc. Clinician: 3– 4 yrs post secondary Med. Licentiate: 3 yrs post AC or 4 post secondary 1 public, 7 private training programs	Associate Clinician: rural areas Primary Care Medical Licentiate: 90% rural areas Level 1 referral district hospitals Medical care Pediatric care Surgery Comp. Obstetric Emergency Care Specialized Clinical Officers provide: Anesthesia Ophthalmology Dermatology/verneology Psychiatry	Health Professions Council of Zambia registers and regulates their practice	2,000 in service 300 graduates/year currently MD ratio 2010 .1/1,000 Population: 14.6 million

MD ratio: World Bank Country ///Population : The World Factbook (CIA) – est July 2014

TABLE B. Asian Accelerated Medically Trained Clinicians

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Afghanistan	Physician Assistant 2012	24 months of training at Kabul National Military Hospital.	To work under the supervision of a physician	Pending	145 students (5 females) MD .234/1,000 Population: 31 million
Bangladesh	Medical Assistant 1979 Renamed: Sub– Assistant Community Medical Officer 2015	Medical Assistant Training Schools (MATS) – 3 year training didactic & clinical 8 MATS– government run 134 MATS private sector	Rural health centers; union health and family welfare centers	Bangladesh Medical and Dental Council	Annual production capacity 9,241 (2013) MD ratio 2011 .4/1,000 Population: 166 million
India	Physician Assistant 1992	3– 4 yr bachelor training 2– 3 yr post graduate training 10 University programs in conjunction with 47 institutes	Originally cardiology/ cardiac surgery as of 2004 general medicine & other specialty focus.	Indian Assoc. of Cardiothoracic Surgeons to conduct certi-fying exam for physician assistants working in area Discussion of development of Allied Health Council by the Indian government	1,300 (2012 info) MD ratio 2012 0.7/1,000 Population: 1.2 billion
Israel	2015/2016	In development	In development	Israeli Ministry of Health	MD ratio 2011 3.3/1,00 Population: 7.8 million
Nepal	Health Assistants 1970's	Completion of secondary school prior to admission 3 year training program – certificate in General Medicine post graduation can sit for Bachelor in Public Health > 20 programs in Nepal	Primary care focus	Council for Technical Education and Vocational Training – approves/ oversees pre– service curriculum Licensure through the Health Professional Council of Nepal	April 2015 = 15,000 MD ratio 2011 .21/1,000 Population: 30.9 million
Mongolia	Baga Emch / Feldsher 1931 – shortened training 1934 – 3 yr curriculum developed	Post secondary – 3 year program Medical diploma earned 2013 last class graduated of Baga Emch – training has stopped – will continue practice until all retired	Rural primary care/ health education / ante-natal/ prenatal care–providing care from their own tents for the rural nomadic population. They have prescriptive rights Also at Soum (district) level	Ministry of Education, Culture and Sciences – education oversite Health Law of Mongolia – licensing every 5 years .	1,100 – 1,200 currently practicing MD ratio: 27.3/10,000 (2010) Population: 2.9 million (July 2014)

TABLE B. Asian Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Myanmar	1953 Health Assistants Condensed Health Assistant Bachelor of Community Health	CHA (Condensed Health Assistant) Certificate Course – One year Three modules within (9) months Bedside training at hospitals for (2) months Field training and research for (1) month Bachelor of Community Health 4 year training course including 3 month clinical training at hospitals and 2 month research and field activities	Primary care / Pre– Referral treatment at rural health centers. They are not allowed to practice in general practice in private clinics	Department of Health, Ministry of Health oversees/ regulates clinical practice. Township Health Department also oversees work. Department of Medical Science and University of Community Health, Magway – oversight of curriculum.	Government posts HA – 1,800 HA Grade 1 – 365 THA (Township Health Assistant) – 96 INGOs and Myanmar Health Assistant Association – 250 MD ratio 2012 .6/1,000 Population: 55 million
Russia Post USSR: Armenia Kazakhstan Kyrgystan Uzbekistan	1600's Physician Assistant/ Apprentice Physician 1870's Feldshers	3– 4 year training schools 'middle grade medical personnel' 1974 – 500 schools training over 130,000 Feldshers (non specialized)	Feldshers– generalists Feldshers mid– wives Feldshers in industrial work Feldshers seagoing/river going vessels Feldshers in emergency services Feldsher– sanitarian Feldsher – child/adolescent care	Ministry of Health/ Ministry of Higher and Special Secondary Education	Russia MD 2010 4.3/1,000 Population: 142 million Armenia 2012 2.7/1,000 Population: 3 million Kazakhstan 2012 3.6/1,000 Population: 17.9 million Kyrgystan 2012 2/1,000 Population: 5 million Uzbekistan 2012 2.4/1,000 Population: 28.9 million
Kingdom of Saudi Arabia	Physician Assistant 2010	28 months of training in a master program. One program at Prince Sultan Military College of Health Sciences	To work as a 1st Lt. medical officer (Physician Assistant) under the supervision of a physician	Pending	22 male graduates that are practicing in the military MD ratio 2010 .9/1,000 Population: 27 million

TABLE B. Asian Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Taiwan *Not officially recognized by the World Health Organization	Physician Assistant 2003	Bachelor degree BSN with a PA certificate (not given by government but local hospital) 3 years of post– nursing training. One program at Fooyin University	Hospital base practice. Works under the supervision of physician.	PA legislation has not yet been passed. Pending	40 graduates of the first PA program * 2005 1,419 PA/NP title depending on hospital that they are working MD ratio not listed Population: 23 million

MD ratio: World Bank Country ///Population : The World Factbook (CIA) – est July 2014

TABLE C. Europe/North America/South America Accelerated Medically Trained Clinicians

Country/Europe	Title Established	Education/Training	Scope	Regulation	Numbers
Republic of Ireland	Physician Associate 5/2015 Royal College of Surgeons Ireland starts two year pilot program; Irish Health Care System	Development of PA thru UK, US, Canada, Dutch PA's filling 2 year contracts in surgery – two year pilot program starting 2015	Breast surgery Upper gastroenterology surgery Lower gastroenterology surgery Orthopaedic surgery Vascular surgery	Planned Education: UK & Ireland Universities Board for Physician Associate Education	Md/ratio=27/10,000 4.6 million
Germany	Physician Assistant 2005	36 months – bachelors degree	Primary Care as well as Emergency medicine, orthopedics, urology and cardiothoracic surgery	Training Accredited through Study Program in Health and Social Sciences State Examination to practice	2013 – 100 graduates MD ratio 2011 3.8/1,000 Population: 80.9 million
Netherlands	Physician assistant 2001	30 months 20 hours per week Work study model that is tied to one specialty. Physicians supervise and train their own PAs Master's degree	Mainly in surgical specialties About 75% of Dutch PAs work in hospitals	Accredited by Dutch Flemish Accreditation Review Commission on Education (NVAO), thru Ministry of Health, Welfare and Sport and the Ministry of Education, Culture and Science.	over 1,000 PAs MD ratio 2010 2.9/1,000 Population: 16.8 million
Ukraine	Feldshers started in Ukraine during WWII	Post high school entrance. 3 cycles of training – didactic and clinical.	Primary care focus – usually in rural clinics, also work on ambulances	Government oversight of all	16,000 in 2001 MD ratio 2012 3.5/1,000 Population: 44 million
United Kingdom England	Physician Associate 2003 – England	2 years Degrees: PGDip/ MSc in Physician Associate Studies 5 Univ training programs	General practice as well as multiple specialties including, but not limited to: Emergency medicine critical care surgery community psychiatry	Pending through Royal College of Physicians gain statutory regulation.	191 PAs qualified in the UK. There are a further 107 students MD ratio 2012 2.79/1,000 Population: 63.7 million
Scotland	Physician Associate 2013 first graduating class	Post graduate program 2 years in duration PgDip Physician Associate Studies	Wide variety of areas – working in teams within in the scope as agreed on by supervising physician	Education: UK & Ireland Universities Board for Physician Associate Education Must pass the National Examination – register with UK Association of Physician Associates to work in the UK as a PA	26 in training currently/ new class in 9/15

TABLE C. Europe/North America/South America Accelerated Medically Trained Clinicians – continued

Country/ North America	Title Established	Education/Training	Scope	Regulation	Numbers
Canada	Physician Assistants 1984 (Canadian Armed forces) 2008 start of non– service programs	24– 28 months in duration 4 PA programs	Primary care, internal medicine, Emergency medicine, surgery	Physician Assistant Certification Council of Canada Academics: Canadian Medical Associations' Conjoint Accreditation services	11/14 PA: 475 working MD ratio 2010 2.1/1,000 Population: 34.8 million
United States	Physician Assistant 1965	Programs an average of 26 months long Bachelors as well as masters' degrees awarded 179 training programs	Practice medicine as part of a team with physicians and other healthcare providers in all areas	National education accreditation: ARC– PA National certifying body: NCCPA State licensing bodies	100,000 in service MD ratio 2011 2.5/1,000 Population: 318.8 million
Country/ South America	**Title Established**	**Education/Training**	**Scope**	**Regulation**	**Numbers**
Guyana	Medex 1977	18 month post RN career 42 month post secondary school	Primary care in rural/remote areas/ health center management/ oversight of CHW	Medex Act /Ministry of Health	2013 70 – serving 747,884 population MD ratio 2010 .2/1,000 Population: 735,554

MD ratio: World Bank Country ///Population : The World Factbook (CIA)– est July 2014

TABLE D. Oceania Accelerated Medically Trained Clinicians

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Australia	Physician Assistant 2011 first graduates in Australia from Queensland.	3 year Bachelors program offered, in Queensland, with a new cohort every two years	Queensland Health approved controlled scope of practice and prescription rights for PAs written into Policy. Local positions within specialties: Orthopedics Spinal Clinic General Practice Surgical assistance Critical care Emergency Department Community health Aboriginal Health Private Mining Support	Pending	Approximately 12 in service, remainder in waiting MD ratio 2011 3.27/1,000 Population: 22 million
Fiji	Medical Assistant 1975– 1984 (Nurse Practitioners since then)	Medical model	Primary Care	1978 Ministry of Health – Medical Assistant Council	61 trained during years MD ratio 2010 .4/1,000 Population: 903,207
New Zealand	Physician Associates Ongoing trial in 2 phases that began in 2006– 07 and will conclude early 2015	2 year post– graduate training model pending	Primary and specialty care under doctor supervision	New Zealand Ministry of Health	< 10 overseas trained physician assistants MD ratio 2010 2.7/1,000 Population: 4 million
Papua New Guinea	Medical Assistant 1910 Health Extension Officer 1970s	4 year bachelor training	Primary care services in rural and underserved communities	Papua New Guinea National Department of Health	452 Health Extension Officers MD ratio 2010 .1/1,000 Population: 6.5 million
Marshall Islands	Health Assistant 1970s– training ended over 30 years – Medex training now	18 month training – medex model trained outside (Hawaii)	Primary care to the 49 outer island health centers	Ministry of Health – Health Services Act	80 Health Assistants MD ratio 2010 .4/1,000 Population: 70,983

TABLE D. Oceania Accelerated Medically Trained Clinicians – continued

Country	Title Established	Education/Training	Scope	Regulation	Numbers
Tonga	Health Officer 1977	2 year training	Tonga's 14 health care centers are staffed by 1 health officer & 4 nurses – they support about 7,200 people	unknown	Unknown number of Health Officers MD ratio 2010 .6/1,000 Population: 106,440

MD ratio: World Bank Country /Population : The World Factbook (CIA)– est July 2014