The cost of health services delivered at primary care facilities in

OMAN

سلطنة عمان
وزارة الصحة
Sultanate of Oman
Ministry of Health

مجلس الصحة لدول مجلس التعاون
Gulf Health Council

UN INTERAGENCY TASK FORCE ON NCDs
#beatNCDs
@un_ncd

World Health Organization

UNDP

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Executive summary

Scope of the Study:
Strong primary healthcare (PHC) is the key to more efficient health systems with lower health spending and better health outcomes. This report estimates the cost of selected clinical services provided to Omani nationals at the primary care level in Oman to further promote preventative and close-to-client services in the country. The cost of a total of 116 public sector primary level clinical outpatient services was estimated based on costs of the health workforce as well as drugs and supplies. Importantly, additional PHC provisions, such as systemic PHC resources (e.g., infrastructure or policy development), multisectoral policies and health prevention, as well as PHC delivered by the private sector, were not costed in this study. Note that the costs of selected primary care services modelled in this study are therefore not directly comparable to health expenditure.

This report also highlights the role PHC can play in addressing the growing non-communicable disease (NCD) burden experienced across the region. Primary health care services support screening, prevention and treatment for NCDs and can achieve better health outcomes with lower health spending for NCD management. Finally, this study provides recommendations to improve future resource allocations for public PHC to meet evolving population health needs.

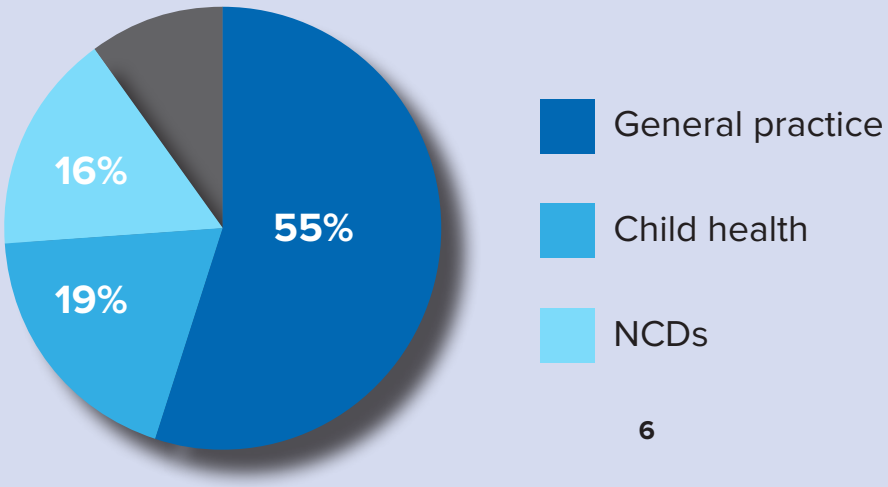
Cost of primary health clinical services

Primary care clinical services cost Oman

US$229 million

in 2019. This is equivalent to US$113 per capita.

Main drivers for primary care clinical service costs



Key findings from the analysis of a set of clinical services provided at the primary care level in Oman:

- **The total cost for the set of clinical services provided at the primary care level in Oman in 2019 was US$299 million.** This is equivalent to US$ 113 per capita for the set of clinical services costed.
- **The main drivers for the cost of clinical services were general practice, child health and NCDs.** The programme contributing the most to the total cost was general practice with 55 percent, followed by child health with 19 percent. Non-communicable diseases (NCDs) made up 16 percent of the total costs, and this was mainly driven by diabetes, chronic respiratory disease and cardiovascular disease services. Maternal and neonatal services accounted for a small share of the costs, highlighting an opportunity to shift more of these services from secondary to primary care level.
- **There is room to scale up the coverage of NCD clinical and screening services.** Indeed, screening services for cancer, risk of cardiovascular disease and diabetes as well as diabetes complications only accounted for less than 1 percent of the total costs. Based on current coverage rates, it is estimated that over 956,000 people did not receive NCD screening and 301,000 people did not receive NCD clinical services they needed at the public primary care level in 2019. A majority of these NCD services were for cardiovascular diseases.
- **Mental health services at PHC level could be strengthened.** The mental health programme makes up less than 1 percent of the total costs, mainly because of low coverage rates. It is estimated that 103,000 people did not receive the mental health services they needed at the public primary care level in 2019.

Recommendations

1	**Scale-up NCD clinical and screening services delivered at primary care level.**
2	**Shift more mental health services to the primary care level.**
3	**Increase PHC funding and resources.**
4	**Leverage the modelling in this study to further improve primary care efficiencies and health outcomes.**

Introduction

The 1978 Alma-Ata Declaration was a landmark event in health history calling for health systems to be orientated towards primary healthcare. In 2018, 40 years later, the Astana Declaration reaffirmed global commitment to PHC as an essential approach to attaining universal health coverage and health-related sustainable development goals. PHC is an approach to healthcare based upon three components: multisector policy and action, empowered people and communities, and primary healthcare as the core of integrated health services within a country.[1] While definitions of PHC vary (see **Box 1**), it generally not only refers to the first point of contact for medical care but also encompasses health education, prevention and promotion.

Efficient PHC has health and economic benefits. A strong PHC system can improve health system efficiency, reduce health costs, increase patient satisfaction and tackle inequalities by improving health outcomes across socio-economic indicators.[2,3,4] Ultimately, investing in PHC can lead to healthier and more productive populations with an association between PHC and lower mortality rates found across high, middle, and low-income countries.[5,6]

1 Operational framework for primary healthcare: transforming vision into action. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF), 2020. Licence: CC BY-NC-SA 3.0 IGO.

2 Organisation for Economic Cooperation and Development (OECD). (2020), Realising the Potential of Primary Healthcare, OECD Health Policy Studies, OECD Publishing, Paris,. Available at: https://doi.org/10.1787/a92adee4-en.

3 Starfield B. (1994). Is primary care essential?. Lancet (London, England), 344(8930), 1129–1133. Available at: https://doi.org/10.1016/s0140-6736(94)90634-3
Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of primary care to health systems and health. The Milbank quarterly, 83(3), 457–502. Available at: https://doi.org/10.1111/j.1468-0009.2005.00409.x

4 Macinko, J., Starfield, B., & Shi, L. (2003). The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries, 1970-1998. Health services research, 38(3), 831–865. Available at: https://doi.org/10.1111/1475-6773.00149

5 Macinko, J., Starfield, B. and Shi, L. (2003). The Contribution of Primary Care Systems to Health Outcomes within Organization for Economic Cooperation and Development (OECD) Countries, 1970–1998. Health Services Research, 38: 831-865. Available at: https://doi.org/10.1111/1475-6773.00149

6 Macinko, J., Starfield, B., Erinosho, T. (2009). The impact of primary healthcare on population health in low and middle income countries. Journal of Ambulatory Care Management, 32:2;150-171.

Box 1. What is Primary Healthcare?

While long established as a concept, the definition of primary healthcare continues to evolve with many definitions existing. Generally speaking, PHC refers to the first, and main, point of contact with the national healthcare system on both an individual and community level.[7,8,9,10,11] Hallmarks of PHC include:

- universal accessibility[7,8,9,10,11]
- person- rather than disease-focussed[7,8,10,11]
- continuous across the life span[7,8,10]
- comprehensive services, including prevention, diagnosis and treatment[7,8,9,10]

In this report, PHC is defined as per the OECD definition:
"*Primary healthcare is expected to be the first and main point of contact for most people with the healthcare system, focused on the people and their communities. It takes into account the whole person and is patient-focused, as opposed to disease or organ system-focused, and thus recognises not only physical, but also psychological and social dimensions of health and well-being.*[7]"

PHC can improve health system efficiency by reducing hospitalization rates and emergency department visits, thereby reducing healthcare costs.[12] This has been seen in countries where a referral from a general practitioner or family practitioner facilitates hospital admission. PHC serves to be the first point of contact between a patient and the health system, thereby allowing the health system to better manage chronic conditions and to perform preventative measures.[13] With a better understanding of individual patient and whole family risks, both preventative and chronic care can be provided in a patient-centred way. With these considerations, PHC provides for a healthier population and a more efficient, cost-effective health system.

7 OECD (2020), Realising the Potential of Primary Healthcare, OECD Health Policy Studies, OECD Publishing, Paris, https://doi.org/10.1787/a92adee4-en.
8 Operational framework for primary healthcare: transforming vision into action. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF), 2020. Licence: CC BY-NC-SA 3.0 IGO.
9 Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. Milbank Quarterly. 2005;83(3): 457–502.
10 Salah, K. & Kidd, M. (2019). Family Practice in the Eastern Mediterranean Region: Universal health coverage and quality primary care. Taylor & Francis Group, Florida, USA.
11 OECD (2019), Deriving preliminary estimates of primary care spending under the SHA 2011 framework. https://www.oecd.org/health/health-systems/Preliminary-Estimates-of-Primary-Care-Spending-under-SHA-2011-Framework.pdf
12 OECD (2020), Realising the Potential of Primary Healthcare, OECD Health Policy Studies, OECD Publishing, Paris. Available at: https://doi.org/10.1787/a92adee4-en.
13 OECD (2020), Realising the Potential of Primary Healthcare, OECD Health Policy Studies, OECD Publishing, Paris,. Available at: https://doi.org/10.1787/a92adee4-en.

Box 2. Characteristics of strong primary health care[14, 15]

- Comprehensive and continuous care accessible to all
- Education and training provided mostly within primary care
- Individual healthcare provider associated with each patient or family
- Efficient referral systems to secondary and tertiary care
- System is targeted to the needs of the local population

Globally there is a renewed commitment to PHC in light of changing population and health characteristics. Aging populations, population growth, increasing health literacy and public expectations of health services are increasing demand for healthcare globally and in the Eastern Mediterranean Region (EMR).[16] Changing disease burdens toward non-communicable diseases and increasing access to technology among the general population are further driving changes in PHC. Estimates regarding PHC note that 90 percent of all health needs can be met at the PHC level, giving countries a clear path forward in improving health and health system efficiency.[17]

There is a long history of primary healthcare in the Eastern Mediterranean, with the Qatar Declaration on Primary Healthcare endorsed by all regional countries in 2008.[18] The declaration stands for Member State commitment to achieve better health and wellness through strengthening PHC-based health systems. The region is seeing a growing commitment to family practice (FP) as a way to improve primary healthcare, and ultimately universal health coverage. PHC can be delivered by through general practice and family practice, with the two terms used interchangeably in many circumstances. For the purpose of this report, general practice (GP) will be considered as services delivered by a physician who is qualified to deliver primary healthcare to an individual, their family and their community through general practice medical training. Family practice will refer to services delivered by a family physician who has undergone specialty training to care for the overall health of families and individuals across their lifespan.[19] An example of this would be one family physician, or team, providing comprehensive PHC to all members of a family unit. Family practice therefore delivers the key elements of PHC and will be considered the basis of PHC for this report.

14 World Health Organization. (2008). The world health report 2008: primary healthcare now more than ever. World Health Organization. Available at: https://apps.who.int/iris/handle/10665/43949

15 van Weel, C., & Kidd, M. R. (2018). Why strengthening primary healthcare is essential to achieving universal health coverage. CMAJ: Canadian Medical Association journal = journal de l'Association medicale canadienne, 190(15), E463–E466. Available at: https://doi.org/10.1503/cmaj.170784

16 Salah, K. & Kidd, M. (2019). Family Practice in the Eastern Mediterranean Region: Universal health coverage and quality primary care. Taylor & Francis Group, Florida, USA.

17 World Health Organization, Regional Committee for the Eastern Mediterranean. (2009). Progress report on strengthening primary health care based health systems. https://applications.emro.who.int/docs/EM_RC56_INF_DOC_4_en.pdf

18 World Health Organization, Regional Committee for the Eastern Mediterranean. (2009). Progress report on strengthening primary health care based health systems. https://applications.emro.who.int/docs/EM_RC56_INF_DOC_4_en.pdf

19 Salah, K. & Kidd, M. (2019). Family Practice in the Eastern Mediterranean Region: Universal health coverage and quality primary care. Taylor & Francis Group, Florida, USA.

Realising the highest possible rate of universal health coverage is essential to achieve the health-related Sustainable Development Goals. As primary healthcare is the cornerstone of comprehensive health coverage, evidence-based planning is critical to ensuring the continuity of primary healthcare programmes. To support increased investments in primary healthcare programmes and to facilitate progress towards achieving universal health coverage, the UN has been invited to assist the Gulf Cooperation Council (GCC) countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE, in undertaking a comparative study on the costs of PHC programmes in the GCC. Knowing the cost of PHC components and having estimates of programme costs for the coming years will help countries find practical financing and allocative solutions to help direct investments to areas that reduce costs such as the medicine industry, medical supplies and training of health personnel according to country needs. This will also enhance the continuity of health services in GCC countries regarding efficiency and quality to meet increasing demand.

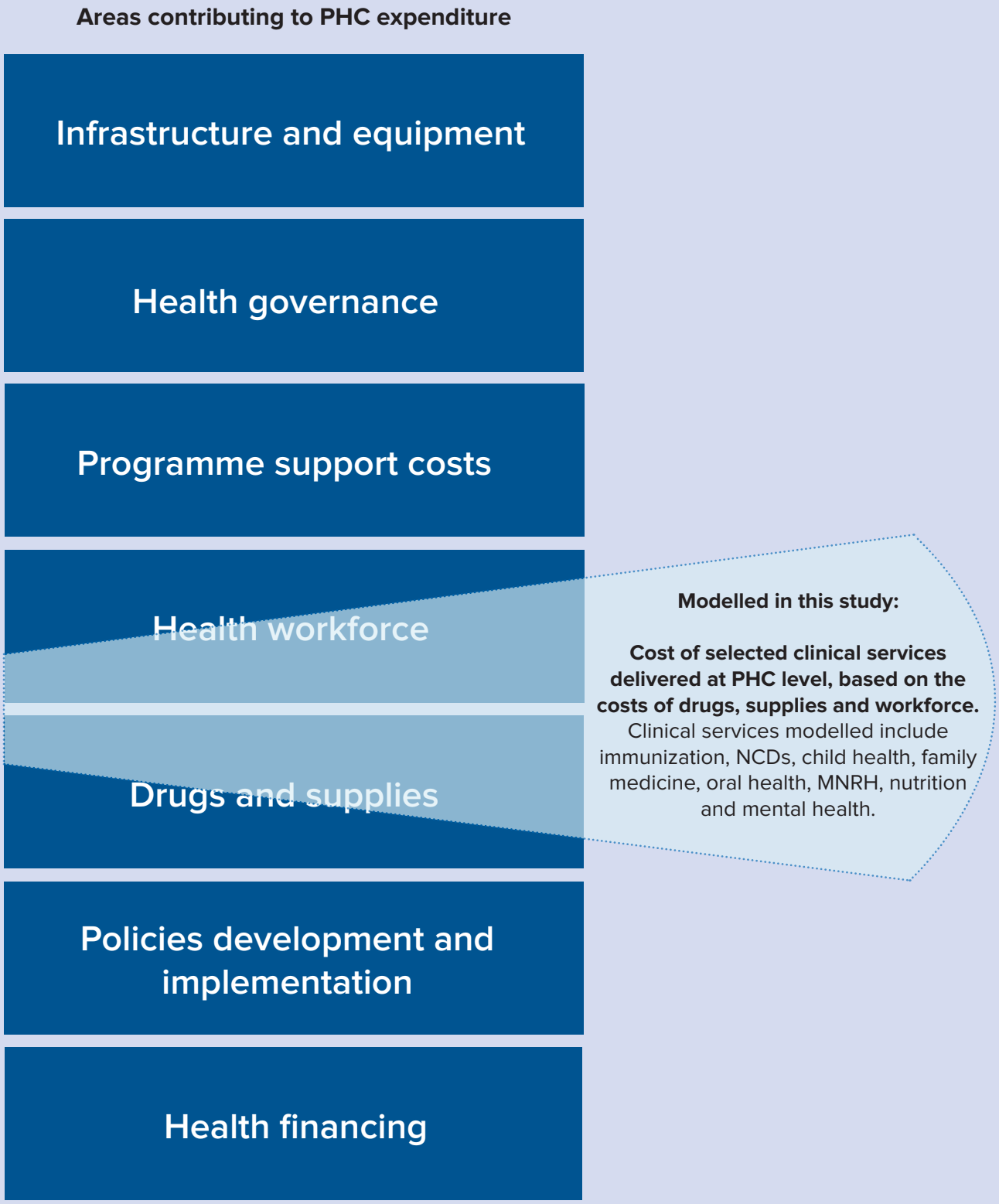
AIM OF THE STUDY

This study aims to estimate the costs of delivering a set of primary care services spread across seven programmes: (1) immunisation, (2) non-communicable diseases, (3) oral and dental care, (4) child health, (5) nutrition, (6) mental health, reproductive, maternal, neonatal and child health, and (7) general practice. The study will use this set of clinical services delivered at the primary care level to represent PHC. However, this set does not include all services, or all costs, associated with PHC.

SCOPE OF THE STUDY

The scope of this study is focused on costing preventive care and general outpatient care (healthcare providers, medicines, diagnostic tests, and supplies) as essential components of PHC in promoting preventive and close-to-client services. The analysis focuses on a list of outpatient clinical services delivered at the primary care level. The clinical services were determined in consultation with experts from the Ministry of Health. The list created does not constitute an exhaustive set of PHC services. The cost of other important PHC measures such as multisectoral policies and actions and empowered people and communities were not estimated. In addition, the share of the required resources for information systems, good governance and financing were not estimated. Additionally, only costs incurred by Oman's public sector were estimated. The coverage rates might not reflect the number of services delivered in the private sector (**Figure 1**).

Figure 1: Primary Healthcare service costs modelled in this study



Methods

SELECTION OF CLINICAL SERVICES

A list of clinical services was established based on information available in OneHealth Tool. This choice was justified by the availability of standard regimen treatments, prices and time estimates in the OneHealth Tool Costing Module. The original list was modified by FPs in each country to reflect the range of services delivered at the primary care level.

COSTS AND HEALTH EXPENDITURES

This study estimates the costs of providing a set of clinical services delivered at primary healthcare facilities. We defined total costs as the direct costs (drugs, procedures, supplies, and healthcare providers' time) spent to deliver a particular service. This definition differs from the broader notion of health expenditures, which encompasses all expenditures incurred to provide health services (infrastructure and equipment, governance, etc.). For example, while health expenditures generally include the total cost of the health workforce, this study valorised only the time spent by healthcare providers on delivering the selected clinical services. Therefore, the costing analysis did not include the time spent by healthcare providers on other clinical services or non-clinical activities (coordination, training, etc.). The costs estimated in this study only reflect the fraction of the primary healthcare expenditures directly employed to deliver the selected clinical services. Furthermore, the study was conducted using standard costs developed based on standard treatment regimens and price estimates (WHO-CHOICE, WHO, UNICEF). Using standard costs provides an estimate of the expected costs of clinical services. It may differ from the actual costs, which refer to what was actually spent to deliver these selected services.

CALCULATION OF INTERVENTION COSTS AND NUMBER OF SERVICES

We used an ingredient costing method to estimate the costs of delivering a selected list of clinical services. In this approach, the cost of clinical service is considered the product of the number of clinical services delivered and the cost per service:

Intervention cost = Number of services x Cost per service

The number of services delivered was obtained from annual statistical reports published by the Ministries of Health or were directly provided by FPs. When the number of services delivered was unavailable or expressed as a coverage rate, we estimated it as follows:

Number of services = Target population x Population in need x Coverage rate

To estimate the cost per service, the following formula was used:

Cost per service = Drugs and supply costs + Healthcare provider time cost

We used treatment, costing, and time staff requirements assumptions from the OneHealth Tool Costing Module. These country-specific assumptions were developed based on standard WHO protocols, expert opinions, and international drug prices (WHO, WHO-CHOICE, UNICEF, MSH International Drug Price Indicator). In addition, we developed specific assumptions for all services not included in the OneHealth Tool Costing Module (see **Annex 1**).

The different components used in the model (target population, population in need, coverage rate, drug and supply cost, and healthcare providers' time cost) are presented below.

TARGET POPULATION

The target population refers to the sub-population eligible for a specific clinical service (i.e., pregnant women, adolescents, total population). When the target population was related to an age group (i.e., children 0-59 months, adults 18+, women 15-49), we defined it from the population census or estimates provided by the Ministry of Health. When it was related to a specific condition, disease or status (i.e., people with diabetes, people with asthma, pregnant women), the target population was estimated from national surveys, statistical reports, international databases or academic literature.

It is important to note that the reference population used in this study was the Omani population only.

POPULATION IN NEED

The population in need refers to the share of the target population, which requires a specific service per year (see Annex 1). It was determined by the incidence or the prevalence of a disease and/or treatment assumptions (e.g. 60 percent of people with diabetes should receive standard glycemic control; 50 percent of women aged 40-70 should receive clinical breast examination every year).

COVERAGE RATE

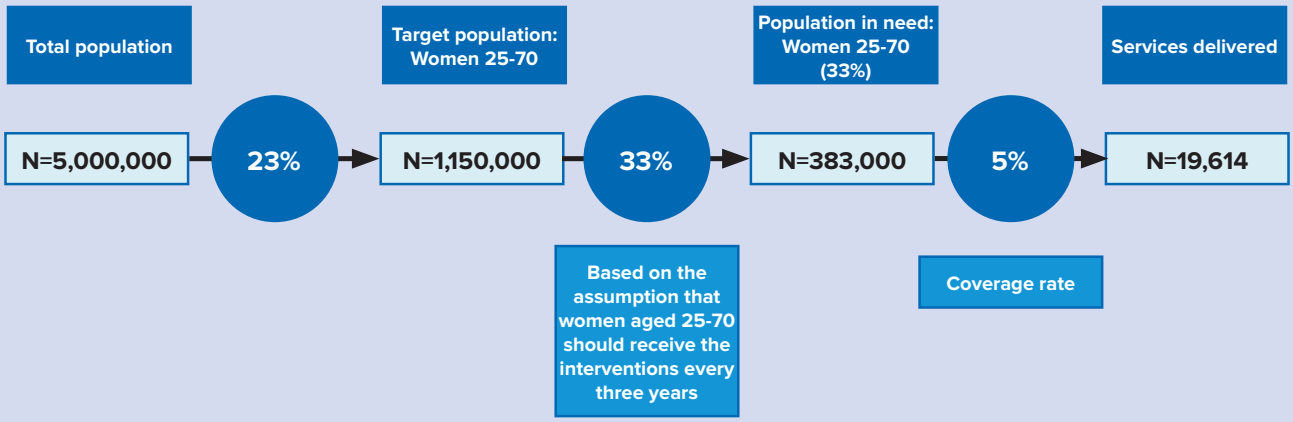
The coverage rate reflects the percentage of the population in need who received a service at the primary healthcare level. The coverage rate was calculated following three steps:

1. We estimated the population in need using prevalence rates, incidence rates or OneHealth Tool treatment assumptions.
2. We determined the number of services delivered in 2019. In the absence of relevant country-specific findings, we developed assumptions based on OHT by-default coverage rates, data from nearby countries or the scientific literature (see **Annex 3**).
3. We divided the number of services delivered by the population in need to obtain the coverage rate.

It is important to note that the coverage rate does not consider the percentage of people who could have received a specific service outside the public primary healthcare level. Also, as mentioned above, the coverage rates were calculated from the Omani population only.

The links between the target population, the population in need, the coverage rate, and the number of services delivered are described below (**Figure 2**).

Figure 2: Cost calculation example: Pap smear intervention for women aged 25 to 70



DRUGS AND SUPPLY COSTS

Country-specific estimates extracted from the OneHealth Tool Costing Module were used as a primary reference to determine the unit drugs, vaccines, and supply costs. Assumptions were developed when no estimate was available in OneHealth Tool (see **Annex 1**).

HEALTH PROVIDERS' TIME COSTS

To estimate the cost of health providers' time per service the following formula was used:

Healthcare provider's cost = salary per minute x Minutes required to deliver the service

The health providers' time costs refer to the time spent by healthcare providers (nurses, general practitioners, specialist doctors, midwives, etc.) for delivering one service, expressed in monetary value. These costs were estimated in two stages. First, we determined the cost of one minute spent by each category of healthcare providers based on their average annual salaries and assumptions on the number of working days per year (221 days) and working hours per day (8 hours). Then, we multiplied the number of minutes spent by health providers for each service by the associated cost per minute. The time spent by the healthcare providers was extracted from the OneHealth Tool or estimated by the research team when data was unavailable (see **Annex 1**).

ASSUMPTIONS AND LIMITATIONS

This analysis had limitations that must be mentioned. The list of clinical services costed does not include all services delivered at the primary care level. The analysis did not estimate health system costs or costs related to other PHC measures. No primary data collection was performed to estimate the drugs and supply costs for each clinical service. Instead, the available information in the OneHealth Tool was used.

Data on intervention coverages were not always available. For interventions without available coverage rates, assumptions were made based on similar interventions or data from nearby countries. When possible, we used the official number of visits related to a programme (i.e. NCDs) or a type of intervention (i.e. diabetes clinics, antenatal care) to estimate services-specific coverage rates and triangulate the results. Coverage rates are particularly uncertain for screening and awareness-related activities since they are not always captured in surveys or health statistics records. Different triangulations and validation methods were used to account for uncertainty, such as consultations with local technical teams, comparing figures with other countries in the region, comparing figures with other similar services, etc. Generally, the coverage rates must be interpreted with caution as they only reflect the quantity of services delivered at the primary care level. As a result, we can assume that some services are also delivered at other levels of the public health system and/or in the private sector. The share of services delivered in the private sector is likely to vary depending on the country's healthcare system and the population structure.

There was no available information about the overhead costs necessary for running the clinical services at primary care (i.e. training, programme management, supervision, monitoring and evaluation, communication, infrastructure and equipment, transportation, and advocacy). Therefore, an estimation of 20 percent of the total costs was used to account for this.

Photo credit: Freepik.com

Primary Healthcare in Oman

PRIMARY HEALTHCARE GOVERNANCE

Oman has made significant progress in the healthcare sector, from having just a handful of health professionals in the 1970s to establishing quality PHC services and being considered a trailblazer. In Oman, PHC is split into a public and private sector, with the Ministry of Health having the largest market share. The majority of services are provided through health centres while polyclinics and extended health centres (EHC) provide outpatient access to specialist clinics and local hospitals provide in-patient services. All Omani nationals and expatriates working in the government sector are entitled to free universal healthcare.[20]

Oman's Vision 2050 lists visions for health services in the country, including Vision 1 "A Strong, Responsive and Sustainable Primary Health Care System as the Main Entry Point and Backbone of Health Care". A number of actions are included in the vision to further strengthen PHC in the country in light of the aging population, increasing burden of NCDs and advances in healthcare technology. These include ensuring sufficient investment in PHC, enhancing community participation, introducing specialty care in PHC, introducing geriatric care to the main elements of PHC and developing a sufficient referral system.

Oman's awareness of key action points needed to tailor PHC to the ageing population with a higher NCD than communicable disease burden is commendable.[21] Since Vision 2050 was developed, Oman has made progress on these aims including enhancing community participation through providing technical support and expanding healthy city, village and lifestyle projects, and improving integrated elderly care. The Ministry of Health introduced the Community Nursing Programme to provide holistic care in the community, which has been merged with the Elderly Health Care Programme. A National Physiotherapist Coordinator was also established in 2015 which has subsequently seen the introduction of a standardardized model of physiotherapy assessment, treatment and induction programme for the elderly and community programme.[22]

Primary healthcare features in the Country Cooperation Strategy for World Health Organization (WHO) and Oman as part of addressing the prevention and control of NCDs, mental health and substance abuse, and establishing and implementing the Oman disability programme. This includes integrating all standard operating procedures into PHC, assisting the integration of mental health services into PHC, and the integration of disability and rehabilitation services into PHC (including improving access to assistive health technology).[23]

20 PHCPI. Ensuring universal access to primary health care in Oman. Available at: https://improvingphc.org/ensuring-universal-access-primary-health-care-oman

21 Oman Health Vision 2050. Available at: https://www.moh.gov.om/documents/16506/119833/_Health+Vision+2050/7b6f40f3-8f93-4397-9fde-34e04026b829

22 Directorate General of Primary Healthcare. Progress Report 2013-1015. Available at: https://www.moh.gov.om/documents/272928/0/Progress+Report+DGPHC/d3eea102-63d5-48fb-8404-2ff3514b0df0

23 World Health Organization Regional Office for the Eastern Mediterranean. Country cooperation strategy for WHO and Oman 2018-2022. Available at: https://apps.who.int/iris/bitstream/handle/10665/259861/WHO-EM-PME-007-E-eng.pdf;jsessionid=F48D36E091F96A8A5B383F9CD8B57417?sequence=3

Decentralization was included as a main strategy of the second phase of health development planning in the early 1990s. Decentralization was pursued as a strategy to encourage local initiatives, local planning, administration and budget control in recognition of the emerging needs of local communities. Under decentralization, the 11 self-contained health governorates were delegated several financial and administrative authorities and responsibilities. Decentralization was also extended further to the wilayat (district) level in 1993 after the establishment of an integrated health system. Wilayat Health Directors participate in health planning and supervise the provision of health services at the wilayat level. Family physicians were appointed as directors of health services at the wilayat level.[24]

PRIMARY HEALTHCARE SERVICES

The Ministry of Health is the main provider of healthcare in the country. As of 2019, under the Ministry of Health there were 51 hospitals with 5,262 beds, equivalent to 1.14 hospital beds per 1,000 population. There was a total of 211 health centres: 136 health centres without beds, 54 health centres with beds and 21 extended health centres.[25]

Health services are also provided by the government outside of the Ministry of Health (**Table 1**). Royal Oman Police, Petroleum Development Oman and Sultan Qaboos University provide health services predominantly for employees and dependents, while the university hospital also provides care for the wider population.[26] There are an additional 27 hospitals with 1,054 beds in the private sector.

Table 1: Government health facilities outside of the Ministry of Health (Adapted from Annual Health Report 2019 Table 10-1)

	Armed Forces Medical Services	Medical Services of Diwan of Royal Court	Royal Oman Police	Petroleum Development Oman	Sultan Qaboos University	Total
Hospitals						
Number	3	0	2	0	1	6
Beds	344	0	82	0	426	852
Primary Healthcare Centres/ Dispensaries						
Number	36	2	20	9	-	62
Beds	183	0	198	24	-	420

24 Oman Health Vision 2050. Available at: https://www.moh.gov.om/documents/16506/119833/Health+Vision+2050/7b6f40f3-8f93-4397-9fde-34e04026b829

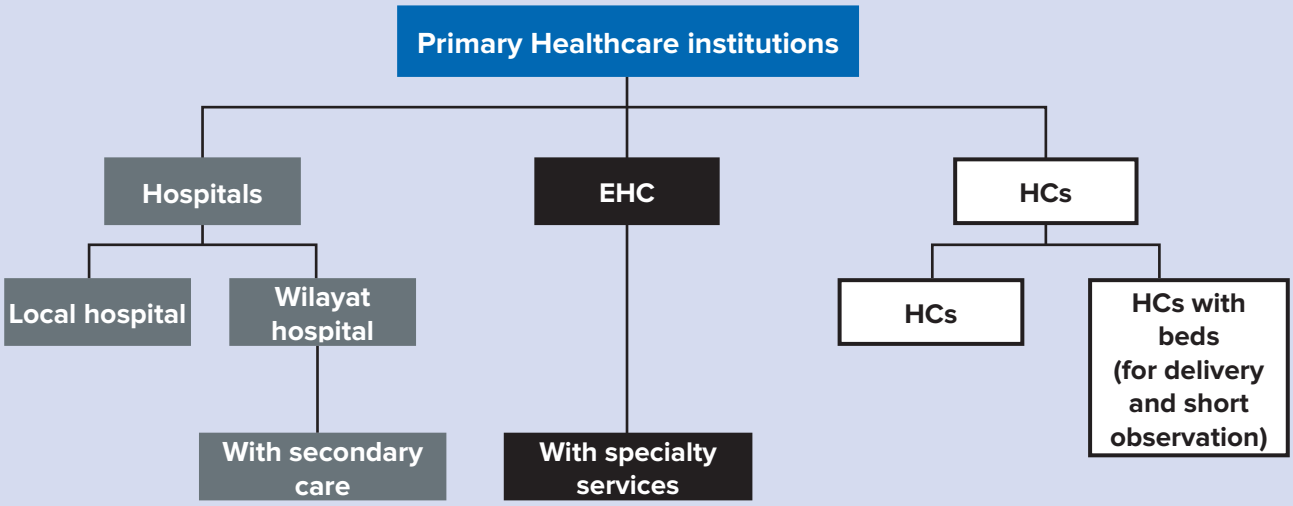
25 Department of Information & Statistics, Directorate General of Planning & Studies. Annual Health Report 2019. Available at:https://www.moh.gov.om/en/web/statistics/-/-2020

26 Ibid.

The Directorate General of Planning and Studies and the Directorate General of Primary Healthcare compiled a list of the 42 services currently provided under primary healthcare services. The services were categorized into three categories based on location and catchment population.[27]

The majority of services are provided through health centres (**Figure 3**). Health centres (HCs) typically serve around 10,000 to 15,000 people and have on-site diagnostic facilities and a pharmacy. Polyclinics/extended health centres (EHC) provide outpatient access to specialist clinics including family medicine, paediatrics, ophthalmology, and obstetrics and gynaecology. Health centres make referrals to specialist, secondary and tertiary care. Polyclinics also provide specialty clinics, psychiatry, general internal medicine, ophthalmology and ear, nose and throat services, while local hospitals provide in-patient services including delivery.[28]

Figure 3: Primary Healthcare institutions in Oman *(Source: Family Practice in the Eastern Mediterranean Region, Taylor & Francis Group, 2019.)*



The increasing burden of NCDs in the country resulted in a shift towards NCD services in PHC services, which now includes the following: mini-diabetes clinics, services for diabetic foot care, services for hypertensive patients, services for mental illness, NCD screening programmes and elderly care. Mini-diabetes clinics have been available in almost all health centres since 1996 and doctors and nurses have been trained to diagnose and treat patients with hypertension since 1998. In 2010, Oman began integrating mental health into PHC programmes and introduced elderly care within its services.[29]

27 Mohamed N; Al-Qasmi A; Al-Lamki S; Bayoumi M; Al-Hinai T. An estimation of staffing requirements in primary care in Oman using the Workload Indicators of Staffing Needs methods. East Mediterr Health J. 2018;24(9):823–829. Available at: https://doi.org/10.26719/2018.24.9.823

28 Salah, K. & Kidd, M. (2019). Family Practice in the Eastern Mediterranean Region: Universal health coverage and quality primary care. Taylor & Francis Group, Florida, USA.

29 Salah, K. & Kidd, M. (2019). Family Practice in the Eastern Mediterranean Region: Universal health coverage and quality primary care. Taylor & Francis Group, Florida, USA.

PRIMARY HEALTHCARE COVERAGE

Universal healthcare including access to mental health services is offered to all Omani nationals and expatriates working in the government sector for free at the point of service, while expatriates are typically covered in the private sector by employer-provided insurance.[30]

As of 2019, Oman has an UHC effective coverage index of 71, demonstrating steady improvement from 54 in 1990.[31] In comparison with the six GCC countries, Oman scores jointly with Bahrain, below Kuwait and Qatar (with effective coverage indices of 82 and 80 respectively), and higher than the Kingdom of Saudi Arabia and United Arab Emirates (64 and 63 respectively). Oman scores above the regional UHC effective coverage index average of 60 for the North Africa and Middle East Region.[32]

HEALTHCARE WORKFORCE

According to Oman's Annual Health Report 2019, there are currently 10.3 general practitioners per 10,000 of total population, and 9.4 specialist doctors per 10,000 of total population. There are 20,111 nurses, equivalent to 43.7 per 10,000 population.[33, 34] The majority of doctors and nurses are under the Ministry of Health, with the remainder from the private sector and government outside the Ministry of Health.[35]

Table 2: Health workforce distribution 2020 *(Adapted from Annual Health Report 2019 Table 4-3)*

	Ministry of Health	Governmental Non-MOH[36]	Private sector	Total
Doctors	5,960 (66%)	594 (7%)	2,506 (28%)	9,058
Specialists	2,013 (58%)	263 (8%)	1,183 (34%)	3,459
General Practitioners (GP)	3,479 (74%)	145 (3%)	4,732 (23%)	4,732
Nurses	14,460 (72%)	1,691 (8%)	3,960 (20%)	2,0111

30 PHCPI. Ensuring universal access to primary health care in Oman. Available at: https://improvingphc.org/ensuring-universal-access-primary-health-care-oman
31 IHME. Oman. Available at: https://www.healthdata.org/oman
32 Lozano, Rafael, et al. "Measuring universal health coverage based on an index of effective coverage of health services in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019." The Lancet 396.10258 (2020): 1250-1284.
33 Figures do not include Armed Forces Medical Services, but includes private sector and governmental non-MOH
34 Department of Information & Statistics, Directorate General of Planning & Studies. Annual Report 2020. Available at: https://www.moh.gov.om/documents/274609/6240456/MOH+Annual+Report+2020/6d94c352-6a53-1e35-5e9a-f6fb5c8577d4
35 ibid
36 Includes Royal Oman Police, Petroleum Development of Oman, Sultan Qaboos University Hospital and Medical Services of Diwan of Royal Court

The Department of Family and Community Medicine (FAMCO) was established in 1987 at Sultan Qaboos University for undergraduates and in 1994 a four-year postgraduate training programme in family medicine was established. Since 2007, the programme has been under the Oman Medical Specialty Board which collaborates with other training programmes both in the region and globally.[37]

The government has begun a process coined "Omanisation" to increase the number of Omani nationals in the health system.[38] This has resulted in the increase of the percentage of Omani physicians from 9 percent in 1990 to 41 percent in 2018. The percentage of Omani nurses has similarly increased from 12 percent in 1990 to 62 percent in 2018.[39]

MULTISECTORAL PRIMARY HEALTHCARE COORDINATION

There are a number of community-based PHC initiatives including healthy city and healthy village projects which started with the Sur Healthy City Project and Qalhat Healthy Village Project in 2002. There are currently 13 Healthy City and Healthy Village projects across the country.[40] In December 2019, Muscat joined the Partnership for Healthy Cities, which aims to make the city fully walkable by 2020 by resigning five key areas.[41]

The Ministry of Health has promoted health in schools since 1991. The Health-Promoting Schools Initiative (HPSI) was launched in 2004 with 19 schools and included eight key components (health education, health services, healthy environment, school nutrition, physical education, mental health and promotion of health of school staff and community involvement).[42] To implement the initiative, school task forces are created compromising of a school nurse, social worker, health supervisor teacher, parents, students and local community members and chaired by the school headmaster or deputy. Interventions are expansive, including integrating health messaging and increased physical activity into the curriculum, establishing a school health nurse and well-equipped clinic, revising school canteen policies, and event days.[43] The initiative has since been expanded to include more

37 Al-Shafaee M. (2009). Family Medicine Practice in Oman: Present and future. Sultan Qaboos University medical journal, 9(2), 116–118.

38 PHCPI. Ensuring universal access to primary health care in Oman. Available at: https://improvingphc.org/ensuring-universal-access-primary-health-care-oman

39 World Health Organization Regional Office for the Eastern Mediterranean. Health workforce snapshot Oman. Available at: https://rho.emro.who.int/sites/default/files/Profiles-briefs-files/OMN-WHOEMHRH653E-eng.pdf

40 World Health Organization Regional Office for the Eastern Mediterranean. Oman Health promotion and community-based initiatives. Available at: http://www.emro.who.int/omn/programmes/health-promotion-and-community-based-initiatives.html

41 Ministry of Health Sultanate of Oman, Muscat Joins Partnership for Healthy Cities Network, 2019. Available at: https://www.moh.gov.om/en/-/--1169

42 World Health Organization Regional Office for the Eastern Mediterranean. Oman Health promotion and community-based initiatives. Available at: http://www.emro.who.int/omn/programmes/health-promotion-and-community-based-initiatives.html

43 For more information including the list of interventions conducted in health promoting schools, see Regional Office for the Eastern Mediterranean. Oman Health promotion and community-based initiatives. Health-promoting schools initiative in Oman. A WHO case study in intersectoral action. Available at: https://applications.emro.who.int/dsaf/EMROPUB_2013_EN_1587.pdf

than 200 government schools. Based on its success, the Ministry of Health is also initiating a Health Promoting College Network.[44]

Oman has also developed guidelines on school mental health services which includes the provision of health promotion and primary prevention through curriculum and life skills health education.[45]

HEALTH BUDGETING

In 2019, 86 percent of the total health expenditure in Oman was provided by the government, an increase from 82 percent in 2000. Private health expenditure and out-of-pocket health expenditure as proportions of total health expenditure has decreased overall, to 13.5 percent and 6.6 percent respectively in 2019.[46]

Of the six GCC countries, Oman has the third highest government health expenditure as percentage of gross domestic product in 2019 at 3.5 percent (from a total health expenditure as percentage of gross domestic product of 4.07 percent). In 2019, Oman spent a total of US$625 per capita on health, with 87 percent (or US$540) coming from government expenditure.[47]

DISEASE BURDEN

Like in many counties, the disease burden in Oman has shifted over the past 30 years to be predominantly attributed to NCDs. In 1990, 48 percent of the total disease burden in disability-adjusted life-years (DALYs) was caused by NCDs. This has increased rapidly and NCDs now account for 68 percent of DALYs in Oman (**Figure 4**).[48] The remaining disease burden includes injuries (20 percent) and communicable, maternal, neonatal and nutritional disease (12 percent). When including death with the disease burden, ischemic heart disease is the second highest cause of death and disability, and eight out of the top 10 causes are non-communicable diseases.[49]

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44 World Health Organization Regional Office for the Eastern Mediterranean. Oman Health promotion and community-based initiatives. Available at: http://www.emro.who.int/omn/programmes/health-promotion-and-community-based-initiatives.html

45 Ministry of Health Sultanate of Oman. Guidelines on Schools Mental Health Services. Available at: https://www.moh.gov.om/documents/272928/3856999/Guidelines+on+Schools+Mental+Health+Services/bee5e6fe-2376-2d1d-e39c-28c74a4497c0

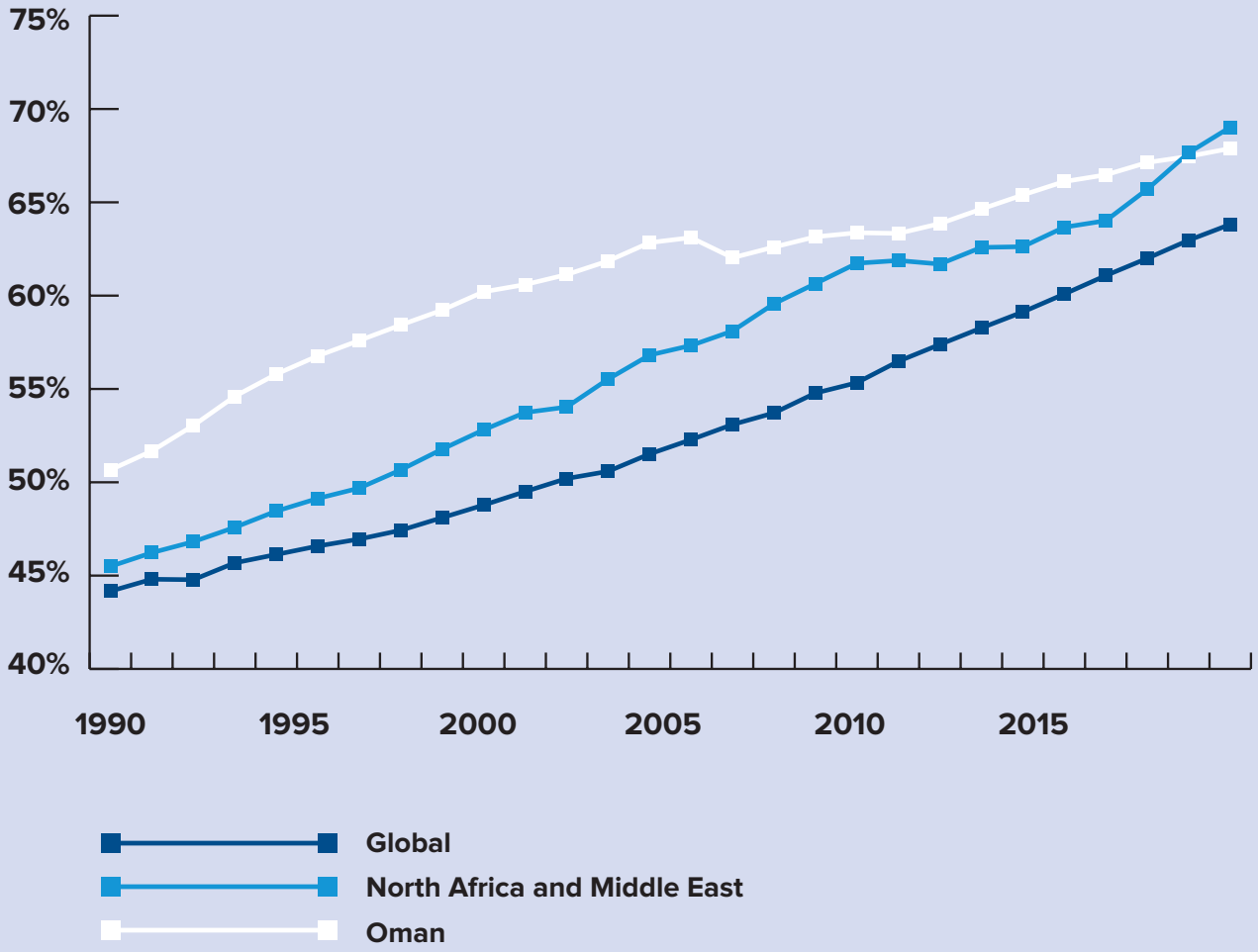
46 World Health Organization Global Health Expenditure Database. Available at: https://apps.who.int/nha/database/ViewData/Indicators/en

47 World Health Organization Global Health Expenditure Database. Available at: https://apps.who.int/nha/database/ViewData/Indicators/en

48 Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2020. Available at: https://vizhub.healthdata.org/gbd-results/.

49 Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2020. Available at: https://vizhub.healthdata.org/gbd-results/.

Figure 4: NCD burden as a percentage of total disease burden *(Source: Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. Institute for Health Metrics and Evaluation (IHME), 2020.)*



Within the high prevalence of NCDs in Oman, the leading causes of disease are cardiovascular diseases (accounting for 15.6 percent), mental health disorders (accounting for 10.4 percent), and musculoskeletal disorders (accounting for 8.3 percent). These diseases are well suited to treatment in PHC, requiring consistent access to health services with providers who know their patients' histories to achieve the best outcomes.

Box 3. The burden of NCDs in Oman

Detailed economic modelling for NCD Investment Cases conducted by the Gulf Health Council, UNDP and WHO revealed that the four main NCDs (cancer, cardiovascular diseases, diabetes and chronic respiratory diseases) caused 72 percent of deaths in Oman in 2019, and that nearly one in five adults in Oman die from NCDs before the age of 70.

NCDs cost the Oman economy OMR 1.1 billion (US$2.8 billion) every year, equivalent to 3.59 percent of its annual GDP. Of these annual costs, 56 percent or OMR 609 million (US$1.6 billion) were government healthcare expenditures.

Of note, the NCD burden above was calculated using a different methodology than the one used in this PHC study, meaning the results are not directly comparable. Indeed, in the NCD Investment Cases, the economic burden of the four main NCDs was calculated considering both direct health expenditure from government and private health providers as well as indirect economic burden from absenteeism, presenteeism and premature mortality. In contrast, this PHC report looks at the costs of a selection of clinical services delivered at public PHC.

Results

LIST OF CLINICAL SERVICES

We included 116 clinical services in the modelling. Of these, seven clinical services relate to the immunization programme, 32 to the NCD programme, 11 to the child health programme, 11 to the nutrition programme, 15 to the mental health programme, 38 to the reproductive, maternal and child health programme, one to the oral and dental care programme, and one to the general practice programme.[50] The total number of PHC visits in 2019 was 11,182,556. This is equivalent to 4.2 visits per capita (see **Annex 2** for a list of clinical services modelled).

COSTS IN 2019 – CLINICAL SERVICES

For 2019, the cost of the selected clinical services delivered at the primary care level in the public sector was estimated at US$239,558,514 (**Table 3**). The overhead costs were estimated at US$59,889,628.

The total cost was estimated at US$299,448,142. These total costs account for 9.6 percent of the total health expenditure (THE), 10.9 percent of the government health expenditure (GHE) and represents a per capita cost of US$112.78.

Table 3: Costs of the clinical service modelled at primary care level in Oman (2019)

Programme	Cost (US$)
Immunization	7,616,959
Non-Communicable Diseases	37,494,024
Child Health	44,787,578
Nutrition	6,575,789
Mental Health	1,520,985
Reproductive, Maternal and Child Health	5,013,553
General Practice	130,478,705

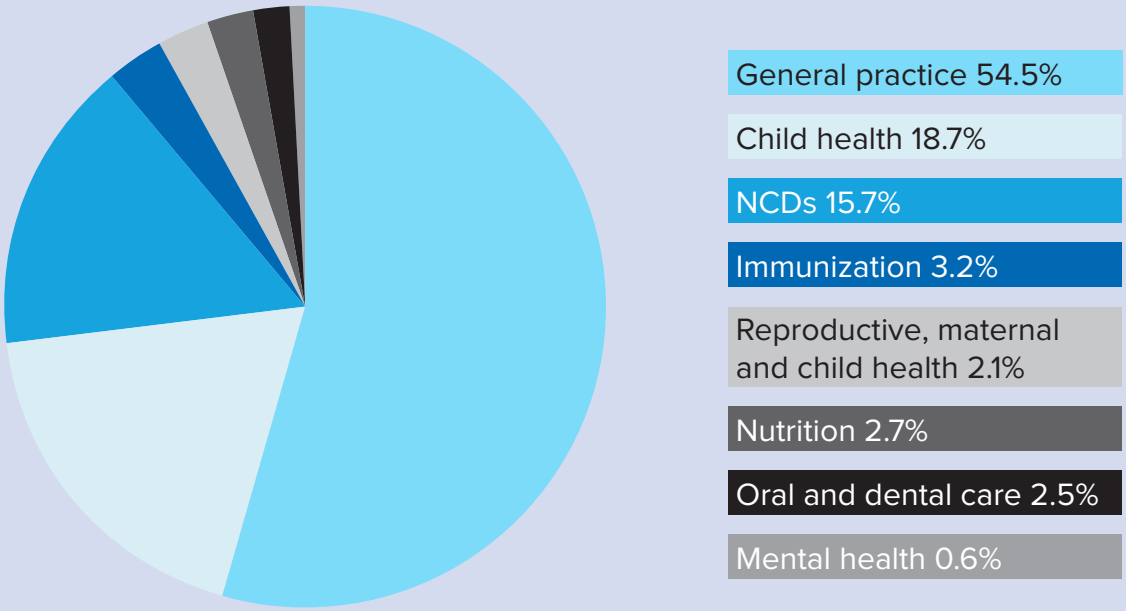
50 General practice refers to general medicine consultations conducted by a General Practitioner (GP). This includes a wide range of preventive and curative medical services. Common cases seen in general medicine consultations may include acute pain management, infectious diseases treatment, health promotion and prevention. In this study, we distinguished between general practice and specialised clinics, which were costed under other programs (maternal care, non-communicable diseases, diabetes, mental health, dental care, vaccinations). The scope of the general practice program was defined based on information and data retrieved from the Annual Health Statistics Reports.

Oral and Dental Care	6,070,921
Cost of Clinical Services	**239,558,514**
Programme Overhead Costs (+20%)	59,889,628
TOTAL COSTS	**299,448,142**
Total Costs (% of THE)	9.6%
Total Costs (% of GHE)	10.9%
Total Costs per capita	112.78

COSTS BY PROGRAMME

General practice accounts for 55 percent of the clinical services costs, with costs estimated at US$130,478,705 in 2019 (**Figure 5**). Child Health and Non-Communicable Diseases are the second and third most expensive programs, with 19 percent and 16 percent of the total costs, respectively.[51] With an estimated cost of US$1,520,985, the mental health programme makes up only 0.6 percent of the total costs, mainly because of low coverage rate and the fact that most of the clinical services related to mental health are currently conducted at the secondary and tertiary levels in Oman. Indeed, an estimated 103,138 individuals did not receive mental health services they needed at primary care level in the public sector in Oman in 2019.

Figure 5: Share of total costs by programme, 2019 (Oman)



51 Please note that costs calculated here are heavily influenced by the population size receiving relevant services.

MAIN COST-DRIVING DISEASES

The analysis of the costs per clinical service showed that the prevention, treatment or control of diabetes, chronic respiratory diseases and cardiovascular diseases are important sources of expenditure. By itself, treatment of diabetic patients generates a cost of nearly US$ 14 million every year. In total, these three most expensive clinical services account for 14.1 percent of the total PHC cost estimated. Please note that coverage rates and the number of patients who did not receive services needed is reflective of selected primary care level services in the public sector only, meaning patients could have received these services in private or secondary/tertiary care.

Table 4: Main cost-driving disease areas

Disease	Cost (US$)	% of the Total Costs	Coverage rate	Patients who did not receive services needed	Coverage rate
Cardiovascular Diseases	7,491,043	3.1%	326,475	198,430	62.2%
Diabetes	13,747,402	5.7%	61,700	64,218	49.0%
Chronic Respiratory Diseases	12,522,554	5.2%	164,139	38,674	80.9%
Total	**33,760,999**	**14.1%**	**552,314**	**301,323**	**64.7%**

SCREENING

Taken together, services related to screening for risk of cardiovascular diseases and diabetes, cancers and diabetes complications were estimated at US$187,170. This represents less than 0.1 percent of the total costs in 2019.

Table 5: Costs of top three screening services

Screening	Cost (US$)	% of the Total Costs	Coverage rate	Patients who did not receive services needed	Coverage rate
Screening for risk of Cardiovascular Diseases and Diabetes	9,816	0.00%	26,176	497,350	5.0%
Screening for Cancer (Breast, Cervix and Colorectal)	126,277	0.05%	21,464	232,463	8.5%
Screening for Diabetes Complications	53,077	0.02%	25,184	226,653	10.0%
Total	**189,170**	**0.08%**	**72,824**	**956,465**	**7.1%**

Recommendations

Oman recognizes the importance of strong PHC to build an effective, efficient health system and foster a healthy society. In recent years, the country has made commendable progress in strengthening PHC by adapting to the changing disease burden of the population. Indeed, Oman has integrated elderly care into PHC, scaled-up multisectoral primary healthcare initiatives and expanded universal health coverage.

In this study, we estimated the costs of a selection of clinical services delivered at public primary care level in the Oman. These costs were estimated based on the cost of medical supplies as well as salaries of medical professionals needed to deliver the service. This study does not consider other factors contributing to healthcare expenditure such as governance, infrastructure or programme support costs. Further important limitations and considerations are highlighted in the methods section.

The costing analysis included in this report has highlighted a number of areas where PHC services and resource allocation in Oman could be further strengthened. The following actions would assist Oman to reap significant health and economic benefits across the population:

1 **Scale up NCD clinical and screening services delivered at the primary care level.**

Like in many countries, Oman is experiencing an epidemiological transition, with the majority of the disease burden attributable to NCDs. The costing exercise in this study revealed that NCD services are only the third largest cost driver of public primary care services, and that coverage rates for NCD clinical and screening services could be scaled up to address the growing disease burden. Indeed, an estimated 630,000 people did not receive NCD clinical services needed at the primary care level in the public sector in 2019, with the majority attributed to cardiovascular disease services. Moreover, less than 1 percent of the service costs modeled in this study (or around US$1 million) were dedicated to screening services and an estimated 1.9 million people did not receive the NCD screening services they needed at the public primary care level in 2019. Notably, patients missing out on services at the public primary care level may have sought out these services elsewhere, including through secondary or tertiary public as well as private care. Nonetheless, expanding the breadth and coverage of NCD clinical and screening services at the primary care level in Oman would provide the opportunity for more coordinated, accessible and cost-effective NCD programmes in the country. In particular screening programmes could help reduce the disease burden through early intervention as well as reduce long-term associated health costs while increasing population health and wellbeing.

2 Shift more mental health services to the primary care level.

Mental health services at the public primary care level in Oman currently account for just 0.6 percent of total costs modeled in this report. This is not due to a low population in need as an estimated 295,000 people did not receive necessary mental health services at the public primary care level in 2019. Of note, these individuals may have sought out and received mental health services in the private sector or in secondary or tertiary care, where the majority of mental health services are currently delivered in Oman. Demand for mental health services will likely have increased as the COVID-19 pandemic has had a negative impact on people's mental health and well-being. Evidence from the first year of the pandemic indicated an increase in the global prevalence of anxiety and depression by 25 percent, with young people and women most affected.[52]

Oman received a score of two out of five for its integration of mental health into primary healthcare according to the WHO Mental Health Atlas 2020.[53] Integrating mental health screening and care services into primary care (and in particular general practice) will not only ensure better access to mental healthcare for the population but has also been demonstrated to lead to better health outcomes than treatment in secondary or tertiary care.[54] Moreover, prominent mental health services in primary care can help provide visibility to mental health conditions and become a platform for education and awareness campaigns to reduce the stigma associated with these conditions. Conceptually, scaling up mental health services in primary care is part and parcel to a people-centred approach to PHC that aims to care for patients and communities in all areas of health and disease.

3 Increase PHC funding and resources.

Oman has made commendable progress increasing government spending on health and reducing out-of-pocket health expenditure.[55] However, Oman still lacks adequate budget and

52 World Health Organization. COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide. Available at: https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide

53 Mental Health Atlas 2020. Member State Profile Oman. Available at: https://cdn.who.int/media/docs/default-source/mental-health/mental-health-atlas-2020-country-profiles/omn.pdf?sfvrsn=dd4288a3_5&download=true

54 Funk M, Saraceno B, Drew N, Faydi E. Integrating mental health into primary healthcare. Ment Health Fam Med. 2008 Mar;5(1):5-8. PMID: 22477840; PMCID: PMC2777555. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2777555/

55 World Health Organization Global Health Expenditure Database. Available at: https://apps.who.int/nha/database/ViewData/Indicators/en

resources for PHC.[56] The increasing costs and demands on the health system highlight the need for allocation of additional resources for PHC.[57] Strengthening the national healthcare workforce is necessary to meet current demands. Moreover, scaling up of services as recommended will incur additional health costs, such as additional workforce training and facilities, alongside a direct increase in services and the associated costs modeled in this analysis. Increased investment could support the improvement of PHC facilities ensuring adequate consultation rooms and emergency equipment.

There is also a need to increase funds allocated for health research and information systems, as there are currently no regular funds allocated for health research in the country. The national health system information system lacks essential information, as a result of the absence of a National Health Accounts system and geographical information system.[58] Better funded health research and information systems would help Oman to pursue evidence-based policy development, planning and decision making. One approach to allocate more funds to primary care (research) is to earmark revenue from health taxes. Indeed, in its Vision 2050, Oman already explores the idea of using taxes on tobacco, alcohol and airline travel, amongst others, to fund health research. This could also be expanded to funding the primary care sector more broadly.

4 **Leverage the modelling in this study to further improve primary care efficiencies and health outcomes.**

The detailed costing in this study is a first step towards better understanding the costs associated with clinical services delivered at the primary care level in Oman. Understanding these costs, and comparing them to budgets and expenditures, can help identify areas and services that would benefit from more resources or could be run more efficiently. Oman can thus utilise the data and costing model generated in this report to further increase the efficiency of the primary care system, ultimately improving health outcomes.

It may also benefit Oman repeat this costing exercise in the near future to assess the impact of any potential changes introduced to primary care service delivery in the country. To this end, it would be beneficial to clearly define the UHC health benefits packages, as this would allow modelling of costs associated with services included in this package.

56 Salah, K. & Kidd, M. (2019). Family Practice in the Eastern Mediterranean Region: Universal health coverage and quality primary care. Taylor & Francis Group, Florida, USA.

57 Al-Mahrezi A, Al-Kiyumi M. Primary Health Care in Oman: Shaping the Future. Oman Med J. 2019 Nov;34(6):479-481. doi: 10.5001/omj.2019.89. PMID: 31745410; PMCID: PMC6851060.

58 Health Vision 2050. Available at: https://www.moh.gov.om/documents/16506/119833/Health+Vision+2050/7b6f40f3-8f93-4397-9fde-34e04026b829

Annex 1: Assumptions used for population in need, drugs and supplies, and labour costs

Clinical Services	Population in Need	Drugs and Supply Costs	Labour Costs
Varicella vaccine	Children 1 and 5 years old, for the first and the second dose	US$17.5 for one dose (WHO Review of vaccine price data)	Nurse (4 min) and GP (4 min) for one dose
Influenza vaccine	Children 0-5 + Pregnant women + People 65+	US$2.39 for one dose (WHO Review of vaccine price data)	Nurse (4 min) and GP (4 min) for one dose
Retinopathy screening	People with diabetes should be screened every year (100%)	-	-
Neuropathy screening	People with diabetes should be screened every year (100%)	-	-
Clinical breast examination	Women aged 40-70 should be screened every 2 years (50%)	-	-
Diagnosis after screened with clinical breast examination	Based on country breast cancer incidence rate (WHO – IARC 2020)	-	-
Pap smear	Women 30-49 should be screened every 3 years (33%)	-	-
Fecal occult blood screening	People 50+ should be screened every 10 years (10%)	-	-
Dental cleaning and preventive care	All population	No costs estimated	Nurse (20 min) and Dentist (15 min) for one visit
General child health	Children 0-14	Cost per outpatient visit (WHO-CHOICE) – Labour costs	GP (15 min) for one visit
Pneumonia treatment	-	-	Nurse (20 min) + GP (20 min) for one visit
Daily iron and folic acid supplementation (anaemic pregnant women)	100% of anaemic pregnant women (World Bank)	-	-
Intermittent iron folic acid supplementation (non anaemic pregnant women)	100% of non anaemic pregnant women (World Bank)	-	-

Daily FAF (folic acid fortification), postpartum, non anaemic women	Based on number of live births (Annual Health Statistics) and percentage of anaemic women (World Bank)		
Intermittent FAF, postpartum, anaemic women	Based on number of live births (Annual Health Statistics) and percentage of non anaemic women (World Bank)		
Care for adults with low body mass index (BMI)	100% of underweight adults (Global Nutrition Report)	-	-
All mental health clinical services	Based on prevalence rates (Zuberi et al. 2021, GBD 2016 Epilepsy Collaborators, GBD 2016 Dementia Collaborators, WHO-EMRO, Atlas of Substance Disorder).	-	-
Treatment of postpartum haemorrhage (PPH)	Based on incidence rates of PPH	-	-
Identification and management of infertility	Based on regional prevalence (Eldib 2018) among adults 15-49 (3.8%)	-	-
Treatment of syphilis	Based on regional incidence rates (Kenyon et al. 2014) among adults 15-49 (2.2%)	-	-
Treatment of gonorrhea	Based on regional incidence rates (Kenyon et al. 2014) among adults 15-49 (0.9%)	-	-
Treatment of chlamydia	Based on regional incidence rates (Kenyon et al. 2014) among adults 15-49 (1.9%)	-	-
Treatment of trichomoniasis	Based on regional incidence rates (Kenyon et al. 2014) among adults 15-49 (2.8%)	-	-
Treatment of pelvic inflammatory infection	Based on US incidence rate (Kresiel 2021) among adults 15-49 (3.6%)	-	-
General practice	All population	Cost per outpatient visit (WHO-CHOICE) – Labour costs	GP (15 min) for one visit
School health program (eye screening)	Children in grade 1, 4, 7 and 10	No costs estimated	Nurse (10 min) for one visit
School health program (dental screening)	Children in grade 1	No costs estimated	Nurse (10 min) for one visit
School health program (ear screening)	Children in grade 1 and 2	No costs estimated	Nurse (10 min) for one visit
Menopause program: screen for urogenital dryness, screen for mood disorders	Women 45-55 (100%)	No costs estimated	GP (15 min) for one visit

Elderly and community care program	People 60+	No costs estimated	Nurse (45 min) for one visit
All Services	-	-	Community health workers time was allocated to nurses
Management of pre-pubertal problems	PIN was not estimated since the number of visits was directly provided by MOH	No costs estimated	Obs/Gyn (15 min) for one visit
Management of polycystic ovary syndrome (PCO), hirsutism, irregular cycles, amenorrhea, abnormal uterine bleeding, management of mild endometriosis, postmenopausal care	PIN was not estimated since the number of visits was directly provided by MOH	No costs estimated	Obs/Gyn (15 min) for one visit
All Services	-	-	Community health workers time was allocated to nurses

Annex 2: Breakdown of costs for clinical services provided at PHC level

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
IMMUNIZATION			
Measles vaccine	283,633	170,074	**453,706**
Pentavalent vaccine	143,986	275,973	**419,959**
Varicella vaccine	772,651	157,066	**929,717**
Diphtheria, Tetanus and Pertussis (DPT) vaccination	57,517	86,950	**144,466**
Polio vaccine	17,998	183,982	**201,980**
BCG vaccine	17,822	86,950	**104,772**
Pneumococcal vaccine	306,970	368,028	**674,999**
NON-COMMUNICABLE DISEASES			
CVD & Diabetes		-	-
Screening for risk of CVD/Diabetes	24,347	13,409	**37,756**
Follow-up care for those at low risk of CVD/ Diabetes (Absolute Risk: 10-20%)	2,784	1,533	**4,317**

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
Treatment for those with very high cholesterol but low absolute risk of CVD/ Diabetes (< 20%)	8,381	5,561	**13,942**
Treatment for those with high blood pressure but low absolute risk of CVD/ Diabetes (< 20%)	859,509	934,319	**1,793,828**
Treatment for those with absolute risk of CVD/Diabetes 20-30%	210,439	111,444	**321,883**
Treatment for those with high absolute risk of CVD/Diabetes (>30%)	325,633	222,232	**547,864**
Treatment of new cases of acute myocardial infarction (AMI) with aspirin	14,974	6,695	**21,669**
Treatment of cases with established ischaemic heart disease (IHD)	55,436	19,681	**75,118**
Treatment for those with established cerebrovascular disease and post stroke	48,548	54,000	**102,548**
Standard Glycemic control	3,640,137	294,936	**3,935,073**
Intensive Glycemic control	1,227,658	124,731	**1,352,390**
Referral for retinopathy screening	0	37,625	**37,625**
Neuropathy screening and preventive foot care	84,995	81,522	**166,516**
Breast Cancer			
Basic breast cancer awareness	0	14,567	**14,567**
Screening: Clinical Breast Examination	0	61,054	**61,054**
Diagnosis after Screened with Clinical Breast Exam	136,343	153,177	**289,520**
Cervical Cancer		-	-
Papanicolaou test (Pap smear)	9,596	84,900	**94,497**
Colorectal Cancer		-	-
Screening: Fecal occult blood testing	5,495	20,549	**26,044**
ELDERLY AND COMMUNITY CARE PROGRAMME		-	-
Elderly and community care programme	0	242,505	**242,505**
RESPIRATORY DISEASE		-	-
Asthma: Inhaled short acting beta agonist for intermittent asthma	153,962	118,939	**272,901**

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
Asthma: Low dose inhaled fluticasone + short-acting beta-agonists (SABA)	834,196	237,878	**1,072,074**
Asthma: High dose inhaled fluticasone + SABA	1,020,350	178,408	**1,198,758**
Asthma: Theophylline + High dose inhaled fluticasone + SABA	1,721,268	237,878	**1,959,145**
Asthma: Oral Prednisolone + Theophylline + High dose inhaled fluticasone + SABA	66,387	7,434	**73,820**
Chronic obstructive pulmonary disease (COPD): Smoking cessation	0	3,729	**3,729**
COPD: Inhaled salbutamol	58,481	45,178	**103,660**
COPD: Low-dose oral theophylline	30,150	19,878	**50,029**
COPD: Ipratropium inhaler	16,011	6,957	**22,968**
COPD: Excacerbation treatment with antibiotics	170	12,834	**13,004**
COPD: Excacerbation treatment with oral prednisolone	1,429	12,834	**14,263**
COPD: Excacerbation treatment with oxygen	16,836	15,180	**32,016**
EMERGENCY CARE		-	-
Average annual emergency care needs	465,695	0	**465,695**
CHILD HEALTH			
Child General Health	12,606,918	4,121,121	**16,728,039**
Deworming	241	0	**241**
Zinc supplementation	6,896	5,366	**12,262**
Diarrhoea management			
ORS	4,760	52,850	**57,610**
Zinc (diarrhea treatment)	3,614	52,850	**56,464**
Antibiotics for treatment of dysentery	119	1,057	**1,176**
Pneumonia			
Pneumonia tretament (children, Mild Cases)	6	527	**533**
Malaria			
Malaria treatment (0-4, Mild Cases)	5	21	**26**

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
School Health Programme			
Eye Screening	0	185,921	**185,921**
Dental Screening	0	48,041	**48,041**
Ear Screening	0	135,678	**135,678**
NUTRITION			
Women of reproductive age and adolescent girls			
Intermittent iron-folic acid supplementation	338	34,581	**34,918**
Pregnant and lactating women			
Daily iron and folic acid supplementation (pregnant women)	4,946	18,432	**23,377**
Intermittent iron and folic acid supplementation (non-anemic pregnant women)	1,740	49,834	**51,574**
Calcium supplementation for prevention and treatment of pre-eclampsia and eclampsia	345,878	68,266	**414,145**
Daily FAF, postpartum, anemic women	1,789	0	**1,789**
Intermittent FAF, postpartum, non-anemic pregnant women	1,392	0	**1,392**
Adults			
Care for adults with low BMI	47,143	36,664	**83,807**
Children			
Breastfeeding counselling and support	0	439,257	**439,257**
Complementary feeding counselling and support	0	860,230	**860,230**
Intermittent iron supplementation in children	2,681	606,846	**609,527**
Management of moderate acute malnutrition (children)	7,934	1,199	**9,132**
MENTAL HEALTH			
Anxiety Disorders			
Basic psychological treatment for anxiety disorders (mild cases).	0	85,526	**85,526**

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
Basic psychosocial treatment and anti-depressant medication for anxiety disorders (mild to moderate cases)	26,368	136,064	**162,432**
Depression			
Basic psychosocial treatment for mild depression	0	11,749	**11,749**
Basic psychosocial treatment and anti-depressant medication of first episode (mild to moderate cases)	1,989	10,280	**12,269**
Psychosocial care for peri-natal depression for mild cases only	0	46,752	**46,752**
Psychosis			
Basic psychosocial support and anti-psychotic medication	37,904	17,278	**55,182**
Epilepsy			
Basic psychosocial support, advice, and follow-up only	6,743	12,971	**19,714**
Dementia			
Dementia screening, basic work up and referral to tertiary care	0	0	**0**
Alcohol use/ dependence			
Identification and assessment of new cases of alcohol use/dependence	0	1,014	**1,014**
Brief interventions and follow-up for alcohol use/dependence	0	9,855	**9,855**
Drug use/ dependence			
Identification and assessment of new cases of drug use/dependence	0	830	**830**
Brief interventions and follow-up for drug use/dependence	0	4,982	**4,982**
Self-harm/ suicide			
Assess and care for person with self-harm	0	48,289	**48,289**
Basic psychosocial treatment, advice, and follow-up for self-harm/suicide	0	78,112	**78,112**
Pesticide intoxication management	0	48,289	**48,289**

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
MATERNAL NEWBORN AND REPRODUCTIVE HEALTH			
Family planning			
Pill - Progestin only	34,447	59,815	**94,262**
Condom - Male	25,818	30,655	**56,474**
Injectable - 3 month (Depo Provera)	17,755	62,485	**80,241**
IUD - Copper-T 380-A IUD (10 years)	3,831	44,060	**47,892**
Implant - Implanon (3 years)	4,098	8,901	**12,999**
LAM (Lactational Amenorrhea Method)	0	13,352	**13,352**
SDM (Standard Days Method)	0	15,577	**15,577**
Periodic abstinence	0	15,577	**15,577**
Withdrawal	0	15,577	**15,577**
Management of ectopic pregnancy care			
Ectopic case management	14,383	94,535	**108,918**
Pregnancy Care - ANC			
Tetanus toxoid (pregnant women)	10,787	207,213	**218,000**
Syphilis screening ONLY (pregnant women)	25,205	231,046	**256,251**
Basic ANC	0	552,567	**552,567**
Pregnancy care - Treatment of pregnancy complications			
Hypertensive disorder case management	86	5,813	**5,899**
Management of pre-eclampsia (Magnesium sulphate)	4,458	221,282	**225,741**
Management of other pregnancy complications	132	33,475	**33,607**
Deworming (pregnant women), part of general care and not specific for pregnant women	124	1,055	**1,179**
Childbirth care - Facility births			
Parenteral administration of uterotonics	1	10	**10**
Labor and delivery management	680	34,728	**35,408**
Pre-referral management of labor complications	451	2,407	**2,858**

Clinical services provided at PHC Level	Drug & Supplies Costs (OMR)	Health Providers Costs (OMR)	Total Costs (OMR) (Drugs & Supplies and Providers)
MgSO4 for eclampsia	36	1,781	**1,817**
Neonatal resuscitation	5	88	**92**
Treatment of local infections (Newborn)	27	120	**147**
Kangaroo mother care	0	2,358	**2,358**
Feeding counselling and support for low-birth-weight infants	173	578	**751**
Manual removal of placenta	24	119	**143**
Postpartum care - Treatment of sepsis			
Maternal sepsis case management (ONLY includes :stabilization, and referral to tertiary care)	397	523	**920**
Postpartum care - Other			
Mastitis	2,641	8,727	**11,368**
Treatment of postpartum hemorrhage	4,243	47,768	**52,011**
Other sexual and reproductive health			
Treatment of urinary tract infection (UTI)	2,467	15,797	**18,264**
Identification and management of infertility (ON:Y includes clinical evaluation, initial work up and referral to speciality care)	0	9,221	**9,221**
Treatment of syphilis	191	209	**400**
Treatment of gonorrhea	30	174	**204**
Treatment of chlamydia	3	4	**6**
Treatment of trichomoniasis	1	11	**12**
Treatment of PID (Pelvic Inflammatory Disease)- mild cases only	477	421	**897**
Menopause Programme			
Screen for urogenital dryness	0	18,645	**18,645**
Screen for mood disorders	0	18,645	**18,645**
GP visits			
General Practice	37,820,754	12,363,364	**50,184,117**
Oral Care and Cancer			
Dental cleaning and preventive care	0	2,334,969	2,334,969

Annex 3: References and assumptions used to estimate the total number of services delivered

Clinical services provided at PHC Level	Reference / Assumption
IMMUNIZATION	
Measles vaccine	MOH Health Statistics 2019
Pentavalent vaccine	
Varicella vaccine	Assumption based on current Coverage Rate (CR) (Immunization)
DPT vaccination	MOH Health Statistics 2019
Polio vaccine	
BCG vaccine	
Pneumococcal vaccine	
NON-COMMUNICABLE DISEASES	
CVD & Diabetes	
Screening for risk of CVD/Diabetes	Assumption: 5.0%
Follow-up care for those at low risk of CVD/Diabetes (Absolute Risk: 10-20%)	Assumption: 5.0%
Treatment for those with very high cholesterol but low absolute risk of CVD/Diabetes (< 20%)	Estimation based on UHC Service Coverage Sub-Index on NCDs (WHO)
Treatment for those with high blood pressure but low absolute risk of CVD/Diabetes (< 20%)	
Treatment for those with absolute risk of CVD/Diabetes 20-30%	
Treatment for those with high absolute risk of CVD/Diabetes (>30%)	
Treatment of new cases of acute myocardial infarction (AMI) with aspirin	
Treatment of cases with established ischaemic heart disease (IHD)	
Treatment for those with established cerebrovascular disease and post stroke	
Standard Glycemic control	Estimation based on MOH Health Statistics (Diabetology Clinics)
Intensive Glycemic control	
Referral for retinopathy screening	
Neuropathy screening and preventive foot care	

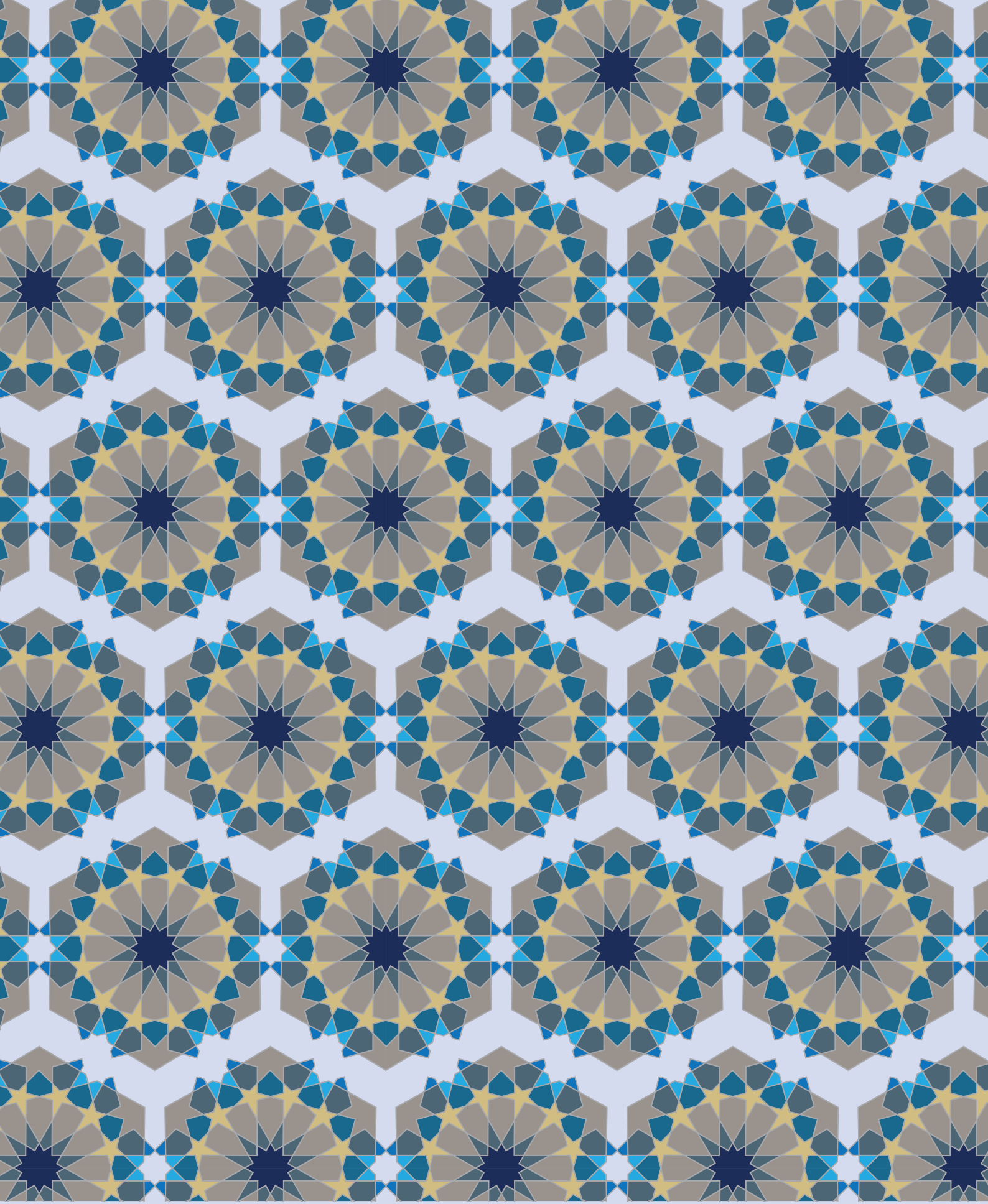
Clinical services provided at PHC Level	Reference / Assumption
Breast Cancer	
Basic breast cancer awareness	Assumption: 5.0%
Screening: Clinical Breast Examination	MOH Health Statistics
Diagnosis after Screened with Clinical Breast Exam	Assumption based on breast cancer incidence (WHO-IARC 2020)
Cervical Cancer	
Papanicolaou test (Pap smear)	Assumption based on Bahrain CR
Colorectal Cancer	
Screening: Fecal occult blood testing	Assumption based on CBE
ELDERLY AND COMMUNITY CARE PROGRAMME	
Elderly and community care programme	MOH Health Statistics
RESPIRATORY DISEASE	
Asthma: Inhaled short acting beta agonist for intermittent asthma	MOH Health Statistics
Asthma: Low dose inhaled fluticasone + SABA	
Asthma: High dose inhaled fluticasone + SABA	
Asthma: Theophylline + High dose inhaled fluticasone + SABA	
Asthma: Oral Prednisolone + Theophylline + High dose inhaled fluticasone + SABA	
COPD: Smoking cessation	
COPD: Inhaled salbutamol	
COPD: Low-dose oral theophylline	
COPD: Ipratropium inhaler	
COPD: Excacerbation treatment with antibiotics	
COPD: Excacerbation treatment with oral prednisolone	
COPD: Excacerbation treatment with oxygen	
EMERGENCY CARE	
Average annual emergency care needs	N/A
CHILD HEALTH	
Child General Health	MOH Health Statistics: 25% of GP visits allocated to Child Health.
Deworming	Estimation based on UHC Service Coverage Index (WHO)
Zinc supplementation	

Clinical services provided at PHC Level	Reference / Assumption
Diarrhoea management	
ORS	Estimation based on UHC Service Coverage Index (WHO)
Zinc (diarrhea treatment)	
Antibiotics for treatment of dysentery	
Pneumonia	
Pneumonia tretament (children, Mild Cases)	Estimation based on MOH Health Statistics
Malaria	
Malaria treatment (0-4, Mild Cases)	Estimation based on MOH Health Statistics
School Health Programme	
Eye Screening	MOH Health Statistics
Dental Screening	
Ear Screening	
NUTRITION	
Women of reproductive age and adolescent girls	
Intermittent iron-folic acid supplementation	Assumption: 5%
Pregnant and lactating women	
Daily iron and folic acid supplementation (pregnant women)	Estimation based on MOH Health Statistics (ANC Visits)
Intermittent iron and folic acid supplementation (non-anemic pregnant women)	
Calcium supplementation for prevention and treatment of pre-eclampsia and eclampsia	
Daily FAF, postpartum, anemic women	Estimation based on MOH Health Statistics (Postnatal Visits)
Intermittent FAF, postpartum, non-anemic pregnant women	
Adults	
Care for adults with low BMI	Assumption: 2.5%
Children	
Breastfeeding counselling and support	MOH Health Statistics
Complementary feeding counselling and support	Estimation based on UHC Service Coverage Index (WHO)
Intermittent iron supplementation in children	
Management of moderate acute malnutrition (children)	MOH Health Statistics

Clinical services provided at PHC Level	Reference / Assumption
MENTAL HEALTH	
Anxiety Disorders	
Basic psychological treatment for anxiety disorders (mild cases).	Estimation based on MOH Health Statistics
Basic psychosocial treatment and anti-depressant medication for anxiety disorders (mild to moderate cases)	
Depression	
Basic psychosocial treatment for mild depression	Estimation based on MOH Health Statistics
Basic psychosocial treatment and anti-depressant medication of first episode (mild to moderate cases)	
Psychosocial care for peri-natal depression for mild cases only	
Psychosis	
Basic psychosocial support and anti-psychotic medication	Estimation based on MOH Health Statistics
Epilepsy	
Basic psychosocial support, advice, and follow-up only	Estimation based on MOH Health Statistics
Dementia	
Dementia screening, basic work up and referral to tertiary care	Estimation based on MOH Health Statistics
Alcohol use/ dependence	
Identification and assessment of new cases of alcohol use/ dependence	Estimation based on MOH Health Statistics
Brief interventions and follow-up for alcohol use/ dependence	
Drug use/ dependence	
Identification and assessment of new cases of drug use/ dependence	Estimation based on MOH Health Statistics
Brief interventions and follow-up for drug use/dependence	
Self-harm/ suicide	
Assess and care for person with self-harm	Estimation based on MOH Health Statistics
Basic psychosocial treatment, advice, and follow-up for self-harm/suicide	
Pesticide intoxication management	

Clinical services provided at PHC Level	Reference / Assumption
MATERNAL NEWBORN AND REPRODUCTIVE HEALTH	
Family planning	
Pill - Progestin only	MOH Health Statistics
Condom - Male	
Injectable - 3 month (Depo Provera)	
IUD - Copper-T 380-A IUD (10 years)	
Implant - Implanon (3 years)	Assumption: 0.5%
LAM (Lactational Amenorrhea Method)	MOH Health Statistics
SDM (Standard Days Method)	
Periodic abstinence	
Withdrawal	
Management of ectopic pregnancy care	
Ectopic case management	Assumption: 100%
Pregnancy Care - ANC	
Tetanus toxoid (pregnant women)	Estimation based on MOH Health Statistics
Syphilis screening ONLY (pregnant women)	MOH Health Statistics
Basic ANC	
Pregnancy care - Treatment of pregnancy complications	
Hypertensive disorder case management	Assumption: 99%
Management of pre-eclampsia (Magnesium sulphate)	
Management of other pregnancy complications	
Deworming (pregnant women), part of general care and not specific for pregnant women	Estimation based on UHC Service Coverage Sub-Index on RMNH (WHO)
Childbirth care - Facility births	
Parenteral administration of uterotonics	Estimation based on MOH Health Statistics (Live birth at HC and Extended HC)
Labor and delivery management	
Pre-referral management of labor complications	
MgSO4 for eclampsia	
Neonatal resuscitation	
Treatment of local infections (Newborn)	
Kangaroo mother care	
Feeding counselling and support for low-birth-weight infants	
Manual removal of placenta	

Clinical services provided at PHC Level	Reference / Assumption
Postpartum care - Treatment of sepsis	
Maternal sepsis case management (ONLY includes stabilization, and referral to tertiary care)	Estimation based on MOH Health Statistics (Live birth at HC and Extended HC)
Postpartum care - Other	
Mastitis	Estimation based on UHC Service Coverage Sub-Index on RMNH (WHO)
Treatment of postpartum hemorrhage	Assumption: 100%
Other sexual and reproductive health	
Treatment of urinary tract infection (UTI)	MOH Health Statistics
Identification and management of infertility (ONLY includes clinical evaluation, initial work up and referral to speciality care)	
Treatment of syphilis	
Treatment of gonorrhea	
Treatment of chlamydia	
Treatment of trichomoniasis	
Treatment of PID (Pelvic Inflammatory Disease)- mild cases only	
Menopause Programme	
Screen for urogenital dryness	Assumption: 7.5%
Screen for mood disorders	Assumption: 7.5%
GP visits	
General Practice	Estimation based on MOH Health Statistics
Oral Care and Cancer	
Dental cleaning and preventive care	MOH Health Statistics



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