

The cost of health services delivered at
primary care facilities in

SAUDI ARABIA

مجلس الصحة
لجدول مجلس التعاون
Gulf Health Council



UN INTERAGENCY
TASK FORCE ON NCDs



@un_ncd



World Health
Organization





Photo credit: [Freepik.com](https://www.freepik.com)

Table of contents

Executive summary	6
Introduction	8
Aim of the study	11
Scope of the study	11
Methods	13
Selection of clinical services	13
Costs and health expenditures	13
Calculation of intervention costs and number of services	13
Target population	14
Population in need	14
Coverage rate	15
Drugs and supply costs	15
Health providers' time costs	16
Assumptions and limitations	16
Primary healthcare in Saudi Arabia	17
Primary healthcare governance	17
Primary healthcare services	18
Primary healthcare coverage	19
Primary healthcare workforce	20
Multisectoral primary healthcare coordination	21
Health budgeting	21
Disease burden	22
Results	24
List of clinical services	24
Clinical services costs in 2019	24
Costs by programme	25
Main cost-driving diseases	26
Screening	26
Recommendations	27
Annex 1: Assumptions used for population in need, drugs and supplies, and labour costs	30
Annex 2: Breakdown of costs for clinical services provided at PHC level	32
Annex 3: References and assumptions used to estimate the total number of services delivered	38
Annex 4: Interventions of the new models of care programme, by the six systems of care	43

Disclaimer

© United Nations Development Programme and the World Health Organization, 2023

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO or UNDP endorses any specific organization, products or services. The unauthorized use of the WHO or UNDP names or logos is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: “This translation was not created by the World Health Organization (WHO) or the United Nations Development Programme (UNDP). Neither WHO nor UNDP are responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition”.

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization (<http://www.wipo.int/amc/en/mediation/rules>).

Suggested citation. Elmusharaf K., Poix S., Jung J. S., Al Farsi, Y., et al (2023). The cost of health services delivered at primary care facilities in Saudi Arabia. Geneva: UNDP, WHO, UNIATF, GHC.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests and queries on rights and any other licensing arrangements, see <http://www.who.int/about/licensing>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO or UNDP concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO or UNDP in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO and UNDP to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO or UNDP be liable for damages arising from its use.

Graphic design by Zsuzsanna Schreck.

Acknowledgements

The authors express their sincere gratitude to the Ministry of Health of the Kingdom of Saudi Arabia and the national team that supported the data collection and analysis. In particular, the authors would like to thank Dr. Mohamed Alsuwaidan at the KSA Ministry of Health for their support and input.

The PHC costing report is made possible by the financial and technical support received from the Gulf Health Council (GHC). GHC representatives provided key contributions by reviewing all deliverables, participating in project planning and organizing meetings with KSA officials. The publication also greatly benefited from the intensive advice and contributions of Dr Yahya Al Farsi and the overall guidance of Dr Suleiman Aldakheel, both with the GHC. Dr Khalifa Elmusharaf, University of Limerick, carried out the economic analysis assisted by Sébastien Poix. Rachael Stanton and Johanna Jung wrote this report together with Dr Elmusharaf and Sébastien Poix of the University of Limerick, Rebecca Gribble, Daniel Grafton, and Dudley Tarlton of the United Nations Development Programme, Dr Nicholas Banatvala of the UN Interagency Task Force on NCDs and Dr Lamia Mahmoud and Dr Deena Alasfoor with the WHO Eastern Mediterranean Regional Office.

The contributions of the WHO and UNDP Country Offices in the KSA are greatly appreciated, in particular those of the UNDP Resident Representative Alessandro Mrakic, Deputy Resident Representative Mohammedsiddig Mudawi, and Layan Faisal, Sara Abdulaziz Bin Ayyaf, and Abdulrahman Alghamdi, as well as WHO Representative Dr Ibrahim El-Ziq. The report benefitted greatly from the contributions from UNDP Regional Office colleagues including Vito Intini, Kawtar Zerouali and Nadine Abdelraouf. The WHO Eastern Mediterranean Regional Office contributed substantial expertise and inputs, with special thanks to Dr Hicham El Berri, Matilda Byström, Dr Heba Fouad, Margarida Goncalves, Dr Asmus Hammerich, Faraz Khalid, Dr Awad Mataria and Dr Nasim Pourghazian.

The authors would like to extend their gratitude to the Ministry of Health of the Kingdom of Saudi Arabia which organized the development of the PHC costing report as well as to KSA ministries and national institutions which provided key inputs.

Executive summary

Strong primary healthcare (PHC) is the key to more efficient health systems with lower health spending and better health outcomes. This report determines the cost of selected clinical services at the primary care level in Saudi Arabia to further promote preventative and close-to-client services in the country. The cost of a total of 98 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.

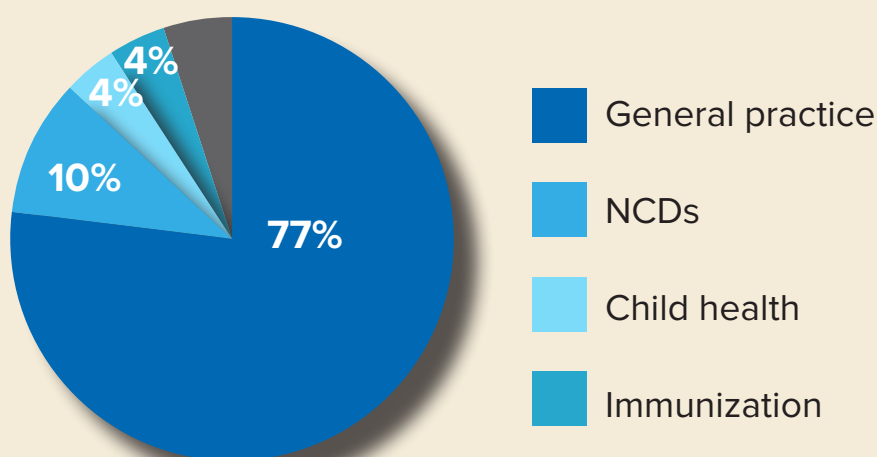
Cost of primary health clinical services

Primary care clinical services cost Saudi Arabia

US\$2.3 billion

in 2019. This is equivalent to US\$69 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 Saudi Arabia:

- **The total cost for the set of clinical services provided at the primary care level in Saudi Arabia in 2019 was US\$2.3 billion.** This is equivalent to US\$68.6 per capita for the set of clinical services costed.
- **The main drivers for the cost of clinical services were general practice, NCDs, child health, and immunization.** The programme contributing the most to the total cost was general practice with 77 percent. Non-communicable diseases (NCDs) made up 10 percent of the total costs, and this was mainly driven by diabetes, chronic respiratory disease and cardiovascular disease services.
- **While NCD services received the highest spending on a single health area, there is room to scale-up service coverage.** Indeed, screening services for cancer, risk of cardiovascular disease and diabetes as well as diabetes complications only accounted for 0.3 percent of the total costs. Based on current coverage rates, it is estimated that more than 18.9 million people did not receive NCD screening services and 10.0 million people did not receive the NCD clinical services they needed at the public primary care level in 2019.
- **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 a low coverage rate. It is estimated that 6.9 million 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 mental health services to primary care facilities.

3

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 tool to achieving universal health coverage and health-related sustainable development goals. PHC is an approach to healthcare based upon three components: multisectoral 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](https://doi.org/10.1016/s0140-6736(94)90634-3)
 - 4 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>
 - 5 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>
 - 6 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., Erinosh, 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?^{7, 8, 9, 10, 11}

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. Hallmarks of PHC include:

- universal accessibility
- person- rather than disease-focused
- continuous across the life span
- comprehensive services, including prevention, diagnosis and treatment

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.”

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. Available at: <https://doi.org/10.1787/a92addee4-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. Available at: <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/a92addee4-en>.

13 OECD (2020). Realising the Potential of Primary Healthcare, OECD Health Policy Studies, OECD Publishing, Paris. Available at: <https://doi.org/10.1787/a92addee4-en>.

Box 2. Characteristics of strong primary healthcare^{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 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. Available at: 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. Available at: 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 achieving 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 PHC programmes and to facilitate progress towards achieving universal health coverage, the United Nations has been invited to assist GCC countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE, in undertaking a comparative study on the costs of PHC programmes. 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 both efficiency and quality to meet increasing demand.

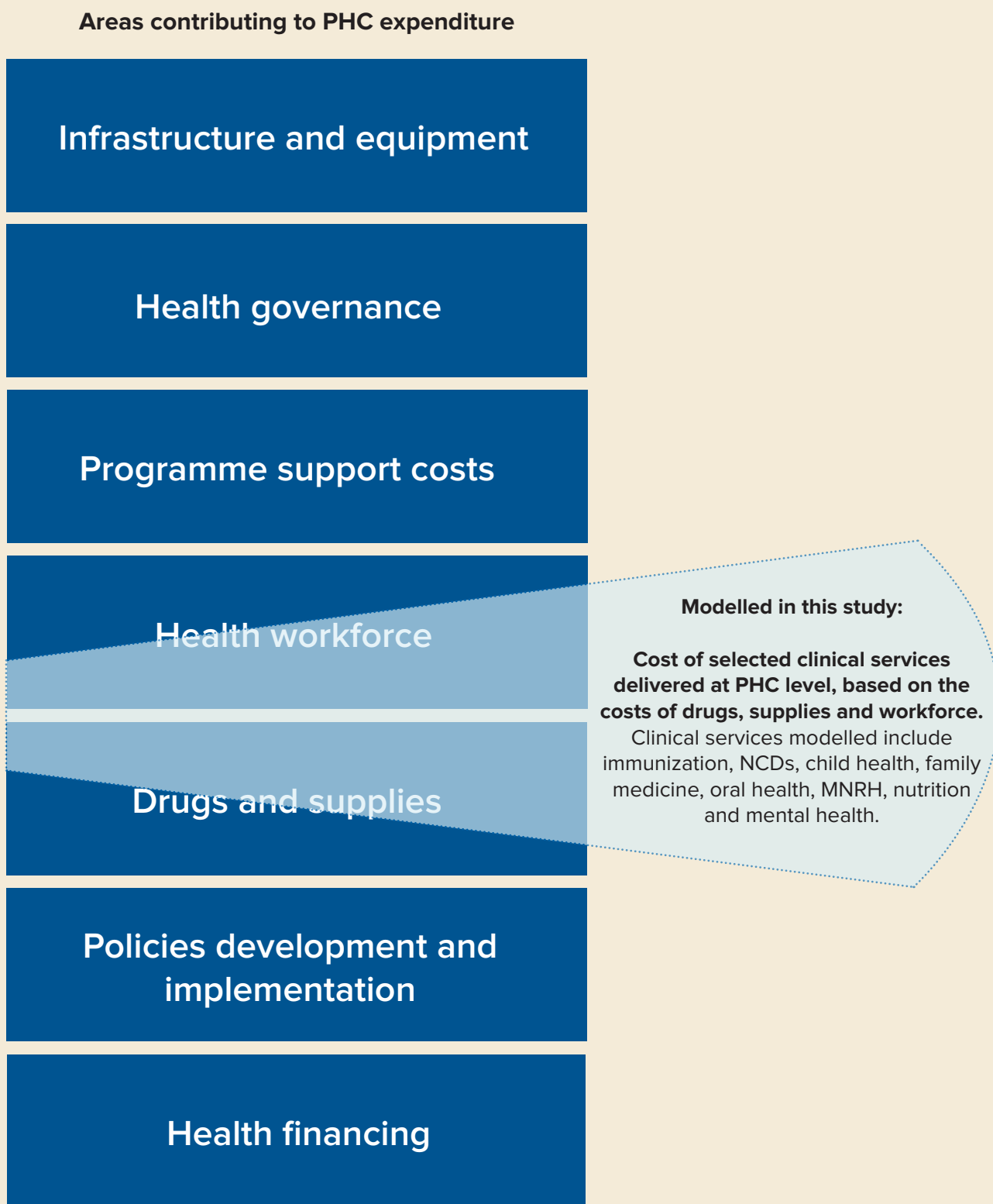
AIM OF THE STUDY

This study aims to estimate the costs of delivering a set of primary care clinical 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 set of outpatient clinical services delivered at the PHC 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 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 the public sector in Saudi Arabia 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 (public sector)



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 focal points 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:

$$\text{Intervention cost} = \text{Number of services} \times \text{Cost per service}$$

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

$$\text{Number of services} = \text{Target population} \times \text{Population in need} \times \text{Coverage rate}$$

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

$$\text{Cost per service} = \text{Drugs and supply costs} + \text{Healthcare provider time cost}$$

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.

The reference population used in this study was the total population, including nationals and expatriates.

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 glycemetic control; 50 percent of women aged 40-70 should receive clinical breast examination every year).

COVERAGE RATE

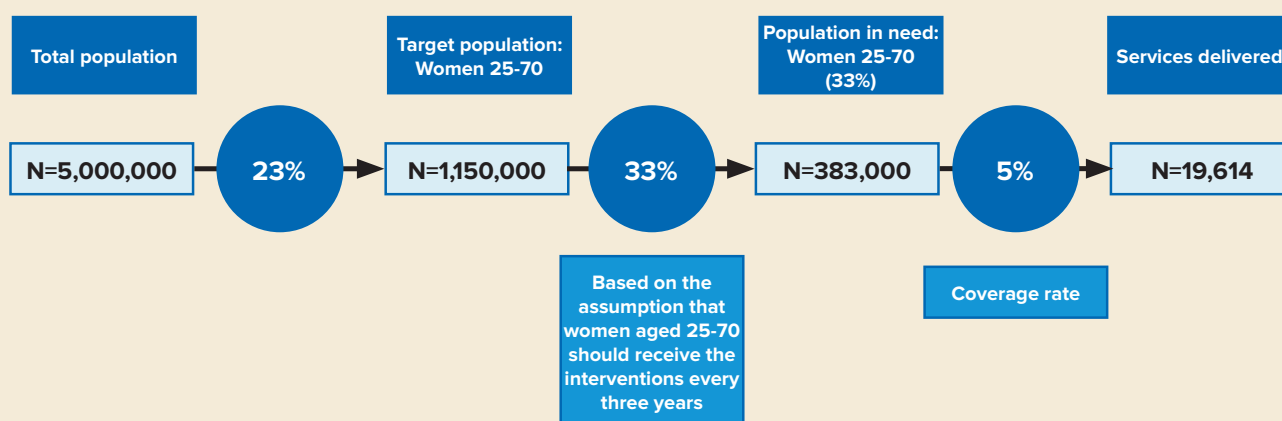
The coverage rate reflects the percentage of the population in need who received a service at the primary healthcare level. The coverage rate was calculated following three steps:

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.

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 formulae was used:

$$\text{Healthcare provider's cost} = \text{salary per minute} \times \text{Minutes required to deliver the service}$$

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 (222 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.

Primary Healthcare in Saudi Arabia

PRIMARY HEALTHCARE GOVERNANCE

The healthcare sector in Saudi Arabia is currently undergoing major restructuring within the country's Vision 2030. However, prior to 2022 the Ministry of Health was the major healthcare provider and financier in the country.²⁰ Ministry of Health services accounted for 60 percent of all healthcare services with other government bodies and the private sector providing 20 percent of healthcare services each. The Ministry of Health supervised 20 Regional Directorates-General of Health Affairs in regions across the country, with each directorate responsible for implementation of services across the three levels of healthcare.²¹ PHC has been an anchor of healthcare in Saudi Arabia since 1980 when PHC centres were first established by ministerial decree. At the PHC level, Ministry of Health centres were connected to the local community through "Health Friends", a committee of community members and PHC representatives who acted as liaisons.²²

In 2016, Saudi Arabia launched its Vision 2030 as a strategic framework to diversify the country's economy through local and foreign investment in support of 11 programmes.²³ One of the 11 vision realization programmes is the health sector transformation programme which is to be launched in 2022 with the four key objectives of: facilitating access to healthcare services, improving the quality and efficiency of health services, promoting the prevention of health risks and enhancing traffic safety.²⁴ The healthcare transformation plan includes significant governance reform with the Ministry of Health being redefined as a regulator and ceasing to be a care provider. The private sector will step in as the major healthcare provider in the country as well as a strategic contributor to the health sector.²⁵

By 2030, the government aims to have privatized almost 300 hospitals and approximately 2,300 primary health centres, with the first privatization of a healthcare entity announced in February 2020 (Saudi Medical Services Company).²⁶ The privatization reform will be based around the formation of more than 20 clusters (formed of primary, secondary and tertiary facilities in a geographical area). These clusters will be established in waves across the country, with each cluster created and managed by the Health Holding Company.²⁷

20 Almalki M, Fitzgerald G, Clark M. (2011). Health care system in Saudi Arabia: an overview. *Eastern Mediterranean Health Journal*; 17:10.

21 *ibid.*

22 *ibid.*

23 Kingdom of Saudi Arabia. (2022). Saudi Vision 2030. Available at: <https://www.vision2030.gov.sa/v2030/vrps/>

24 Kingdom of Saudi Arabia. (2022). Saudi Vision 2030. Available at: <https://www.vision2030.gov.sa/v2030/vrps/hstp/>

25 Kingdom of Saudi Arabia. Health Sector Transformation Program Delivery Plan 2020-2021.

26 Omnia health. (2022). Saudi Arabia's evolving healthcare system: What's new in 2020. Available at: <https://insights.omnia-health.com/healthcare-regulation/saudi-arabias-evolving-healthcare-system-whats-new-2020>

27 Kingdom of Saudi Arabia, Ministry of Health. Health Sector Transformation Strategy. V.3.

There are many government sectors alongside the Ministry of Health which currently provide PHC in Saudi Arabia. These include the national referral hospital (King Faisal Specialist Hospital) and the Ministry of Education hospitals (teaching hospitals), which offer healthcare to the wider population, as referred or in emergencies. Other government bodies provide healthcare services to specific populations, usually employees, including security and armed forces medical services, national guard health affairs, Saudi Arabian Oil Company (ARAMCO), and the Royal Commission for Jubail and Yanbu.²⁸

PRIMARY HEALTHCARE SERVICES

In 2020, 85 percent of all outpatient visits to Ministry of Health facilities were for PHC visits, taking place across 2,257 PHC centres. The number of Ministry of Health PHC centres in 2020 has slightly decreased from 2,325 in 2016, in line with the planned privatization.²⁹ Ministry of Health PHC centres are spread over 20 health regions, with a higher concentration of clinics in the capital area (almost 20 percent in Riyadh) and in the west of the country in areas such as Aseer, Jazan, Medinah, Makkah and Jeddah.³⁰ The total number of PHC visits in 2019 was 54,343,743. This is equivalent to 1.6 visit per capita.³¹

Saudi Arabia's PHC system has faced several challenges in delivering primary health care, including integration with secondary and tertiary care and service provision in rural areas.^{32, 33} To help address these challenges, PHC is a focus of the Vision 2030 health sector transformation. One strategy is the New Models of Care Programme, a grouping of 42 healthcare interventions across six systems of care to achieve health goals in the country (Annex 2). Primary healthcare is listed as a cross-cutting intervention within this programme, demonstrating recognition of the role PHC plays in delivering care across the six systems, including safe birth, chronic conditions, and wellbeing.

Another initiative within the current health sector transformation is the reformation and restructuring of primary healthcare by the Ministry of Health. This aims to increase PHC visits to 4 per capita per year by ensuring access to services for all beneficiaries through:³⁴

28 Almalki M, Fitzgerald G, Clark M. (2011). Health care system in Saudi Arabia: an overview. *Eastern Mediterranean Health Journal*; 17:10.

29 Kingdom of Saudi Arabia, Ministry of Health. (2020). *Statistical Yearbook 2020*. Available at: <https://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx> Available at:

30 Kingdom of Saudi Arabia, Ministry of Health. (2020). *Statistical Yearbook 2020*. <https://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>

31 Kingdom of Saudi Arabia, Ministry of Health (2020). *Statistical Yearbook 2020*.

32 Kingdom of Saudi Arabia, Ministry of Health. *Health Sector Transformation Strategy*. V.3.

33 Kingdom of Saudi Arabia. *Health Sector Transformation Program Delivery Plan 2020-2021*.

34 Kingdom of Saudi Arabia. *Health Sector Transformation Program Delivery Plan 2020-2021*.

- increasing geographical coverage of PHC and extending hours of health centres
- upgrading PHC facilities
- increasing availability of diagnostic and treatment medical equipment
- increasing staff capacity in family medicine and additional relevant medical specialties
- unifying medical records, implementing health information systems and data collection
- providing mobile PHC clinics to remote populations
- development of consulting centres which offer medical specialties
- developing school programs for screening, as well as curative and preventative measures.

At the same time, quality improvement projects for Ministry of Health PHC centres are underway and include training programmes, data collection, the identification, monitoring and evaluation of performance indicators, and implementing best practices.³⁵

PRIMARY HEALTHCARE COVERAGE

Under the constitution, health is a fundamental right to all Saudi citizens, with healthcare services from the Ministry of Health provided for free at the point of service. Saudi Arabia had a population of 34 million in 2021, with expatriates accounting for 36 percent of the population.³⁶ The private sector currently provides coverage for non-citizen workers and Saudi nationals who work in the private sector. However, coverage for these populations remains at 70 percent (in 2016) with concerns regarding equity.³⁷

Under the health sector transformation plan and the development of health clusters, all citizens will be able to access all healthcare requirements free of charge. This will be financed by the Center for National Health Insurance through agreements with each cluster to provide free medical coverage to citizens within their coverage area.³⁸ Saudi Arabia aims to achieve free access to health services for 88 percent of the population by 2025, with the long-term aim of reaching 100 percent coverage.³⁹

35 Kingdom of Saudi Arabia. Health Sector Transformation Program Delivery Plan 2020-2021.

36 Kingdom of Saudi Arabia. General Authority for Statistics. (2021). Population Estimates. Available at: <https://www.stats.gov.sa/en/43>

37 Grafton D, Elmusharaf K., Jung J., et al. (2021). Prevention and Control of Non-Communicable Diseases in Saudi Arabia: The Case for Investment. Geneva: UNDP, WHO, UNIATF, GHC.

38 Kingdom of Saudi Arabia. Health Sector Transformation Program Delivery Plan 2020-2021.

39 Kingdom of Saudi Arabia. (2022). Saudi Vision 2030. Available at: <https://www.vision2030.gov.sa/v2030/vrps/hstp/>

PRIMARY HEALTHCARE WORKFORCE

Saudi Arabia's healthcare workforce is steadily growing, with 58.2 nurses and 27.6 physicians per 10,000 population in 2019. This places Saudi Arabia approaching, but below, the OECD average of 90 nurses and 36 physicians per 10,000.⁴⁰ In 2020 there were a total of 12,814 general practitioners (consultants, registrars and residents) in Saudi Arabia and 8,220 family practitioners working across the different sectors (**Table 1**). While there are more general practitioners than family practitioners in Saudi Arabia, there are a similar number of each specialty working in the Ministry of Health.

Table 1: Sector of employment for general practitioners in Saudi Arabia, 2020

	Ministry of Health	Private Sector	Other governmental sectors	Total
General practitioners	6,595	5,103	1,116	12,814
Family practitioners	6,299	238	1,683	8,220

Table source: Kingdom of Saudi Arabia, Ministry of Health. (2020). Statistical Yearbook 2020. <https://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>

Similar to other GCC countries, a key challenge for Saudi Arabia is a reliance on expatriate medical professionals. In 2020 almost half of all physicians in the Ministry of Health's PHC centres were expatriates.^{41,42} However, in 2020 almost all nurses, pharmacists and allied health professionals working in PHC were Saudi nationals, accounting for 87 percent, 99 percent and 99 percent of each specialty respectively.⁴³ The government is taking steps to increase the number of local family practitioners through the country's 15 family practice residency training programmes. One programme is a four-year family practitioners training programme, which has been available in Saudi Arabia since 1983.⁴⁴ This programme requires all residents to conduct research on family medicine, which has also helped to increase scientific knowledge on PHC in the country.⁴⁵ A separate two-year diploma training programme is also offered and is run by the Saudi Commission for Health Specialties in conjunction with the Ministry of Health.⁴⁶ Both training programs have actively increased recent enrolment to almost double that of previous years.

40 OECD (2021): Health at a Glance 2021. OECD Library. Available at: <https://www.oecd-ilibrary.org/sites/ae3016b9-en/1/3/8/2/index.html?itemId=/content/publication/ae3016b9-en&csp=ca413da5d44587bc56446341952c275e&itemIGO=oecd&itemContentType=book>

41 Hassan S, Kidd M. (2019). Family Practice in the Eastern Mediterranean Region. Taylor and Francis Group. Available at: <https://applications.emro.who.int/docs/9781138498587-eng.pdf>

42 *ibid.*

43 Kingdom of Saudi Arabia, Ministry of Health. (2020). Statistical Yearbook 2020. <https://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx>

44 Hassan S, Kidd M. (2019). Family Practice in the Eastern Mediterranean Region. Taylor and Francis Group. Available at: <https://applications.emro.who.int/docs/9781138498587-eng.pdf>

45 *ibid.*

46 *ibid.*

MULTISECTORAL PRIMARY HEALTHCARE COORDINATION

The Ministry of Health, through the Public Health Agency, launched the Healthy Schools Program in partnership with the Ministry of Education. A ‘healthy school’ is defined as a school where all community members (students, teachers, parents, administrators) work to promote student health through physical, psychological, social and religious programmes.⁴⁷

Saudi Arabia has 10 cities recognized as healthy cities in the WHO Eastern Mediterranean Region Healthy Cities Programme.⁴⁸ A further 20 have been registered with WHO by the country as part of the Healthy Cities Programme, which allows for cities to share action plans, experiences and initiatives related to good practices for city health and social development. However, any city regardless of its current health and social status can join the regional network, with political commitment to improving lives of those living in urban areas views as the most important joining requirement.⁴⁹

HEALTH BUDGETING

In 2019, 69 percent of the total health expenditure in Saudi Arabia was provided by the government, a decrease from 72 percent in 2000. Private health expenditure has risen over the same period, from 28 percent in 2000 to 31 percent of total health expenditure in 2019, reflecting an increase private sector service provision in the country. Out-of-pocket health expenditure as a proportion of total health expenditure have slightly decreased during this time, from 18 percent to 16 percent.⁵⁰

In 2019, Saudi Arabia’s total health expenditure was equivalent to 5.7 percent of the country’s gross domestic product, the highest percentage across the six GCC countries. However, health spending per capita was only the fourth highest among GCC countries, at US\$1,316 per person in 2019.⁵¹

In recent years, under 7 percent of the total government budget was allocate to the Ministry of Health. With over 90 percent of this funding dedicated to hospital infrastructure and development, only a relatively low level of funding remained for PHC.⁵² Through providing free healthcare to all citizens, the government has faced increasing costs with an increasing demand for health services in the country. The Vision 2030 Strategy will see a further increase in private health expenditure in the country.

47 Kingdom of Saudi Arabia. Ministry of Health. 2020. Healthy Schools. Available at: <https://www.moh.gov.sa/en/Ministry/Projects/Healthy-Schools/Pages/default.aspx>

48 Healthy City Network. 2022. Available at: <https://applications.emro.who.int/HCN/>

49 Healthy City Network. 2022 Available at: <https://applications.emro.who.int/HCN/>

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

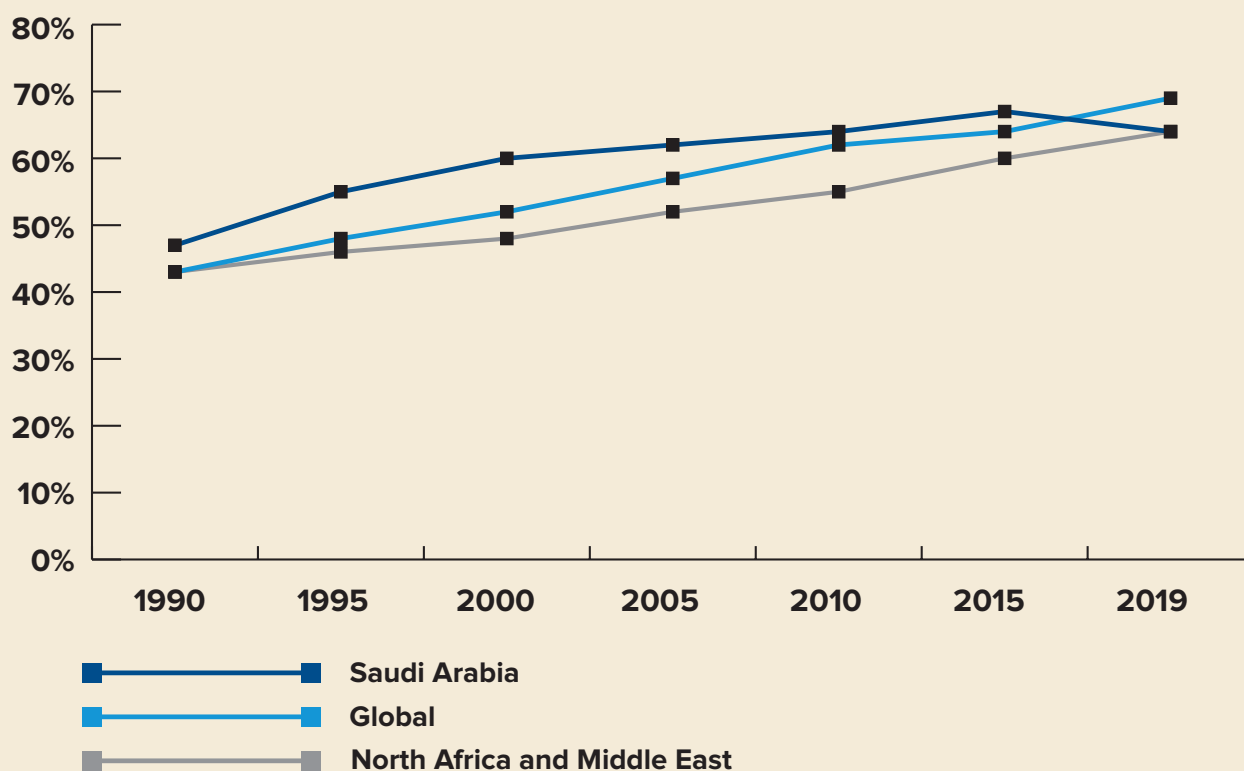
51 World Health Organization Global Health Expenditure Database. Available at: <https://apps.who.int/nha/database/ViewData/Indicators/en>

52 Grafton D, Elmusharaf K., Jung J., et al. (2021). Prevention and Control of Non-Communicable Diseases in Saudi Arabia: The Case for Investment. Geneva: UNDP, WHO, UNIATF, GHC.

DISEASE BURDEN

In Saudi Arabia, like many countries, the disease burden has shifted over the past 30 years to be predominantly attributed to NCDs. In 1990, 47 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 64 percent of the total disease burden in Saudi Arabia (**Figure 3**).⁵³ From 1990 to 2015, Saudi Arabia had a higher NCD burden than the global and regional averages but in 2019 this levelled out with the global average, sitting just below the regional level. In 2019, the remaining disease burden included injuries (25 percent) and communicable, maternal, neonatal and nutritional diseases (7.7 percent).⁵⁴

Figure 3: NCDs as percentage of total disease burden (in DALYs) 1990-2019



53 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/>.

54 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/>.

Within the high prevalence of NCDs in Saudi Arabia, the leading causes of disease are cardiovascular diseases (17.2 percent of DALYs), mental disorders (8.9 percent), musculoskeletal disorders (7.4 percent) and diabetes (6.2 percent).⁵⁵ Ischemic heart disease is the leading cause of death in the country, and six out of the top ten causes of death are NCDs.⁵⁶ Importantly, 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 Saudi Arabia⁵⁷

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 35 percent of deaths in Saudi Arabia in 2019, and that more than one if four are currently affected by these diseases.

NCDs cost the Saudi Arabian economy SAR 91.6 billion (US\$24.4 billion) every year, equivalent to 3.08 percent of its annual GDP. Of these annual costs, 45 percent or SAR 41 billion were government healthcare expenditures.

Notably, 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.

Of note is the high level of injuries within the total disease burden in Saudi Arabia, at a quarter of the total amount. Transport injuries in the country account for 13.4 percent of the total disease burden, a significantly higher level than the global, regional, and high-income country group averages (3.1 percent, 5.1 percent and 2.2 percent respectively). This has increased from 20 percent of total disease burden in 1990, with transport injuries consistently remaining just over half of this total amount. Strengthening PHC services would allow resources at the secondary and tertiary levels to better meet the high levels of injuries. Additionally, maternal and neonatal disorders alone account for 2.4 percent of the total disease burden, which is significantly higher than the average for high-income countries of 1.2 percent.⁵⁸

55 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/>.

56 Institute for Health Metrics and Evaluation. (2022). Saudi Arabia. Available at: <https://www.healthdata.org/saudi-arabia>

57 Grafton D, Elmusharaf K., Jung J., et al. (2021). Prevention and Control of Non-Communicable Diseases in Saudi Arabia: The Case for Investment. Geneva: UNDP, WHO, UNIATF, GHC.

58 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/>.

Results

LIST OF CLINICAL SERVICES

We included 98 clinical services in the modelling. Of these, eight clinical services relate to the immunization programme, 40 to the non-communicable diseases (NCD) programme, eight to the child health programme, nine to the nutrition programme, 15 to the mental health programme, 16 to the reproductive, maternal and child health programme, one to the oral and dental care programme and one to the general practice programme⁵⁹ (see **Annex 2** for a list of clinical services modeled).

CLINICAL SERVICES COSTS IN 2019

For 2019, the cost of the selected clinical services delivered at the primary care level in the public sector was estimated at US\$1,877,929,805 (**Table 2**). The overhead costs were estimated at US\$469,482,451.

The total costs were estimated at US\$2,347,412,257. These total costs account for 5.2 percent of the total health expenditure (THE) or 8.3 percent of the government health expenditure (GHE), and represent a per capita cost of US\$68.60.

Table 2: Costs of the Clinical Service Delivered at the Primary Care Level in Saudi Arabia (2019)

Programme	Cost (US\$)
Immunization	75,048,096
Non-Communicable Diseases	189,841,089
Child Health	79,111,181
Nutrition	25,159,126
Mental Health	1,165,366
Reproductive, Maternal and Child Health	36,524,004
Oral and Dental Care	25,349,141
General Practice	1,445,731,801

⁵⁹ 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.

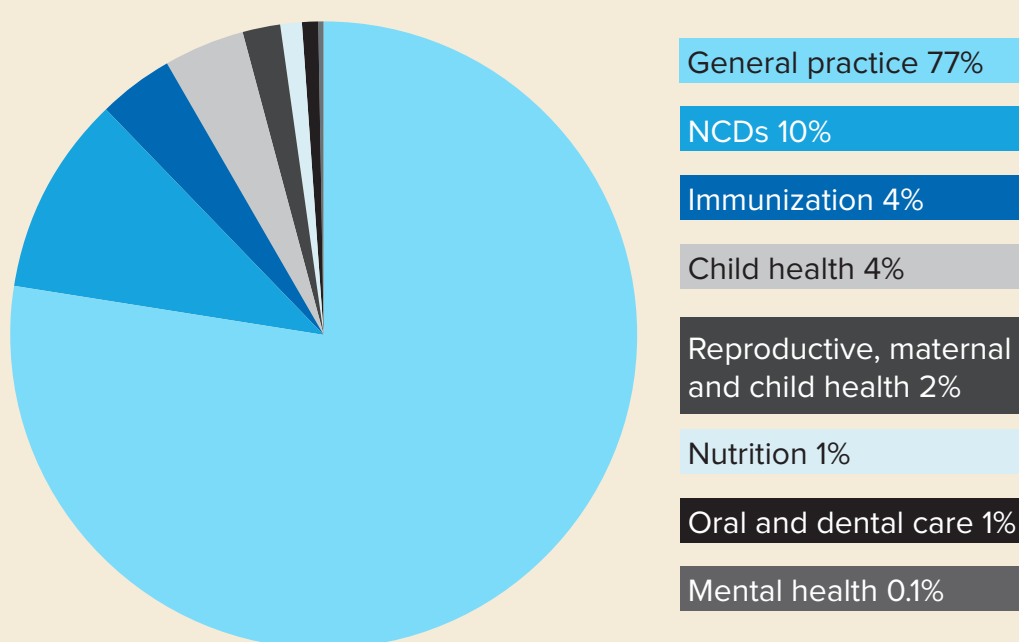
Cost of Clinical Services	1,877,929,805
Programme Overhead Costs (+20%)	469,482,451
TOTAL COSTS	2,347,412,257
Total Costs (% of THE)	5.2
Total Costs (% of GHE)	8.3
Total Costs per capita	68.60

COSTS BY PROGRAMME

General practice accounted for 77 percent of the clinical services costs, with costs estimated at US\$1,445,731,801 in 2019 (**Figure 4**). NCDs were the second most expensive programme, making up 10 percent of the total costs. This is likely due to the high number of clinical services related to NCD control and treatment, the chronic nature of the conditions being treated, and the fact that many interventions in this category require expensive consumables.

With an estimated cost of US\$1,165,366, the mental health programme accounts for 0.1 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 Saudi Arabia. Indeed, an estimated 6.9 million individuals did not receive mental health services they needed at public primary care level in Saudi Arabia in 2019.

Figure 4: Share of Total Costs by Programme, 2019 (Saudi Arabia)



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 patients with chronic respiratory diseases generates a cost of nearly US\$53 million every year. In total, these three most expensive clinical services account for 5.8 percent of the total cost estimated (**Table 3**). 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 3: Main cost-driving disease areas

Disease	Cost (US\$)	% of Total Costs	Unique Patients	Patients who did not receive services needed	Coverage Rate
CVD	19,775,542	1.1%	1,359,375	5,496,844	19.8%
Diabetes	35,306,908	1.9%	168,525	3,750,668	4.3%
Chronic Respiratory Diseases	52,989,812	2.8%	743,728	2,974,912	20.0%
Total	108,072,262	5.8%	2,271,628	9,950,796	18.6%

SCREENING

Taken altogether, services related to screening of risk of cardiovascular diseases and diabetes, cancers and diabetes complications were estimated at US\$5.8 million. This represents 0.3 percent of the total costs in 2019 (**Table 4**).

Table 4: Costs of top three screening services

Disease	Cost (US\$)	% of Total Costs	Unique Patients	Patients who did not receive services needed	Coverage Rate
Screening for risk of CVD/Diabetes	1,292,366	0.1%	527,661	10,025,553	5.0%
Screening for Cancer (CBE, Pap Smear, FOBT)	3,123,300	0.2%	365,011	5,938,692	5.8%
Screening for Diabetes Complications	1,429,249	0.1%	39,192	3,880,002	1.0%
Total	5,844,916	0.3%	931,863	18,912,383	4.7%

Recommendations

Saudi Arabia recognizes the importance of strong PHC to build an effective, efficient health system and foster a healthy society. This is clearly demonstrated in the defined role PHC plays within the current health sector reform under Vision 2030. In recent years, the country has made commendable progress in strengthening PHC through scaling-up training of healthcare professionals and introducing initiatives and deep restructuring to improve PHC clinic performance.

In this study, we estimated the costs of a selection of clinical services delivered at public primary care level in Saudi Arabia. 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 Saudi Arabia could be further strengthened. The following actions would assist Saudi Arabia to reap significant health and economic benefits across the population:

1

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

NCDs account for a large proportion of morbidity and mortality in Saudi Arabia (64 percent and 35 percent respectively). This costing exercise found that while NCDs received the highest spending on a specific health area (behind general practice as the largest overall area), with costs largely driven by services for cardiovascular diseases, diabetes and respiratory diseases. However, there is room to scale-up coverage of NCD clinical and screening services to address the significant disease burden. Indeed, almost 10 million people did not receive the NCD clinical services they needed at the public primary care level in 2019. The majority of these NCD services were for cardiovascular diseases, with 5.5 million people missing out on clinical services. Moreover, just 0.5 percent of the PHC costs modelled in this study (or around US\$9.7 million) were dedicated to NCD screening services in Saudi Arabia, and it is estimated that nearly 19 million people did not receive the NCD screening services they needed in public primary care 2019. It is noteworthy that patients missing out on services at the public primary care level may have sought these services out 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 Saudi Arabia 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. Of note, scaling up of services for NCDs will incur additional health system costs, such as workforce training and facilities, alongside a direct increase in services and the associated costs modelled in this analysis.

2

Shift mental health services to primary care facilities.

Mental health services at PHC level currently account for just 0.1 percent of total costs modelled in this report. This is not driven by a lack of need for services, but rather due to a low coverage rate, as an estimated 7 million people did not receive necessary mental health services at the public primary level in Saudi Arabia 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 Saudi Arabia. Demand for mental health services will likely have increased in recent years as it is well established that the COVID-19 pandemic has had a negative impact on many people's mental health and wellbeing.⁶⁰

Integrating mental health screening and care services into primary care 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.⁶¹ Moreover, prominent mental health services in primary care can help provide visibility to mental health disorders and provide a platform for education and awareness campaigns to reduce 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.

60 World Health Organization. 2022. Mental Health and COVID-19: Early evidence of the pandemic's impact. Scientific brief.

61 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/>

3

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 Saudi Arabia. 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. Saudi Arabia 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 be of use to 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.

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, 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 gonorrhoea	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
Screening: mammography	Women aged 40-70 should be screened every 2 years (50%)	-	-
Post-treatment surveillance for breast cancer patients	Based on country breast cancer incidence rate (WHO – IARC 2020)	-	-
Post treatment surveillance for cervical cancer	Based on country cervix cancer incidence rate (WHO – IARC 2020)	-	-
Screening: Sigmoidoscopy, colonoscopy	People 50+ should be screened every 10 years (10%)	-	-
Post treatment surveillance for colorectal cancer	Based on country colorectal cancer incidence rate (WHO – IARC 2020)	-	-
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 (KD, 2019)	Health Providers Costs (KD, 2019)	Total Costs (Drugs & Supplies and Providers)
IMMUNIZATION			
Measles vaccine	5,832,444	25,123,473	30,955,918
Pentavalent vaccine	12,041,000	25,279,843	37,320,843
Varicella vaccine	57,889,649	12,888,623	70,778,272
Polio vaccine	1,117,462	25,279,843	26,397,305
BCG vaccine	1,188,570	6,385,115	7,573,685
Rubella vaccine	27,569,074	12,808,899	40,377,973
Pneumococcal vaccine	38,546,244	25,279,843	63,826,087
HPV vaccine	434,482	291,344	725,825
NON-COMMUNICABLE DISEASES			
CVD & Diabetes			
Screening for risk of CVD/Diabetes	4,786,542	2,874,924	7,661,466
Follow-up care for those at low risk of CVD/ Diabetes (Absolute Risk: 10-20%)	401,621	241,224	642,846
Treatment for those with very high cholesterol but low absolute risk of CVD/Diabetes (< 20%)	11,982,172	8,705,108	20,687,280
Treatment for those with high blood pressure but low absolute risk of CVD/Diabetes (< 20%)	25,960,293	30,897,112	56,857,406

Clinical services provided at PHC Level	Drug & Supplies Costs (KD, 2019)	Health Providers Costs (KD, 2019)	Total Costs (Drugs & Supplies and Providers)
Treatment for those with absolute risk of CVD/Diabetes 20-30%	9,096,539	5,277,975	14,374,514
Treatment for those with high absolute risk of CVD/Diabetes (>30%)	13,676,918	10,227,719	23,904,638
Treatment of new cases of acute myocardial infarction (AMI) with aspirin	763,491	373,159	1,136,650
Treatment of cases with established ischaemic heart disease (IHD)	2,864,308	1,113,722	3,978,030
Treatment for those with established cerebrovascular disease and post stroke	2,600,934	1,284,526	3,885,460
Treatment of cases with rheumatic heart disease (with benzathine penicillin)	5,896,472	40,660,778	46,557,250
Standard Glycemic control	93,499,659	8,275,323	101,774,982
Intensive Glycemic control	37,266,666	4,141,756	41,408,422
Neuropathy screening and preventive foot care	2,580,789	2,712,727	5,293,516
Breast Cancer			
Basic breast cancer awareness	0	2,086,720	2,086,720
Screening: Clinical Breast Examination	0	12,994,644	12,994,644
Screening: Mammography	565,808	7,171,084	7,736,892
Diagnosis: Screened with clinical breast exam	22,804,806	28,083,043	50,887,849
Diagnosis: Screened with mammogram	21,832,122	18,722,029	40,554,151
Post-treatment surveillance for breast cancer patients	34,337	992,679	1,027,016
Cervical Cancer			
Papanicolaou test (Pap smear)	780,814	7,551,571	8,332,385
Post treatment surveillance for cervical cancer	7,541	69,910	77,451
Colorectal Cancer			
Screening: Fecal occult blood testing	225,721	922,951	1,148,672
Screening: Sigmoidoscopy	62,568	1,110,152	1,172,720
Screening: Colonoscopy	202,421	2,236,791	2,439,212
Diagnosis for colorectal cancer screened with FOBT	14,236,763	0	14,236,763

Clinical services provided at PHC Level	Drug & Supplies Costs (KD, 2019)	Health Providers Costs (KD, 2019)	Total Costs (Drugs & Supplies and Providers)
Diagnosis without screening for colorectal cancer (symptom based)	949,118	0	949,118
Post treatment surveillance for colorectal cancer	538,214	901,308	1,439,521
RESPIRATORY DISEASE			
Asthma: Inhaled short acting beta agonist for intermittent asthma	5,645,764	4,771,665	10,417,429
Asthma: Low dose inhaled fluticasone + SABA	30,589,775	9,543,330	40,133,105
Asthma: High dose inhaled fluticasone + SABA	37,416,017	7,157,497	44,573,514
Asthma: Theophylline + High dose inhaled fluticasone + SABA	63,118,499	9,543,330	72,661,828
Asthma: Oral Prednisolone + Theophylline + High dose inhaled fluticasone + SABA	2,434,379	298,229	2,732,608
COPD: Smoking cessation	0	419,760	419,760
COPD: Inhaled salbutamol	6,006,112	5,076,222	11,082,333
COPD: Low-dose oral theophylline	3,096,484	2,233,538	5,330,022
COPD: Ipratropium inhaler	1,644,340	781,738	2,426,078
COPD: Exacerbation treatment with antibiotics	17,480	1,441,492	1,458,972
COPD: Exacerbation treatment with oral prednisolone	146,768	1,441,492	1,588,259
COPD: Exacerbation treatment with oxygen	1,729,042	1,705,611	3,434,653
EMERGENCY CARE			
Average annual emergency care needs	33,611,010	0	33,611,010
CHILD HEALTH			
General Health (Children)	197,986,901	85,922,920	283,909,821
Zinc supplementation	1,294,148	977,245	2,271,393
Diarrhoea management			
ORS	194,626	1,375,898	1,570,524
Zinc (diarrhea treatment)	147,762	1,375,898	1,523,660
Antibiotics for treatment of dysentery	31,772	307,744	339,515
Treatment of severe diarrhea	184,276	1,828,389	2,012,665

Clinical services provided at PHC Level	Drug & Supplies Costs (KD, 2019)	Health Providers Costs (KD, 2019)	Total Costs (Drugs & Supplies and Providers)
Pneumonia			
Pneumonia treatment (children, Mild Cases)	36,681	797,900	834,581
Treatment of severe pneumonia	44,494	497,719	542,213
NUTRITION			
Women of reproductive age and adolescent girls			
Intermittent iron-folic acid supplementation	56,005	11,460,457	11,516,463
Pregnant and lactating women			
Daily iron and folic acid supplementation (pregnant women)	778,649	3,164,787	3,943,436
Intermittent iron and folic acid supplementation (non-anaemic pregnant women)	31,288	977,604	1,008,892
Vitamin A supplementation in pregnant women	1,514,027	3,058,103	4,572,130
Iodine supplementation in pregnant women	260,981	0	260,981
Adults			
Care for adults with low BMI	3,871,265	2,993,086	6,864,351
Children			
Breastfeeding counselling and support	0	7,877,453	7,877,453
Complementary feeding counselling and support	0	20,256,307	20,256,307
Management of moderate acute malnutrition (children)	33,645,073	3,236,861	36,881,935
MENTAL HEALTH			
Anxiety Disorders			
Basic psychosocial treatment for anxiety disorders (mild cases)	0	446,551	446,551
Basic psychosocial treatment and anti-depressant medication for anxiety disorders (moderate-severe cases)	150,746	852,506	1,003,252
Depression			
Basic psychosocial treatment for mild depression	0	152,632	152,632
Basic psychosocial treatment and anti-depressant medication of first episode moderate-severe cases	28,337	160,264	188,601

Clinical services provided at PHC Level	Drug & Supplies Costs (KD, 2019)	Health Providers Costs (KD, 2019)	Total Costs (Drugs & Supplies and Providers)
Psychosocial care for peri-natal depression	0	16,649	16,649
Psychosis			
Basic psychosocial support and anti-psychotic medication	83,896	201,580	285,476
Bipolar disorder			
Basic psychosocial treatment, advice, and follow-up for bipolar disorder, plus mood-stabilizing medication	737,916	460,006	1,197,922
Epilepsy			
Basic psychosocial support, advice, and follow-up, plus anti-epileptic medication	53,215	112,155	165,370
Developmental disorders			
Basic psychosocial treatment, advice, and follow-up for developmental disorders	18,877	36,603	55,481
Conduct disorders			
Basic psychosocial treatment, advice, and follow-up for behavioural disorders	0	722,557	722,557
Dementia			
Assessment, diagnosis, advice, and follow-up for dementia	8,038	73,642	81,680
Alcohol use/dependence			
Identification and assessment of new cases of alcohol use/dependence	0	10,468	10,468
Brief interventions and follow-up for alcohol use/dependence	0	102,225	102,225
Drug use/dependence			
Identification and assessment of new cases of drug use/dependence	0	9,244	9,244
Brief interventions and follow-up for drug use/dependence	0	55,463	55,463
Self-harm/suicide			
Assess and care for person with self-harm	0	574,362	574,362
MATERNAL NEWBORN AND REPRODUCTIVE HEALTH			
Family planning			
Pill - Standard daily regimen	15,404,039	16,998,762	32,402,801
IUD - Copper-T 380-A IUD (10 years)	2,511,313	31,766,435	34,277,748

Clinical services provided at PHC Level	Drug & Supplies Costs (KD, 2019)	Health Providers Costs (KD, 2019)	Total Costs (Drugs & Supplies and Providers)
Withdrawal	0	0	0
Pregnancy Care			
Tetanus toxoid (pregnant women)	421,601	8,345,540	8,767,141
Basic ANC	0	22,254,773	22,254,773
Pregnancy care - Treatment of pregnancy complications			
Hypertensive disorder case management	2,406	177,404	179,810
Childbirth care - Facility births			
Pre-referral management of labour complications	2,406	177,404	179,810
Postpartum care - Other			
Treatment of postpartum haemorrhage	579,201	7,149,556	7,728,757
Other sexual and reproductive health			
Treatment of urinary tract infection (UTI)	1,054,557	7,324,003	8,378,560
Treatment of syphilis	7,229	8,687	15,916
Treatment of gonorrhoea	883	5,677	6,560
Treatment of chlamydia	19,637	29,007	48,644
Treatment of trichomoniasis	6,438	77,116	83,554
Treatment of PID (Pelvic Inflammatory Disease)	56,639	54,673	111,311
General Practice			
General Practice	2,199,917,809	954,726,609	3,154,644,419
Oral Care and Cancer			
Dental cleaning and preventive care	0	93,885,709	93,885,709

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

Clinical Services	Reference / Assumption
IMMUNIZATION	
Measles vaccine	MOH Statistical Yearbook 2019
Pentavalent vaccine	
Varicella vaccine	Assumption based on current CR (Immunization)
Polio vaccine	MOH Statistical Yearbook 2019
BCG vaccine	
Rubella vaccine	
Pneumococcal vaccine	
HPV vaccine	Assumption: 5.0%
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 MOH Statistical Yearbook 2019 (PHC Chronic Diseases Clinics)
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	KSA World Health Survey (Self-Reported)
Treatment of cases with rheumatic heart disease (with benzathine penicillin)	Estimation based on UHC Service Coverage Sub-Index on NCDs (WHO)
Standard Glycemic control	Estimation based on MOH Statistical Yearbook 2019 (PHC Diabetes Clinics)
Intensive Glycemic control	
Neuropathy screening and preventive foot care	

Clinical Services	Reference / Assumption
Breast Cancer	
Basic breast cancer awareness	Assumption: 5.0%
Screening: Clinical Breast Examination	Assumption based on Bahrain CR
Screening: Mammography	KSA World Health Survey (Self-Reported)
Diagnosis: Screened with clinical breast exam	Estimation based on breast cancer incidence (WHO IARC 2020)
Diagnosis: Screened with mammogram	
Post-treatment surveillance for breast cancer patients	Estimation based on UHC Service Coverage Sub-Index on NCDs (WHO)
Cervical Cancer	
Papanicolaou test (Pap smear)	KSA World Health Survey (Self-Reported)
Post treatment surveillance for cervical cancer	Estimation based on UHC Service Coverage Sub-Index on NCDs (WHO)
Colorectal Cancer	
Screening: Fecal occult blood testing	Estimation based on Ajumah and Aljebreen (2017)
Screening: Sigmoidoscopy	
Screening: Colonoscopy	
Diagnosis for colorectal cancer screened with FOBT	Estimation based on breast cancer incidence (WHO IARC 2020)
Diagnosis without screening for colorectal cancer (symptom based)	
Post treatment surveillance for colorectal cancer	Estimation based on UHC Service Coverage Sub-Index on NCDs (WHO)
RESPIRATORY DISEASE	
Asthma: Inhaled short acting beta agonist for intermittent asthma	Estimation based on MOH Statistical Yearbook 2019 (PHC Chronic Disease Clinics)
Asthma: Low dose inhaled fluticasone + short-acting beta-agonists (SABA)	
Asthma: High dose inhaled fluticasone + SABA	
Asthma: Theophylline + High dose inhaled fluticasone + SABA	
Asthma: Oral Prednisolone + Theophylline + High dose inhaled fluticasone + SABA	
Chronic obstructive pulmonary disease (COPD): Smoking cessation	
COPD: Inhaled salbutamol	
COPD: Low-dose oral theophylline	
COPD: Ipratropium inhaler	
COPD: Exacerbation treatment with antibiotics	
COPD: Exacerbation treatment with oral prednisolone	
COPD: Exacerbation treatment with oxygen	

Clinical Services	Reference / Assumption
EMERGENCY CARE	
Average annual emergency care needs	N/A
CHILD HEALTH	
General Health (Children)	MOH Statistical Yearbook 2019
Zinc supplementation	Estimation based on UHC Service Coverage Index (WHO)
Diarrhoea management	
ORS	
Zinc (diarrhea treatment)	Estimation based on UHC Service Coverage Index (WHO)
Antibiotics for treatment of dysentery	
Treatment of severe diarrhea	
Pneumonia	
Pneumonia treatment (children, mild cases)	Estimation based on UHC Service Coverage Index (WHO)
Treatment of severe pneumonia	
NUTRITION	
Women of reproductive age and adolescent girls	
Intermittent iron-folic acid supplementation	Estimation based on Al-Mothaited et al. (2021) and Alreshidi et al. (2018)
Pregnant and lactating women	
Daily iron and folic acid supplementation (pregnant women)	Estimation based on Al-Duraibi and Am-Mutawa (2020)
Intermittent iron and folic acid supplementation (non-anaemic pregnant women)	
Vitamin A supplementation in pregnant women	Estimation based on Azzeh and Refaat (2020)
Iodine supplementation in pregnant women	
Adults	
Care for adults with low BMI	Assumption based on Bahrain Coverage Rate (CR)
Children	
Breastfeeding counselling and support	Estimation based on UHC Service Coverage Sub-Index on MNCH (WHO)
Complementary feeding counselling and support	
Management of moderate acute malnutrition (children)	Estimation based on UHC Service Coverage Index (WHO)
MENTAL HEALTH	
Anxiety Disorders	
Basic psychosocial treatment for anxiety disorders (mild cases)	Assumption: 1.0%
Basic psychosocial treatment and anti-depressant medication for anxiety disorders (moderate-severe cases)	

Clinical Services	Reference / Assumption
Depression	
Basic psychosocial treatment for mild depression	
Basic psychosocial treatment and anti-depressant medication of first episode moderate-severe cases	Assumption: 1.0%
Psychosocial care for peri-natal depression	
Psychosis	
Basic psychosocial support and anti-psychotic medication	Assumption: 1.0%
Bipolar disorder	
Basic psychosocial treatment, advice, and follow-up for bipolar disorder, plus mood-stabilizing medication	Assumption: 1.0%
Epilepsy	
Basic psychosocial support, advice, and follow-up, plus anti-epileptic medication	Assumption: 1.0%
Developmental disorders	
Basic psychosocial treatment, advice, and follow-up for developmental disorders	Assumption: 1.0%
Conduct disorders	
Basic psychosocial treatment, advice, and follow-up for behavioural disorders	Assumption: 1.0%
Dementia	
Assessment, diagnosis, advice, and follow-up for dementia	Assumption: 1.0%
Alcohol use/dependence	
Identification and assessment of new cases of alcohol use/dependence	
Brief interventions and follow-up for alcohol use/dependence	Assumption: 1.0%
Drug use/dependence	
Identification and assessment of new cases of drug use/dependence	
Brief interventions and follow-up for drug use/dependence	Assumption: 1.0%
Self-harm/suicide	
Assess and care for person with self-harm	Assumption: 1.0%
MATERNAL NEWBORN AND REPRODUCTIVE HEALTH	
Family planning	
Pill - Standard daily regimen	
IUD - Copper-T 380-A IUD (10 years)	KSA World Health Survey
Withdrawal	

Clinical Services	Reference / Assumption
Pregnancy Care	
Tetanus toxoid (pregnant women)	Estimation based on KSA World Health Survey
Basic ANC	
Pregnancy care - Treatment of pregnancy complications	
Hypertensive disorder case management	Assumption: 100%
Childbirth care - Facility births	
Pre-referral management of labour complications	Assumption: 100%
Postpartum care - Other	
Treatment of postpartum haemorrhage	Assumption: 100%
Other sexual and reproductive health	
Treatment of urinary tract infection (UTI)	Estimation based on UHC Service Coverage Sub-Index on MNCH (WHO)
Treatment of syphilis	
Treatment of gonorrhoea	
Treatment of chlamydia	
Treatment of trichomoniasis	
Treatment of PID (Pelvic Inflammatory Disease)	
General Practice	
General Practice	MOH Statistical Yearbook 2019
Oral Care and Cancer	
Dental cleaning and preventive care	MOH Statistical Yearbook 2019

Annex 4: Interventions of the New Models of Care Programme, by the six systems of care

Source: Kingdom of Saudi Arabia, Ministry of Health. Health Sector Transformation Strategy. V.3.

