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TECHNICAL REPORT

Rapid assessment of the service delivery and health systems challenges in emerging priority areas in the Middle East

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Acronyms

ACE	Angiotensin-converting enzyme
ACS	Acute coronary syndrome
ACSC	Ambulatory case sensitive conditions
ACSHs	Ambulatory case sensitive hospitalizations
AMI	Acute myocardial infarction
ASSIST	USAID Applying Science to Strengthen and Improve Systems Project
BP	Blood pressure
CC	Calcium channel
CME	Continuing medical education
COPD	Chronic obstructive pulmonary disease
CPD	Chronic pulmonary disease
CVD	Cardiovascular disease
D/K	Don't know
DALY	Disability-adjusted life year
EGY	Egypt
EMRO	WHO Eastern Mediterranean Regional Office
GBR	Great Britain
GDP	Gross domestic product
GHED	Global health expenditure database
GHO	Global Health Observatory
GMF	Global monitoring framework (for NCDs)
Hb	Hemoglobin
HHD	Hypertensive heart disease
HPV	Human papillomavirus
HSPA	Health system performance assessment
HSS	Health system strengthening
HTN	Hypertension
IHD	Ischemic heart disease
IHR	International health regulations
IPCHS	Integrated People-Centered Health Services
IRQ	Iraq
JEE	Joint external evaluation
JOR	Jordan
LBN	Lebanon
LBY	Libya
MAR	Morocco
ME	Middle East
MONA	Morphine, oxygen, titrated nitrate and aspirin
NCD	Non-communicable diseases
NGO	Non-governmental organization
NHPS	Nutrition, Health and Population Statistics (World Bank)
NR	No response
NRT	Nicotine replacement therapy
OECD	Organization of Economic Cooperation and Development
OOP	Out-of-pocket
PSE	Palestine
SARA	Service Availability and Readiness Assessment
SDGs	Sustainable development goals
STEPS	STEPwise approach to Surveillance (WHO)
SYR	Syria
TCH	Total cholesterol
TUN	Tunisia
UK	United Kingdom

UN	United Nations
UNDP	United Nations Development Program
UNHCR	United Nations High Commission on Refugees (UN's Refugee Agency)
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNRWA	United Nations Relief and Works Agency for Palestine Refugees
USA	United States of America
USAID	United States Agency for International Development
VIA	Visual inspection with acetic acid
WHO	World Health Organization
YEM	Yemen
YLD	Years lived with disability
YLL	Years of life lost

EXECUTIVE SUMMARY

Similar to global trends, the Middle East (ME) region has experienced a rise in premature deaths and disability from non-communicable diseases (NCDs), including cardiovascular disease, diabetes, chronic respiratory illness and cancer. In 2014, NCDs were responsible for an estimated 70% of total deaths and over 20% of premature deaths in the region. The increased burden of NCDs – their cross-cutting behavioral risk factors (including tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol) and associated premature morbidity and mortality – have devastating human, social and economic consequences. In terms of disability-adjusted life years (DALYs), the burden from NCDs in the Middle East far exceeds that of other causes. Death and disability together exact high costs on individuals, families, and communities because of a reduced and weakened workforce, increased health care costs, and associated catastrophic health expenses. In addition, NCDs negatively affect outcomes in other priority areas, including maternal, child and young adult health.

There is a strong and growing body of evidence that suggests an interaction between NCDs and maternal health. Poor nutrition, high blood pressure, gestational diabetes, alcohol consumption and tobacco exposure increase the risk of adverse outcomes of pregnancy and maternal health. Maternal malnutrition increases intergenerational transmission of cardiovascular disease (CVD) risk factors: if a woman is overweight or underweight during pregnancy, it increases the risk of CVD for the child later in life. Maternal pre-existing and gestational diabetes increases the risk of a large baby, obstructed labor, and newborn asphyxia, one of the leading causes of newborn mortality.

Smoking, a risk factor for CVD, greatly increases a woman's chance of complications during pregnancy and can have negative health effects on her developing fetus. Smoking during pregnancy increases a child's risk of dying within the first week of life, and exposure to secondhand smoke during pregnancy increases by 23% the risk of stillbirth. Even exposure to secondhand tobacco smoke increases the risk of life-threatening delivery complications and increases the chance of the mother and her children developing diabetes later in life. Secondhand smoke also affects the health of other children in the home: the World Health Organization (WHO) estimates that secondhand smoke contributed to 1,151,467 DALYs lost and 32,289 deaths among children under five years of age in the WHO Eastern Mediterranean Region from lower respiratory tract infections alone (2004).

Although there is limited data on the prevalence of NCDs among young adults in Middle East countries, NCD cross-cutting risk factors are highly prevalent. For example, over 80% of Jordanian young adults are physically inactive (2014), 28.8% of the population 18-34 years old is overweight, 18.2% is obese, 4.5% suffers from hypertension, 6.4% suffers from diabetes, and 5.2% has high cholesterol. Young adults, representing a significant share of the population in the Middle East, will be heavily responsible for future economic and social development. Hence, the increased prevalence of chronic diseases and their risk factors among the youth population will negatively impact the future productivity and economic growth of Middle East countries.

Addressing the growing burden of NCDs in the context of emergencies is the critical area of concern in the ME region. The Eastern Mediterranean Region hosts more than half of the world's refugees and has the largest number of displaced persons. Displaced populations in the ME often suffer from various health challenges associated with their displacement including: trauma, injury, communicable diseases, mental health disorders, exposure to violence, etc. The health needs of displaced populations are further complicated by their mobility and are constantly changing as their context shifts (leave home, in transit, settle at destination location). The burden of NCDs is increased in this situation: displaced persons often managed chronic conditions present in their home country, but find management of these conditions more difficult during the migration or forced displacement because of destruction of key health infrastructure, such as access to chronic care medications; inability to maintain contact with regular primary care providers; lack of financial resources to procure health care services and chronic medications; degradation of living conditions; stress and psychological effects of displacement and other factors. Delayed care and lack of appropriate preventive and follow-up services may lead to life-threatening complications and subsequent need for costly treatment. Addressing these challenges requires strong, resilient health systems capable of responding to the health care needs of growing displaced populations.

Considering all of the above, NCDs place significant strain on Middle East countries to build resilient health systems that are able to sustainably improve the health of their populations (including displaced people) and reduce preventable mortality from current and emerging health priorities (including maternal and child death and premature mortality from NCDs).

The 2030 Sustainable Development Goals (SDGs) give prominence to NCDs in the global development agenda. They aim to reduce premature deaths from NCDs by one-third by 2030 (SDG target 3.4), strengthen the implementation of the WHO Framework Convention on Tobacco Control (SDG target 3.a), strengthen efforts to reduce the harmful use of alcohol (SDG target 3.5), support the research and development of medicines for NCDs that primarily affect developing countries (SDG target 3.b), and achieve universal health coverage (SDG target 3.8). The conceptual framework for non-communicable diseases and injuries (NCDI), developed by the United States Agency for International Development (USAID) Bureau for Global Health, also recognizes NCDs as "complementary to and not competitive with existing health priorities." According to Dr. Ariel Pablos-Méndez, USAID Assistant Administrator for Global Health, "USAID is identifying cost-effective interventions to address NCDs; win-win interventions for both the SDGs and the NCDs." It is increasingly clear that NCDs contribute to the outcomes of the USAID's existing health priorities; thus, addressing NCDs would advance and accelerate progress on maternal, newborn, and child health (MNCH), HIV/AIDS, family planning/reproductive health (FP/RH), tuberculosis (TB), and health systems strengthening (HSS).

Understanding the gaps in an effective health system response is an essential first step to strengthen the capacity of health systems to respond to emerging public health threats in the ME. In October 2016, USAID's Regional Bureau for the Middle East tasked the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project with conducting a research activity to rapidly assess the health system and service delivery challenges of emerging health priorities contributing to the highest disease burden and premature mortality in the ME. Considering the high prevalence of NCDs, their cross-cutting risk factors in the region and their devastating impact on population health (including their impact on USAID's existing health priorities), the objective of the rapid assessment was to explore the ability of existing health systems in the ME to address the growing burden of NCDs and to analyze the resiliency of the health systems.

This report presents the results of the rapid assessment of service delivery and health system challenges to address the growing burden of NCDs in the ME, conducted by a collaborative effort between the USAID ASSIST Project and WHO. The report starts with description of key objectives and the methodology of the rapid assessment (**Section I. Introduction** and **Section II. Methodology**). All information collected through the assessment is structured and presented without author's judgement under the **Section III. Key Findings**. The descriptive section is followed by **IV. Analysis**, which discusses the findings from different angles. Results of the discussion in the previous sections are synthesized in **Section V. Conclusions and Recommendations** followed by the main observations and suggestions to key stakeholders to improve regional and national strategies for strengthening health systems and service delivery in relation to NCD prevention and control. For health system resilience, areas for more substantive exploration are highlighted.

Purpose and Methodology

The study aimed to identify health system constraints (including service delivery gaps) in prevention, early detection and management of NCDs in ten Middle East focus countries: Egypt, Iraq, Jordan, Lebanon, Morocco, Palestine, Tunisia, Syria, Libya and Yemen.

In addition, this study included a discussion of the resiliency of health systems in the context of NCDs, given the ongoing violent conflict and other protracted emergencies in many of the study countries (Syria, Yemen, Libya, Palestine, Iraq) and the impact this has had on neighboring countries in terms of migrant influx, spillover violence, etc. Specifically, we looked at the ability of health systems to respond to health emergencies at the various levels of care (national, sub-national and facilities) using the health systems building blocks and other relevant factors; enablers and gaps in providing quality essential health services to general and target populations (e.g., refugees) during an emergency; and

coordination between different sector actors working to mitigate the health impact of an emergency (i.e., coordination mechanisms between international aid organizations and local health authorities).

With respect to clinical content, the rapid assessment focused on the areas contributing to the highest disease burden and premature mortality in the region in both general and in specific target populations (such as displaced populations). Consequently, the rapid assessment focused on prevention, early detection and care of the following priority clinical conditions:

1. Cardiovascular diseases (CVD)

2. Cancer

3. Diabetes

4. Mental health (depression)

An analytical framework was developed at an early stage in the study to define the assessment boundaries and methodology. The analytical framework mapped critical milestones that the health system should achieve, from preventing cross-cutting NCD risk factors and unhealthy behaviors to averting premature mortality from NCDs. Consequently, a results chain was drawn up containing a hierarchy of NCD prevention and control objectives. This process continued identifying critical health system and service delivery inputs at each level of the results chain and identifying and **prioritizing the indicators** to assess the service delivery and health system performance to achieve each NCD prevention and control milestone. The study frameworks underpinning the assessment, including data collection and analysis, are discussed in detail in section **II.B. Conceptual and Analytical Framework**.

All 25 indicators prioritized by the Global Monitoring Framework (GMF) for Prevention and Control of NCDs were selected for the analysis. To assess health system and service delivery performance according to the analytical framework of the study, multiple additional resources were reviewed and an additional 267 indicators were identified. To assess coverage or quality of high impact, cost-effective, individual-level clinical interventions for NCDs, we used the WHO Package of Essential NCD Interventions for Primary Health Care Settings and other emerging evidence.

A special Microsoft Excel-based tool was developed to prioritize and score the selected 267 indicators for the rapid assessment using the following criteria:

- **Importance** of an indicator for measuring:
  - individual-level, high-impact NCD services (within the health facility setting)
  - population-based, high-impact NCD services
  - national-level health system response

- **Practicality**: Usefulness of an indicator for the analysis of the NCD prevention- and control-related health system challenges (or relevance to answering the main questions of the rapid assessment)

- **Feasibility:** Availability and reliability of data for the indicator

Indicators (other than from the GMF) were scored against each criterion using three values: "1" if it met the criteria fully, "0" if it met the criteria partially, "-1" or (blank space) if it the indicator did not meet the criteria. To avoid missing important measures because of data availability, the total score for each indicator was calculated for all criteria except feasibility: it was decided to reassess each indicator after the desk review (collection of quantitative information from available secondary data sources) and prioritize indicators based on the assumption that data is available publicly.

Indicators scored 1 or higher were prioritized and considered for the analysis; in total, 219 measures were selected. Selected measures were further described by assigning values for several attributes such as: a) clinical focus area; b) origin (data source); c) health system components (including health system building blocks); d) service delivery domains (availability, access, coverage and utilization, quality, and equity); e) result level (corresponding to the results chain levels); and f) measurement blocks to link indicators to the analytical model.

The selection was completed by preparing a data collection matrix for each of the 10 countries that included three sets of columns for each selected indicator: one for baseline data, years, and comments; another for more recent measurements; and a third set (of three similar columns) specifically for refugees or internally displaced populations.

Data Collection

Data was collected through a desk review and key informant interviews (in-depth, semi-structured interviews). The primary purpose of the desk review was to extract quantitative information from global, regional or national technical/statistical reports to describe the NCD prevention and control trends in the ME and the related health system and service delivery performance using the 219 selected indicators. Quantitative data were complemented with qualitative information obtained through the desk review to explore issues related to health system resilience and interpret preliminary findings.

The desk review was completed by filling in a health systems and service delivery measurement matrix for all 10 countries, consisting of the pre-selected 219 rapid assessment indicators and columns for baseline and the most recent values (whenever possible). This exercise informed the design of key informant interviews for each country by:

- Identifying preliminary findings to be validated

- Identifying data gaps, which can be addressed (partially) and or validated (assuming that the key informants might share some additional statistics/information not available during the desk review)

Key informant interviews served to obtain qualitative information on the current situation and trends in the health system and service delivery challenges concerning NCD prevention and control in each country:

- A set of common (non-country specific) questions was developed during the desk review in parallel to the quantitative data collection.

- In addition to the common questions, the interview guides were comprised of country-specific questions elaborated after completing the desk review exercise (as described above).

A preliminary list of potential key respondents was analyzed in terms of their role in NCD prevention and control and key interview guides were customized further according to their role (e.g., government representative, development partner/donor representative, NCD focal point, primary health care focal point, etc.). Key informant interviews were conducted via Skype or phone. Interviews were recorded and transcripts prepared for processing and analysis.

Key Findings and Analysis

The assessment results revealed a lack of essential information on most of the indicators prioritized through the assessment methodology. The data gaps were particularly evident on quality and coverage of NCD prevention and treatment practices and their outcomes (incidence and prevalence of NCDs and their complications); effectiveness of implementation of national policies targeting prevention and control of NCDs; understanding knowledge, attitude and practices of patients and communities regarding NCDs and their risk factors; and health care needs of refuges and other target populations.

While the nature of the rapid assessment and the data gaps precluded us from a comprehensive assessment of the key service delivery and health system challenges, a few important observations emerged from this exploratory effort:

NCD burden and premature mortality:

Between 2005 and 2015, the burden of selected NCDs (CVD, cancer, diabetes, mental health/depression) only decreased in Morocco and Egypt. It stayed more or less the same in Jordan while increasing in the remaining countries, as show in the figure below.

Figure 5: Summary of disease burden: disability adjusted life years (DALYs) by priority diseases, by country and year
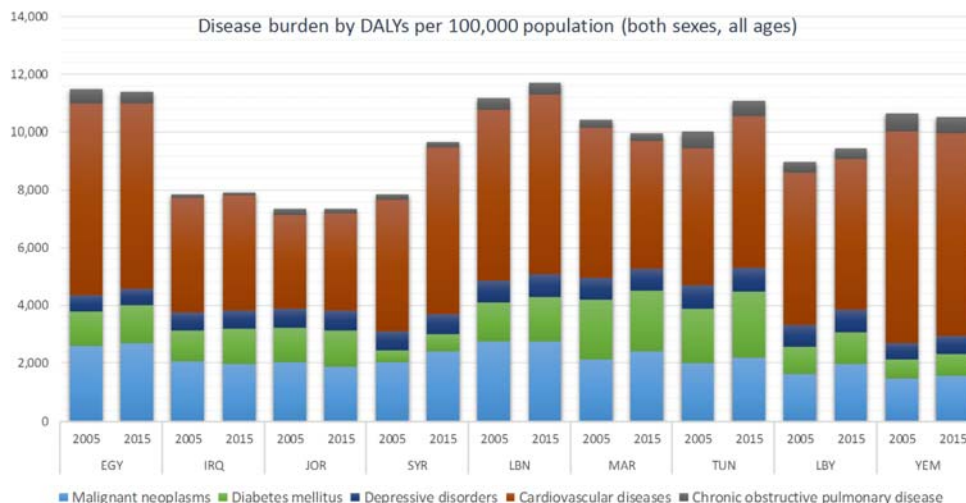
Source: WHO Global Health Estimates 2016

Between 2012 and 2015, mortality between ages 30 and 70 from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases increased in Lebanon, Libya, Syria, and Yemen and decreased slightly in Egypt, Jordan, Iraq, and Tunisia. Only Morocco showed a significant decrease.

While the nature of the rapid assessment and the data gaps precluded us from a comprehensive assessment of the key service delivery and health system challenges, a few important observations emerged from this exploratory effort:

The assessment revealed that some countries (e.g., Lebanon, Jordan, Morocco) are more likely to be effective in reducing mortality from NCDs (YYLs) while maintaining a relatively high level in years of living with disabilities. This fact, together with high prevalence of risk factors and NCDs in the region, suggests that these countries were successful in treatment of NCDs while they are ineffective in their efforts to prevent NCDs and their risk factors.

Transformational action is required to shift from this heavy focus on the treatment of NCD services rather than on prevention of developing NCDs since treatment without prevention efforts may save lives, but it creates a significant health and economic burden for patients, their families and society.

Service delivery:

There was a heavy focus on treatment services for NCDs with relative progress in managing NCDs (e.g., Lebanon, Jordan, Morocco), but efforts to prevent NCDs and their risk factors at the primary care level have largely been ineffective. A low level of use of primary care services also impedes the possibility to provide NCD screening and preventative care at this level of care. In addition, there has
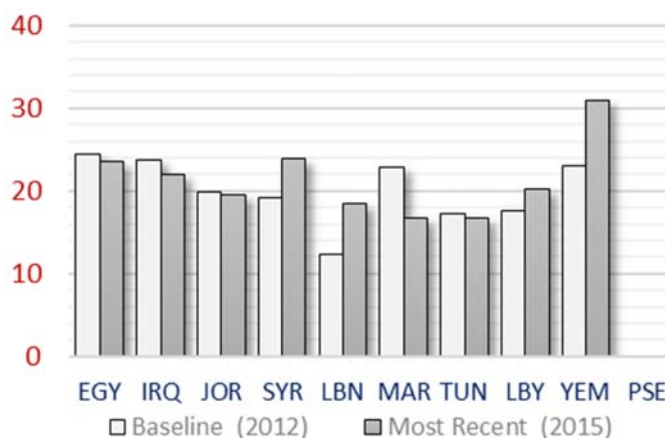
been a reduction in the number of primary care facilities, and a deterioration in condition in those that remain, in conflict-affected countries and regions.

The study also revealed gaps in coverage and quality of high impact maternal and child care and nutrition services and skilled birth attendance (e.g., antenatal care coverage, early initiation and exclusive breastfeeding, syphilis testing), particularly in rural settings (except Jordan). However, there is an overall positive trend in the reduction of maternal (except Yemen) and newborn mortality (except Yemen, Iraq and Morocco). There is a substantial missed opportunity to integrate NCD and MCH services, particularly at the primary care level (e.g., use home visiting/community health services for mothers and children for depression screening and child/family violence prevention programs).

Selected clinical area-specific gaps:

An inability to stratify cardiovascular risks during primary care visits in most of the surveyed countries (except Lebanon) creates a substantial challenge to service delivery systems of surveyed counties to prevent development of heart attack and stroke; major killers among the adult population of the ME. Poor screening practices are also manifested in limited availability of NCD risk factor screening and counselling practices, including tobacco cessation and counselling, at the primary health care (PHC) level in all countries, limited availability of mammography in several counties, with unknown (likely very low) coverage of target groups, and limited cervical cancer screening programs in all countries (except Morocco).

Similarly, limited availability of secondary prevention practices for rheumatic fever and heart disease in most countries (except Jordan, Lebanon and Morocco) and acute stroke care and rehabilitation create a challenge for the health service delivery system to prevent disease complications, disability and premature death from these high-burden clinical conditions. Gaps in curative services were also manifested in poor coordination and lack of multidisciplinary management of cancer patients (e.g., in Jordan) and limited capacity and poor organization of outpatient mental health services between levels of care (e.g., outpatient vs. inpatient) in most countries (except Lebanon).

Essential NCD medications:

There was no coverage of nicotine replacement therapy, tobacco cessation counselling and cancer pain relief medications (at PHC level) in most countries. The poor coverage in these countries was coupled with occasional delays in the delivery of essential medications (including for chronic NCDs) at PHC facilities and irrational use and prescription of medications in Jordan (data lacking in other countries).

Policy and governance:

Most countries demonstrated strong national leadership to integrate NCDs into national policies and strategies. Although only a few countries lack multi-sectoral policies targeting reduction of behavioral risks or exposure to common risk factors of NCDs, there is a little evidence demonstrating whether or not health systems succeed in implementing these policies and achieving desired results in the counties where national policies were available (e.g., reduced tobacco use). In addition, parallel, vertical pathways of implementation of policies and guidelines for the general population and forcibly displaced individuals, as well as for public and private facilities, impede effective and efficient national NCD responses in general and specific target populations.

Gaps in effective policy implementation were also manifested in the limited uptake and use of the existing guidelines for NCDs (except for Syria, Yemen and Palestine); variable health system capability to recognize and respond to emerging challenges (as measured by six criteria), with Jordan, Morocco and Tunisia ranking highest; and relatively weak cross-sectoral coordination across all surveyed countries.

Health financing:

Most surveyed countries lack sustainable government funding to support emerging health priorities, including growing costs associated with NCDs. Syria, Egypt, Morocco and Yemen have high out-of-pocket (OOP) expenses as a percentage of total expenditure on health. Furthermore, a high

proportion of the population of most countries (>25%) are not financially protected from impoverishment as the result of illnesses, so they are at a high risk of catastrophic expenditures for surgical care (except Iraq and Jordan).

In terms of financing essential NCD services, all countries report good coverage with Hepatitis B vaccination (except Syria, Iraq and Yemen). Coverage was limited for NCD screening, and diagnostic services through population-based screening programs (such as cervical cancer screening program), are lacking in all countries (except Morocco with <10% coverage).

The absence of palliative care in most of countries and unknown coverage in others together with no access to oral morphine in the public health sector also represents important gap in coverage with essential services and medications.

Health workforce:

The assessment found a shortage of primary care physicians and certain specialists in most of the surveyed countries (e.g., shortage of qualified mental health specialists in Morocco, Yemen, Syria and Iraq) combined with presumably uneven distribution between urban and rural areas. The health workforce of the studied ME countries also lacks a regular schedule of continuing medical education (CME) to update skills; CME and other trainings, where they exist, are mostly supported by donors.

Data systems:

The study found a lack of strategic information, particularly at the service delivery level, to inform the national/regional NCD response and health system strengthening (detailed information of data availability by measurement blocks, by health system building blocks, and by country is provided in the **Annex**).

At the population level, the study revealed good availability of population-based cancer registries in all countries (except Iraq and Syria) but limited availability of other NCD registries (except diabetes registry in Iraq and Jordan). At the population level, no stepwise approach to surveillance (STEPS) or other NCD risk-factor surveys are also conducted on a routine basis in most of surveyed countries.

Whenever data are available, they are fragmented, particularly in conflict areas, and poorly integrated into the national health management information systems.

Patient/family and community engagement:

While data on patient, family and community engagement in NCD prevention and control efforts were generally lacking in surveyed countries, the assessment found low utilization of primary care services and pneumonia case-seeking behavior and composite coverage of reproductive, maternal, newborn, child and adolescent (RMNCHA) health services, particularly in the rural settings of Egypt, Iraq, Tunisia and Yemen.

Conclusions and Recommendations

Based on the results of this rapid assessment, we recommend several lines of action to strengthen prevention, early detection and management of NCDs in ten Middle East focus countries:

- **National policy and a focus on quality**: There is a need to refine existing national policies and align them with an integrated approach to service delivery, health systems strengthening and health emergencies. Establishing proper programmatic, financial, regulatory and other policy implementation and evaluation tools and mechanisms is also crucially important. Special focus is required to reduce modifiable risk factors for NCDs and underlying social determinants through creation of an enabling environment for health promotion on one hand and improving quality of NCD prevention, early detection and care at the primary health care level on the other.

- **Multi-sectoral approach**: Establish multi-sectoral coordination mechanisms within countries and regionally to effectively prevent, detect and respond to potential threats; and identify joint ways of improving both the software (guidelines, protocols, processes) and the hardware (coordination, infrastructure) of health system resilience.

- **Package of essential services and medications**: It is important to further explore the basic benefit package, accounting for quality of care and with a focus on NCDs, for all populations, including forcibly displaced persons. While sustainable funding mechanisms are needed to increase physical and financial access to essential services for priority diseases, efforts need to be directed to integrate public funding, donor financial support, and innovative financing mechanisms (including public-private partnerships). On the other hand, there is a need to increase effectiveness and cost-effectiveness of government investments by integrating high-impact, cost-effective services for the prevention, timely diagnosis and management of priority diseases in publicly funded health care programs and insurance schemes. Given that many essential outpatient medicines (e.g., oral morphine, statins, nicotine replacement therapy) are not available or not covered, it is critically important to integrate essential outpatient medicines for prevention and treatment of priority acute and chronic conditions in the National List of Essential Medications to address limited treatment compliance caused by limited financial access to essential medications. For improved access to essential outpatient medicines, countries could also establish effective cost-containment and rational medication use strategies (including but not limited to supporting the prescription of generic medications through different regulatory and financial tools, improving rational medication prescription practices through capacity-building of medical personnel, and supporting patient education activities at population and facility levels).

- **Primary care**: Strengthening primary health systems requires reorienting care models and creating integrated, people-centered service delivery models that engage the people and community in the design, delivery and evaluation of health services and systems in the affected countries.

- **Quality and clinical effectiveness of health services**: An integrated effort is needed by the government and donor community to invest in continuous quality improvement (QI) in health service delivery settings. This is done by supporting facility QI teams to assess the quality of care for priority clinical conditions and continuously plan, implement, routinely monitor and refine changes in their health care processes to address the gaps in quality of care. Considering the critical gaps in data availability (and consequently, data use), investments need to be made to support generation, collection and use of clinical data for routine quality monitoring through capacity building in data analysis and use at all levels of health system and integration of key QI indicators for prevention and management of priority NCDs in standard medical documentation, routine reporting forms, and the national Health Management Information System (HMIS).

- **Compliance with evidence-based clinical practices:** enhanced efforts are needed to improve access to and use of evidence-based medical information by care providers. It is particularly important to support professional associations in continuous development/adaptation of evidence-based medical information applicable for local settings and provide regular support to their peers to improve their knowledge and compliance with evidence-based clinical practices. The development of proper supporting mechanisms is also required at local (e.g., district, regional) levels to provide continuous supportive supervision, coaching and clinical/improvement skills-building of health facility teams and promote shared learning on effective improvement practices at each and between different levels of care.

- **Capacity building for health workers**: To improve professional knowledge, skills and practices of human resources in screening, management and counseling of high-burden clinical conditions, enhanced efforts are needed to integrate updated recommendations on evidence-based care of these diseases into all pre-service, post-diploma and continuous professional development for health providers, pharmacists, health administrators and public health providers, through close involvement of respective professional associations. In addition to supporting increased participation of medical personnel in continuous professional development programs through different regulatory and/or financial tools, some countries need to invest in human resources for health to address critical shortages of primary care and mental health professionals, particularly in rural settings. For timely and effective emergency responses, where applicable, focus is needed on designing, developing and executing emergency training programs for frontline workers, with emphasis on refresher courses to sustain skills gained.

- **Community engagement**: Addressing service delivery and health system challenges in emerging priority areas in the ME requires a strong health systems approach. Building resilient health systems that respond to the needs of people at risk of or living with NCDs, displaced populations, conflicts and emergencies, requires developing the capacity for continuous improvement at all levels of the health system and enhancing patient, family and community engagement.

- **Data systems**: Fundamental investments are also needed to improve data systems and the improve the capacity to generate, collect, analyze and use data to address the growing burden of NCDs and their devastating socio-economic consequences. It is critically important to routinely monitor tendencies in the burden of disease and mortality caused by priority clinical conditions and evaluate the effectiveness of their prevention, early diagnosis, and management practices at the service delivery level. Efforts must be specifically directed to:

  o define national targets for prevention and management of priority clinical conditions in compliance with national priorities, global targets, and monitoring frameworks;

  o integrate these targets and their assessment indicators into the national Health Management Information System;

  o promote routine generation, collection, analysis, and use of data;

  o periodically plan and implement population- and facility-level studies to assess prevention, screening, and management practices along with investments in disease registries for priority NCD conditions;

  o improve quality of vital statistics and registration of mortality causes; and

  o strengthen human and institutional capacity for generation, analysis and data use.

- It is particularly essential to address data gaps in following areas:

  o **Quality and coverage of NCD prevention and control services and NCD care outcomes:** While several standardized tools are available for these purposes, for long-term sustainability it is essential to incorporate (or update) NCD modules into relevant facility and population-based surveys such as DHS2, SARA, SPA, STEP and the routine HMIS. These assessments should also focus on understanding patients' experiences of care; knowledge, attitudes and practices to manage/modify chronic NCDs; and underlying health behaviors.

  o **Health care needs of displaced population:** Properly addressing the health needs of migrants and forcibly displaced populations improves health, facilitates their integration into local communities, and contributes to achieving sustainable development goals in the host country (goals 3.8 and 10.7) to ensure "healthy lives for all and to leave no one behind".

  o **Health service resilience and health security in the ME region**: More substantive research is needed to further explore resiliency of health systems in the context of emerging health priorities and health security.

- Analytical frameworks, together with indicator mapping and prioritization tool developed as part of this assessment could help Middle Eastern countries and others to systematically and comprehensively assess service delivery and health system challenges and opportunities throughout continuum of care for major NCDs and depressive disorders and adapt it to local settings/priorities. Aligned with the global monitoring framework and consistent with the available evidence around high impact, "best buy" NCD prevention and control practices, the tool proposes standardized measures throughout the NCD prevention and control continuum. On the other hand, data gaps identified and systematized for each dimension of the results chain within the assessment could help countries to easily identify, prioritize and, consequently, address data availability.

To summarize study findings, investments in three major areas are particularly essential:

- improving integrated maternal, child, adolescent care and NCDs;

- strengthening data systems, particularly around coverage and quality of care for priority NCDs and their clinical outcomes; and

- understanding and systematically addressing the needs of displaced populations.

USAID has successfully implemented QI programs and built the QI capacities of care providers and managers in many different countries and across several clinical content areas (e.g., MNCH, FP, HIV/AIDS, TB, nutrition). Due to their potential contribution as indirect causes of maternal morbidity and mortality, there is a strong rationale for addressing the needs of mothers with pre-existing co-morbid disorders, such as cardiac and endocrine disease (including hypertension and gestational diabetes) through an integrated primary care approach. The package of priority clinical interventions supported by USAID could be expanded to incorporate high-impact NCD services.

The evidence of effectiveness of priority NCD clinical interventions clearly demonstrates the potential positive impact of the investment on averting NCD-related disability and death, as well as reducing disease burden and associated costs. Investment in NCDs fully aligns with the Global Health Initiative's principles; especially those on integration, partnerships and private sector engagement, country ownership, health systems strengthening, and focus on women and girls. In particular, investment in NCDs supports USAID's efforts to eliminate extreme poverty and prevent child and maternal deaths and will accelerate progress towards achieving the SDGs.

I. INTRODUCTION

A. Background and Objectives of the Rapid Assessment

Similar to global trends, the Middle East (ME) region has experienced a rise in premature deaths and disability from non-communicable diseases (NCDs), including cardiovascular disease, diabetes, chronic respiratory illness and cancer. In 2014, NCDs were responsible for an estimated 70% of total deaths and over 20% of premature deaths in the region (1). The increased burden of NCDs, their cross-cutting behavioral risk factors (including tobacco use, unhealthy diets, physical inactivity and harmful use of alcohol) and associated premature morbidity and mortality have devastating human, social and economic consequences. In terms of Disability Adjusted Life Years (DALYs) (1), the burden from NCDs in the Middle East far exceeds that from other causes. Death and disability are together exacting high costs on individuals, families, and communities as a result of a reduced and weakened workforce, increased health care costs, and associated catastrophic health expenses. It is estimated that low- and middle-income countries will spend 2% of their GDP on the management of cardiovascular diseases alone from 2011–2025 (an average 250 billion USD annually). Treatment for NCDs, including medications, are estimated to represent the largest share of total health expenses. The direct cost of managing diabetes, hypertension, and dyslipidemia in Jordan, for example, reached JD 654 million (about USD 924 million) in 2004 and has been continuously increasing in recent years. WHO reports, "The increasing cost of treating NCDs, compounded by the increased burden from the Syrian refugee crisis, are significantly straining the health system and threaten to negatively impact the economy." (1)

The economic impacts of NCDs are also seen at the individual and community levels. Those affected, especially the poor and disadvantaged, fall deeper into poverty or are unable to climb out of poverty. Children are robbed of their caretakers and resources for food and education. Workplaces suffer from lost workforce productivity, high workplace turnover, and absenteeism. At the national level, this contributes to the depletion of health budgets and increased health inequalities. As the poor and disadvantaged have less access to health care and are more likely to have to pay for it out of pocket, they get sicker and die sooner; thereby, increasing health inequalities and slowing down countries' abilities to achieve the Sustainable Development Goals (SDGs), especially those related to ending poverty in all its forms everywhere, ensuring inclusive and equitable quality education, and assuring good health and well-being for all (141).

In addition to their direct human and economic consequences, NCDs negatively affect outcomes of other priority areas, including maternal, child and young adults' health. Limited access to healthy lifestyle and nutrition choices contribute to child deaths; nutrition-related factors are responsible for over 35% of child deaths. Maternal malnutrition increases intergenerational transmission of cardiovascular disease (CVD) risk factors: if a woman is overweight or underweight during pregnancy, it increases the risk of CVD for the child later in life. Maternal pre-existing and gestational diabetes increase the risk of a large baby, obstructed labor, and newborn asphyxia, which is one of the leading causes of newborn mortality. Untreated type I diabetes is universally fatal if untreated, with a life expectancy of less than one year, and type II diabetes is now seen increasingly in children in all resource settings. Smoking during pregnancy increases the risk of the infant dying within the first week of life. Exposure to secondhand tobacco smoke during pregnancy increases the risk of stillbirth by 23%, giving birth to a child with a congenital malformation by 13%, and having an infant with a low birth weight and smaller-than-normal head circumference.

Exposure to secondhand tobacco smoke is also a significant contributor to child death and disability. Globally, 40% of children are exposed to secondhand smoke. It contributes to the loss of 6.6 million disability adjusted life years (DALYs) and 166,000 deaths among children annually — that is 61% of all DALYs and 28% of deaths associated with exposure of secondhand smoke in all age groups. WHO estimated that due to lower respiratory tract infections alone, secondhand smoke contributed to 1,151,467 DALYs lost and 32,289 deaths among children under five years of age in the WHO Eastern Mediterranean Region. Considering the increased smoking prevalence since 2004, the potential negative impact of secondhand smoke on children could be much higher now.

Similarly, there is a strong and growing body of evidence that suggests an interaction between NCDs and maternal health. High blood pressure, gestational diabetes, alcohol consumption, and tobacco exposure increase the risk of adverse outcomes of pregnancy and maternal health. Smoking, a key risk factor for CVD, greatly increases the chance of complications during pregnancy for women. Exposure to secondhand tobacco smoke is another major contributor to women's premature death and disability. Globally, secondhand smoke contributes to 2.6 million DALYs lost and 281,000 deaths among women—24% of all DALYs and almost a half (47%) of all deaths associated with exposure to secondhand smoke globally. Considering the increased smoking prevalence since 2004, the potential negative impact of secondhand smoke on women could now be much higher. Unhealthy eating habits also factor into maternal mortality, with iron deficiency contributing to about 115,000 maternal deaths a year. Preexisting and gestational diabetes is also associated with life-threatening delivery complications, as well as increased chances of the mother and her children developing diabetes later in life. With regards to cancer, prevention and treatment of those cancers that commonly affect women of reproductive age (such as breast and cervical cancer) strongly influence maternal outcomes and life expectancy/survival of women of reproductive age.

It is estimated that more than half of NCDs result from behaviors initiated in childhood and adolescence, such as initiation of tobacco and dangerous alcohol use as well as other high-risk behaviors. Although there is limited data on the prevalence of NCDs among young adults in Middle Eastern countries, NCD cross-cutting risk factors are highly prevalent. For example, according to the 2014 WHO Global Status Report on NCDs, over 80% of Jordanian young adults are physically inactive, 28.8% of the population between 18 to 34 years old are overweight, 18.2% are obese, 4.5% suffer from hypertension, 6.4% suffer from diabetes, and 5.2% have high cholesterol (1). Young adults, representing a significant share of the population in the Middle East, will be heavily responsible for future economic and social development. Hence, the increased prevalence of chronic diseases and their risk factors among the youth population will considerably affect the productivity and economic growth of Middle Eastern countries (142). Considering the above, NCDs place significant strain on Middle Eastern countries to build resilient health systems capable of achieving universal health coverage (UHC) with quality health services, to reduce premature mortality from NCDs and reach the Sustainable Development Goals (SDGs).

Addressing the growing burden of NCDs in the context of emergencies is the critical area of concern in the ME region (2). The Eastern Mediterranean Region hosts more than half of the world's refugees and has the largest number of displaced persons (3). Displaced populations in the ME often suffer from various health challenges associated with their displacement including: trauma, injury, communicable disease, mental health disorders, exposure to violence, etc. The health needs of displaced populations are further complicated by their mobility and are constantly changing as their context shifts (leave home, in transit, settle at destination location). The burden of NCDs is increased in this situation: displaced persons often managed chronic conditions present in their home country, but find management of these conditions more difficult during the migration or forced displacement because of destruction of key health infrastructure, such as access to chronic care medications; inability to maintain contact with regular primary care providers; lack of financial resources to procure health care services and chronic medications; degradation of living conditions; stress and psychological effects of displacement and other factors. Delayed care and lack of appropriate preventive and follow-up services may lead to life-threatening complications and subsequent need for costly treatment. Addressing these challenges requires strong, resilient health systems capable of responding to the health care needs of growing displaced population.

Understanding the gaps in effective health system response is an essential first step to strengthen the capacity of health systems to respond to emerging public health threats in the Middle East (ME). For this purpose, in October 2016 USAID's Regional Bureau for the ME had tasked the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project to conduct a research activity to rapidly assess the health systems and service delivery challenges of emerging health priorities contributing to the highest disease burden and premature mortality in the Middle East. Considering the high prevalence of NCDs, their cross-cutting risk factors in the region and their devastating impact on population health (including impact on USAID's existing health priorities), the objective of the rapid

assessment was to explore the ability of existing health systems in the ME to address the growing burden of NCDs and to analyze their resiliency. Specifically, the study aimed to identify health system constraints (including service delivery gaps) in prevention, early detection and management of NCDs in USAID ME focus countries in the context of protracted emergencies.

The geographical scope of the regional assessment focused on 10 USAID-supported countries in the ME: Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, West Bank/Gaza, and Yemen. All countries belong to Country Group 2 by economic status as defined by WHO EMRO (4 p. 14) except Yemen, which is listed under Group 3.

B. Structure and Content of the Report

The report starts with description of key assessment objectives and the methodology used for the rapid assessment. The methodology focuses primarily on the concepts and analytical framework, explaining what are the key questions to be answered, and what is the most practical approach to answering these questions. In addition, the section on methodology briefly outlines the data collection approaches and techniques (readers can get a more detailed insight by reviewing stand-alone documents such as the rapid assessment methodology, the MS Excel-based indicator selection instrument developed for this study and the key informant interview guide), and data limitations (including data collection results based on the data availability and actual response of key informants compared to original expectations).

All information collected through the desk review of technical reports and global health databases and through key informant interviews is structured and presented as fact (without author's judgement) under the section **III. Key Findings** as follows:

- Selection of indicators for gathering strategic information (related to coverage and utilization or quality of individual health services) and data availability for these indicators, as an important finding, is described in **III.A. Measurement Practices and Data Availability**.

- The quantitative data collected through the desk review covers two broad areas: NCD epidemiologic trends (covering layers from peoples' knowledge of and attitudes about NCD-related risk factors to disease burden) and health system response in respective areas (including service delivery). Respectively, desk review results are presented separately under **III.B. Major Trends in NCD Epidemics** and **III.C. Major Trends in Health System and Service Delivery Performance**.

- Considering the geopolitical context in the ME, section **III.D. Resiliency of Health Systems to Address NCDs in the Context of Emergencies** is devoted to the exploration and description of health system resilience in ME countries to address the growing burden of NCDs in the context of emergencies based on information obtained from desk reviews and qualitative interviews using an inductive approach for the qualitative interviews conducted. Data presented through the desk and literature review were also analyzed and grouped according to emerging themes and by countries.

The descriptive section is followed by a discussion of the findings from different angles in section **IV. Analysis**.

- **IV.A. Common Health System and Service Delivery Challenges** presents an attempt to find commonalities across the 10 countries in health system and service delivery challenges along the continuum of NCD prevention and control for major groups of diseases: cardiovascular and chronic pulmonary diseases, diabetes, cancer and mental health.

- **IV.B. Gaps and Opportunities in Addressing Emerging Health Priorities in the Context of Emergencies** is fully devoted to exploring the ability of the health systems in the 10 priority countries to provide quality, essential NCD prevention and control services despite challenges caused by war, civil unrest, influx of refugees, economic hardship and security gaps.

Results of the discussion in the previous sections are synthesized in **V. Conclusions and Recommendations** followed by main observations and suggestions to key stakeholders to improve

regional and national strategies for strengthening health systems and service delivery in relation to NCD prevention and control. For health service resilience, areas for more substantive exploration are highlighted for action.

The **Annex** contains technical information to support information in the main text followed by the list of references for the literature and information sources used for the rapid assessment.

II. METHODOLOGY

Key elements for the rapid assessment methodology were chosen based on several factors:

- The original scope of work that defined data collection methods (desk review and key informant interviews conducted remotely), the list of countries, the technical scope of the assessment, the timeline and resources.

- Applicability of existing conceptual frameworks of NCD prevention and control, in general, and of health system challenges and opportunities for NCD prevention and control, in particular.

- Global and regional practices and public databases for NCD prevention- and control-related health system and service delivery performance measurement (ensuring easy access to reliable metrics).

- Previous experience conducting similar assessments, such as the assessments of:

  - Challenges and opportunities for health systems for better non-communicable disease outcomes in around 10 countries[1] in Europe (5);

  - National capacity for the prevention and control of NCDs in 21 out of 22 countries in the EMRO in 2015 (4)); and

  - Non-communicable disease prevention, screening, and care for women of reproductive age in four countries[2] in Europe (6).

A. Purpose of the Rapid Assessment

1. What we intended to assess

The purpose of the rapid assessment was to identify health system constraints (including service delivery gaps) in prevention, early detection and management of NCDs in USAID ME focus countries. It is presumed that the gaps identified can inform national policies and the development of partner support strategies and could contribute to the eventual scale-up of NCD prevention and control interventions.

As such, the rapid assessment sought to help answer the high-level question:

- What are key health system challenges in each of the ten selected Middle East countries that should be addressed to improve NCD prevention and control in each country?

The assessment defined NCD prevention- and control-related health system and service delivery challenges and explored three directions to answer the main question:

- What is the status of NCD prevention and control in each of the ten countries?

- How do the NCD prevention and control related health system components (including service delivery) perform in each of the ten countries?

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[1] Armenia, Croatia, Estonia, Hungary, Kyrgyzstan, Moldova, Tajikistan, Turkey, Belarus, Macedonia

[2] Albania, Armenia, Georgia and Russia

- What are the major gaps in NCD prevention and control and can they be explained by or are they related to health system performance shortfalls or constraints?

The assessment aimed to identify important service delivery and health system issues (i.e., strategic in terms of value for money or feasibility) related to the status of NCD prevention and control in the ME without answering question: "How should the challenges be addressed?" However, it provides an important evidence base for an effective national and regional response to address the growing NCD epidemic and its socio-economic consequences.

The task can be disaggregated into two sub-assessments and an analytical exercise:

Figure 1: NCD prevention and control (results chain) and health system inputs

1. An assessment of NCD epidemiology – covering everything from NCD-related risk factors to death caused by NCDs, to the extent possible

2. An assessment of the context where NCD prevention and control takes place – focusing on the performance of health system areas/components that are most relevant to NCD prevention and control

3. Examination of whether success or failure in each area of NCD prevention and control can be explained by or be related to performance of health system components

In order to assess NCD epidemiology and health system/service delivery context we needed descriptive models for each component to quantify performance (conceptual or exploratory frameworks). In addition, there was a need to develop an analytical model (explanatory framework) that would help us to describe causal relationships between NCD prevention and control and health system performance (7). All three models underpinning the assessment (data collection and analysis) are discussed in detail in section **II.B. Conceptual and Analytical Framework**.

In addition, three major areas have been investigated to explore resiliency of health systems in the context of NCDs and protracted emergencies in the priority countries:

- Ability of health system to respond to health emergencies at the various levels of care (national, sub-national and facilities) using the health systems building blocks and other relevant factors.

- Enablers and gaps in quality essential health services to target population (general and migrant populations)

- Coordination of health sector actors to mitigate risk factors to population health for NCDs

2. What we did not intend to assess

There was no intention either to conduct a comprehensive health system performance assessment (similar to one conducted in Armenia, Belgium (8), Azerbaijan, or Georgia based on the WHO proposed conceptual framework of health system performance (9)) or to compare health systems in the ten focus countries (similar to a comparative international analysis of health system performance in eight countries (10) or to the comparison of technical efficiency in all EMRO countries (11)). Measuring the performance of specific components of the national health systems was needed as much as understanding health system inputs/responses to NCD prevention and control in ME focus countries.
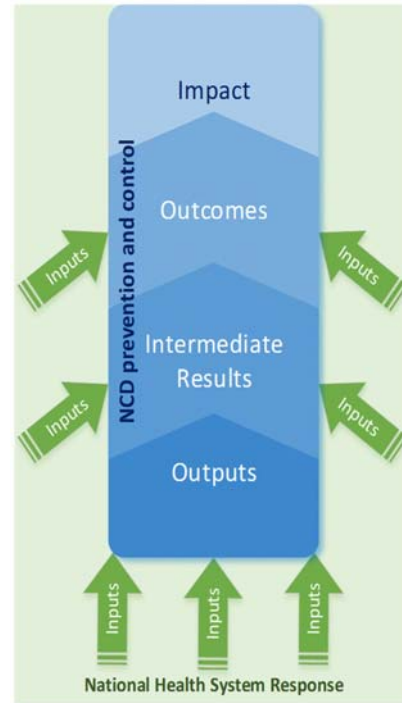
The primary objective of the assessment was NCD prevention and control and its results chain, from outputs (e.g., NCD risk factor modification) to impact (disease burden expressed in DALYs) (Figure 1) above. Therefore, we did not apply a hierarchy of results approach to measure health system/service delivery performance (as stipulated by traditional health systems performance assessment [HSPA] approaches (12)) – we treated everything that happens in the health system and contributes to NCD prevention and control as inputs. Two out of three health system goals (impact level) – fair distribution of financial burden for health care (or improved protection against health care-related financial risks through pre-paid or risk pooling financing schemes) and health system responsiveness – we treated as enablers for NCD prevention and control, contributing to improved equity in and utilization of personal (medical) services for early diagnosis and management of hypertension, diabetes, cancer or depression.

Instead, we applied a hierarchy of results approach by split events and results along the NCD prevention and control continuum enabling us to link specific health system inputs with particular elements of the results chain (as illustrated in Figure 1 above).

We did not compare countries in the effectiveness or efficiency of NCD prevention and control measures; however, we often compared NCD epidemiology at two consecutive levels of the results chain to understand why NCD prevention and control intermediate results differ between two countries with the same level outputs (e.g., same proportion of population with physical inactivity or poor dietary practices but different levels of overweight/obesity). Such comparisons help to explain possible differences in health system inputs (that determine translation of NCD prevention and control outputs into intermediate results).

B. Conceptual and Analytical Framework

1. Key terms and concepts

It is a common practice to refer to *primary* and *secondary prevention* of NCDs, although boundaries are not always clear[3]. The USAID conceptual framework for non-communicable diseases and injuries (NCDI) proposes the following definitions (13):

- Primary prevention refers to methods by which occurrence of the disease or injury can be avoided. Most primary prevention interventions are population-based (e.g., improved nutrition, smoke-free restaurants and work places, school health and fitness programs, or programs to raise awareness about road safety).

- Secondary prevention interventions by comparison usually focus on individuals and are intended to diagnose a condition in its early stages and control it before it causes significant and costly morbidity. Examples of secondary prevention interventions include screening for cervical cancer or taking aspirin for secondary prevention of cardiovascular events.

The conceptual framework developed by the World Health Organization Regional Office for Europe that guided the assessment of challenges and opportunities for health systems for better NCD outcomes in Europe (5) divides NCD prevention and control into two broad categories – population services ("core interventions") and individual services – and then refers to "first line" and "second line" core NCD services for CVD and cancer prevention (see Figure 125 on page 128).

In some literature, primary prevention does not imply clinical (personal) services and its purpose is to reduce exposure to harmful nutritional and environmental factors (14). However, personal-based

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[3] Even a concept tertiary prevention is used in case of mental disorders (defined as "includes interventions that reduce disability, enhance rehabilitation and prevent relapses and recurrences of the illness") (68 p. 17)

clinical services, such as tobacco cessation and counselling, are critical to reduce behavior that increases the risk of developing major NCDs (15).

The rapid assessment focused on the areas contributing to the highest disease burden and premature mortality in the region, in general, and in specific target populations (such as displaced populations). Consequently, the rapid assessment focused on prevention, early detection and care of the following priority clinical conditions: 1) Cardiovascular diseases (CVD); 2) Cancer; 3) Diabetes; and 4) Mental health (depression).

The clinical conditions listed above differ from so-called main NCDs covered by the surveillance of NCD risk factors (per STEPS) (16). Chronic pulmonary diseases (CPD) were not considered a priority clinical area for the rapid assessment for two reasons: (a) it was assumed that the health system challenges and opportunities for CVD and diabetes do not differ from the health system inputs in the prevention and control of chronic respiratory diseases and (b) the was limited data available for the rapid assessment. Instead, the rapid assessment focused on mental health (depressive disorders, ICD-10 group II.E.1), since depressive disorders and other mental health issues have been increasing as a share of the burden of diseases in the ME region (17) given the enlarged size of the forcibly displaced population, armed conflicts and humanitarian crises (2), and prevention and control of mental health conditions are presumably exposed to the health system challenges and opportunities that are different from dominant somatic NCDs.

2. Descriptive models

NCD prevention and control (efforts of slowing the course of existing NCDs or reducing their severity) processes are usually divided between primary and secondary, or population and personal services, that sometimes are treated as synonyms, as discussed above. This simplified approach is often practical to outline a policy or programmatic scope, which usually favors primary/population prevention interventions (due to the scale, return on investment, relative ease of measuring intervention results, etc.). However, this simplified model is not sufficient to bridge health service inputs with the NCD prevention and control results chain, especially with the processes and results after onset of diseases symptoms (which can be labeled as "NCD case management") that encompass mostly personal services in outpatient or inpatient settings, mixed with individual behavior and exposure to risk factors (playing a lesser role, but still worth taking into account).

For the purpose of the rapid assessment, we developed a model that covers a continuum from the healthy state to death. It encompasses all key stages a person goes through as the NCD progresses (irrespective of NCD prevention and control interventions) (Figure 126 on page 129). Traditional primary and secondary prevention is further broken down into five stages of prevention between six "milestones" for all NCDs under consideration.

For CVD (as well as diabetes and CPD) these stages and milestones include:

1. A period from the healthy state to the occurrence of behavioral (tobacco use, physical inactivity, unhealthy diet and harmful use of alcohol) and/or physiologic/biological risk factors (obesity/overweight, high blood pressure, glucose and cholesterol).

2. A period from the occurrence of behavioral and biological risk factors to the diagnosis of CVD (including the onset of hypertension and/or diabetes).[4]

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[4] One may argue that high blood pressure or sugar indicates on the occurrent of diseases (hypertension or diabetes) from a clinical medicine point of view; however, we keep the existing approach for the sake of alignment with conventional understanding of the development of cardiovascular diseases and its complication from a public health point of view (92 p. 11)

3. A period from detecting CVD to the development of complications (e.g., acute myocardial infarction (AMI) or stroke).

4. A period from the development of complications until death before the age of 70.

5. A period after the age of 70 until CVD-related death.

Conceptually, the prevention and control of cancer differs substantially from CVD, diabetes and chronic pulmonary disease because certain cancers can be prevented by vaccination and a person can be fully cured from cancer in contrast to these other diseases. Therefore, while CVD or CPD prevention and control aims at delaying NCD-related death (and improving the quality of remaining life), in the case of cancer, three different pathways can be considered after the onset of the disease (Figure 127 on page 130):

1. Medical care (early detection and treatment in inpatient and/or outpatient settings) with follow-up observation that results in complete remission of the disease.

2. Medical care that cannot cure cancer, but can control/slow down its progress and prolong life (delay cancer-related death).

3. Palliative care (when cancer treatment is not effective or justified) to prevent or relieve a person from suffering by means of early identification and impeccable assessment and treatment of pain and other physical, psychosocial and spiritual problems. (18)

Similar to cancer, the continuum of prevention and control of depression has pathways different from CVD (as shown in Figure 129 on page 132).

The proposed breakdown of NCD prevention and control into five stages and milestones in the illustrative example of CVD (Figure 2 below) makes it easier to understand how the ultimate success (reduced NCD burden; measured by DALY, including years of life lost to premature mortality in the population, and Years Lost due to Disability [YLD]) is achieved by breaking it down into consecutive success steps. If a country does very well at all but one stage and another fails at all three stages, both countries fell short in an effort to reduce NCD burden. But the nature of failure, and potential remedies, are very different. How the proposed breakdown benefits the understanding of the health system inputs into NCD prevention and control will be elaborated in the next section.

Figure 2: Decomposition of the CVD prevention and control life cycle and ultimate success

• A period from healthy state to occurrence of behavioral and/or physiologic/biological risk factors	→ Preventing the development of and/or modification of the risk factors
• A period from the occurrence of behavioral and biological risk factors to the diagnosis of CVD	→ Preventing the development of CVD
• A period from detecting CVD to the development of complications	→ Preventing CVD complications (such as acute myocardial infarction [AMI] or stroke)
• A period from the development of complications to death before the age of 70	→ Preventing CVD-related premature death
• A period after the age of 70 to CVD-related death	→ Preventing CVD-related death

The decomposed success in NCD prevention and control makes it obvious that curative services in the traditional sense (including diagnosis, inpatient or outpatient care, rehabilitation and follow up) are still preventive as long as they help to avert or postpone moving a step closer to the NCD-related (premature) death. Therefore, the traditional "preventive-curative" dichotomy becomes obsolete in the proposed life cycle model.

The health system's response to the prevention and control of NCDs is described as three levels of efforts that complement each other and are aligned with the NCD prevention and control continuum as shown Figure 126 (on page 129):

- **Level 1** efforts are population-based public health services that aim at risky behavior change or reducing harmful nutritional or environment exposures. These efforts are critical at the two initial stages of NCD prevention while also remaining beneficial at the later stages.

- **Level 2** efforts represent personal health services delivered in outpatient settings and composed of diagnostic services (screening/preventive medical check-ups); counselling on behavior change, especially in case of smoking, obesity or high blood cholesterol; and regular care of chronic diseases such as hypertension, ischemic heart disease and diabetes. This level of efforts, a backbone of prevention from premature death related to NCDs, may be temporarily suspended/replaced with intensive inpatient care (level 3) in the case of complications, but should then be resumed after discharge from the hospital.

- **Level 3** efforts encompass intensive care and rehabilitation in inpatient settings. These efforts are critical to recover from complications, such as myocardial infarction and/or stroke, and minimize damage to the health/well-functioning of an individual.[5]

Focusing on the three levels sheds light on the importance of placing people and the community at the heart of all endeavors on improving care delivery. The global strategy on Integrated People-Centered Health Services (IPCHS) (19) echoes this sentiment: putting people and communities at the center of health service planning makes health services more comprehensive and responsive, more integrated and accessible, and offers us a coordinated method to address the diverse range of health needs facing humanity, including those of chronic conditions such as NCDs (20). Understanding how services are reoriented towards the needs of the individual requires an understanding of the community (population) in which the person is placed.

The advantage of this approach is that there is no clear-cut boundary between primary and secondary prevention interventions; or population and personal services. If we look at it through the eyes of a person, at a given time he or she might: (a) be exposed to a series of regulatory restrictions reducing exposure to risk factors, (b) receive smoking, nutrition and exercise counseling in addition to mass media campaigns promoting a healthy lifestyle, and (c) undergo case management for hypertension control (including medications). The traditional classification is not convenient to define where this person is along the NCD prevention and control continuum, but the proposed complementary levels fully describe the "layers" of NCD prevention and control that a person experiences at any given time of his or her life cycle.

In addition, the proposed model helps to visualize how different levels of services project over the NCD prevention and control continuum. Namely, the diagram specifies how personal-based services provided at the primary and secondary/tertiary levels of care phase in with the progress of CVDs and illustrates high impact, cost-effective ("best buy") interventions at each level of the health service delivery system (15).

Finally, illustrative USAID-supported interventions (as listed at the bottom of Figure 126 on page 129) to strengthen health systems and integrate NCDs into existing USAID health priorities are aligned to the continuum of NCD prevention and control efforts (21).

Luckily, there are plenty of health system models that have been used in various country assessments (12), many of them drawing on the WHO conceptual framework for health systems (9), as well as performance assessment models, developed by WHO (22) and USAID (23), and chronic

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[5] Conceptually, these three levels are aligned with the three focus areas outlined in the "Technical package for cardiovascular disease management in primary health care" (2016) (92).

care models, developed by other stakeholders (24). A relatively new approach to health system performance assessment (HSPA), from New Zealand (25), is more interesting in terms of measuring health system performance directly by reducing NCD burden, but its discussion goes beyond the scope of this exercise.

As illustrated in Figure 1 (on page 5), for the purposes of this assessment, we aim to map all types of health system interventions as inputs, along with the NCD prevention and control results chain, to understand the ultimate success of the national NCD response (NCD burden reduction).

Therefore, instead of a three-dimensional descriptive model, we opted for a simplified health system model with the six well-known health system building blocks (service delivery, health workforce, health information, essential medicines, financing, leadership/governance) complemented by population demand (for health maintenance and improvement[6]), plus two health system goals: responsiveness and financial fairness, which are treated as enablers (or constraints).

Figure 3: Simplified model to describe health system inputs into NCD prevention and control
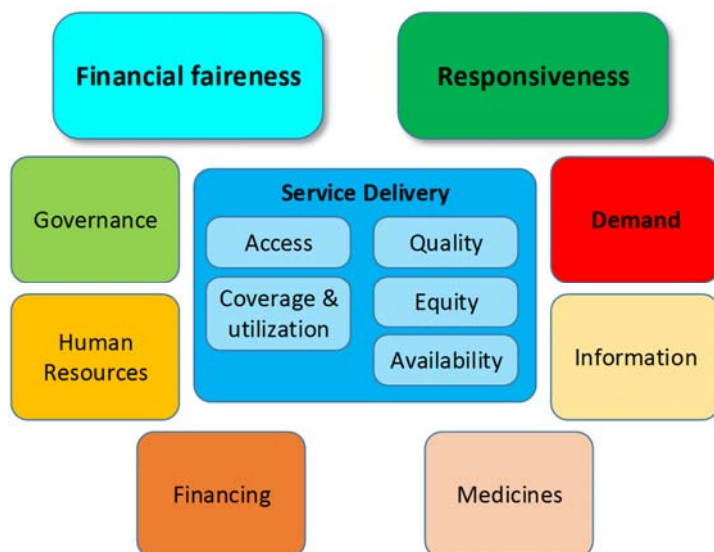
The model represents 15 health system challenges proposed by WHO to assess health systems for better NCD outcomes (5). Indeed, the 15 boxes in Figure 99 (on page 107) derive from or correspond to one of the nine boxes in our model.

Considering our particular interest in NCD prevention and control at levels 2 and 3 (or personal services), inputs classified as "service delivery" were further refined into attributes (or features) of service delivery such as quality, equity, availability (yes/no), access (geographic), coverage, and utilization.

3. Analytical explanatory model

We used the NCD Global Monitoring Framework (GMF) with nine NCD prevention and control targets and 25 indicators (Figure 124 on page 126) as the platform of the analytical model. The NCD GMF was developed by consultative process to encourage WHO member states to consider the development of national NCD targets and indicators, building on the global framework, to routinely measure the progress of national NCD efforts. While the framework was built upon a small set of high level measures to avoid heavy reporting burden by member states, the first question we tried to answer before embarking on designing an analytical model was this: Does the NCD Global Monitoring

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[6] That is broader and different from population demand for health care services; to be met through universal health coverage approaches.

Framework (Figure 124 on page 126) allow the capture of critical health system inputs into NCD prevention and control?

Figure 128 (on page 131) illustrates the results of mapping 25 indicators of the NCD Global Monitoring Framework (GMF) with the NCD prevention and control continuum:

- NCD GMF indicators measuring epidemiologic aspects were positioned above the line of the NCD prevention and control continuum. As shown in Figure 128, the epidemiologic measures of the GMF are mostly concentrated either in the left part of the continuum (those that measure prevalence of NCD behavioral and biologic risk factors) or at the right end of the continuum (premature NCD-related death). There is no measurement of health/medical events that falls between the prevalence of high blood pressure or cholesterol and death – except cancer incidence.

- NCD GMF indicators measuring the health system response[7] were placed below the line of the NCD prevention and control. They capture some aspects of health system contributions at level 1 efforts (population-based services) and availability of some resources (medicines, medical technologies) as prerequisites to the health system contribution to personal services. Only two indicators from the GMF assess personal NCD services at health care facilities: multidrug treatment and counselling for high CVD risk and cancer screening.

After designing the descriptive model of the NCD prevention and control continuum, we developed an analytical framework that explains how national system responses (inputs) contribute to success along the NCD prevention and control continuum (illustrated in Figure 130). Specifically:

- We rotated the horizontal NCD prevention and control continuum for CVD (that is applicable to diabetes and CPD as well) and cancer and received two vertical results chains starting from a common output ("reduced behavior risks") and then united again in the end at the level of impact ("reduced mortality caused by CVD, diabetes, cancer and CPD") framed in the blue box in the center of the diagram.

- Between the output level I and impact level IV, we identified three levels: intermediate levels II1 and II2 and outcome level III. All levels correspond to the periods and milestones of the NCD prevention and control continuum (continuum as illustrated in Figure 125 on page 128 and Figure 126 on page 129).

- Reduction of premature mortality (caused by CVD or cancer) was considered as an outcome of successful NCD prevention and control.

- Level II covers two main achievements of NCD prevention and control:

  - Reduction of disease occurrence at sub-level II1 (such as reduced prevalence of CVD/CPD or reduced incidence of cancer): When NCD prevention and control reaches that level, it means that personal medical services phase in and become key determinants of success afterwards; therefore, II1 sub-level is "a gate" for transitioning from population to personal services.

  - Reduction of complications of CVD or CPD or early detection of cancer and cure or improved palliative care (sub-level II2).

- A light green zone "surrounding" the NCD prevention and control results chain diagram depicts key health system inputs that are expected to transform results at one level into successes at a higher level of the NCD prevention and control results chain:

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[7] Health system (or national system) "response," the term used in the GMF, is equivalent to "inputs" in our model describing health system contribution to NCD prevention and control.

- o We decided to separate service delivery inputs from the remaining health system inputs and enablers (described above in Figure 3) considering their importance for the rapid assessment;

- o Each input is described in boxes in the light green zone of the model and is labeled corresponding to the level, disease, and attribution of the input to service delivery or the remaining health system components using the following notation:

  - Each label consists of two or three elements separated by a dash "-".

  - Numbers from I to IV correspond to the result levels (from outputs to impact).

  - The first group of letters correspond to NCDs where A is for CVD, B=Cancer, C=CPD, and D=Depression. For example, AC means CVD (including its risk factor, diabetes) and CPD, III-A stands for outcomes defined as premature death caused by CVD, II2-AC means the second (higher level) intermediate result for CVD and CPD prevention and control (that is, "Reduced complications of CVD and CPD").

  - The second group of letters denote either health system (HS) or service delivery and are used to label enablers. For instance, "I-B-SD" means service delivery enablers for cancer specific outputs (that is, "Availability of and coverage with vaccination against hepatitis B and HPV"). If an enabler is not result level but NCD specific, then it is labeled as A-HS or B-HS, respectively (without result level in the beginning).

The proposed explanatory analytical model allows us to:

- Measure progress (or gaps) in NCD prevention and control at each level of the results chain

- "Visualize" and/or quantify health system inputs at each level to understand their role in achieving (or failing to achieve) the NCD prevention and control result at the higher (upper) level of the results chain.

Conversely, if we can describe in numbers the NCD epidemiology at each of five levels of the analytical model (or five stages of the descriptive model) and then quantify the health system inputs (each box in light green zone), we can understand the role health system inputs played in NCD prevention and control in each country.

We recognize that there are many other factors beyond the identified health system inputs that determine achievements at any level of the NCD prevention and control results chain. However, if used carefully, the proposed framework can still serve its purpose to first connect health system/service delivery performance with the NCD prevention and control results chain and then identify the major bottlenecks to scaling up NCD prevention and control interventions.

Two steps hold us from this analysis (presented in section IV): selection of proper indicators (both for NCD epidemiology and health system inputs) and data collection. The first is explained in the next methodological sub-section and the data collection success and results are presented in the next section (**III. Key Findings**).

4. Selection of indicators

All GMF indicators were automatically selected for the analysis. Understanding that we need additional measures to assess progress in NCD prevention and control according to the analytical framework, we reviewed multiple resources (such as a global reference list of 100 core health indicators (26), global NCD monitoring or health status reports (13) (27) (1) (28)), as well as global and regional repositories of health system and service delivery indicators measuring high impact, cost-effective NCD interventions) and compiled a list of an additional 267 indicators.

For assessing coverage or quality of high impact, cost-effective NCD individual-level clinical interventions, we used the WHO Package of Essential NCD Interventions for Primary Health Care Settings and other emerging evidence (12) (81) (86) (88) to define the list of service delivery indicators. Figure 98 (on page 103) in the annexes illustrates the rationale of selecting service

delivery indicators by presenting a package of essential clinical interventions per each major NCD category and related indicators to assess quality, coverage or availability of these services in the health facilities.

- A special Microsoft Excel-based tool was designed to prioritize additional indicators for the rapid assessment and generate a "short list" of indicators using the following criteria:

    - <u>Importance</u> of the indicator for measuring:

        - The population-based, high-impact NCD services

        - Personal (facility-level) high-impact NCD services

        - The national (health) systems response

    - <u>Practicality</u>: Usefulness for the analysis of NCD prevention and control-related health system challenges (or relevance to answering the main questions of the rapid assessment)

    - <u>Feasibility</u>: Availability and reliability of data

- Indicators (other than those from the GMF) were scored against each criterion using three values: "1" if it met the criteria fully, "0" if it met the criteria partially, "-1" or (blank space) if it did not meet the criteria. To avoid missing important measures because of data availability, the total score for each indicator was calculated for all criteria except feasibility; it was decided to reassess each indicator after the desk review (collection of quantitative information from available secondary data sources) and prioritize indicators based on the assumption that data is available publicly.

    - Indicators that scored 2 were considered important and the tool highlighted them in bright green.

    - Indicators that scored 1 were considered useful, and were marked as "additional" and highlighted in light green.

    - The rest of indicators remained uncolored (if they scored <0) or colored in light yellow (if they scored 0) and were not prioritized.

- All short-listed indicators (219 in total) that were ranked by importance/score were included in the Excel-based tool[8]:

    - Red color shows the highest level of importance and marks all indicators from the GMF.

    - Bright green color marks important indicators.

    - Additional indicators are marked in a light green color.

The short-listed (selected) indicators were further described by assigning values for several attributes:

- **Focus area**: Shows relation of the indicator to the rapid assessment primary (focus) areas, such as CVD, cancer, diabetes, CPD, mental health or refugee health.

- **Origin**: Indicates where the indicator (its definition) comes from, be it GMF; WHO Global Health Observatory; the World Bank Nutrition, Health, and Population Statistics (NHPS); STEPS reports; 100 core health system indicators or custom ones.

- **Result level**: Indicates corresponding results chain level (from outputs to impact for NCD epidemiology), assigning value "inputs" for indicators measuring health system contribution (performance) to NCD prevention and control.

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[8] In reality, this exercise was done in three iterations, expanding from an initial short list of 140 indicators to the final 219 based on the review of indicator databases and reports and exploration data collection possibilities.

- **Health system and its components**: Shows relation of the indicator to the nine health system components outlined in Figure 3: the traditional six "health system building blocks," including demand, plus the three health system goals (health, financial fairness and responsiveness).

- **Service delivery domains**: If the indicator captures service delivery related inputs, it is further described by service delivery aspects, such as: availability, access, coverage and utilization, quality, and equity.

- **Measurement blocks (of the analytical model)**: Labeled corresponding to boxes of the analytical model (Figure 130) linking indicators to each measurement objective.

The MS Excel-based indicator selection and prioritization tool populated the list of selected indicators grouped by origin, measurement blocks, health system components or results chain.

Figure 4: Summary of selected indicators by focus area and results chain levels

Results chain levels	Focus Areas						Grand Total
	Cancer	CPD	CVD	HS	Mental	NCDs	
Impact	1	1	4	7	2	2	17
Inputs	7		13	99			119
Intermediate results	4	3	10		2		19
Outcome	6	4	16	3	14		43
Output			19	1	1		21
Grand Total	**18**	**8**	**62**	**110**	**19**	**2**	**219**

The selection was completed by preparing a data collection matrix for each of the 10 countries that included three sets of columns for all selected indicators: one for baseline data [9], years, and comments; another for more recent measurements; and a third set (of three similar columns) specifically for refugees or internally displaced populations.

In the end, data collection and entry matrices were expanded to 281 rows to accommodate data for 219 indicators: some indicator definitions were broad and required disaggregation (for instance, the original indicator from GMF for cancer incidence rate, by type of cancer [per 100,000 population], was broken down into 50 rows to enter data for 17 main types of cancer for men, women and both sexes).

C. Data Collection and Validation

Data were collected through two methods: desk review and key informant interviews (in-depth, semi-structured interviews).

The primary purpose of the desk review was to extract quantitative information from global, regional or national technical/statistical reports to describe the NCD prevention and control trends in the ME and the related health system and service delivery performance using a set of indicators. Some quantitative information was expected to be obtained through the desk review to help interpret preliminary findings.

The desk review was completed by filling in a health systems and service delivery measurement matrix for all 10 countries, consisting of pre-selected rapid assessment indicators and columns for baseline and the most recent values (whenever possible).

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[9] Meaning values that can be considered as a baseline if more recent measurements allowed us to see what happened compared to the previous situation (baseline result).

This exercise informed the design of key informant interviews for each country by:

1. Identifying preliminary findings to be validated

2. Identifying data gaps that can be addressed (partially) and or validated (assuming that the key informants can share some additional statistics/information not available during the desk review)

The primary purpose of the key informant interviews was to obtain qualitative information on the current situation and trends in health system and service delivery challenges concerning NCD prevention and control in each country:

- A set of common (not country specific) questions was developed during the desk review in parallel to the quantitative data collection.

- In addition to the common questions, the interview guides were comprised of country-specific questions elaborated after completing the desk review exercise (as described above).

A preliminary list of 40 potential key respondents was analyzed in terms of their role in NCD prevention and control and key interview guides were customized further according to respondent's role (e.g., government representative, development partner/donor representative, NCD focal point, primary health care focal point, etc.).

Key informant interviews were conducted via Skype or phone. Interviews were recorded and transcripts prepared for processing and analysis.

Health systems and service delivery measurement matrices with all data collected were shared with key informants for validation prior to the analysis of data.

Similar to other study areas, a mixed methods approach (quantitative and qualitative) was employed **to understand health system resilience in the context of NCDs and protracted emergencies**. Hence, the key findings presented on resilience include an amalgamation of both the desk review and the qualitative interviews with key informants.

D. Limitations

Original plans to interview up to 40 respondents turned out to be overestimated. Partially due to summer/travel season (second half of July through August 2017) and limited responses from some key informants after several interview requests, it was not possible to interview most of the potential respondents.

Limitations in quantitative data collection was related to reliability and quality of secondary data. For some indicators, different data sources provided conflicting results. For validation purposes, we shared quantitative data collection results to country stakeholders and, where possible, updated results based on the most reliable source. Another important finding that limited the scope of the analysis was limited data availability particularly around NCD prevention and control measures at service delivery level. The findings related to the data availability and measurement gap are described in detail in sub-section **III.A Measurement Practices and Data Availability** below.

III. KEY FINDINGS

A. Measurement Practices and Data Availability

A thorough review of global or regional measurement practices, including NCD monitoring or health reports, as well as initiatives in narrow professional circles on health system metrics (29) showed that indicators that could have captured important NCD epidemiology events or health system inputs from the onset of NCD to NCD-related death were largely missing in health monitoring databases. For instance, an indicator to measure how timely cancers are detected (cancer incidence rates by stages and cancer types) cannot be found in global health databases. Some of these data may exist, but they are not available publicly (or in English) and were not shared upon request by key informants.

Figure 131 (on page 134) demonstrates the availability of 30 "custom" indicators (that have been used in specific studies or for other purposes, but are not from global monitoring) assessing quality of coverage of NCD high-impact clinical interventions. It also shows that data was not available for any of these indicators except for the indicator for percentage of fully immunized children (indicator #32 | 179), which was found in DHS reports (if they were conducted in selected countries).

Figure 100 (on page 108) and Figure 101 (on page 109) summarizes the data availability for each country; grouping indicators by either the measurement blocks or health system components ("building blocks"), respectively.

Data is relatively available for: a) health system enablers (blocks A-HS, B-HS, C-HS, D-HS, ABSD-HS had availability score[10] mostly above 0.7); b) inputs at level I of NCD results chain (availability score mostly above 0.65); c) NCD epidemiology at output level (related to behavior and biological risks); and d) impact level (IV-ABC and IV-D had availability score above 0.8).

As noted above, the critical deficit of evidence at level II of the results chain – such as for measuring the results "Reduced prevalence of CVD & CPD" (II1-AC), "Reduced complications of CVD & CPD" (II2-AC), "Increased early detection of cancer and treatment success" (II3-B) and "Improved palliative care of cancer" (II2-B) – limited our ability to assess how successful countries were in the provision of individual-level health services to identify individuals with a high risk of developing a particular NCD, prevent the development of the disease or its complications, and avert premature mortality from these chronic conditions.

The scores for data availability in the summary matrixes do not consider the relative weight of each indicator by its importance (or relevance) that was assigned to each indicator in the long list. Therefore, the actual usefulness of the data available is often lower than indicated by simple mathematical averages of "availability scores."

Unfortunately, the data could not be obtained even for some indicators of the GMF:

- "Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years" (GMF 08)

- "Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ years" (GMF 15)

- "Access to palliative care assessed by morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per death from cancer)" (GMF 20)

- "Drug therapy and counseling to prevent heart attacks and stroke in high CVD risk individuals, people with diabetes and established CVD (%)" (GMF 18)

Data for the following two GMF indicators was available in few countries:

- "Age-standardized prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol ≥5.0 mmol/l or 190 mg/dl); and mean total cholesterol concentration" (GMF 17) – in 4 countries (EGY, IRQ, JOR and SYR)

- "Proportion of women between the ages of 30–49 screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes or policies" (GMF 25) – only in EGY

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[10] Each indicator received a score of "1" for "data available" and "0" for "not available." If data was available for 3 out of 15 indicators in the group for specific country, then the overall data availability score was "0.2" (3/15).

B. Major Trends in NCD Epidemics

1. Disease burden and mortality from NCDs

This subsection summarizes major trends in disease burden and premature mortality from NCDs. This corresponds to the impact and outcome level results (level III and level IV) of the NCD analytical framework.

The burden of selected NCDs (malignant neoplasms, diabetes, depressive disorders, cardiovascular diseases and chronic obstructive pulmonary diseases) decreased only in Morocco and Egypt, did not change practically in Jordan, and increased in the remaining countries over the decade from 2005 to 2015 (as shown in Figure 5 below).

Figure 5: Summary of disease burden: disability adjusted life years (DALYs) by priority diseases, by country and year
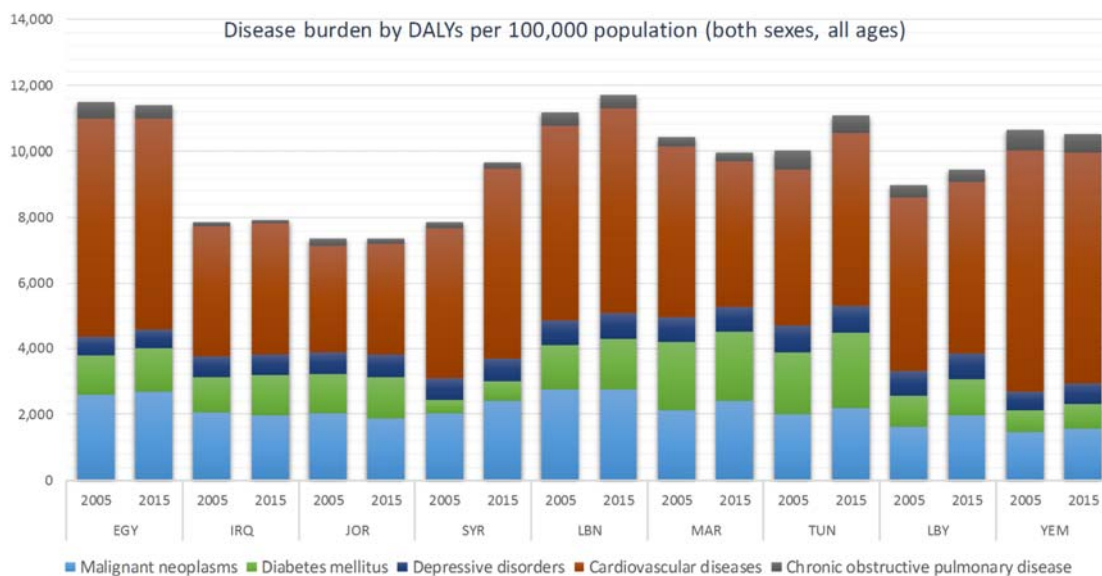
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

The positive dynamics in Morocco can be explained by a more than 5% reduction of DALYs caused by major CVDs (dark green cells in Figure 132 on page 136), while in Egypt a >5% reduction in stroke and COPD-related DALYs accounted for the observed improvement. A >5% reduction in malignant neoplasm, stroke and COPD related DALYs in Jordan was offset by negative trends in diabetes, hypertensive heart diseases and ischemic heart disease (IHD) DALYs.

The share of cancer and CVD in the total disease burden was highest in Lebanon (9.8% and 21.1% in 2005, respectively) and increased (up to 10.1% and 23.1% in 2015) due to 3.8% reduction in total disease burden and >5% increase in disease burden caused by CVD and diabetes.

Syria experienced the most dramatic increase in cancer-related disease burden (by 22%), diabetes (by 49%) and CVD (by 29%), although overall NCD share of the disease burden declined due doubling the disease burden from 21.9 to 47.6 thousand DALYs per 100,000 population.

Although overall disease burden remained almost at the same level in Tunisia, it increased by 5 or more percent for almost all priority NCDs except COPD.

The disease burden was the highest in Yemen in 2005 at the level of 53,000 per 100,000, and despite a 20% reduction, it still remains high (second highest among study countries after Syria). It is the only country where disease burden caused by depressive disorders increased by >5% in 10 years from 568 to 618 per 100,000 population (Figure 6).

Figure 6: Summary of disease burden: years of life lost (YLL) by priority diseases, by country and year
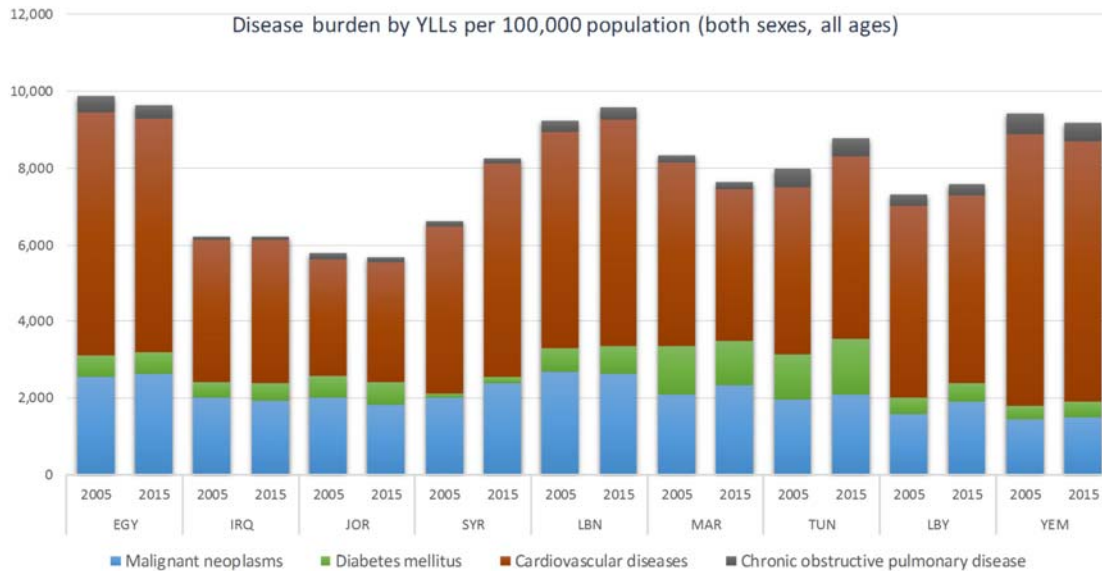
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

The overall disease burden expressed in DALYs was further decomposed into years of life lost and years lived with disabilities as illustrated in Figure 6 above and Figure 7 below respectively:

- Years lived with disabilities per 100,000 population was the highest in Morocco and Tunisia, at the level of 2,400 years (followed by Lebanon with 2,100 years)

- Almost every 4 years of life out of 10 years lost in Lebanon was caused by cardiovascular diseases as opposed to almost 2 years in Jordan and Morocco and 3 years in Egypt and Tunisia (Yemen, Iraq and Syria were discarded due to completely different structure of the disease burden related to military conflicts).

- In contrast to main "killers," diabetes and depression disorders were almost equally accountable for the number of years lived with disabilities; together ranging from 10 to 17% of the total YLDs. However, diabetes burden in terms of YLD was the lowest in Syria and Yemen compared to other countries in the sample.

Figure 116 (on page 118) shows that the share of YLD in DALYs for selected NCDs in 2015 varied from 13% in Yemen to 23.4% in Morocco (up from 19.8% in 2005).

Figure 7: Summary of disease burden: years lived with diabilities (YLD) by priority diseases, by country and year
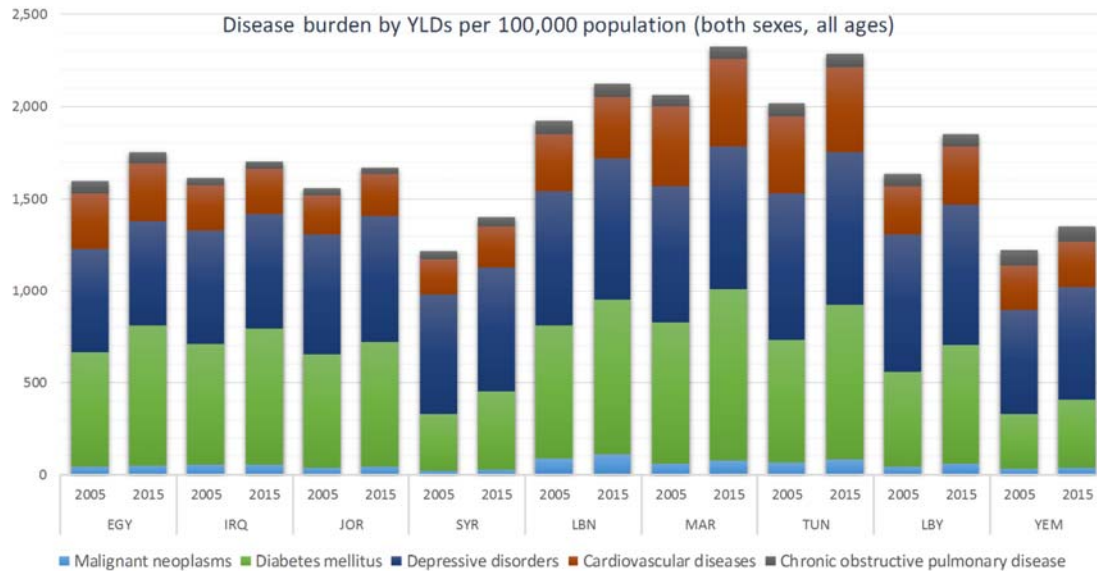
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Yemen had the largest increase in premature mortality associated with the major NCDs among the countries in the study between 2005 and 2015 and by 2015 it had the highest premature mortality associated with major NCDs at 39.9; compared with 16.7 in Morocco (the lowest) (Figure 8).

Figure 8: Probability of Duying between 30 and 70 years of age from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases per 100,000 population
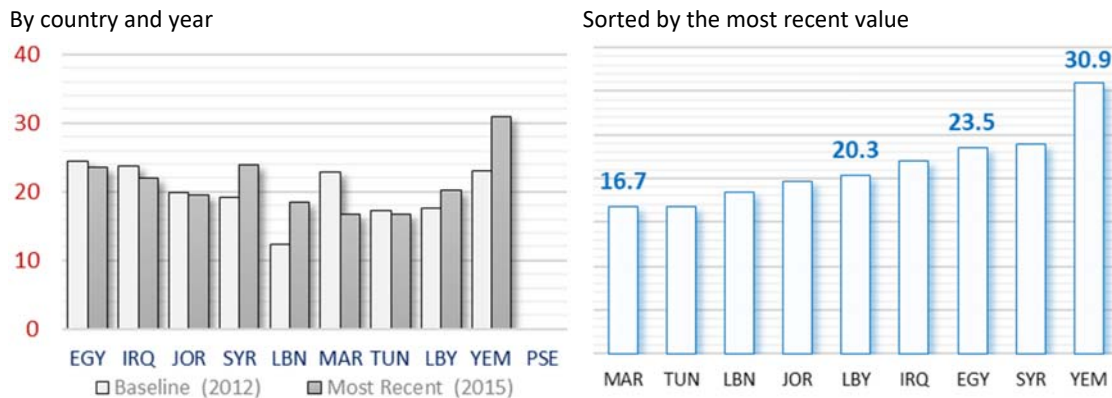
Source: WHO Global Health Estimates (http://www.who.int/healthinfo/global_burden_disease/en/)

Tunisia and Lebanon had a similar level (<20.0) of premature mortality rates at 16.8 and 18.4, respectively, despite a significant increase in Lebanon from 12.4 in 2012.

Overall, the probability of dying between 30 and 70 years for any reason for males increased significantly in Syria, which was the highest in the region followed by Yemen, and was the lowest in Palestine and Lebanon (below the average for Europe) (Figure 9).

Figure 9: Adult mortality (probability of dying between 30 and 70 years of age per 1000 population) - Males

By country and year

Sorted by the most recent value
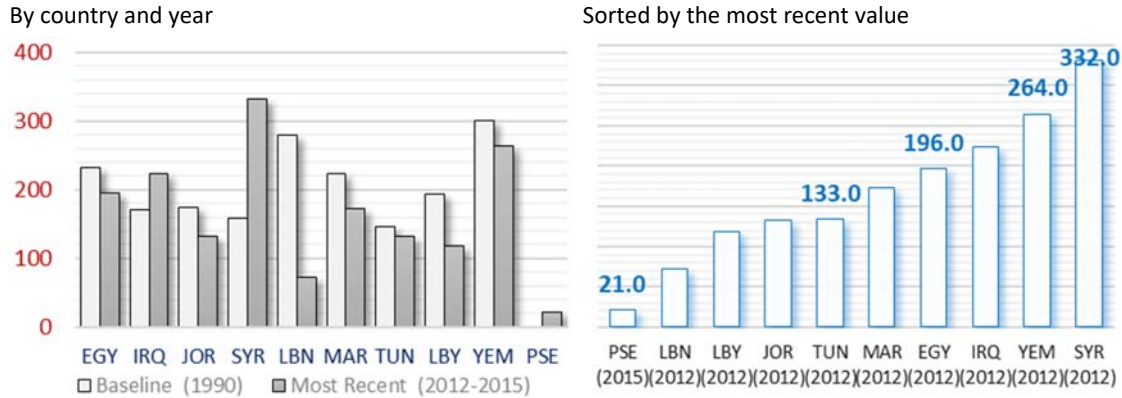
Source: WHO Global Health Estimates (http://www.who.int/healthinfo/global_burden_disease/en/)

Among females the adult (15 and 60 years of age) mortality rate was the highest in Yemen (214 per 1000 population) followed by Morocco, Egypt, Syria and Iraq (all >100 per 1000 population) and was the lowest in Lebanon at 47 per 1000 (Figure 10).

Figure 10: Adult mortality rate (probably of dying between 15 and 60 years of age per 1000 population) - Females
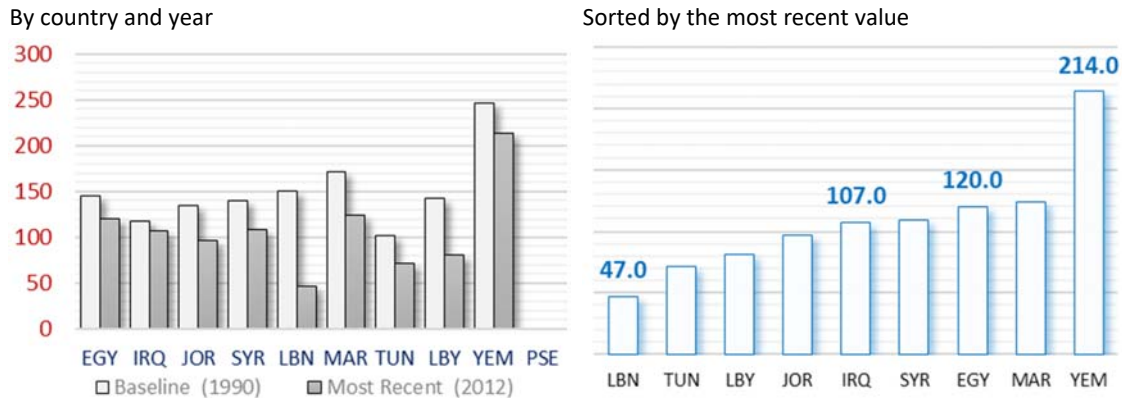
By country and year

Sorted by the most recent value

Source: WHO Global Health Estimates (http://www.who.int/healthinfo/global_burden_disease/en/)

Cardiovascular diseases

Cardiovascular disease burden was the lowest in Jordan (see Figure 11 below) despite a slight increase over the decade analyzed (2005-2015). The burden reduced slightly in Yemen and Egypt over this time period, but remained the highest in these countries among 10 study countries. Syria, Tunisia and Lebanon experienced the most significant increase, while cardiovascular disease burden dropped in Morocco.

Figure 11: Disease burden details: DALYs caused by cardiovascular diseases, by country and year
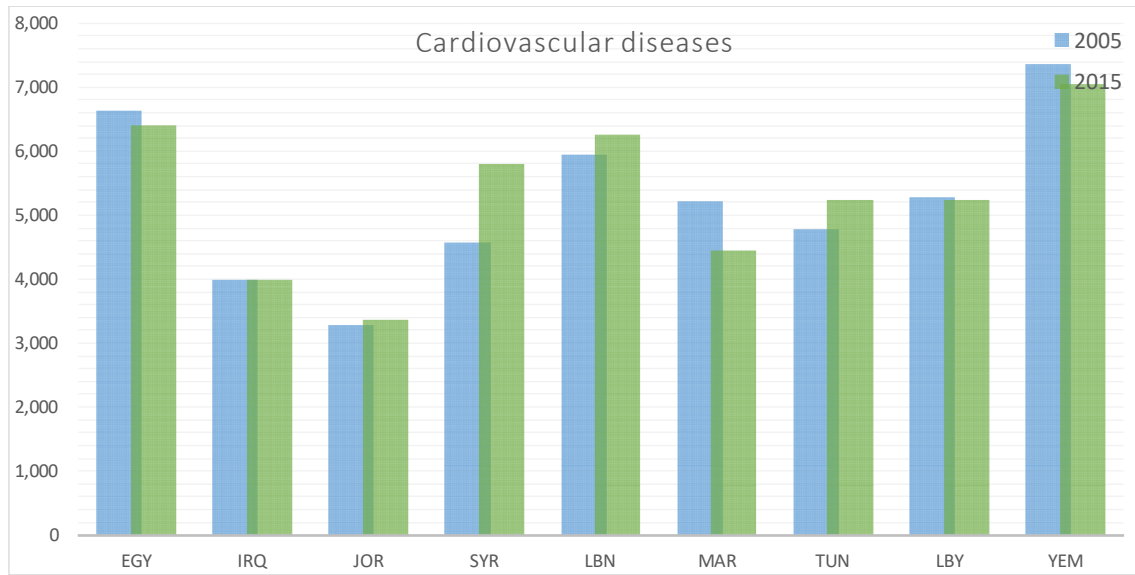
Cardiovascular diseases

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 105 (on page 113), Figure 106 (on page 113) and Figure 108 (on page 114) show the trends in disease burden caused by three major CVDs: hypertensive heart disease (HHD), ischemic heart disease (IHD) and stroke, respectively. Decrease in stroke-related disease burden offset a significant increase in HHD in Jordan, while all three diseases accounted for the decline in CVD burden in Morocco.

Figure 12 below shows that the IHD-related death rate increased in all countries but Iraq and Yemen, and was the highest in Lebanon (213 per 100,000).

Figure 12: Standardized death rate by cause – Ischemic heart disease
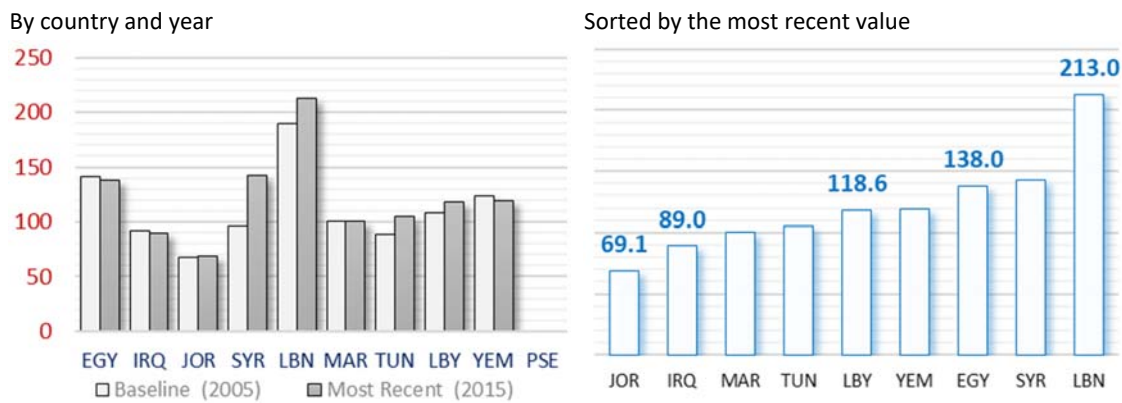
By country and year

Sorted by the most recent value

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

With respect to the stroke-related death rates, Jordan had the lowest death rate, followed by Iraq (37.6 and 39.0, respectively, per 100,000 population) as shown in Figure 13 below. However, Tunisia, with relatively low death rates caused by IHD (105 per 100,000 population), was first among the study countries in the death rate caused by stroke (95.8 per 100,000).

Figure 13: Standardized death rate by cause - Stroke
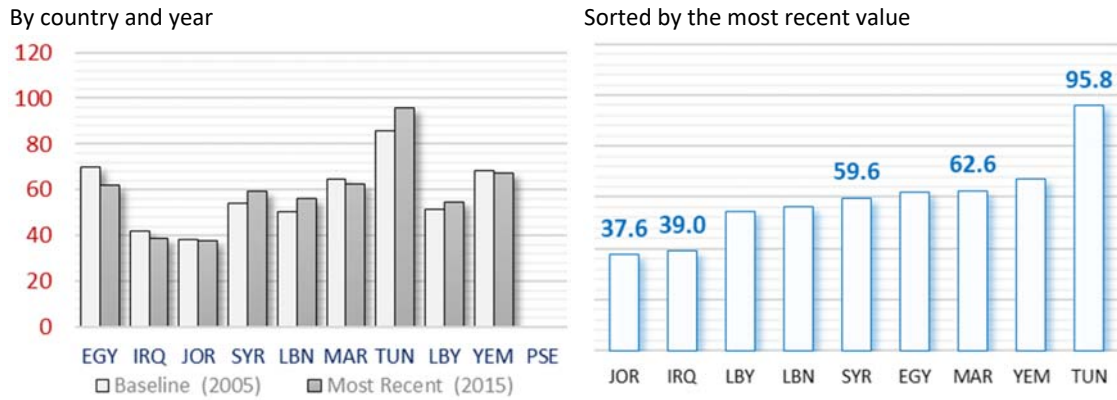
By country and year

Sorted by the most recent value

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Can the above described ultimate results of NCD prevention and control be explained by achievements at lower levels of the NCD prevention and control results chain? We will analyze that after describing level I and, to the extent possible, level II NCD prevention and control results in next-sub section.

Diabetes

The burden of diabetes increased in all countries during the study decade (2005-2015) and was highest in Tunisia and Morocco and the lowest in Syria (Figure 14).

Figure 14: Disease burden details: DALYs caused by diabetes by country and year
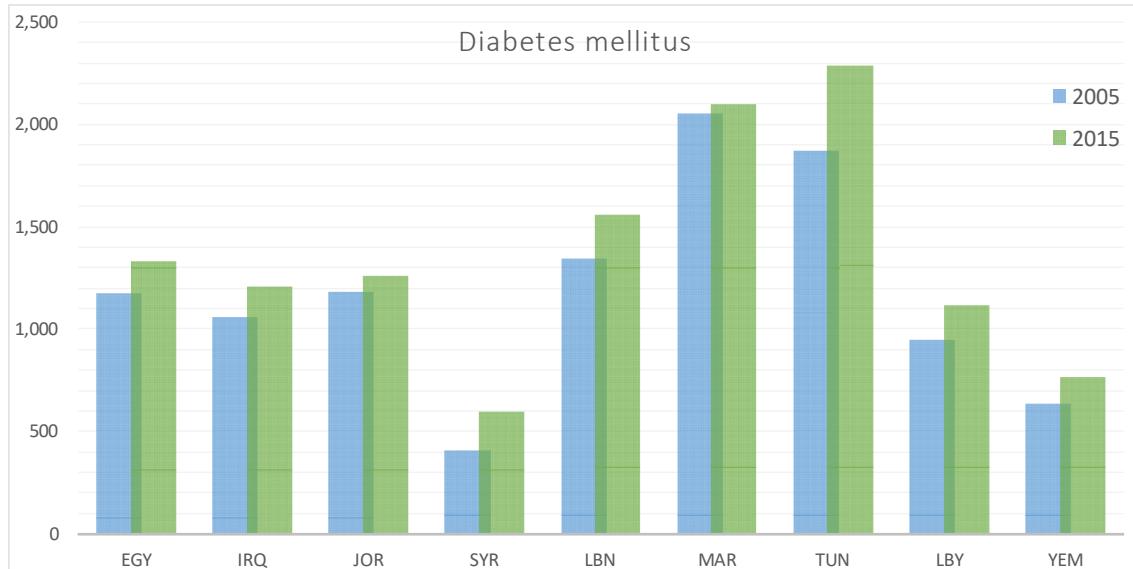
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 15 on page 23 shows that diabetes-related mortality rates increased in all countries and is the highest in Tunisia 70.8 per 100,000 – ten times higher compared to Syria.

Figure 15: Standardized death rate by cause - Diabetes Mellitus
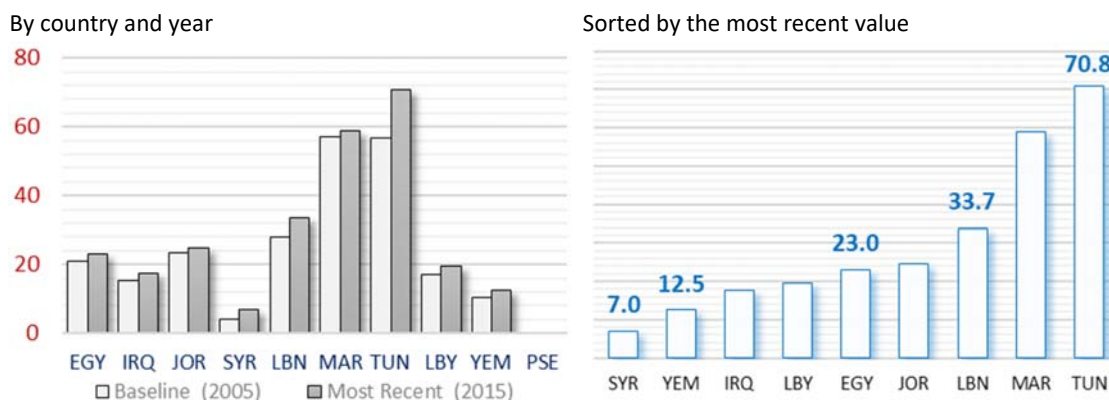
By country and year

Sorted by the most recent value

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

This observation is not supported by the estimates of the years of life lost due to diabetes (see Figure 112 on page 116): it decreased in Morocco since 2015 while further increased in Tunisia. A shift of diabetes-related deaths to old age and reduction in premature deaths in Morocco could be one of the explanations for this trend (assuming that diagnostic coding of diseases and death causes are relatively accurate or both global health estimates and mortality rate estimates used the same source of data). This phenomenon can result from either later onset of diabetes in Morocco and/or from improved diabetes management.

Figure 16 below shows that cancer-related disease burden reduced in Jordan, Iraq and slightly in Lebanon, and increased in all other countries, especially in Syria and Libya.

Cancer-related disease burden remained highest in Lebanon (despite a slight decrease over the study decade) and Egypt at the level of 2,700 life years lost per 100,000.

The comparison of Figure 114 (on page 117) and Figure 115 (on page 118) shows that years lived with disabilities was low in Egypt in contrast to Lebanon.

Figure 16: Disease burden details: DALYs caused by cancer, by country and year
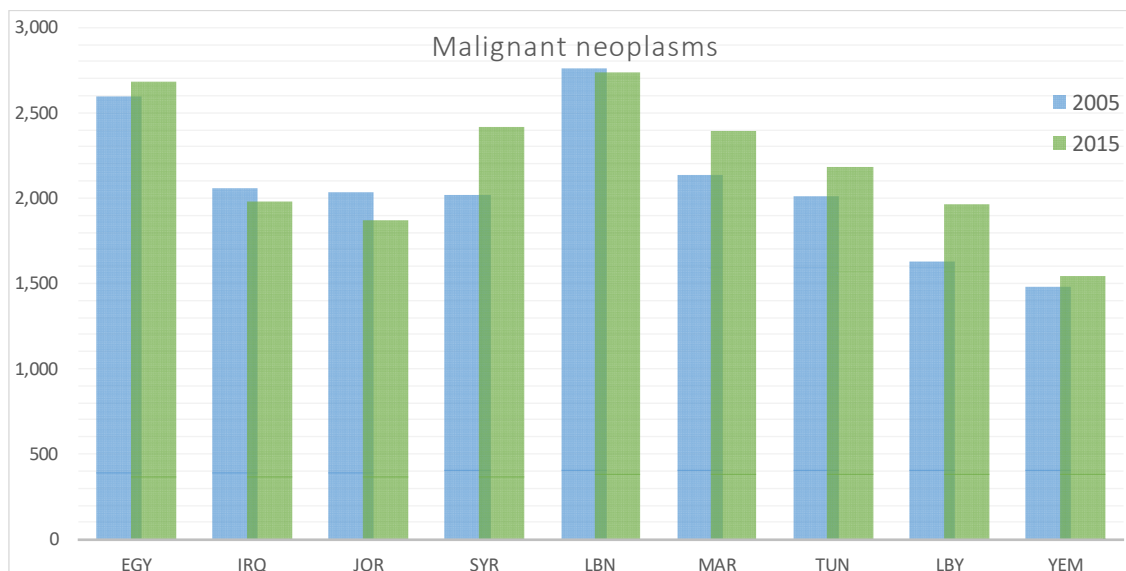
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Although the estimated cancer incidence and five-year prevalence was the highest in Lebanon (and far above regional averages as shown Figure 17 below), years of life lost by cancer was almost the same as in Egypt and slightly higher than in Morocco, where cancer incidence and prevalence was much lower. The finding that years of life lost due to cancer in the countries with much lower prevalence of cancer was at the level of Lebanon which much higher cancer incidence and prevalence implies that cancer screening and treatment services (II1-II3 sub-levels of analytical framework) are more successful in Lebanon than in other countries.

Figure 17: Cancer incidence and five-year prevalence (all types), 2012
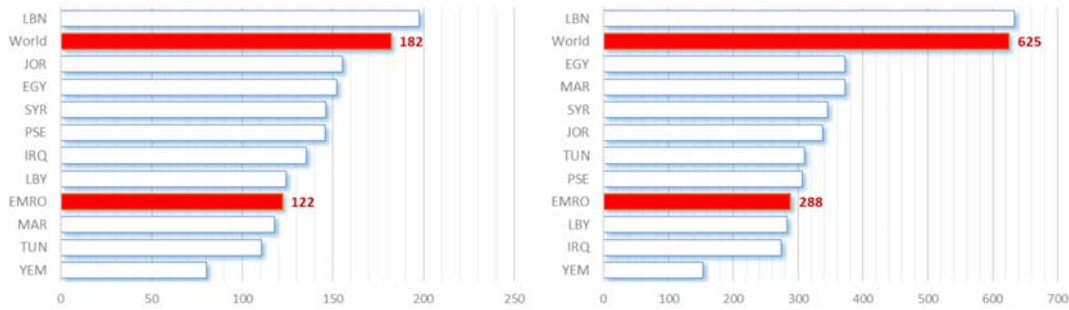
Source: International Agency for Research on Cancer

Figure 18: Breast cancer incidence and five-year prevalence, 2012

Source: International Agency for Research on Cancer

Figure 19: Cervical cancer incidence and five-year prevalence, 2012
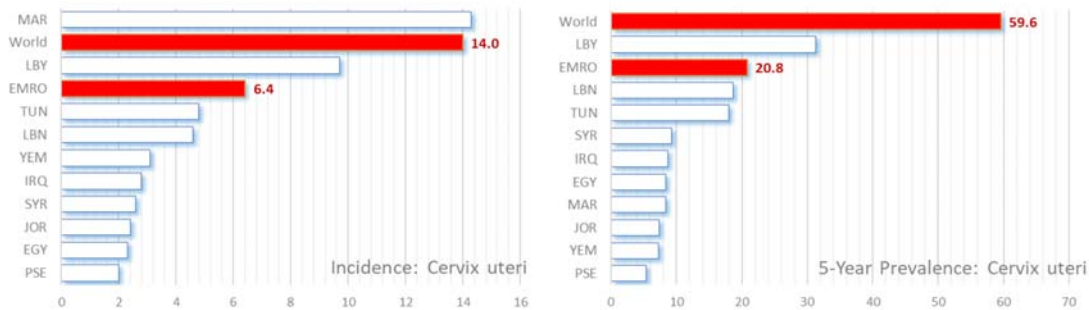
Source: International Agency for Research on Cancer

Cancer epidemiology estimates by main types for the focus countries are presented in Figure 102 on page 109.

The depressive disorder-related disease burden increased in all countries; with the highest burden (in DALYs) observed in Tunisia, Lebanon, Morocco and Libya (Figure 20).

Figure 20: Disease burden details: DALYs caused by depressive disorders, by country and year
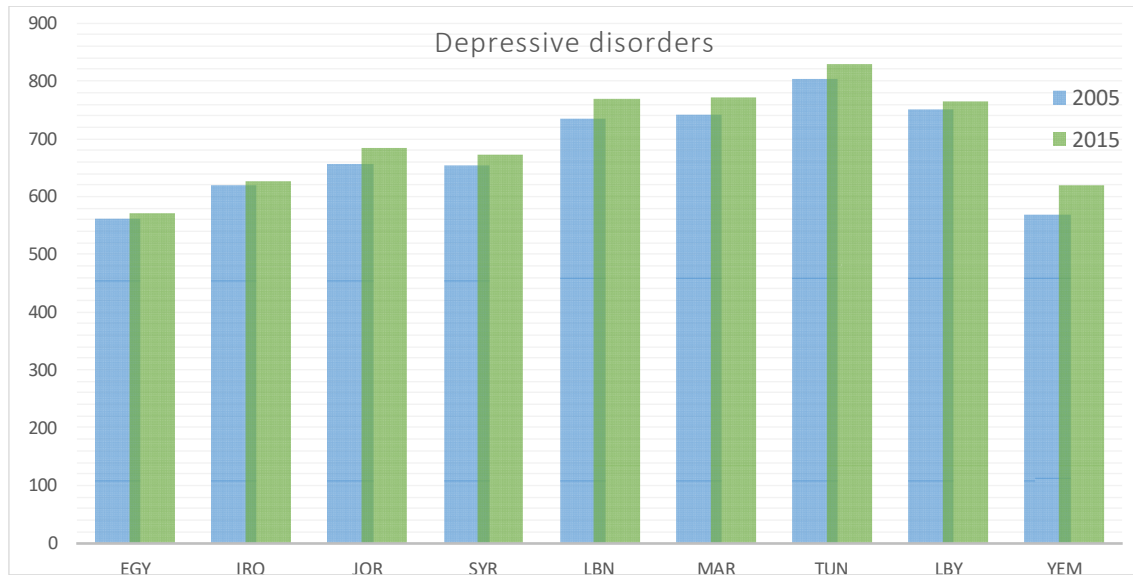
Depressive disorders

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Suicide death rates increased significantly in Yemen, Libya and Tunisia during the study period, reaching 8.2 per 100,000 in Yemen in 2015; six to seven times higher compared to suicide death rates in Jordan, Iraq and Egypt (Figure 21).

Figure 21: Suicide mortality rate

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
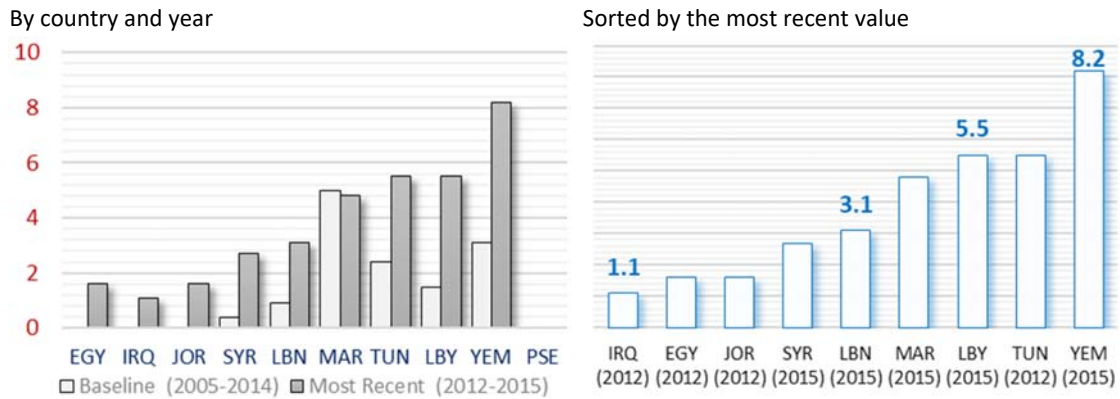
Tunisia had the highest prevalence of depression (4.9% of population) followed closely by Lebanon. However, anxiety disorders were highest in Lebanon (5.5% of population). Yemen and Egypt had relatively lower prevalence of both mental disorders (Figure 22).

Figure 22: Prevalence of depression and anxiety disorders, as % of population (2015)

Depression

Anxiety disorders
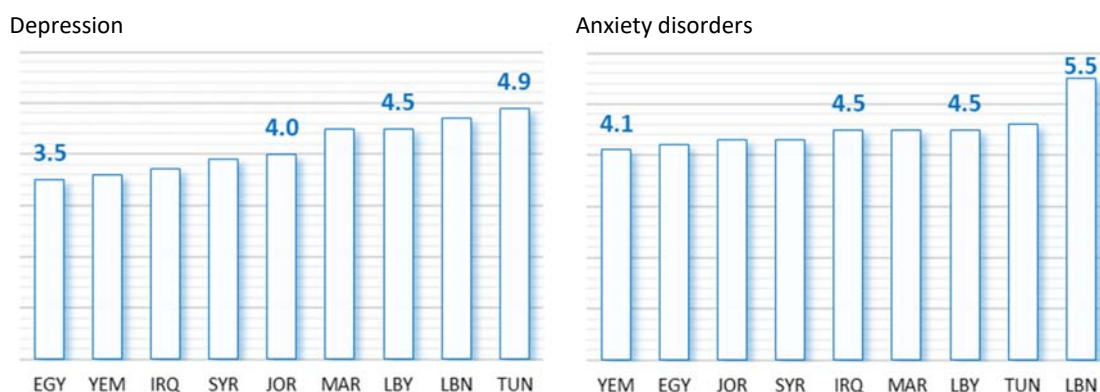
Source: WHO 2017

2. Prevalence of risk factors

This subsection summarizes key findings at level I and level II of the analytical framework (outputs and intermediate outcomes). Due to the unavailability of data on incidence and prevalence of the major NCDs and their complications, the analysis of level I and level II results of the analytical framework mainly focuses on prevalence of risk factors of CVDs and other NCDs.

According to STEPS reports, the highest mean total blood cholesterol (186 mg/dl) was in Syria in 2003 (Figure 23).

Figure 24 shows that the mean total cholesterol in blood decreased in all countries from 1980 to 2009.

The mean total cholesterol level in the blood remained higher in females compared to males. In 2009, among males, it was highest in Jordan at 4.9 mmol/l and lowest in Yemen at 4.4 (mmol/l); among females, it was the highest in Lebanon and Jordan (5.0 mmol/L) and the lowest in Yemen (4.6 mmol/L).

Figure 23: Mean total blood cholesterol, including those currently on medication for raised cholesterol (mg/dl) (215)
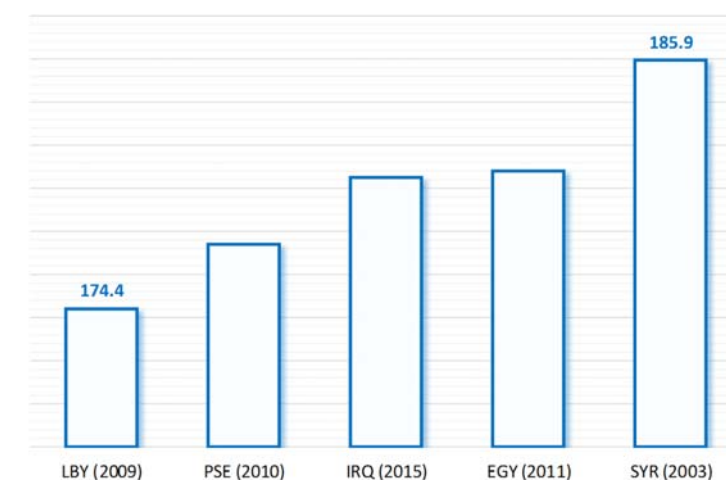
Source: STEPS reports

Libya observed the most prominent reduction in mean total cholesterol of its population between 1980 and 2009; dropping by 0.6 mmol/L between 1980 and 2009 for both females and males.

Figure 24: Mean total cholesterol age-standardized (male)

By country and year

Sorted by the most recent value

Sources: WHO Global Health Observatory (http://www.who.int/gho/en/)
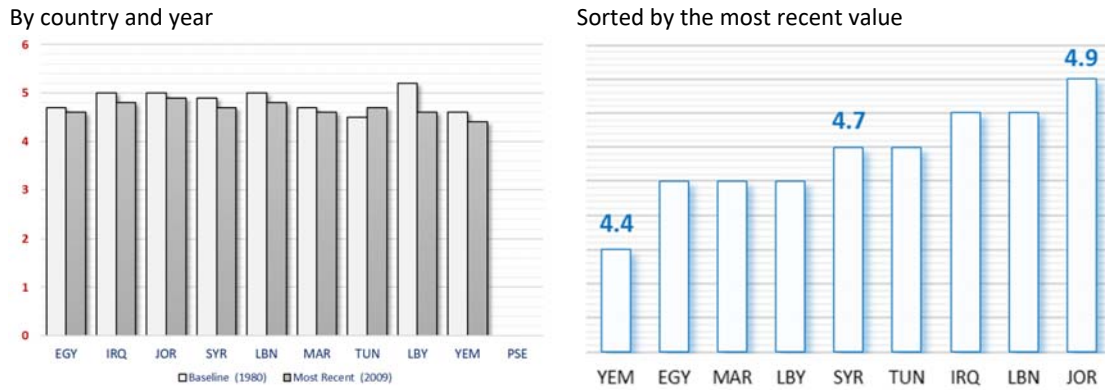
Figure 25: Mean total cholesterol age-standardized (female)

By country and year

Sorted by the most recent value

Sources: WHO Global Health Observatory (http://www.who.int/gho/en/)
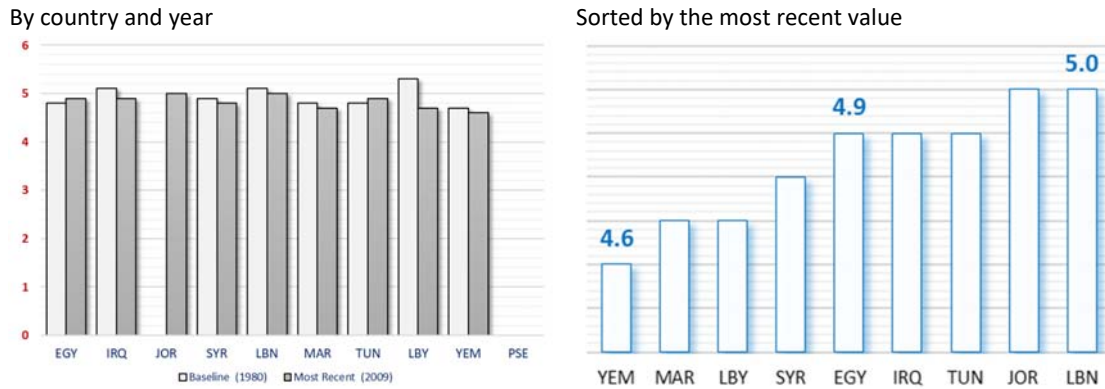
Lebanon had the greatest share of the female population with high total cholesterol (≥6.2 mmol/L) (13.3%) and Jordan had the greatest share of the male population with high cholesterol (11.4%) as shown in the Figure 26 below.

Figure 26: The share of population of with raised total cholesterol (2008)

	Total cholesterol ≥5.0 mmol/L			Total cholesterol ≥6.2 mmol/L		
	Female	Male	Both sexes	Female	Male	Both sexes
Egypt	45.3	33.9	39.9	11.7	6.5	9.2
Iraq	44.1	43.7	44	11	9.8	10.5
Jordan	49.6	47.8	48.8	12.9	11.4	12.2
Lebanon	47	41	44.2	13.3	9.4	11.5
Libya	36.6	34.8	35.6	8.1	6.7	7.4
Morocco	39	35.3	37.2	9.6	7.2	8.5
Syrian	42.4	38.3	40.5	11.1	8.3	9.8
Tunisia	43.8	37.3	40.7	11.9	8.1	10.1
Yemen	33.6	30.7	32.3	7.7	5.9	6.9

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)

Raised blood pressure

The proportion of the adults with raised blood pressure decreased in Egypt, Libya and Iraq, but increased in Lebanon (Figure 27). It was the highest in Palestine (35.8%); almost three times higher than in Lebanon (12.6%).

Figure 27: Age-standardized prevalence of raised blood pressure among persons aged 18+ years

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
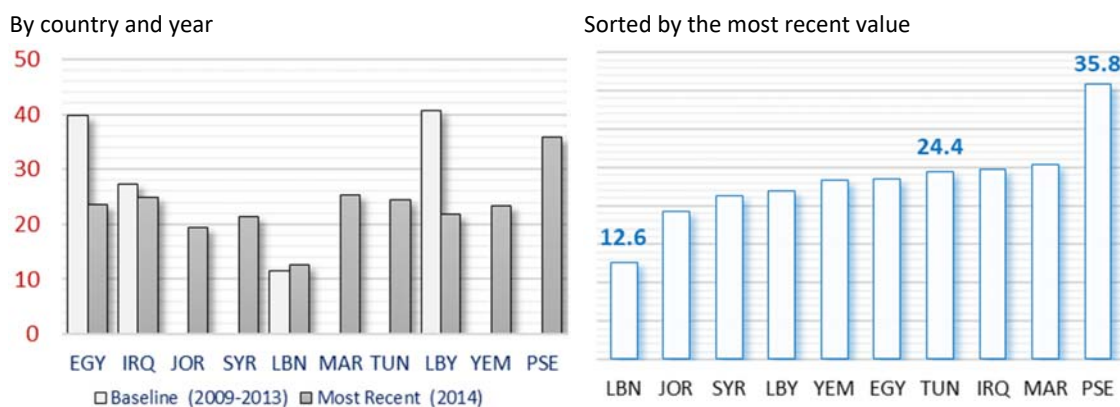
Alcohol consumption

Alcohol consumption declined in all countries where data was available. It remains highest (two times higher) in Lebanon and Tunisia compared to other countries (Figure 28).

Figure 28: Total (registered and unregistered) alcohol per capita (aged 15+ years old) consumption within a calendar year in liters of pure alcohol, as appropriate, within the national context

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
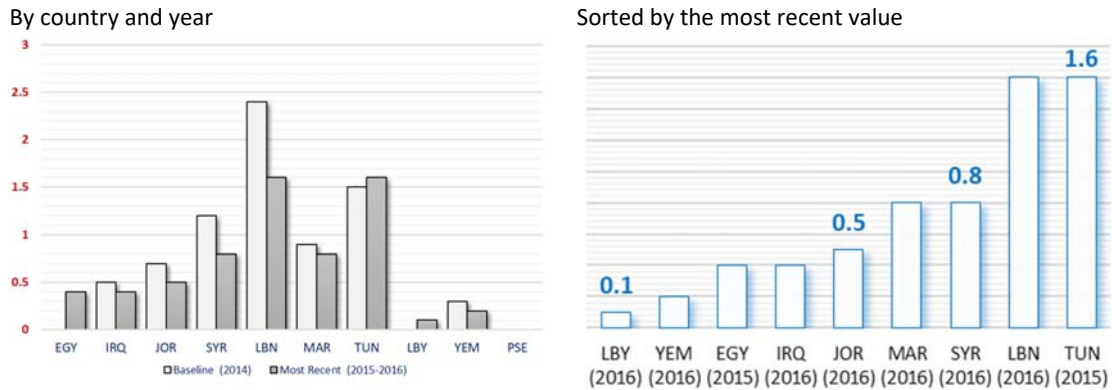
Disaggregated data on alcohol consumption also confirms that the proportion of the population consuming alcohol is small in the countries with a predominantly Muslim culture. The share of the population who consumed alcohol in the last 12 months was higher among males compared to females with highest consumption among the male population of Lebanon (13%) compared to other countries (Figure 29).

Figure 29: Self-reported alcohol consumers, past 12 months (%) (2010)

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
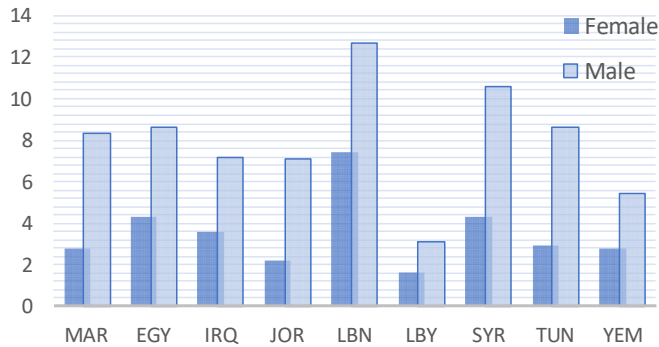
Heavy episodic alcohol consumption significantly declined in Egypt and Jordan between baseline (2005-2007) and the most recent data (2010-2014), and was the highest in Syria (6.4% in 2003) as shown in Figure 30 below.

Figure 30: Age-standardized prevalence of heavy episodic drinking among adolescents and adults, as appropriate, within the national context

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
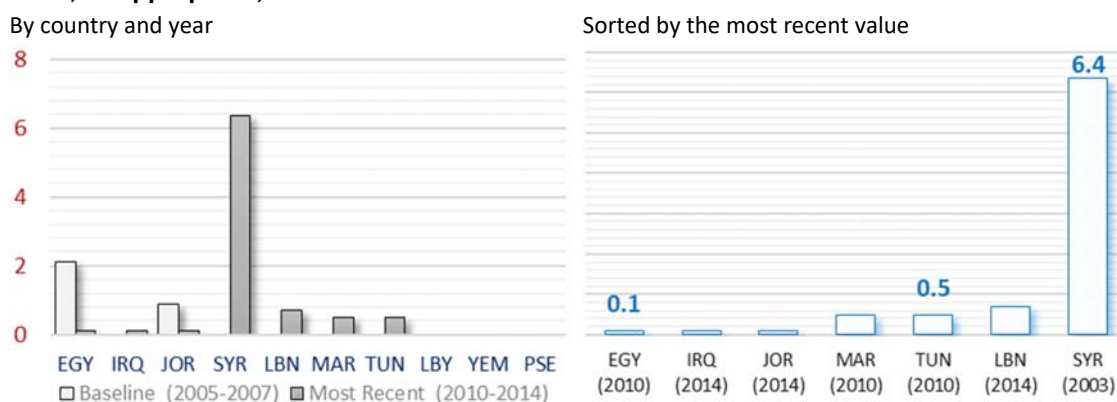
Diabetes

According to the Nutrition, Health and Population Statistics (NHPS) of the World Bank, prevalence of diabetes was three times higher in Egypt (Figure 31) in 2015 than in Yemen (16.7% vs. 5.1% respectively).

Figure 31: Diabetes prevalence (% of population ages 20 to 79)

By country and year

Sorted by the most recent value
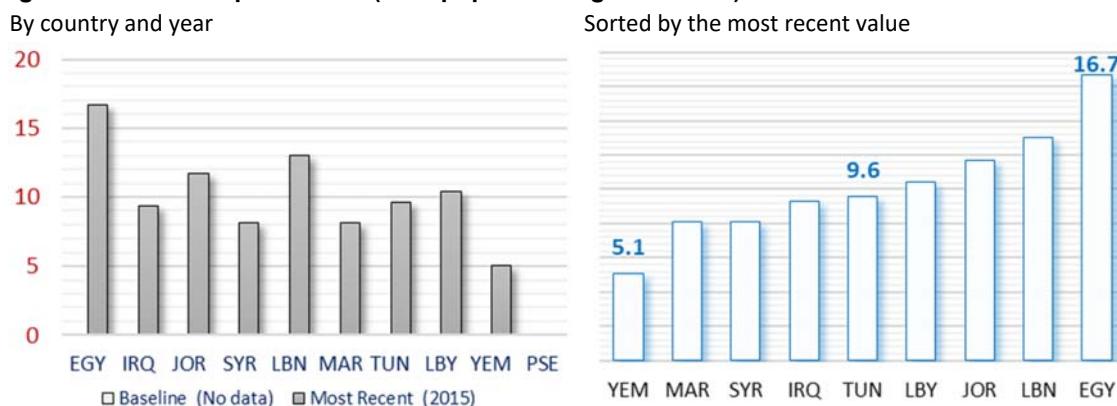
Source: The World Bank Nutrition, Health and Population Statistics

The World Bank Nutrition, Health and Population Statistics figures on diabetes prevalence are based on International Diabetes Federation estimates (30).

According to WHO EMRO statistics (31), high blood glucose prevalence (age-standardized) was the highest in Egypt (18.9 per 100,000). It has been halved in Lebanon in one year; from a reported 28.4 in 2013 to 12.6 in 2014. However, diabetes-related disease burden in Lebanon was significantly lower compared to Morocco and Tunisia (Figure 32), which both have about the same level of prevalence (13.5 and 13.3 per 100,000 respectively).

Figure 32: Age-standardized prevalence of raised blood glucose/diabetes among persons aged 18+ years or on medication for raised blood glucose

By country and year

Sorted by the most recent value
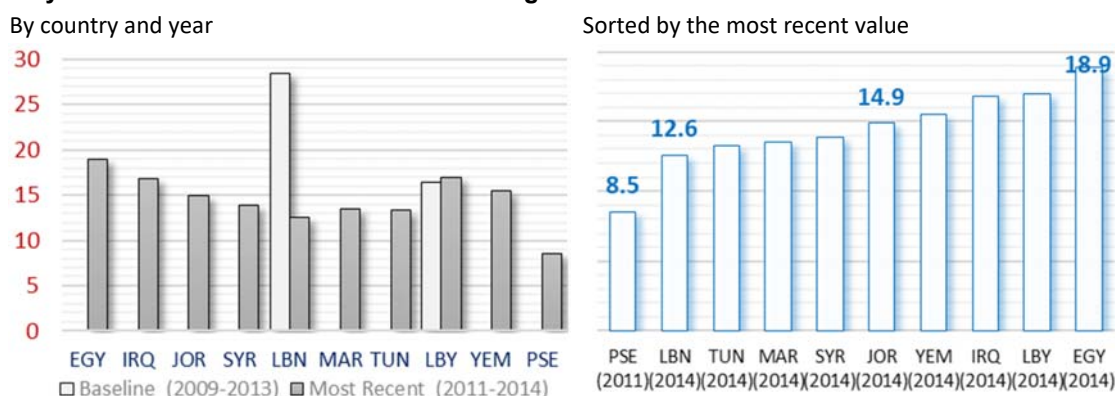
Source: WHO EMRO Framework (31)

Disaggregating the data by sex shows a different epidemiologic landscape. Figure 33 (below) on males and females with raised fasting blood glucose (≥7 mmol/L) shows that:

- Glucose levels were the highest in Egypt, with 19.8% of females and 16% of males having raised fasting blood glucose (with weighted average for both sexes of 17.9%);

- Lebanon, which has the highest age-standardized prevalence of raised blood glucose, ranked 6th out of the nine study countries (no data for Palestine) in percentage of the population with raised fasting blood glucose, with a weighted average prevalence of 13.4% for both sexes;

- Morocco, Lebanon and Yemen were the only three countries where males were more likely to have high fasting blood glucose than females (14% vs. 13.4%, 14.5% vs. 12.2% and 12.6% vs. 10.1%, respectively).

Figure 33: Population (in %) with raised fasting blood glucose (>=7.0 mmol/L or on medication) (age-standardized estimate), by sex and country, 2014

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
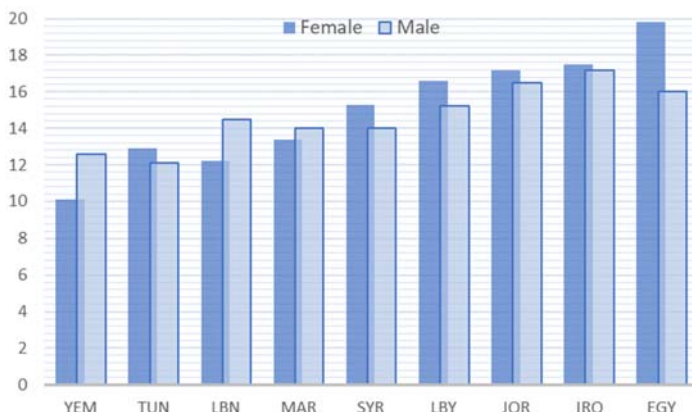
WHO Global Health Observatory statistics are based on NCD Risk Collaboration data (32). More details for the period from 1980 to 2014 can be found in Figure 139 (on page 143) and Figure 140 (on page 144). For instance, Figure 140 shows that the prevalence of the biological factors increased in five years (from 2010 to 2014) in all ten study countries, and the increase was highest among males in Lebanon (16%), followed by Yemen (14.5% in males and 13.5% in females).

Overweight and obesity

Iraq and Egypt had the highest percentage of overweight or obese adolescents among the study countries. Approximately 8% of adolescents in Iraq and 7% of adolescents in Egypt suffered from obesity as shown Figure 34 below.

Figure 34: Prevalence of obesity in adolescents

By country and year   Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
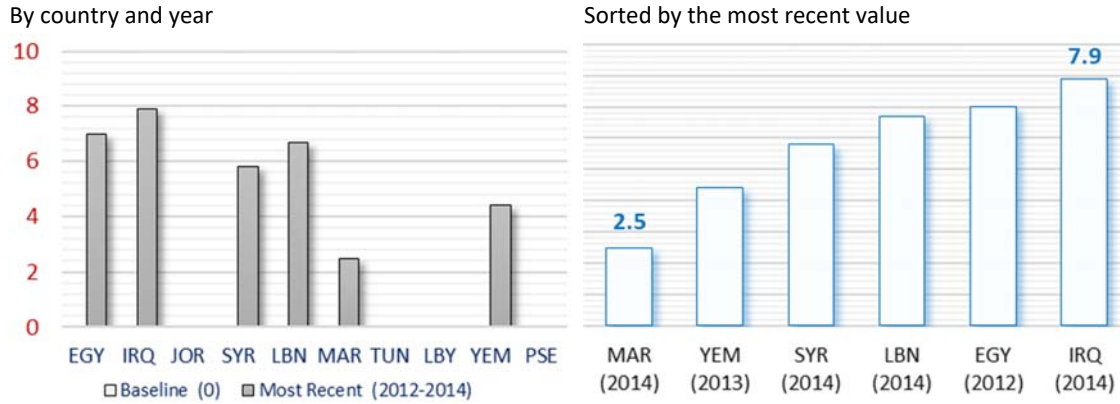
Twenty-two (22) percent of children under the age of 5 in Libya, and 21.5% in Syria, were overweight compared to 2% in Yemen in 2014 (Figure 35).

Figure 35: Children aged under 5 years who are overweight

By country and year   Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
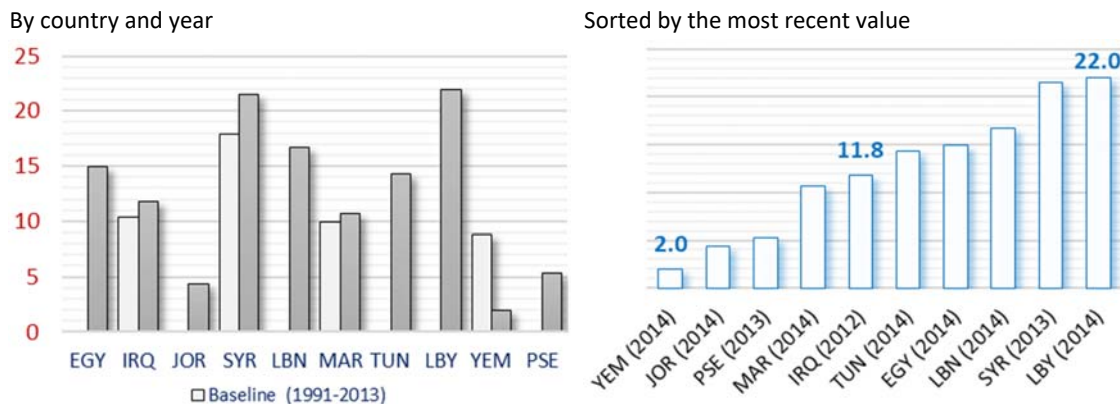
Most countries experienced a significant increase in the prevalence of overweight persons as shown Figure 36 below. The proportion of overweight adults remained higher in Egypt than in Iraq, similar to the trend among children under five, but both countries were positioned in the middle band of the 10 countries sorted by the prevalence of overweight and obesity. Libya and Lebanon topped the list of study countries with the highest prevalence of overweight persons among their population (close to 70%), while less than half of the adult population in Yemen were overweight.

Figure 36: Age-standardized prevalence of overweight in persons aged 18+ years

By country and year

Sorted by the most recent value

Sources: WHO Global Health Observatory (http://www.who.int/gho/en/)
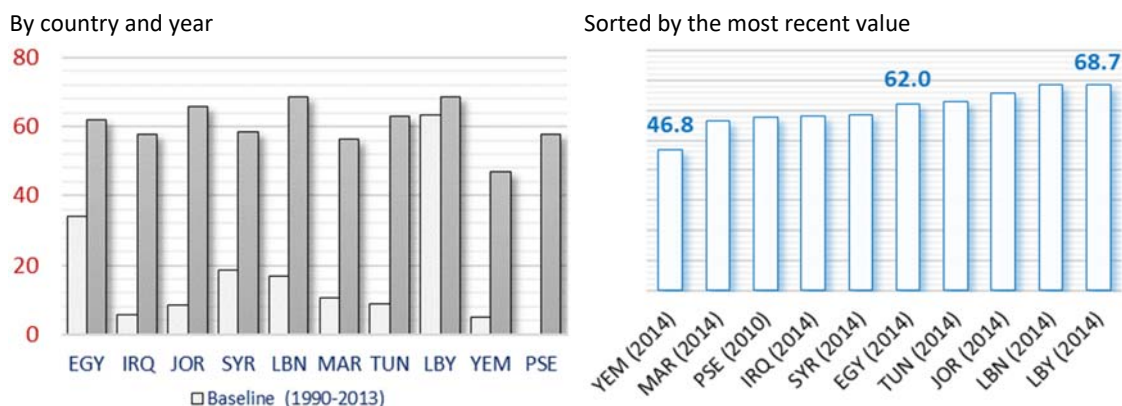
The same pattern is observed when the prevalence of obesity among adults is compared across the selected countries as shown in Figure 37 below.

Figure 37: Age-standardized prevalence of obese in persons aged 18+ years

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
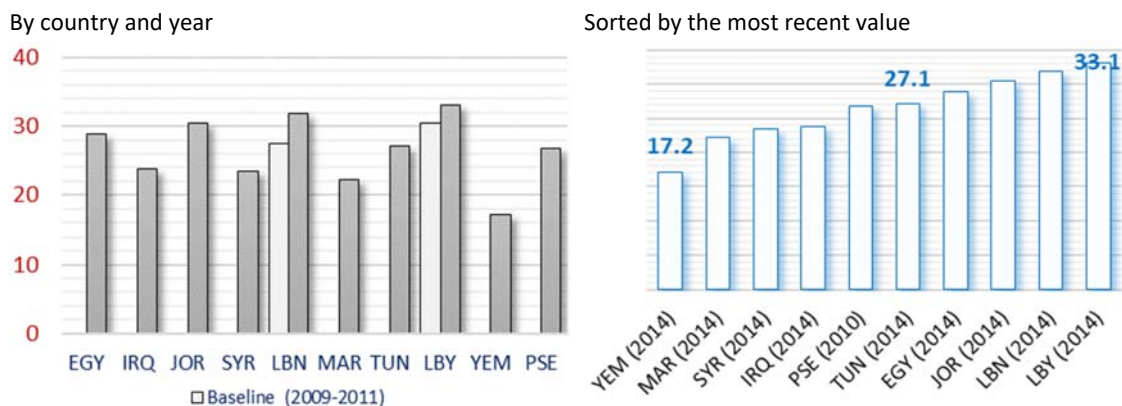
Insufficient physical activity

Insufficient physical activity was widespread among adolescents in all countries where data was available (Figure 38). It was relatively lower in Lebanon (65%) compared to the rest of the countries (>80%).

Figure 38: Prevalence of insufficiently physically active adolescents, defined as less than 60 minutes of moderate to vigorous intensity activity daily

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
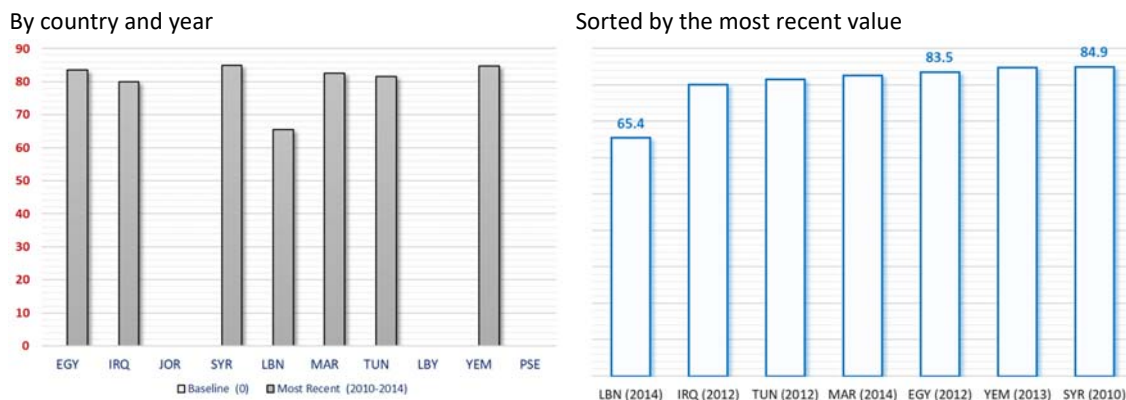
Information on dietary practice was limited. In Syria, Morocco and Lebanon, more than 95% of the population was not consuming the recommended servings of fruit and vegetables per day (Figure 39).

Figure 39: Age-standardized prevalence of persons (aged 18+ years) consuming less than five total servings (400 grams) of fruit and vegetables per day

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
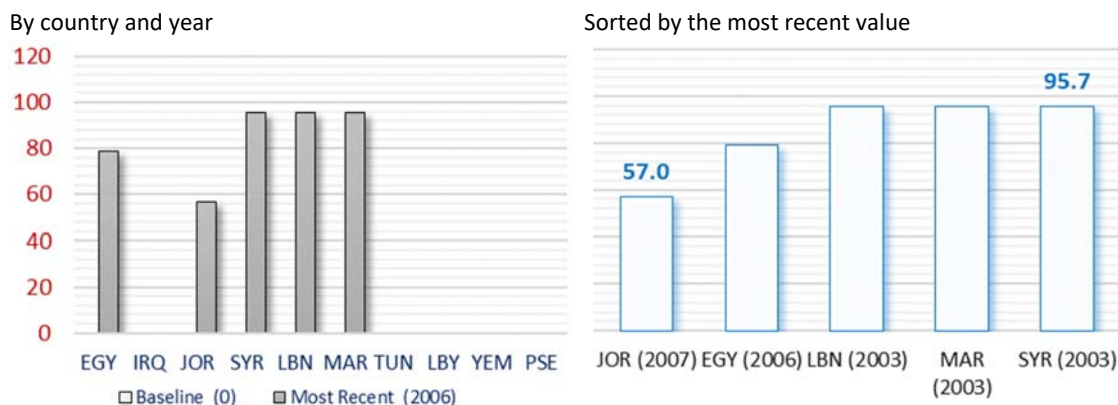
Tobacco consumption

Tobacco use among adolescents reduced slightly in Jordan between 2013 and 2014 (there was no baseline data to see trends in other countries). Prevalence of current tobacco use among adolescents was highest in Lebanon (36.2%) – significantly higher than in the other selected countries –and was the lowest in Egypt (5.1%) (Figure 40 on page 35).

Middle East NCD rapid assessment

Figure 40: Prevalence of current tobacco use among adolescents

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
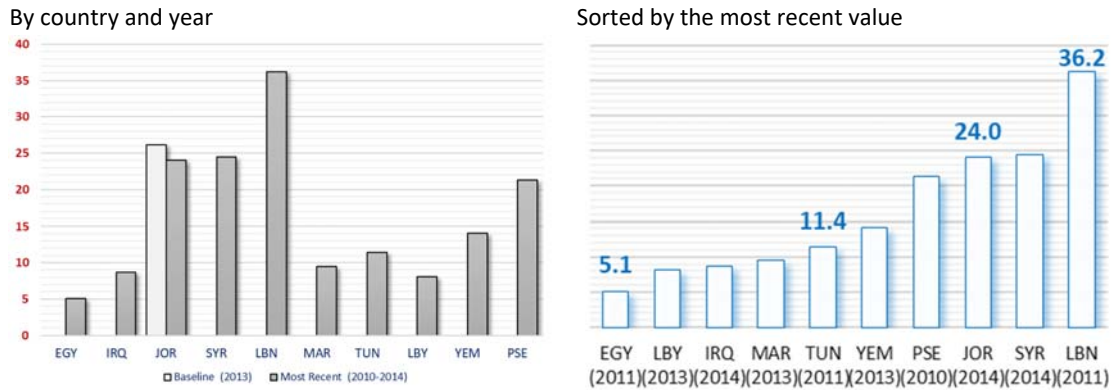
Tobacco use among adults varied among the study countries. It increased significantly in Jordan and Lebanon between the baseline (2003-2011) and the most recent data (2011-2014) and was highest in Jordan (38.4%), where it was twice as high as in Morocco or Iraq (Figure 41).

Figure 41: Age-standardized prevalence of current tobacco use among persons aged 18+ years

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
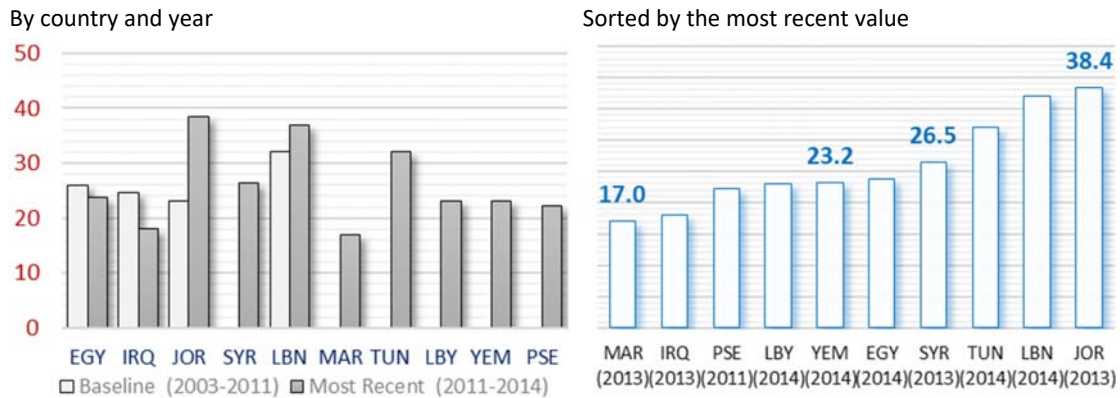
Environmental risk factors

The entire population (rural and urban) in all ten countries were exposed to fine particulate matter air pollution levels exceeding the WHO guideline value of 10 μg/m3 annual mean level in 2015, according to the World Bank NHPS data[11] (Figure 42).

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[11] https://data.worldbank.org/indicator/EN.ATM.PM25.MC.ZS?view=chart

Figure 42: Particulate matter air pollution, mean annual exposure (micrograms per cubic meter)

	2010	2011	2012	2013	2014	2015
Egypt	90.5	89.1	88.6	95.0	99.2	**104.7**
Iraq	90.7	83.9	78.6	66.4	58.9	52.0
Jordan	36.0	34.8	34.6	35.5	37.0	38.8
Lebanon	28.4	27.5	27.2	28.8	30.6	32.6
Libya	67.7	61.1	58.7	64.3	71.1	**79.2**
Morocco	19.8	19.0	18.7	20.0	21.4	23.0
Palestine	18.2	17.8	17.9	18.6	19.5	20.6
Syria	41.2	38.3	37.6	38.4	39.9	41.6
Tunisia	35.5	34.1	33.6	35.9	39.9	44.8
Yemen	50.8	55.5	62.5	59.3	55.9	52.8
Middle East & North Africa	*61.9*	*60.9*	*61.1*	*61.0*	*60.7*	*61.0*
Middle East & North Africa (excluding high income)	*56.4*	*55.2*	*54.8*	*55.7*	*56.4*	*57.7*
Arab World	*63.8*	*63.2*	*63.8*	*63.4*	*63.0*	*63.1*
Euro area	*13.0*	*12.9*	*12.8*	*13.4*	*13.8*	*14.2*
World	*41.8*	*41.8*	*42.4*	*42.9*	*43.4*	*44.0*

Source: World Bank 2017; Colors: red – the highest value in 2015, white – the lowest

The mean annual exposure declined over time in only two countries: Iraq (90.7 micrograms per cubic meter in 2010 to 52 µg /m^3 in 2015) and Yemen (from 62.5 µg /m^3 at its highest in 2012 to 52.8 µg /m^3 in 2015). The highest pollution levels were observed in Egypt (104.7 µg /m^3 in 2015; almost twice as high as most of the other study countries) and Libya (79.2 µg /m^3 in 2015) (Figure 42).

Figure 43: Age-standardized mortality rate attributed to household and ambient air pollution (per 100,000 population)

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
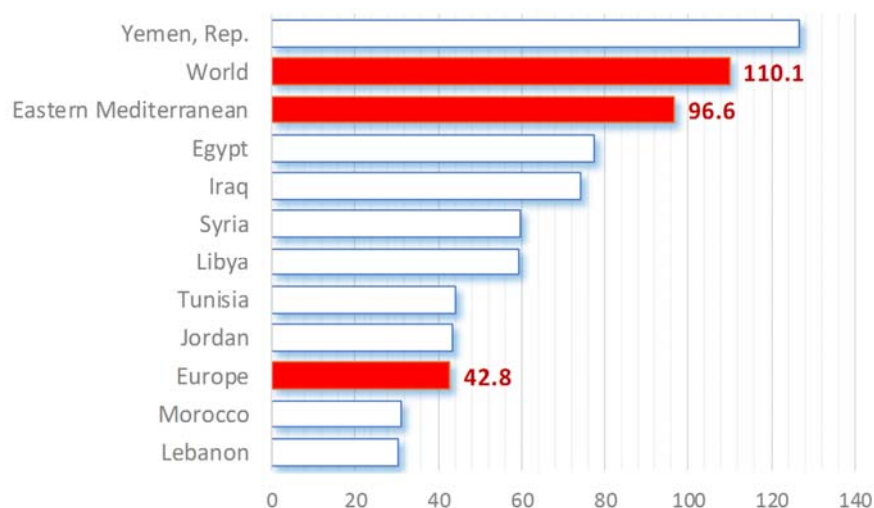
As expected, trends in mortality associated with air pollution largely followed trends in air pollution. Yemen (ranked third in air pollution) had the highest mortality rate associated with air pollution; Lebanon and Morocco, the lowest (**Figure 43**).

C. Major Trends in Health System and Service Delivery Performance

As part of the desk review, we reviewed country reports of joint external evaluations of international health regulations [IHR] core capacities to identify any existing national policies or plans to address NCDs. According to the country reports, Egypt had no national plans for reducing NCDs or their risk factors except for reducing tobacco use (Figure 44). Iraq reported the existence of plans to address topics listed in Figure 44, except a plan to reduce harmful consumption of alcohol, and Jordan had a plan for all topics except for a plan to address chronic respiratory diseases (CRD). A multi-sectoral or integrated plan/policy on NCDs was available only in Iraq and Lebanon. Only Tunisia reported having plans/regulations on saturated fatty acids. A plan/policy to reduce salt consumption was available only in Tunisia and Jordan.

Policies to reduce the impact on children of marketing of foods and non-alcoholic beverages that are high in saturated fats, trans fatty acids, sugars, or salt (GMF 23) were absent in six countries (Egypt, Iraq, Jordan, Lebanon, Morocco, Syria) and no information was available for the remaining countries (Tunisian, Libya, Yemen, Palestine).

The status of "Adoption of national policies that limit saturated fatty acids and virtually eliminate partially hydrogenated vegetable oils in the food supply, as appropriate, within the national context and national programmes (GMF 21)" was not clear in Tunisian, Libya, Yemen, Palestine, and Iraq and was negative in the remaining countries.

Figure 44: National capacity for policies and strategies

		Plan on CVD	Plan on Cancer	Plan on Diabetes	Plan on CRD	Harmful use of alcohol	Unhealthy diet	Reduce physical inactivity	Decrease tobacco use	Existence of indicators and targets	Multisectoral national NCD	Marketing of foods to children	To reduce salt consumption	On saturated fatty acids	Physical activity public awareness program
Egypt	2013	No	No	No	No	No	No	No	Yes		No				
	2015	No	No	No	No	No	No	No	NR	Yes	No	No	No	No	No
Iraq	2013	Yes	Yes	Yes	Yes	D/K	Yes	Yes	Yes		Yes				
	2015	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	D/K	Yes
Jordan	2013	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes		No				
	2015	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Lebanon	2013	D/K	D/K	D/K	D/K	D/K	D/K	D/K	Yes		D/K				
	2015	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No	No
Libya	2013	No	No	D/K	No	No	No	No	No		No				
	2015	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Morocco	2013	Yes	Yes	Yes	No	No	No	No	Yes		No				
	2015	Yes		Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes
Syria	2013	No	Yes	Yes	Yes	No	No	No	Yes		No				
	2015	No	No	No	No	No	No	No	D/K	No	No	No	No	No	No
Tunisia	2013	No	No	Yes	No	No	No	No	Yes		No				
	2015	Yes	Yes	Yes	NR	No	Yes	Yes		Yes	No	No	Yes	Yes	Yes
Yemen	2013	No	No	No	No	No	No	No	No		No				
	2015	No	Yes	No	No	No	No	No	NR	No	No	No	No	No	No

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

An operational or structural unit within Ministries of Health responsible for the implementation of public policy on NCDs was available in three countries: Libya, Morocco and Tunisia (Figure 45). At the same time, NCD policy is implemented by a multi-sectoral committee/agency in Egypt and Jordan. There is no governance or public administration structure responsible for NCDs in Iraq, Lebanon, Syria, and Yemen.

Figure 45: National capacity for governance/public administration of NCDs

		Operational Unit with responsibility for NCDs	National multisectoral commission, agency or mechanism for NCDs
Egypt	2013	No	
	2015	No	Yes
Iraq	2013	D/K	
	2015	D/K	No
Jordan	2013	No	
	2015	No	Yes
Lebanon	2013	No	
	2015	No	No
Libya	2013	Yes	
	2015	No	No
Morocco	2013	No	
	2015	Yes	
Syria	2013	No	
	2015	No	No
Tunisia	2013	No	
	2015	Yes	No
Yemen	2013	No	
	2015	No	No

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

The health systems' capability to recognize and respond to emerging challenges (such as shortfalls in NCD prevention and control) depends on performance of the government (33). Figure 46 summarizes governance practices in the study countries using six governance criteria. As indicated in the figure:

- Jordan, Morocco and Tunisia where ranked higher on these six criteria (Figure 46) compared to the rest of the study countries.

- Syria, Iraq and Yemen were ranked the lowest for governance criteria. Iraq and Syria showed no change in scores for these criteria compared to five years ago. Syria ranked higher in 2010 than in 2015 for criteria such as political stability, governance effectiveness, regulatory quality and rule of law (see 2010 scores in Figure 119 on page 123), but ongoing civil war (2011 to present) has weakened these structures.

Figure 46: Percentile ranks of selected countries against governance criteria (2015)

	Voice and Accountability	Political Stability and Absence of Violence/Terrorism	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Egypt	18.23	8.57	22.12	24.52	35.58	35.10
Iraq	14.78	2.86	9.13	8.65	**3.85**	**4.33**
Jordan	26.60	26.67	59.13	55.29	68.27	64.42
Lebanon	31.03	7.14	37.98	43.75	24.52	17.79
Libya	9.85	3.33	**1.92**	**0.48**	**1.92**	**0.96**
Morocco	28.08	**34.76**	50.48	49.04	54.81	50.48
Palestine	22.66	4.76	35.58	56.25	32.69	26.92
Syria	**2.96**	**0.00**	2.88	4.33	4.33	1.92
Tunisia	54.68	19.05	49.04	38.94	56.25	55.29
Yemen	7.88	**0.48**	2.40	12.50	7.21	2.88

Source: The World Bank, World Governance Indicators

In terms of countries' capacity to detect, report and respond to public health events based on international health regulations according to six key criteria (legislation, coordination, surveillance, response, preparedness and human resources), Morocco had the highest scores for criteria that are relevant to NCD prevention and control (including legislation, coordination, response and preparedness). Egypt, Jordan and Iraq's scores were also relatively high compared to the other study countries (Figure 47).

Figure 47: The most recent international health regulation capacity scores by country

Legislation

Coordination

Surveillance

Response

Preparedness

Human resources

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
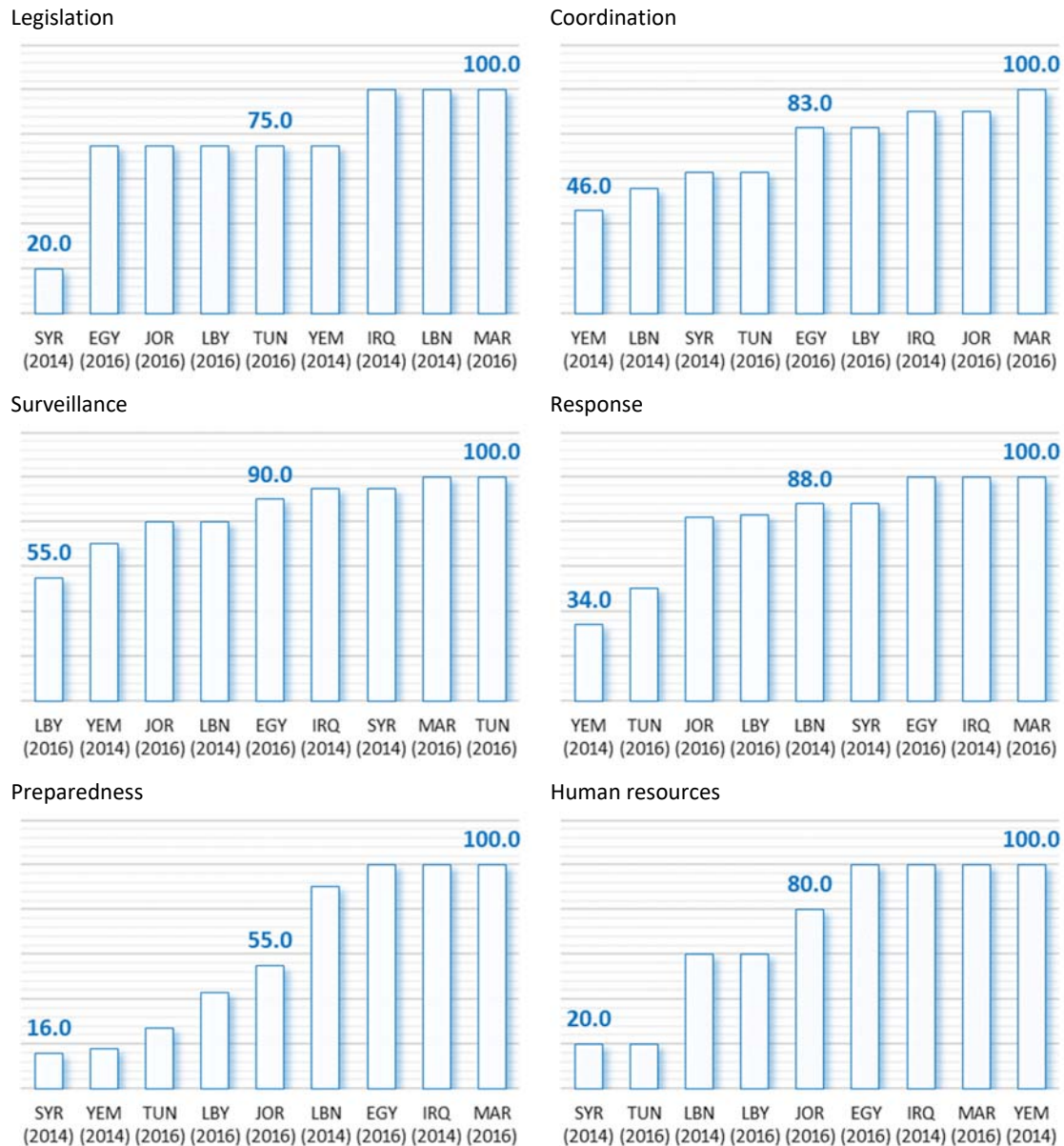
Service delivery

Access to and availability of NCD services and health care infrastructure

The number of primary health care facilities per population declined in Jordan, Lebanon, Tunisia and Egypt; it was the highest in Libya (2.6 per 10,000 population) compared with 0.5 in Egypt (Figure 48).

Figure 48: Number of primary care facilities per 10,000 population

By country and year

Sorted by the most recent value

Baseline (1999) Most Recent (2013-2015)
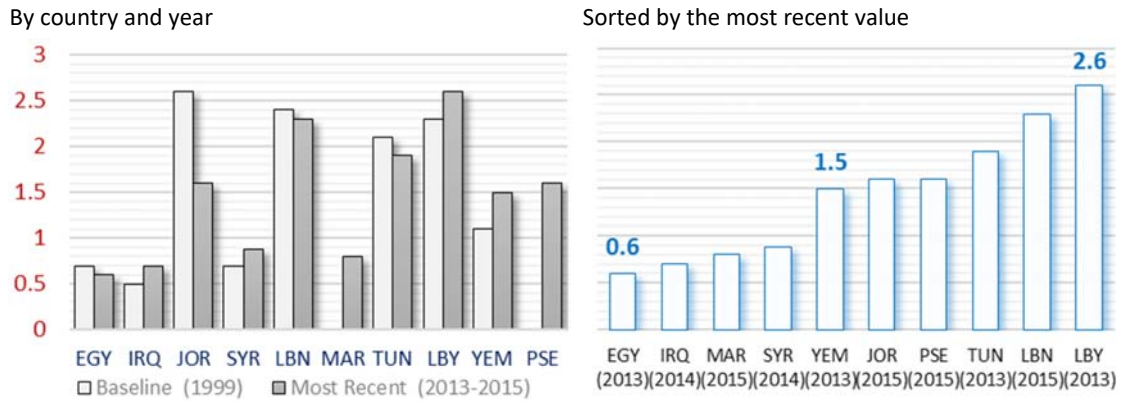
Source: WHO EMRO

Information on the availability of mammographs was available only in six countries. The highest density of mammographs was reported in Lebanon (370.2 per 100,000 in 2013); three times higher compared to the next highest country, Jordan (Figure 49).

Figure 49: Density of mammographs per million population in public and private sector health facilities

By country and year

Sorted by the most recent value

Baseline (No data)

Sources: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
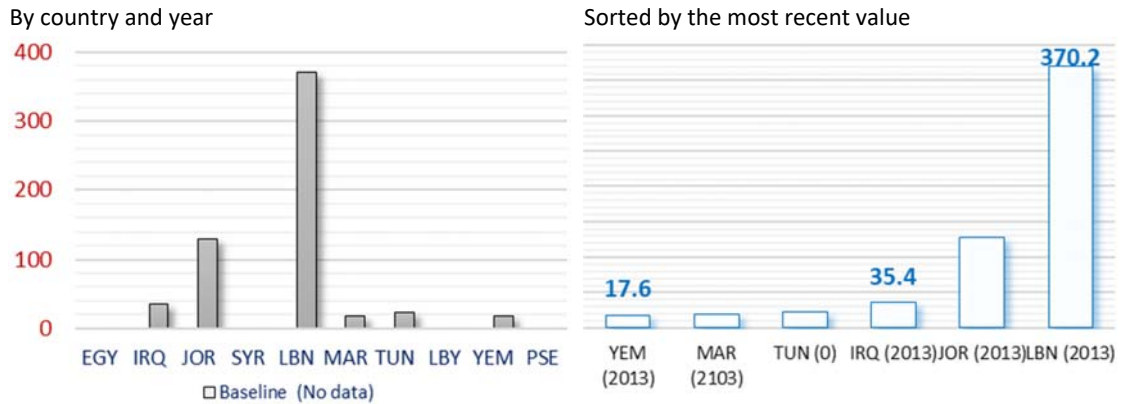
Total cholesterol testing was available in the public health sector in all countries, except Tunisia and Libya; the status was unknown in Morocco and Yemen (Figure 50). Blood glucose testing was available in all countries, and diabetes testing by HbA1c was available in all countries, except Libya (the status was unknown for 2015 in Egypt, Tunisia and Yemen).

Figure 50: General availability of selected tests or diagnostic interventions in public health sector

		Total cholesterol	Peak flow spirometry	Urine testing for albumin	Blood glucose	diabetes testing (by HbA1c)	cardiovascular risk stratification in 50% or more primary health care facilities	Secondary prevention of rheumatic fever & heart disease in >50% of public sector health facilities
Egypt	2013	Yes	No	Yes	Yes	Yes		
	2015	D/K	D/K	Yes	Yes	D/K	No	No
Iraq	2013	Yes	No	Yes	Yes	Yes		
	2015	Yes	No	Yes	Yes	Yes	No	Yes
Jordan	2013	Yes	Yes	Yes	Yes	Yes		
	2015	Yes	D/K	Yes	Yes	Yes	No	No
Lebanon	2013	Yes	Yes	Yes	Yes	Yes		
	2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libya	2013	D/K	No	D/K	Yes	No		
	2015	No	No	No	No	No	No	No
Morocco	2013	Yes	Yes	Yes	Yes	Yes		
	2015	D/K		Yes	Yes	Yes	No	Yes
Syria	2013	Yes	Yes	Yes	Yes	Yes		
	2015	Yes	Yes	D/K	Yes	Yes	No	No
Tunisia	2013	No	Yes	Yes	Yes	Yes		
	2015	No	No	No	Yes	D/K	NR	NR
Yemen	2013	Yes	D/K	D/K	Yes	Yes		
	2015	D/K	D/K	D/K	Yes	D/K	No	No

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

Cardiovascular risk stratification in more than 50% of primary health care facilities was available only in Lebanon, and the secondary prevention of rheumatic fever and hearth diseases was only available in two countries: Lebanon and Morocco.

Only in Lebanon, Morocco, and Palestine did more than 50% of the public health sector provide care for stroke in 2015 ("Provision for care of acute stroke and rehabilitation in more than 50% of public sector health facilities (160)").

Retinal photocoagulation was available in Egypt, Iraq, Jordan, Morocco and Tunisia.

Dialysis was available in all countries except Libya.

Kidney transplantation was only available in Egypt, Iraq, Morocco and Yemen.

Coronary bypass/stenting and thrombolytic therapy were available in all countries except Libya and Syria.

Figure 51 presents the availability of medical procedures/interventions for the management of NCDs in public health care facilities:

- Retinal photocoagulation was available in Egypt, Iraq, Jordan, Morocco and Tunisia.

- Dialysis was available in all countries except Libya.

- Kidney transplantation was only available in Egypt, Iraq, Morocco and Yemen.

- Coronary bypass/stenting and thrombolytic therapy were available in all countries except Libya and Syria.

Figure 51: Availability of medical procedures/interventions for the management of NCDs in public health care facilities (2015)

	Retinal photocoagulation	Dialysis	Renal transplantation	Coronary bypass or stenting	Trombolytic therapy	Acute stroke care and rehabilitation > 50% of health facilities
Egypt	Yes	Yes	Yes	Yes	Yes	No
Iraq	Yes	Yes	Yes	Yes	Yes	No
Jordan	Yes	Yes	No	Yes	Yes	No
Lebanon	No	Yes	No	Yes	Yes	Yes
Libya	No	No	D/K	No	No	No
Morocco	Yes	Yes	Yes	Yes	Yes	Yes
Syria	No	Yes	No	No	D/K	No
Tunisia	Yes	Yes	No	Yes	Yes	NR
Yemen	D/K	Yes	Yes	Yes	Yes	Yes

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

Coverage and utilization

Utilization of primary care or outpatient visits is highest in Jordan at 11.5 visits per person per year in 2014. This is almost twice as high as the second highest performer, Lebanon, with over five outpatient visits per year. Utilization of primary care services is very low – less than a visit per person per year – in Egypt, Morocco, Palestine and Syria. Information is not available in Tunisia (Figure 52).

Figure 52: Number of primary care or outpatient department visits per person per year
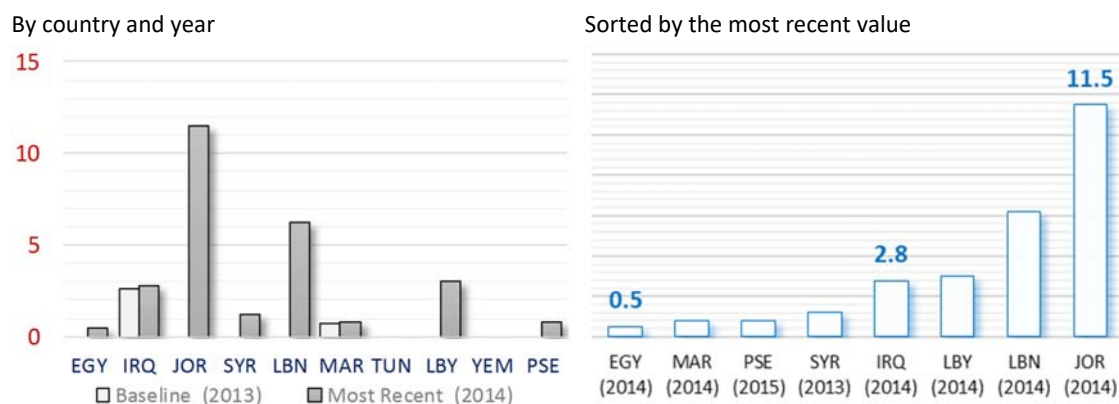
Source: WHO EMRO

Coverage of children with hepatitis B vaccine was low in Syria (41%), Iraq (61%) and Yemen (70%), but coverage was 80% and above for the rest of the study countries (as seen in the Figure 53).

Figure 53: Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants

By country and year

Sorted by the most recent value
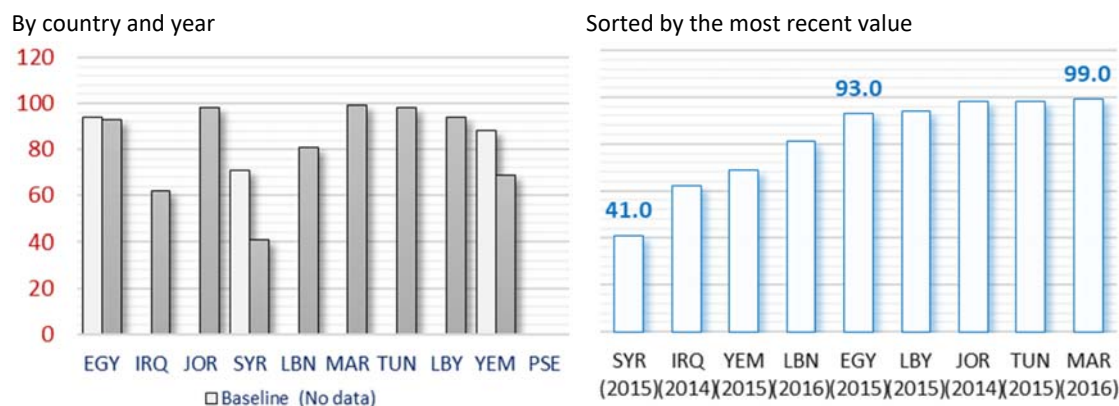
Sources: WHO and UNICEF estimates of national immunization coverage

The population of Libya is not covered with breast or cervical cancer screening programs. Cervical cancer screening programs were available only in Morocco, but the coverage was <10% (Figure 54).

Figure 54: Availability, type and coverage of cancer screening programs (2015)

	Breast cancer	Cervical cancer	Most widely used screening method in national cervical cancer screening program	Type of national cervical cancer screening program	Coverage of national cervical cancer screening program (%)
Egypt	Yes	No	Not applicable	Not applicable	Not applicable
Iraq	Yes	No	Not applicable	Not applicable	Not applicable
Jordan	Yes	No	Not applicable	Not applicable	Not applicable
Lebanon	Yes	No	Not applicable	Not applicable	Not applicable
Libya	No	No	D/K	Not applicable	Not applicable
Morocco	Yes	Yes	No response	Organized population-based screening	Less than 10
Syria	Yes	No	Not applicable	Not applicable	Not applicable
Tunisia	No response	No response	No response	No response	No response
Yemen	Yes	No	Not applicable	Not applicable	Not applicable
Palestine					

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
Note: Blank cells indicate no data

There is no information about the coverage with or utilization of outpatient and inpatient medical services related to most NCD prevention and control services (except PHC/outpatient care visits). A composite coverage index for combined reproductive, maternal, newborn and child health interventions (RMNCH) may serve as a proxy measure of the health system's ability to reach the population with essential care (Figure 55).

Figure 55: Coverage of RMNCH services by country, residence and education levels

	Children aged < 5 years with pneumonia symptoms taken to a health facility (%)		Composite coverage index (%)					
	Rural	Urban	Rural	Urban	No Education	Primary education	Secondary or higher	Years
Egypt	67.8	67.5	78.7	80.1	75.4	77.3	80.2	2014
Iraq	70.5	76.5	68.5	77.5	67.1	73.0	80.9	2011
Jordan	84.2	75.8	85.3	83.9	75.9	79.9	84.7	2012
Lebanon			64.2	80.1	67.6	76.9	82.8	2003
Libya								
Morocco								
Palestine								
Syria	72.1	80.5	74.0	80.2	64.8	76.2	82.4	2006
Tunisia	52.9	63.1	82.8	85.7	82.7	84.4	85.2	2011
Yemen	32.8	37.8	45.5	66.5	44.3	56.7	67.9	2013

Sources: WHO Global Health Observatory and Demographic and Health Survey

Composite coverage was the lowest in Yemen (46% in rural and 66% in urban populations). The disparity between rural and urban coverage was relatively large in Lebanon (rural 64% vs. urban 80%) and Iraq (rural 69% and urban 78%). In Jordan, the rural population had better coverage than the urban population (85.3% vs. 83.9%), but only marginally so (Figure 55). The coverage indicators by year are presented in Figure 120 (on page 123), Figure 121 (on page 124), and Figure 122 (on page 125).

Equity

Except for the information presented above, there was very limited information on access to or coverage with health services by main equity stratifications (urban vs rural, income/consumption groups or sex). Considering that only 35% of the population in Yemen lives in urban settings (Figure 56), understanding the accessibility of health services in rural areas in countries with predominantly rural residence (Yemen, Egypt) is essential.

Figure 56: The share of urban population by countries (2016)
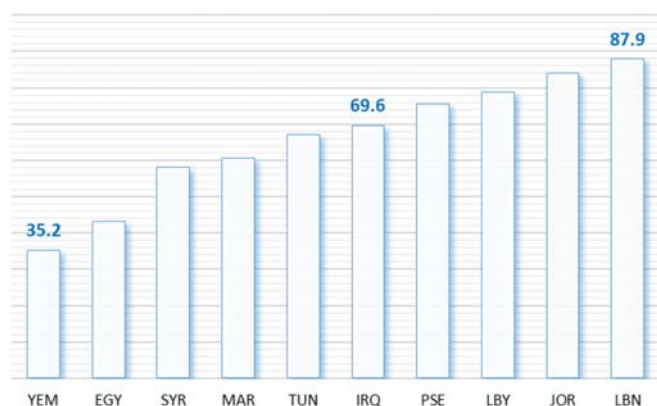
Source: World Bank, Nutrition, Health and Population Statistics 2017

An important equity consideration in the countries with an increased influx of displaced populations is access to and coverage with essential health services in this target population. While information on coverage with essential health services is limited in this population, a recent survey conducted in 2015 by the UN Refugee Agency (UNHCR) (143) revealed that 58% of adult refugees with chronic conditions were not able to access medicines or other health services. This lack of access, coupled

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with their low socioeconomic status, may prevent refugees from using basic health services and medications, in addition to experiencing a higher disease burden or risk of developing NCDs (including depression) in comparison to the rest of the population. While health care needs in this population are not well understood, a study investigating depressive tendencies in Syrian refugees found that about one-third of refugees demonstrated significant depression, as measured by the Beck Depression Inventory; about 40% had hypertension and higher rates of diabetes versus those of the general Jordanian population.

As noted in the section on data availability, information on compliance with evidence-based, high impact NCD prevention, early detection and treatment services (see Figure 98 in the Annex) is uniformly limited in ME focus countries. WHO EMRO has developed quality of care indicators at the PHC level, a majority of which are related to NCD prevention, diagnosis and treatment services, but most of these indicators are not routinely collected or reported in ME focus countries.

Based on the available information, the progress on improving prevention and control of NCDs at the service delivery level is mostly focused on improving availability of guidelines on management of major NCDs (41%) and drug therapy and counselling for high CVD risk individuals (36%) (34) (35).

Essential medicines were available in 93% of health facilities in Syria compared to only 28% in Jordan (Figure 57).

Figure 57: Availability and affordability of quality, safe and efficacious essential non-communicable disease medicines, including generics, and basic technologies in both public and private facilities

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory (http://www.who.int/gho/en/)
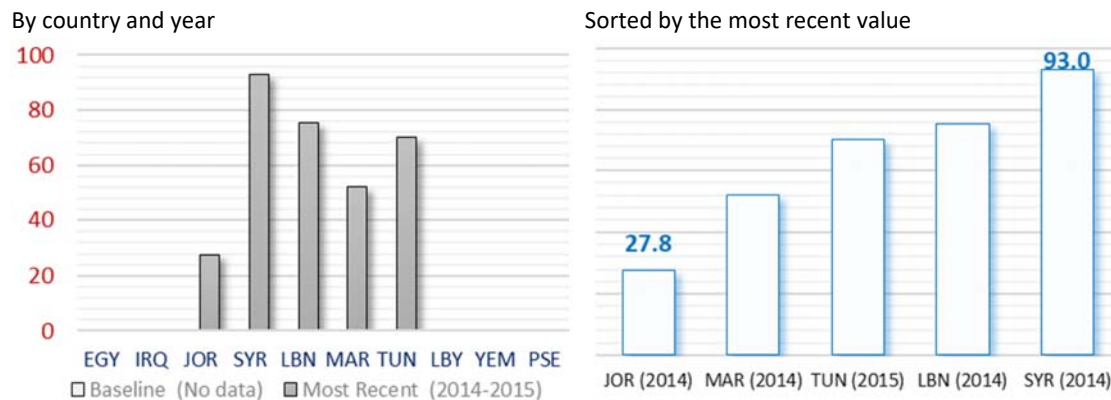
According to WHO Global Health Observatory data, insulin and statins were available in the public sector in Egypt and Iraq in 2013, but were unavailable in 2015. The same happened with oral morphine and steroid inhalants in Egypt and statins in Lebanon (Figure 58):

• None of the essential medicines were available in Libya in 2015, and only insulin and beta-blockers were available in Yemen in 2015.

• Nicotine replacement therapy was only available in the public sector in Jordan, Lebanon, and Yemen.

• In 2015:

    o Statins were available only in Jordan.

    o Aspirin was not available in Libya, Morocco, or Yemen.

Figure 58: General availability of selected essential medicines in the public health sector

		Insulin	Aspirin (100 mg)	Metformin	Thiazide diuretics	ACE Inhibitors	CC Blockers	Statins	Oral morphine	NRT	Steroid inhalers	Broncho-dilators	Beta blockers
Egypt	2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	
	2015	No	Yes	Yes	Yes	Yes	Yes	No	No		No	Yes	Yes
Iraq	2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	
	2015	No	Yes	Yes	Yes	Yes	Yes	No	No		Yes	Yes	Yes
Jordan	2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No		Yes	Yes	Yes
Lebanon	2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	2015	Yes	Yes	Yes	Yes	Yes	Yes	No	No		Yes	No	Yes
Libya	2013	Yes	Yes	D/K	Yes	Yes	Yes	No	No	No	Yes	Yes	
	2015	No	No	No	No	No	No	No	No		No	No	No
Morocco	2013	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	
	2015	Yes		Yes	Yes	Yes	Yes	No	No		Yes	Yes	No
Syria	2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	
	2015	Yes	Yes	Yes	Yes	No	No	No	D/K		Yes	Yes	No
Tunisia	2013	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	
	2015	Yes	Yes	Yes	Yes	Yes	Yes	No			Yes	Yes	No
Yemen	2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	2015	Yes	No	No	No	No	No	No	No		No	Yes	No

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
Note: No data available for Palestine

The HPV vaccine was only introduced in Libya in the national immunization calendar (in 2013) making it the only country where the value of the indicator "Availability, as appropriate, if cost-effective and affordable, of vaccines against human papillomavirus, according to national programs and policies (22)" was positive (36).

Human resources

Health worker density was the highest in Libya and Lebanon (90 and 95.4 per 1,000 population, respectively), followed by Palestine and Jordan (Figure 59). Tunisia and Syria are in the middle, and Yemen has the lowest density of health workers at 10.7 per 1,000 population.

Figure 59: Health worker density and distribution (per 1000 population)
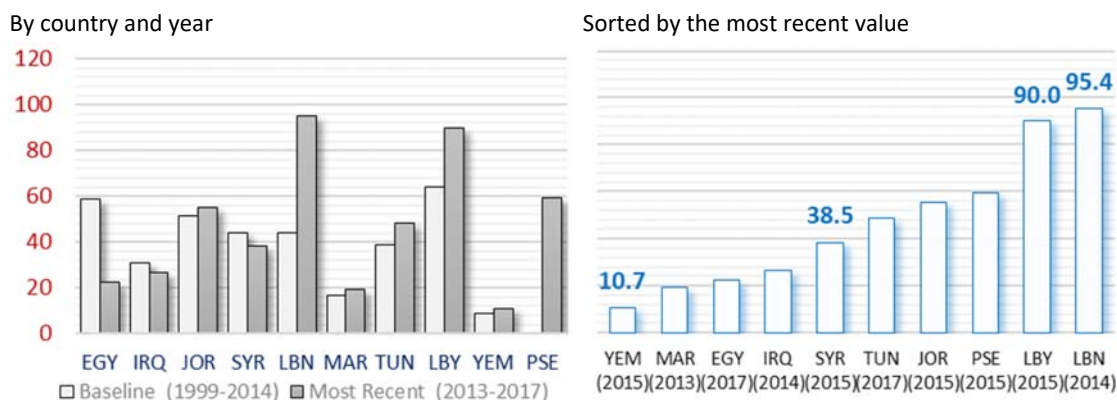
Source: World Health Statistics 2017 (48)

The number of health workers (per 1,000) declined in Egypt, Iraq and Syria, while it increased significantly in Lebanon and Libya in last two decades.

WHO EMRO provides slightly different statistics disaggregated by the major types of health workers (Figure 60). Similar to trends observed with 2017 World Health Statistic data, Libya has the highest density of health workers (104) followed by Lebanon (95.4). The second layer of countries with health workforce distribution at the level of 50-65 includes Jordan, Tunisia, Palestine, and Syria (Figure 60).

Libya has the highest ratio of nurses and midwives to physicians at 3.6, followed by Tunisia (3.1) and Yemen (2.4). The lowest ratio was found in Lebanon with 1 nurse per physician.

Figure 60: Human resources for health – density by major categories (the latest figures, 2013-2015)

	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE
Physicians	8.4	8.4	22.2	13.3	32	6.3	13	20	3	21.5
Nursing and midwifery	14.8	17.8	20.7	19.8	33	8.9	40.9	71	7.3	22.3
Dentists	1.7	2.2	7.1	7.6	12.9	1.4	3.1	7	0.2	5.7
Pharmacists	3.4	2.4	13.5	12.7	17.5	2.7	2.3	6	1	9.7
All health workers	**28.3**	**30.8**	**63.5**	**53.4**	**95.4**	**19.3**	**59.3**	**104**	**11.5**	**59.2**
Ratio nurse per physician	*1.8*	*2.1*	*0.9*	*1.5*	*1.0*	*1.4*	*3.1*	*3.6*	*2.4*	*1.0*

Source: WHO EMRO (31)

Figure 61 summarizes statistics from WHO Global Health Observatory database (Figure 118 on page 121) using the latest figures (from 2017). Differences in health workforce density between WHO EMRO and WHO GHO sources are significant for some countries, particularly in relation to the nurse-to-physician ratio:

- Libya has the highest density of health workers overall and nurses in particular, although the nurse-to-physician ratio was 3.3 according to WHO EMRO data (compared to 3.6 per WHO GHO data).

- The nurse-to-physician ratio in Tunisia is lower than in most of other countries: 3.1 according to WHO EMRO statistics and 1.9 according to WHO GHO (31).

There is no information on the distribution of health workers by urban versus rural residence. There are only statistics from Iraq showing that in 2004 up to 20% of physicians, 27% of midwives and 32% of nurses worked in rural areas (according to WHO GHO database).

Figure 61: Summary of human resources for health – density by major categories (2017)

	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE
Physicians	8.1	8.5	26.5	15.5	23.8	6.2	16.5	20.9	3.1	
Nursing and midwifery	14.3	18.1	28.6	23.0	25.6	8.7	31.9	69.1	7.6	
Dentists	1.7	2.2	9.3	8.8	10.0	1.4	3.8	7.3	0.2	
Pharmacists	3.3	2.4	16.5	14.8	13.6	0.0	2.2	6.3	1.0	
All health workers	**27.4**	**31.3**	**80.8**	**62.1**	**73.0**	**16.3**	**54.4**	**103.6**	**11.9**	
Ration nurse per physician	*1.8*	*2.1*	*1.1*	*1.5*	*1.1*	*1.4*	*1.9*	*3.3*	*2.4*	

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)

Health care financing

Jordan spent 7.5% of their GDP on health care in 2014, down from 8.5% in 1995, although total health expenditure (THE) per capita almost doubled during the same period (Figure 62 and Figure 63). Jordan devoted more than double the share of their GDP to health expenditures than Syria, which spent only 3.3% of their GDP on health in 2014 (Figure 62).

Figure 62: Total health expenditure as a percentage of gross domestic product (health financing)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
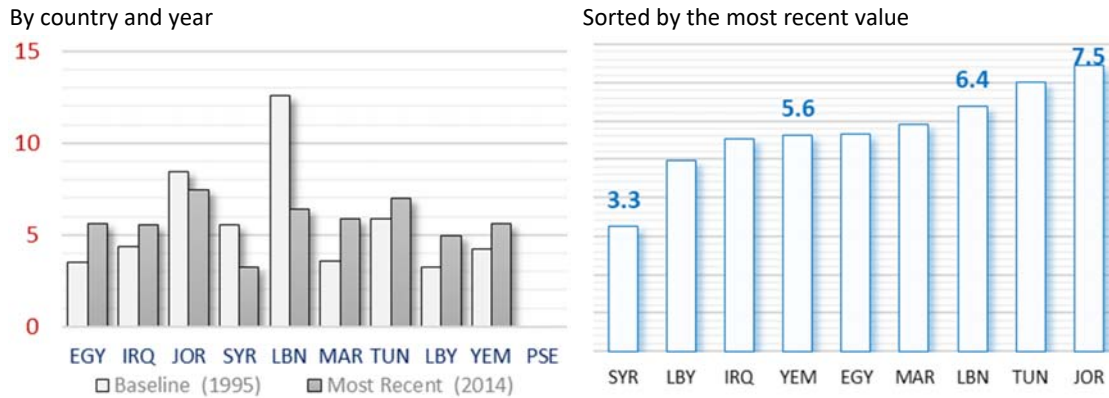
Trends in health care expenditures as a percentage of GDP for the last 20 years are presented in Figure 136 on page 140.

The highest absolute expenditure on health was in Lebanon (up to 1000 PPP$ in 2014); though this was less than Lebanon spent per capita in 1995. Yemen spent almost five times less on health (202 PPP$) compared to Lebanon (Figure 63).

Figure 63: Total health expenditure (THE) per capita per annum (PPP int. $)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
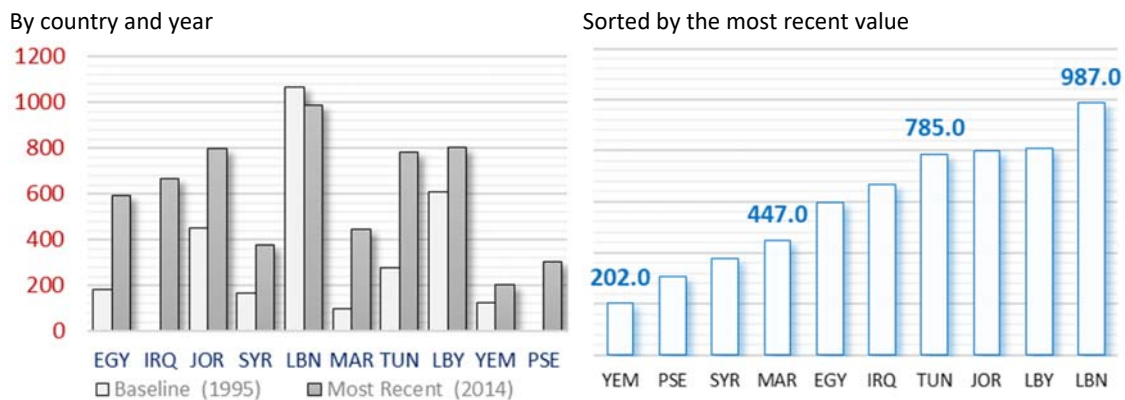
Public health expenditure accounted for 74% of total health expenditure in Libya in 2014 (up from 46% in 1995). In Yemen, public health expenses were less than one fourth (23%) of total health expenditures in 2014 (Figure 138 on page 142). Public sources of health financing were relatively high in Iraq and Jordan (61% and 70% respectively) in 2014. Conversely, the share of out-of-pocket expenditures on health was the highest in Yemen in 2014 at 76%; three times higher as compared to Jordan or Libya (Figure 64). The share of out-of-pocket expenditures reduced in Iraq, Lebanon, and Libya over the two decades from 1995 to 2014 (Figure 137 on page 141).

Figure 64: Out-of-pocket (OOP) expenditure as a percentage of total health expenditure

By country and year

□ Baseline (1995-2003)   ■ Most Recent (2014)

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
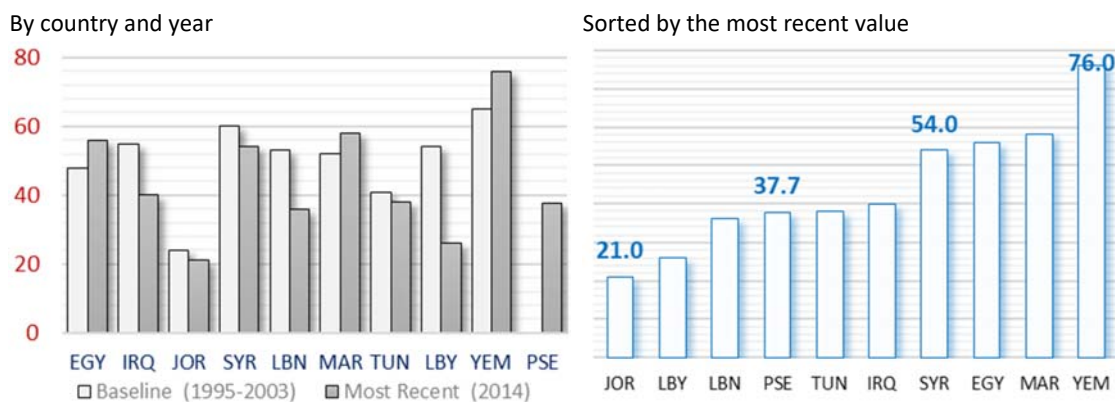
Private prepaid plans accounted for 30% of private expenditures in Lebanon (or 15% of THE); meaning that two thirds of private financing are paid at the point of service (out-of-pocket), while one third is paid through prepaid arrangements (private insurance schemes). In Morocco, where private expenditure accounted for 66% of THE, 12% of the total private expenditure (or 7.2% of THE) were channeled through prepaid plans (presumably providing better financial protection to insured) (Figure 65).

Figure 65: Private prepaid plans as a percentage of private expenditure on health (health financing)

By country and year

□ Baseline (1995)   ■ Most Recent (2014)

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
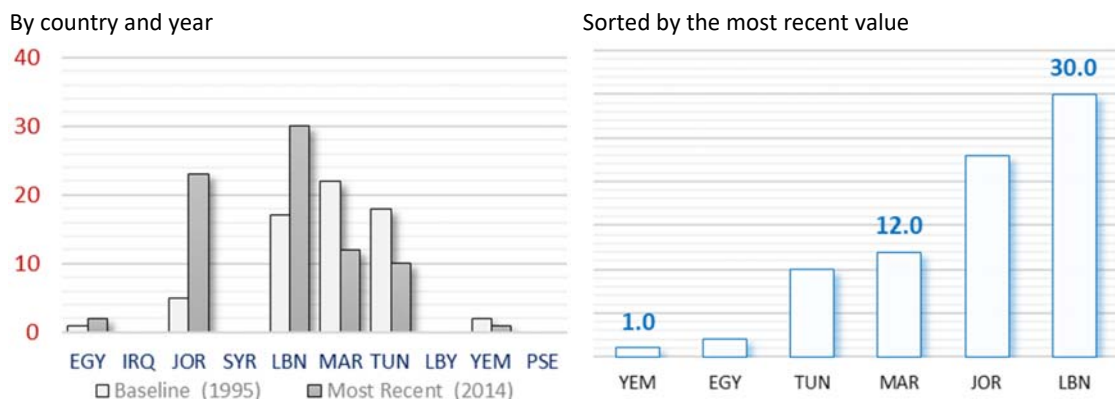
Protection against catastrophic expenditures for surgical care was relative better in Iraq where only 14.5% population would have experienced catastrophic expenditures in case of surgery. In Yemen 65% of population were exposed to this risk (Figure 66).

Figure 66: Risk of catastrophic expenditure for surgical care (% of people at risk)

By country and year

Sorted by the most recent value

Sources: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
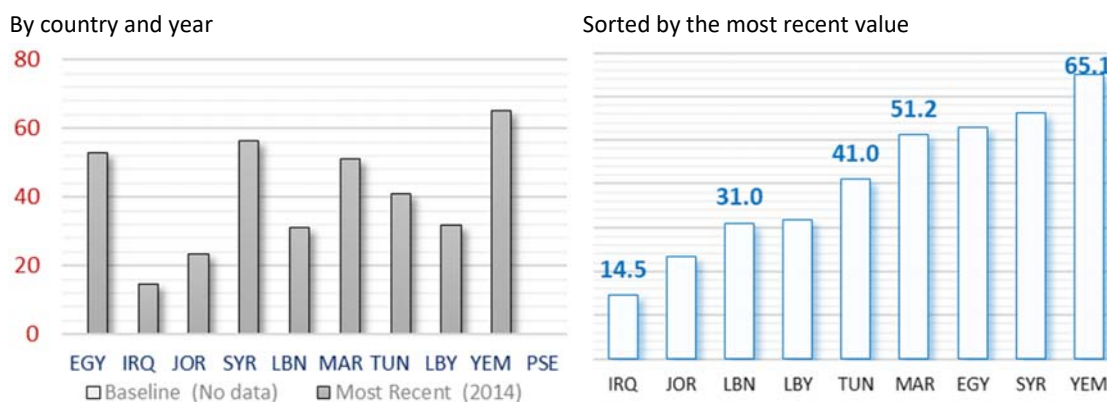
The structure of public financing differed in the five countries where data were available. Specifically, social security expenditures as the share of government expenditures on health (i.e., mandatory social health insurance schemes) varied from 56% in Tunisia to 9% in Jordan in 2014 (Figure 67).

Figure 67: Social security expenditure on health as a percentage of general government expenditure on health (health financing)

By country and year

Sorted by the most recent value
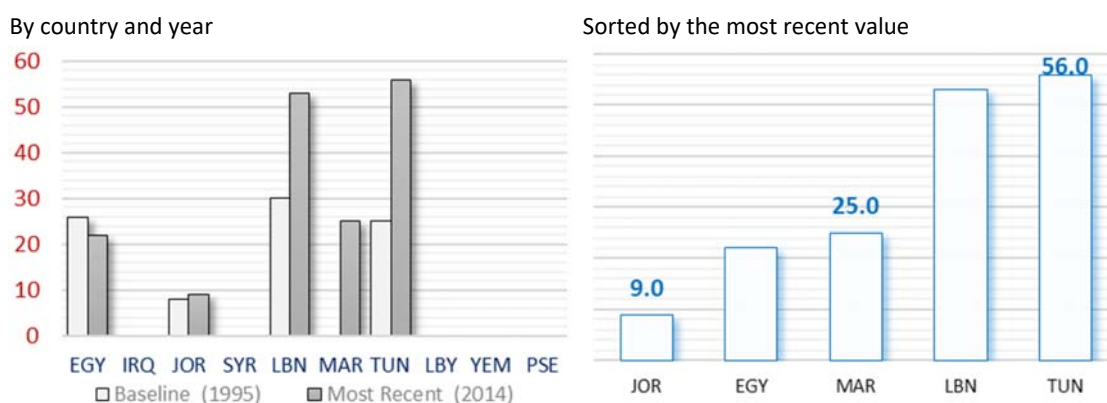
Sources: WHO Global Health Expenditure database and National Health Accounts 2014

Expenditures on mental health care constituted 5% of general government expenditures in Tunisia and 2% in Syria (Figure 68).

Figure 68: Government expenditures on mental health as a percentage of total government expenditures on health, in %
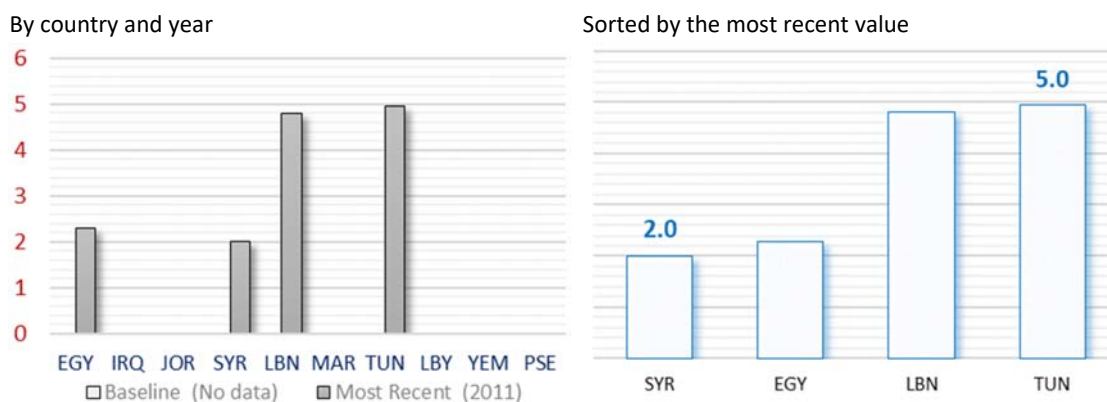
By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

According to the International Diabetes Federation, health expenditures for people living with diabetes were two- to three-fold higher than health spending of people without diabetes (30). Figure 69 below highlights that per capita health expenses on diabetes among persons with diabetes is five times more in Lebanon than in Syria. At the same time, total per capita health expenses of people with diabetes are almost five times higher in Syria than in Lebanon (Figure 69).

Figure 69: Total health expenditure per capita in PPP$, health expenditure in PPP$ for people with diabetes per person with diabetes, other health expenditure per person with diabetes in PPP$, 2014

Sorted by health expenditure on diabetes per person with diabetes, from smallest to largest
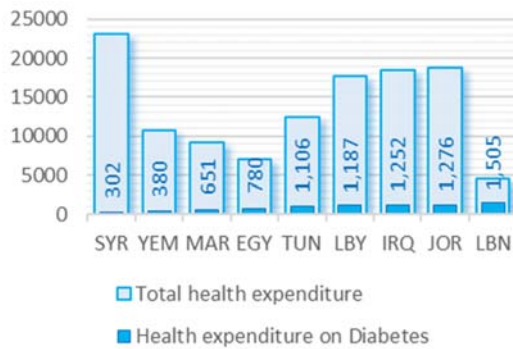
Sorted by ratio of expenditures for people with diabetes to other health expenditures per person living with diabetes, from the smallest to largest
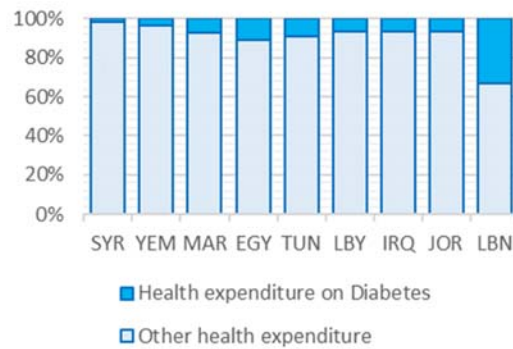
Sources: International Diabetes Federation, World Development Indicators (for THE per capita in PPP$)

Health information systems

As evident from the data availability section, most countries are collecting data on their NCD disease burden and associated premature mortality at the population level. As to the national capacity for surveillance, a population-based cancer registry was available in all countries except Iraq and Syria in 2015, while a diabetes registry was available only in Iraq and Jordan (Figure 70). According to WHO GHO data, none of the countries conduct STEPS surveys or equivalent comprehensive surveys every five years.

Figure 70: National capacity for surveillance – availability of surveillance practices/data sources

		Population-based cancer registry	Diabetes Registry	STEPS survey or a comprehensive health examination survey every 5 years
Egypt	2013	Yes		
	2015	Yes	No	No
Iraq	2013	No		
	2015	No	Yes	No
Jordan	2013	Yes		
	2015	Yes	Yes	No
Lebanon	2013	No		
	2015	Yes	No	No
Libya	2013	No		D/K
	2015	Yes	No	No
Morocco	2013	Yes		
	2015	Yes		No
Syria	2013	No		
	2015	No	No	No
Tunisia	2013	Yes		
	2015	Yes	No	No
Yemen	2013	No		
	2015	Yes	No	No

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

Similar to many low- and middle-income countries (LMICs) of the world, most of the study countries do not have NCD surveillance in place to report on progress made towards reaching NCD targets according to the Global Monitoring Framework for Prevention and Control of NCDs. Among the surveillance mechanisms lacking is reporting on drug therapy and counselling of high CVD risk individuals. WHO EMRO has developed and pilot tested the measures to assess quality of care at the primary care level (including performance indicators on NCDs) in Iran, Jordan, Oman and Tunisia. However, most of the indicators are not part of the routine HMIS or planned facility-level assessments in these or other ME countries. Similar to other LMICs of the world, countries of the Middle East lack data on quality and coverage of high impact, cost-effective NCD prevention, early detection and treatment interventions among the general public and specific vulnerable groups, including migrants and forcibly displaced populations.

Health system and service delivery performance related to mental health

While the number of psychiatrists per capita declined in Jordan, Morocco and Lebanon in five years (2010-2014), the density of psychiatrists increased in Tunisia, which was also the study country with highest coverage (2.6 psychiatrists per 100,000 population in 2014) (Figure 71).

Figure 71: Psychiatrists working in mental health sector (per 100,000)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
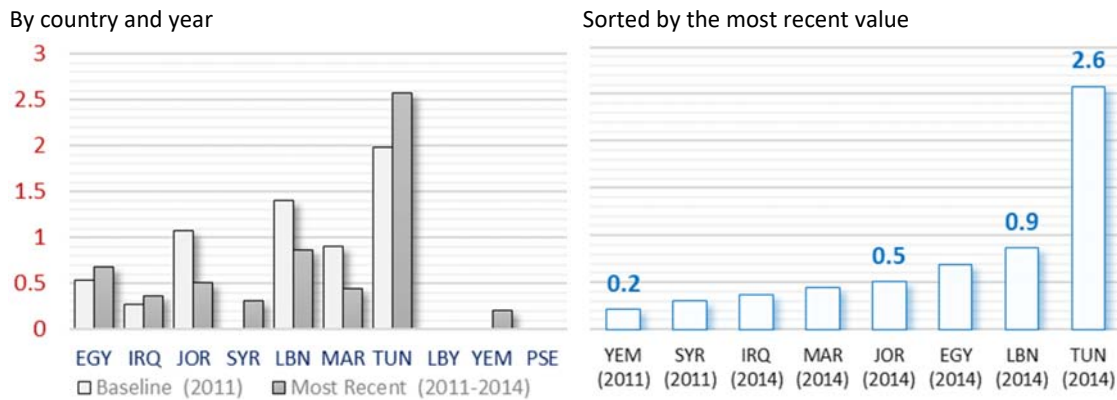
The ratio of psychologists to the population declined in Lebanon and Tunisia, but these countries still had the highest coverage (1.7 per 100,000 population in Lebanon and 1.1 in Tunisia), compared to Jordan with 0.17 psychologists per 100,000 population and Morocco with 0.054 in 2014 (Figure 72).

Figure 72: Psychologists working in mental health sector (per 100,000) (Mental health)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
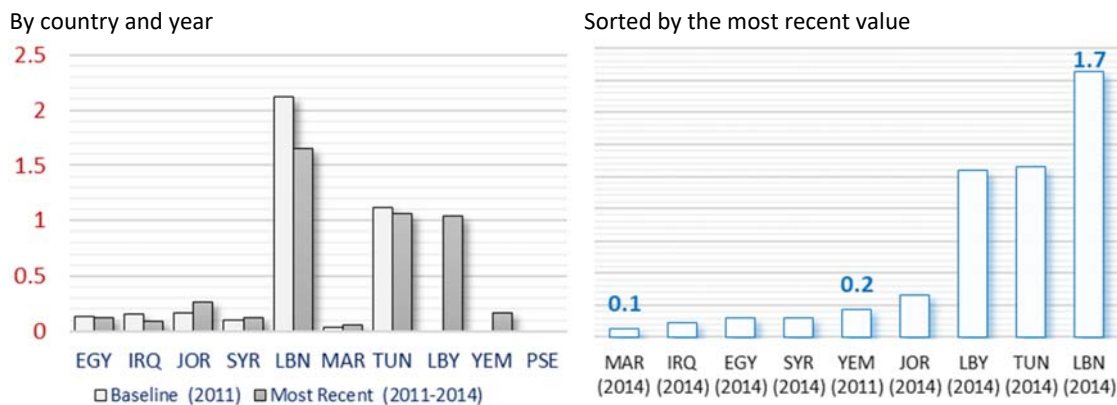
The number of hospital beds in mental hospitals decreased significantly in Lebanon and were the lowest per 100,000 population 0.9 in 2015 as compared to 9.6 in Libya (Figure 73 below).

Figure 73: Beds in mental hospitals, per 100,000

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
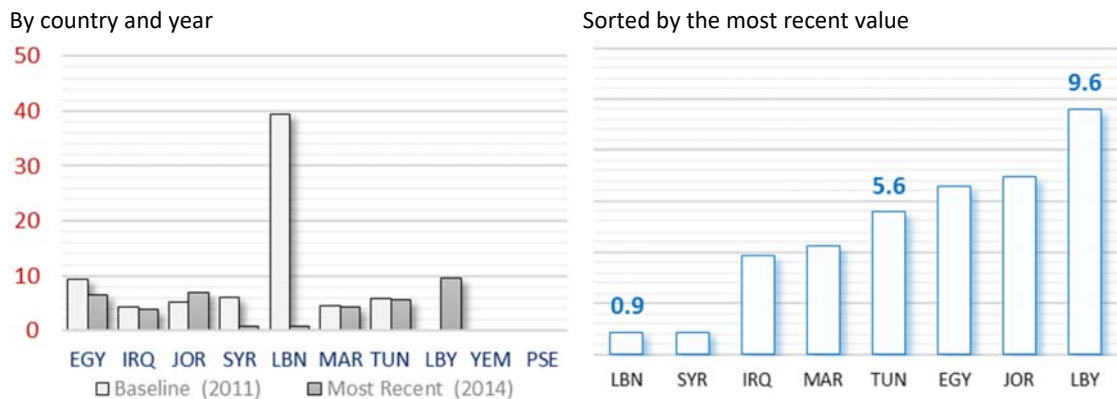
Tunisia reported that 2,173 patients per 100,000 population were treated in mental health outpatient settings in 2011 as shown in Figure 74, which is five times more than in the next country (Morocco).

Figure 74: Persons treated in mental health outpatient facilities (per 100,000 population)

By country and year   Sorted by the most recent value
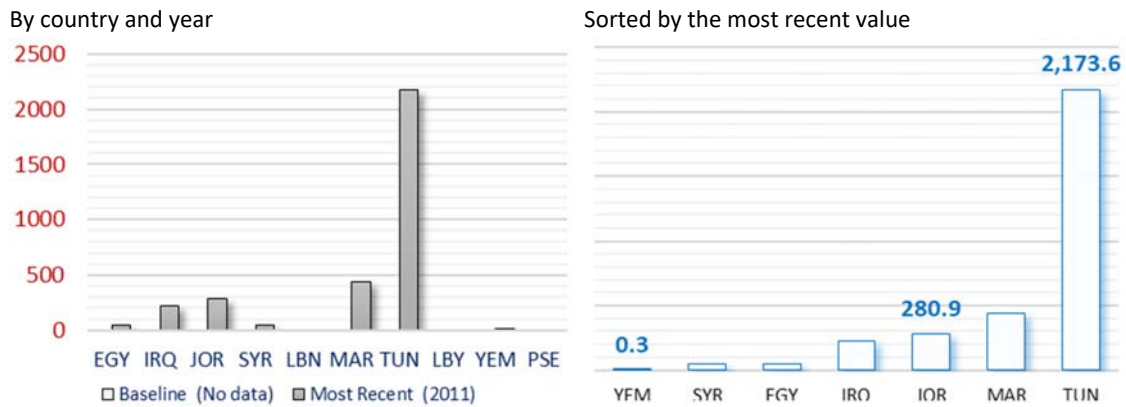
Source: Country Mental Health Profiles

A similar pattern was observed in the case of service coverage via day care mental health facilities in 2011 with 46 patients per 100,000 treated in Tunisia compared to 1.7 in Egypt (Figure 75).

Figure 75: Persons treated in mental health day treatment facilities (per 100,000 population)

By country and year   Sorted by the most recent value
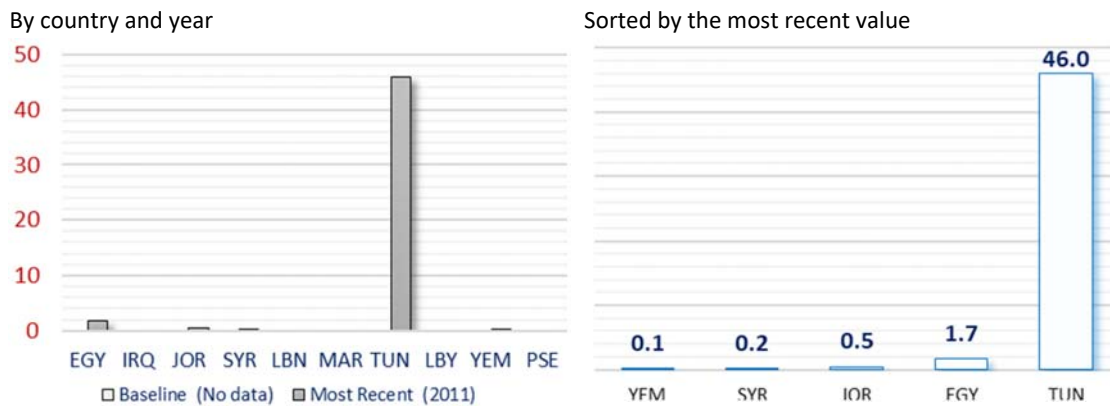
Source: Country Mental Health Profiles

Community-based residential mental care was available in Jordan (2.01 patients per 100,000 population), Syria (1.6 per patients per 100,000), and Yemen (0.1 patients per 100,000) ("Persons staying in community in the community residential facilities in the end of the year (240)").

The role of social workers in mental health care increased significantly in Lebanon with approximately 2.3 social workers per 100,000 population engaged in mental care in 2014 compared with fewer than 0.5 per 100,000 in 2011. That is four times higher than the next highest country, Libya (Figure 76).

Figure 76: Social workers working in mental health sector (per 100,000)

By country and year

Sorted by the most recent value
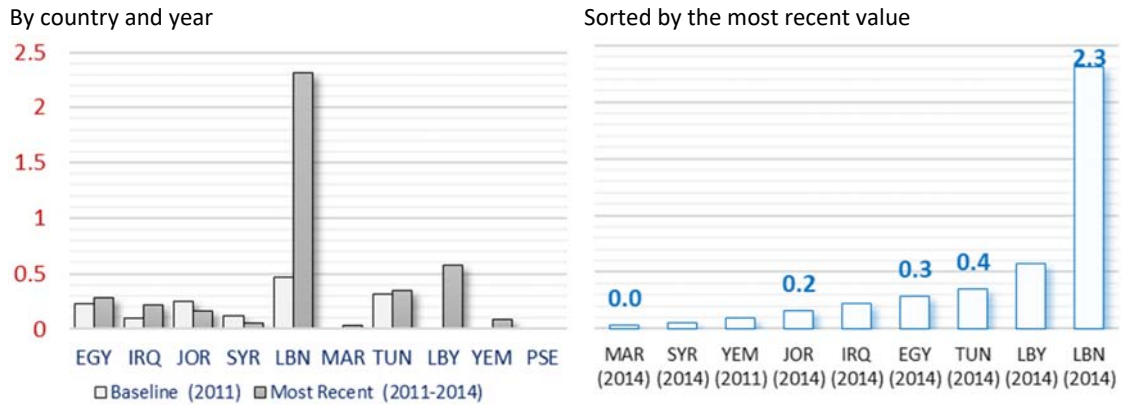
Source: Country Mental Health Profiles

Mental health-related hospital admissions were the highest in Lebanon (24.2 admissions per 100,000 population) in 2011 among the six study countries where data was available; followed closely by Tunisia (23.7 admissions per 100,000 population). Iraq comes next with 4.9 admissions per 100,000 population (Figure 77).

Figure 77: Number of admissions to psychiatric beds in general hospitals (per 100,000 population)

By country and year

Sorted by the most recent value
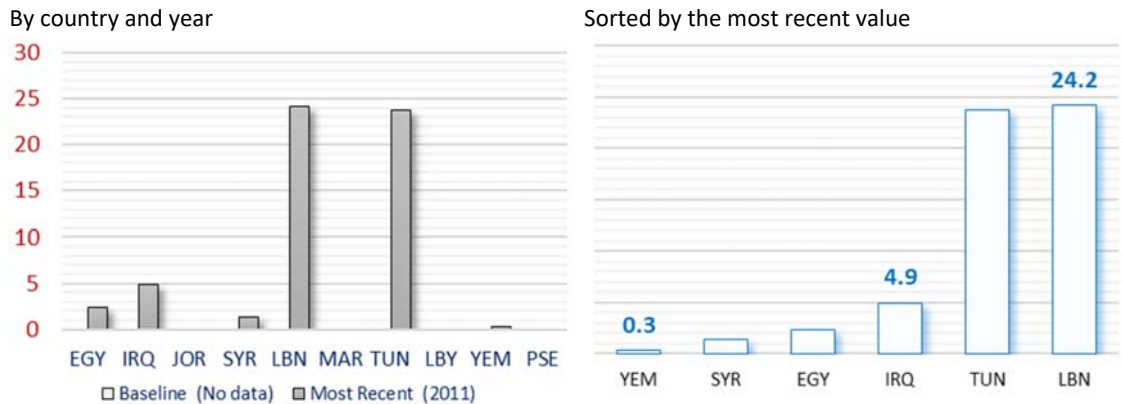
Source: Country Mental Health Profiles

Figure 78 shows most patients needing inpatient care were admitted to mental hospitals. Tunisia shows the highest admission rates (55.7 per 100,000 population), followed by Lebanon (39.4). In Jordan, inpatient mental care is provided only in specialized facilities. There was no information on inpatient care for mental health in Libya and Palestine.

Figure 78: Number of admissions to psychiatric beds in mental hospitals (per 100,000 population)

By country and year

Sorted by the most recent value
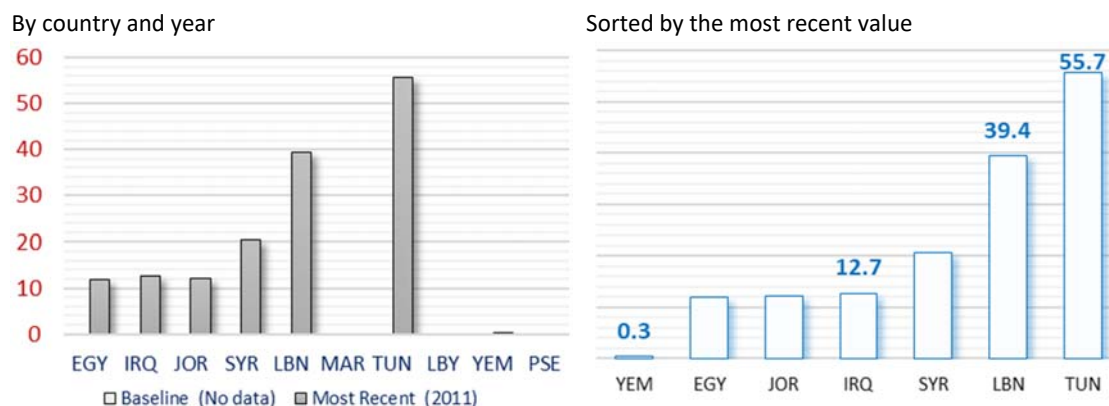
Source: Country Mental Health Profiles

Information on prevention programs on domestic violence, child abuse and neglect was limited. These programs can be considered as health system inputs in the prevention of mental health disorders, including depression. Figure 79 illustrates the availability and implementation scale of such programs in some countries.

Figure 79: Violence prevention programs availability and implementation scale

	Child maltreatment: Extent of implementation of home-visiting programs	Youth violence: Extent of implementation of life-skills and social development programs	Intimate partner violence: Extent of implementation of dating violence prevention programs	Elder abuse: Extent of implementation of caregiver support programs
Egypt	Limited	Limited	None	Limited
Iraq	Limited	Larger scale	None	Larger scale
Jordan	None	Larger scale	None	Larger scale
Morocco	Larger scale	Larger scale	Limited	Larger scale
Tunisia	Limited	None	None	Larger scale
Yemen	None	Limited	None	None

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)

Health system and service delivery performance related to maternal and child health

Maternal mortality declined in all countries, particularly in Morocco and Yemen; however, it still remained high in Yemen (385 maternal deaths per 100,000 live births) and Morocco (121 maternal deaths per 100,000 live births) (Figure 80). The lowest maternal mortality rates were reported in Libya (9.0) and Lebanon (15.0) in 2015.

Figure 80: Maternal mortality ratio (per 100,000 live births)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
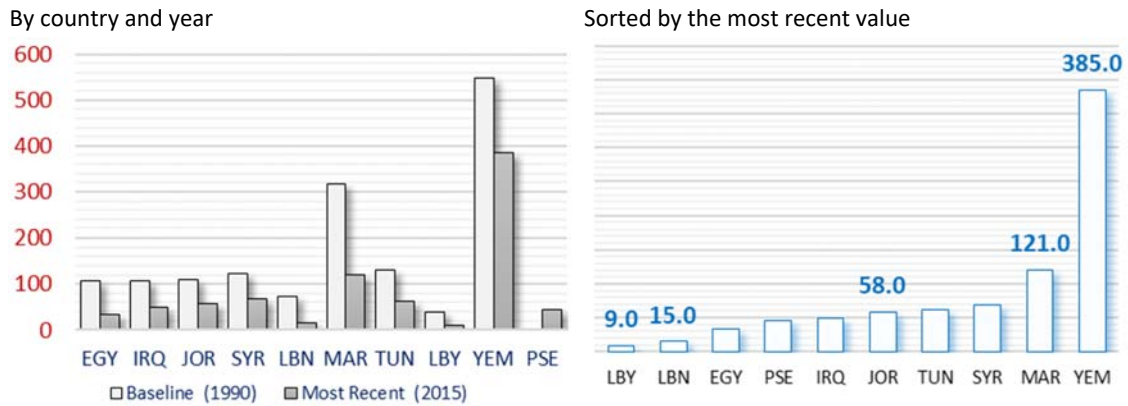
The neonatal mortality rate declined in all selected countries over the last 25 years, but it still remains relatively high in Yemen (22.8 neonatal deaths per 1,000 live births), Iraq (19) and Morocco (18.2). Lebanon had the lowest neonatal mortality rate at 5 deaths per 1,000 live births in 2014 (Figure 81).

Figure 81: Neonatal mortality rate (per 1000 live births)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
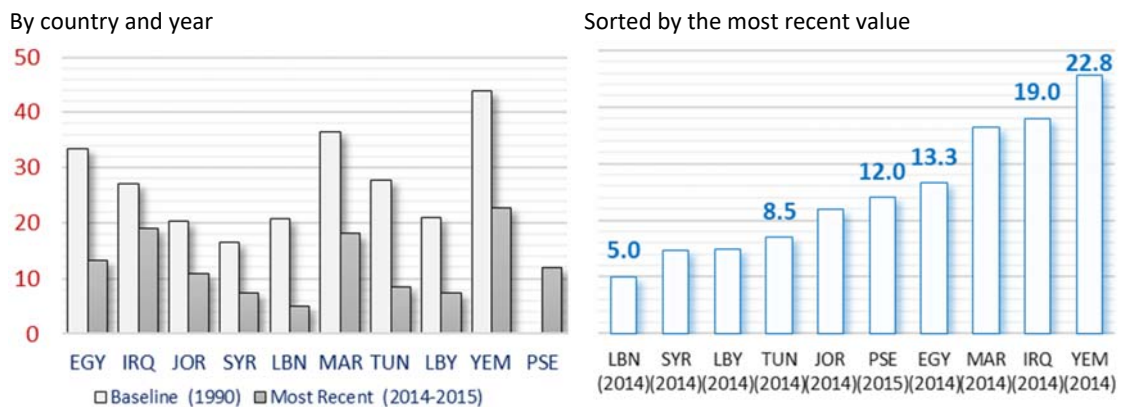
The stillbirth rate was highest in Yemen (29 stillbirths per 1,000 live births) and lowest in Libya (8.8 per 1,000) (Figure 82). These results place Yemen among the mortality ranges for targeting as a USAID high priority country for preventing child and maternal deaths.

Figure 82: Stillbirth rate (per 1000 total births)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
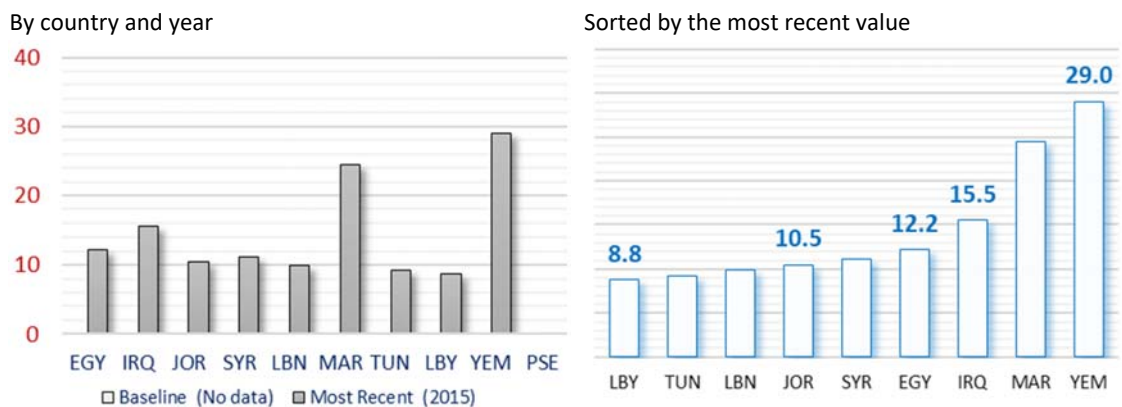
No information was available on early initiation of breastfeeding in Libya and Palestine. The highest frequency was observed in Yemen (52.7% of newborns breastfed within first hour) in 2013, and the lowest in Jordan (18.6% of newborns breastfed within first hour) in 2012 (Figure 101 on page 109).

Figure 83: Percentage (%) of babies with early initiation of breastfeeding

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
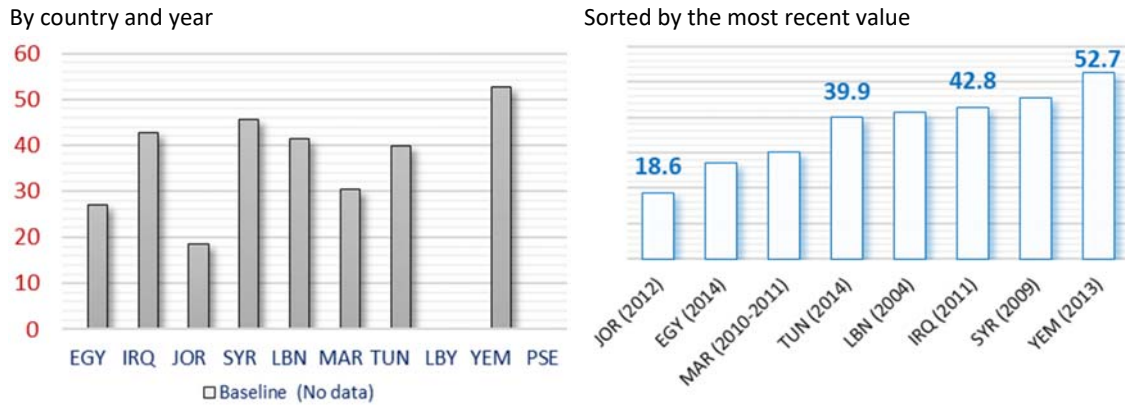
Exclusive breastfeeding during the first 6 months increased in Iraq, Jordan, and Syria, but decreased in Egypt, Morocco, Tunisia and Yemen between baseline and the most recent measurement (Figure 84).

Exclusive breastfeeding was the highest in Syria (42.6% in 2009), Egypt (39.7% in 2014), and Palestine (38.6% in 2014) and lowest in Tunisia (8.5% in 2014) (Figure 84).

Figure 84: Percentage (%) of babies who exclusively breastfeed, 0-5 months (<6 months) of age (82)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
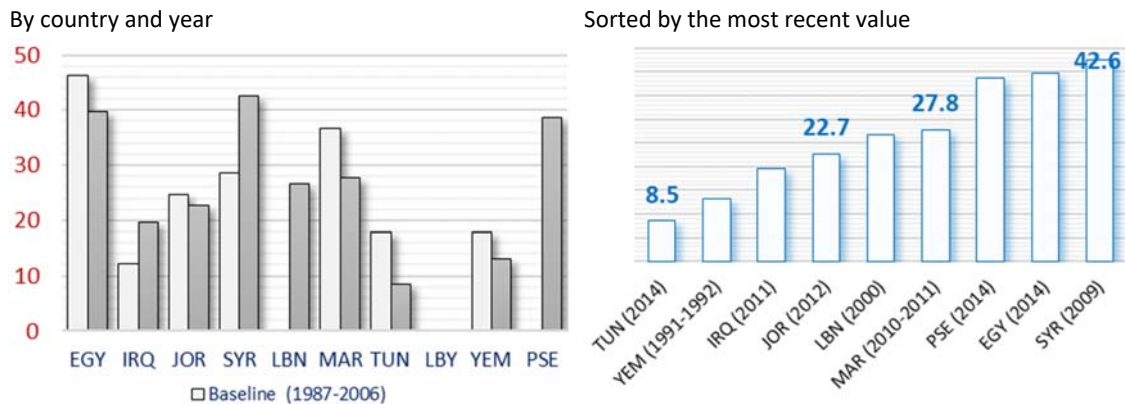
Births attended by skilled health personnel (as a percentage of total births) was high in most of the selected countries (>90%) except Yemen (44.7% in 2013), Morocco (73.6% in 2011) and Tunisia (73.6 in 2014) (Figure 85).

Figure 85: Births attended by skilled health personnel (%)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
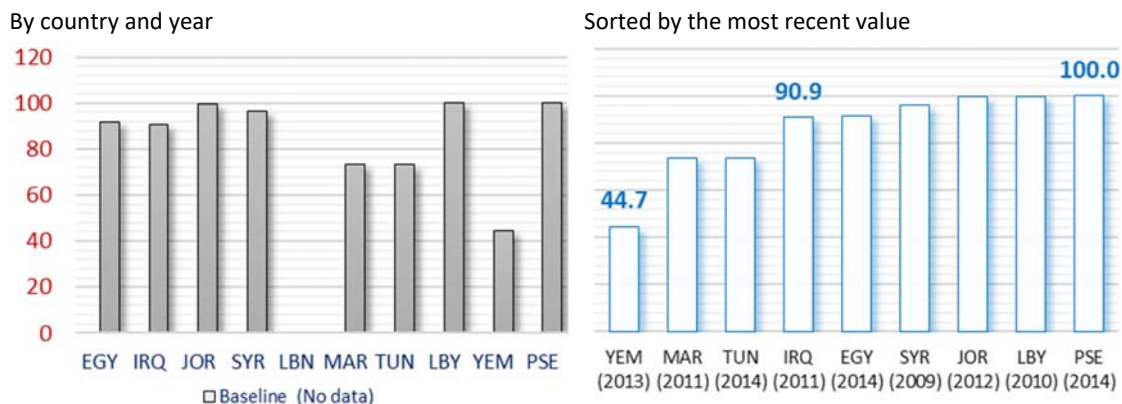
Antenatal care (ANC) coverage was highest in Jordan with 94.5% of pregnant women visiting a health facility for a check-up at least four times during pregnancy in 2012. ANC coverage was lowest in Yemen at 25.1% (Figure 86).

According to Global AIDS Response Progress Reporting (GARPR), only 27% of pregnant women were tested for syphilis at the fist ANC visit in 2010 in Iraq and 0.8% in Jordan in 2008.

Figure 86: Antenatal care coverage - at least four visits (%)

By country and year

Sorted by the most recent value

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)
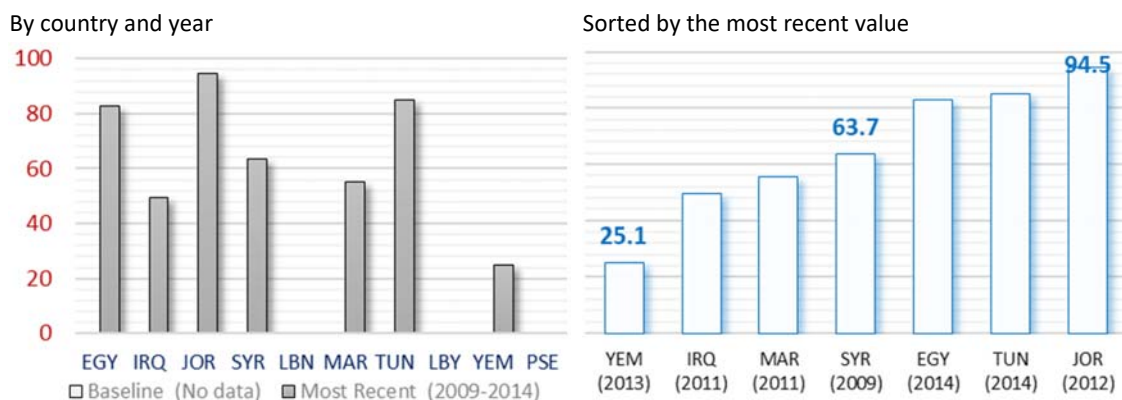
In Morocco, 15.4% of newborns had a low birth weight compared to only 6.9% in Tunisia. Information on low birth weight was not available in Yemen and Palestine (Figure 87).

Figure 87: Incidence of low birth weight among newborns

By country and year

Sorted by the most recent value
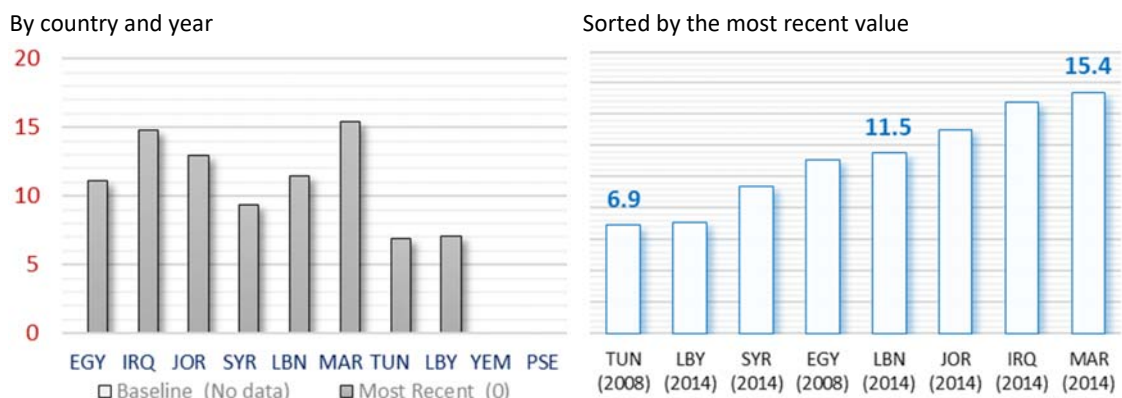
Sources: WHO EMRO Framework, DHS 2008 Egypt

The percentage of children under the age of 5 who suffered from moderate or severe stunting decreased in Egypt and Syria between baseline (2011-2013) and the most recent data (2013-2015) (Figure 88 below). Jordan, Lebanon and Palestine had the lowest incidence of stunting among children under 5 (<10%), while almost half of all children in Yemen under the age of 5 were stunted.

Figure 88: Children under 5 years who are stunted (moderate and severe)

By country and year   Sorted by the most recent value
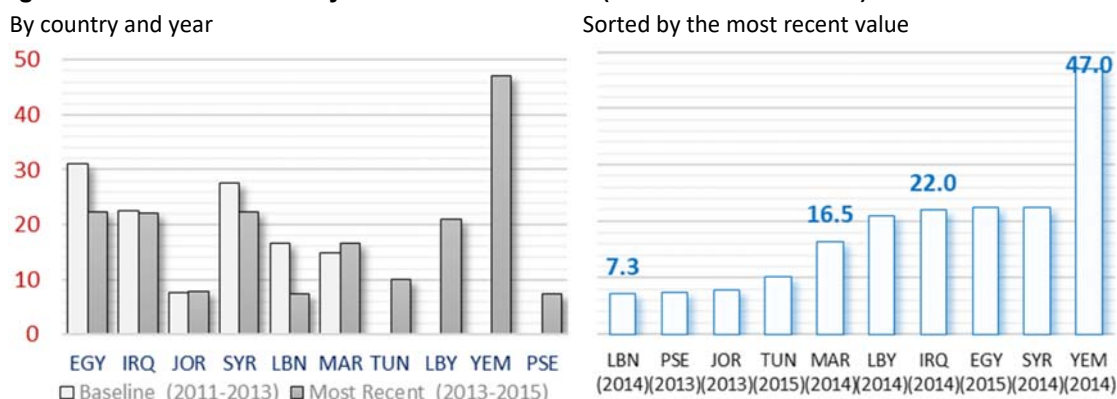
Source: WHO EMRO

Yemen also had the highest incidence of wasting among children under 5 (15.2% in 2003), followed by Egypt with 9.5% in 2015-2016 (Figure 89).

Figure 89: Children under 5 years who are wasted (moderate and severe)

By country and year   Sorted by the most recent value
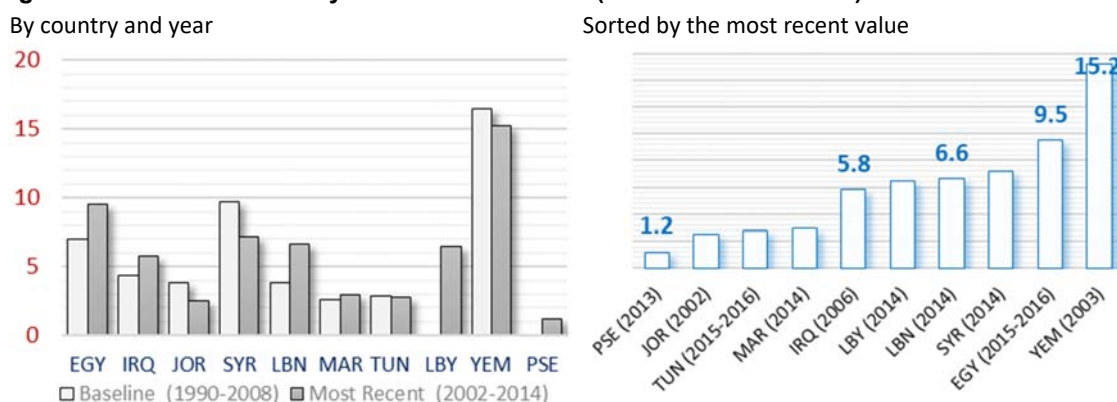
Source: WHO EMRO

D. Resiliency of Health Systems to Address NCDs in the Context of Emergencies

NCDs have historically been neglected by humanitarian actors in emergency situations (37). Without prioritization, complex emergencies can compromise NCD prevention and control, lead to poorer outcomes for patients, and impose high financial costs for payers and society (3). These patient outcomes and cost implications undermine universal health coverage implementation and position NCDs as a risk to both individual and collective health security[12] (38). To combat this health security

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[12] The WHO defines global public health security as "the activities required, both proactive and reactive, to minimize vulnerability to acute public health events that endanger the collective health of populations living across geographical regions and international borders." (101)

risk, health systems must be strengthened to deliver and maintain quality health services during both peacetime and emergency situations. Countries with strong health systems are better prepared and are more resilient to cope with the added demands on health services and staff that outbreaks and other health emergencies inevitably bring (39).

Following the Ebola crisis, resilience has become a focus of the international health community to prevent another devastating event. Resilience can have different meanings based on context. For the purposes of this report, resilience will be mentioned in the forms of health system resilience and health service resilience. For clarification, health systems are set within political and institutional frameworks of a country and can be defined as "the ensemble of all public and private organizations, institutions, and resources mandated to improve, maintain or restore health" (40). In the Framework for Integrated People-Centered Health Services set forth at the 69th World Health Assembly, health services were defined as "all services dealing with the promotion, maintenance, and restoration of health. They include both personal and population-based services" (28). These definitions provide a valuable foundation when discussing resilience. Further, resilience is often discussed in the context of health security, which can be divided into two major concepts: individual health security and collective health security. Individual health security is the security that comes from personal access to safe and effective health services, products, and technologies (38). Collective health security is the reduction or elimination of vulnerability of societies to health threats that spread across national borders (40).

While literature is currently non-existent surrounding the idea of health service resilience, much work has been done of late to conceptualize and operationalize the idea of health system resilience. Kruk et al. (41) defined health system resilience as "the capacity of health actors, institutions, and populations to

> *The resilience of a health system refers to its ability to absorb disturbance, to adapt and respond with the provision of needed services.*
>
> Kutzin & Sparkes (49)

prepare for and effectively respond to crises; maintain core functions when a crisis hits; and, informed by lessons learned during the crisis, reorganize if conditions require it." Resilience is also defined by The Rockefeller Foundation as "the capacity of individuals, communities, and systems to survive, adapt, and grow in the face of stress and shocks, and even transform when conditions require it" (42). Resilience can also be seen as "a measure of the amount of change a system can experience and still maintain the same controls on structure and function" (43).

Resilient health systems are characterized as being: aware, diverse, self-regulating, integrated, and adaptive (41). Oxfam expands on these characteristics and describes six specific core foundations for resilient health systems, which are: (i) adequate number of trained health workers; (ii) available medical supplies; (iii) robust health information systems; (iv) adequate number of well-equipped health facilities; (v) adequate financing; and (vi) strong public sector to deliver equitable, quality services (44). Similarly, The Rockefeller Foundation defines the core foundations of resilience as systems which are: reflective; resourceful; robust; redundant; flexible; inclusive; and integrated (42).

However, it is important to note that it is not sufficient just to have stable governance and adequate resources in order for systems to be resilient at all levels; strong leadership is also necessary. At the subnational level, "everyday resilience in district health systems is derived from forms of leadership that reframe challenges to support problem-solving; embody respect and empower others, particularly front-line managers and staff; enable learning and innovation; and draw on and catalyze social networks and relationships across, within and outside the health system" (45). Ager et al. (46) explain that "resilience is not so much the culmination of a number of additive 'protective factors' but the outcome of a range of interacting systems and influences, operating at a variety of levels." Focusing not only on what resources the health system has, but also *what it does* with those resources and *how it does it*, will lead to the building of future resilient health systems. Further, resilience is not an action to be implemented, but rather a dynamic objective of investments and reforms to the health system (40). This is of crucial importance because when health systems are resilient, they can

reduce loss of life and lessen adverse health outcomes in times of crises by providing effective care for emergent and routine health needs (41).

While resilience as a concept has taken hold in much of the health systems world, measuring health system resilience proves to be another challenge. The United Nations Office for Disaster Risk Reduction (UNISDR) states that resilience is "determined by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need" (Terminology on Disaster Risk Reduction, 2009). However, there is still a question of how to measure such resources and capabilities. Especially as the domains that dictate resilience are continuing to be defined, measurement will play a key role in the future discussions of health system resilience implementation. Kruk et al. (47) have proposed a preliminary set of indicators to measure national health system resilience. These measures include "existing health system and preparedness metrics (from the International Health Regulations, the Global Health Security Agenda, and the Sustainable Development Goals), relevant measures from non-health fields, and new proposed measures that need further development and testing." Most importantly, health systems and countries are heterogeneous; therefore, the benchmarks and indicators for resilience should be set to accommodate local contexts (47).

Both acute and protracted emergencies or crises can lead to an increase in the burden of disease among affected populations. Heymann et al. (38) explain that "the direct health effects of conflict and disaster on individuals (such as physical injury, mental trauma, or infectious disease) as well as the indirect effects (from displacement, famine, and other causes of insecurity) can be severe, often falling most heavily on women, children, and displaced and marginalized groups." With this unequal distribution of health risk, special consideration must be given to these vulnerable populations when addressing the resilience of health systems.

As an example, the resilience of Lebanon's health system and services were evaluated by the Lebanon Ministry of Health in response to the Syrian refugee crisis with consideration of both Lebanese citizens and Syrian refugees. Following the large influx of refugees from Syria, the evaluators concluded that Lebanon's health system was resilient and able to maintain service delivery for both citizens and refugees with limited inputs. The Lebanese system's resilience was attributed to four factors: 1) networking with stakeholders; 2) diversification of the health system providing infrastructure and human resources; 3) comprehensive communicable disease response; and 4) integration of refugees into the health system (48). The dramatic increase in the refugee population placed a "shock" on the Lebanese health system, but the system's special consideration of the refugee population and conscious efforts to integrate their health services into the system already in place allowed for system resilience.

As the global burden of non-communicable disease continues to grow, the health security agenda needs to consider non-communicable diseases (38). Especially in times of crisis, if public health infrastructure is damaged and access to treatment is threatened, there is an enormous risk of morbidity and mortality associated with non-communicable diseases (49). In particular, the main barriers to NCD care in emergencies include cost of care, low income, and competing priorities, especially for displaced populations who may not be entitled to local health services (3). In the WHO Global Action Plan and Control of Noncommunicable Diseases, the importance of addressing NCDs in the emergency context has been well highlighted. WHO's two main foci in the humanitarian disaster or emergency setting are to improve the availability of technologies and essential medicines for managing NCDs and to deploy an interagency emergency health kit for treatment of NCDs (WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020).

To manage NCDs during emergencies, NCD care must be included in the standard operating procedures of emergency response and be integrated in different relief efforts (3). Additionally, continuity of care in emergencies can potentially be improved with written plans for self-management, with emphasis on up-to-date medications and familiarity with community emergency plans (3). NCD

service delivery and integration with primary care is especially important in times of crisis (38). The Japan Global Health Working Group, as part of the 2016 G7 leaders deliberation, asserted that to promote resilience "developing health care systems should address the prevention of and support for NCDs and mental health by shifting from hospital-centered care to patient-centered chronic care within a community based, integrated health-care service model to enhance quality in health and long-term care provision" (50) (Japan Global Health Working Group, 2016). For NCD treatment in emergencies, integration of various systems and services is vital to successful continuity of care and resilience.

Most importantly, in order to sustainably implement strategies to mitigate NCD exacerbation in emergencies, coordinators with an NCD focus need to be integrated into the disaster response and into the health system during non-disaster periods ((49). Efforts should be focused during peacetime to strengthen health systems and services, especially primary care services, that can oversee management of NCDs (38) assert that "the health security threat of non-communicable disease cannot be mitigated without provision of horizontally integrated primary care that can prevent, diagnose, and manage a wide range of illnesses." Additionally, during non-crisis times it is important to assess the system's readiness to manage common NCDs during an emergency. National preparedness plans should use assessments, such as the Service Availability and Readiness Assessment (SARA) to understand the availability and condition of health services and supporting infrastructure. The SARA has already provided valuable insights into country health system capacities in countries that are both stable (e.g., Tanzania) and affected by conflict (e.g., Libya). Also, these assessments can be combined with real time data during the emergency to assess health service response (3).

A case study in Mali was examined to assess diabetes care in an emergency humanitarian setting. The lessons learnt from managing diabetes in an emergency setting were found to be interlinked with the six building blocks of health systems (service delivery, healthcare workforce, information, medical products, financing, and leadership/governance), with all six building blocks needing to be addressed to create a strong health system, regardless of the delivering organization or facility in the crisis. Upon further examination in Mali, however, complexity arose in the disease management of diabetes and NCDs because of the different sub-populations that had context-specific needs. These sub-populations in Mali are inherently more vulnerable in an emergency setting and include those still in conflict areas, internally displaced people, refugees, and a country's baseline population (37). Further, Besançon et al. (37) assert that generally, "the lessons from this case study may be applicable to other low-income countries where frequent humanitarian emergencies place strain on already weak health systems. The lack of priority given to this group of individuals in humanitarian emergencies needs to be addressed as well as how the response for chronic conditions needs to build on existing local expertise to benefit the emergency response, but also plan for the post-emergency reconstruction."

Achieving the SDGs will require that concerted efforts are made to ensure that all individuals, irrespective of their socio-economic and geographic background, have equitable access to quality health services. This includes displaced individuals (51). Further, focused attention on the essential package of services available in each of the identified countries is critical. Such packages should be comprehensive and must address the priority critical needs of all populations. Without a health system that addresses the needs of changing demographics and the epidemiological transitions through public health-based approaches, the burden of NCDs will continue to grow, increasing morbidity and mortality and the overall burden on the health care system.

Given the importance of public health events in the ME region, including acute and protracted emergencies, understanding the quality of essential health services delivered and their influence on building strong, resilient health systems (including service delivery) has become critically important in the effort to ensure continuity of NCD care during peacetime and emergency crises. Health systems are resilient if they protect human life and produce good health outcomes for all before and during a crisis and in its aftermath (41). Timely access to and coverage of essential health services and

medications for NCDs should be placed among the key health system efforts aimed at withstanding a shock and continuing functioning.

Below, we summarize key findings by country of our exploration of health system resilience to address growing burden of NCDs in the context of emergencies.

Egypt

With the recent influx of Syrian refugees into Egypt, a presidential decree in 2012 was given to allow all Syrian refugees equal access to public primary health care services at similar costs to Egyptians. Further, the United Nations High Commission on Refugees (UNHCR) subsidizes essential secondary and life-saving health care services for refugees through a strategic referral approach with a network of facilities. However, despite the government's increased access for refugees, 25% of adult Syrian refugees with chronic conditions reported they could not afford treatment. The Regional Refugee & Resilience Plan (3RP) 2017-2018 was recently released under the coordination of Egyptian national authorities, UN agencies, and in-country NGOs to address the Syrian refugee crisis. While collaboration amongst stakeholders remains fragmented, two items in the strategic vision and response plan for health (3RP) highlight Egypt's commitment to resilient health systems and non-communicable diseases. These items are: 1) supporting equitable and sustainable access and coverage through quality health care services, while also enhancing community outreach health awareness; and 2) strengthening of existing national health systems with a focus on non-communicable diseases. Further, the 3RP acknowledges the capacity gaps in responding to mental health and non-communicable disease needs and follow-up and plans to address these gaps through capacity-building and a wider roll-out of programs in refugee host areas. Some level of funding exists to support forcibly displaced populations. This is dependent on charity organizations, patient support groups and some funding from the government.

In general, policy and governance structures within a country's strategic health plan are critical. Regarding NCDs, the 2014 WHO NCD Fact Sheet shows that Egypt has evidence-based national guidelines for the management of NCDs through a primary care approach and the existence of a national multi-sectoral commission, agency or mechanism for NCDs. The evolving landscape on NCDs presents an opportunity to develop key performance indicators in order to track progress made on health and NCDs. Though policies exist, improvements in financing, focusing not only on treatment but prevention and increased availability of essential medicines for diabetes were noted. Similarly, a basic package of essential health services exists in Egypt. However, the lack of essential medicines and commodities in addition to funding has resulted in a heightened focus on absolute essentials. Areas such as tobacco cessation and mental health have not traditionally been included as essential.

Behavioral change for NCD risk reduction is being applied in Egypt. The focus in Egypt has been on increasing coverage of health services with limited focus on quality beyond the point of coverage. Too few doctors for the number of people, lack of counselling and education on lifestyle changes, and poor engagement of patients in health consultations were cited as quality issues in public health facilities where the majority of care is given. Health workers play a critical role in providing routine health services and, in most cases, can rapidly contain potential outbreaks. The competency level of many health workers remains limited. Means of assuring quality, such as regulation, licensing and accreditation, are currently underway in the country to ensure the provision of such quality services by health professionals. At the pre-service level, some high impact NCD services are addressed in the curricula of training professionals. Emphasis is needed on building NCD services into routine training, supervision and mentoring of health professionals.

There is a lack of information on NCD prevention and control services, and the quality of these services, collected in facilities and at the national-level. Very little data is documented at the facility level due to the high workload of health workers. Moreover, patient records are often not centralized. Very little to no information on such issues are collected at the national level. When data is collected,

it does not cover forcibly displaced individuals. Additionally, data is often incomplete and missing, which poses a challenge for many facilities in using this data for analysis or improvement.

Iraq

Iraq has an operational policy, strategy, or action plan to address cardiovascular diseases, diabetes, cancer, chronic respiratory disease, unhealthy diet, physical activity and tobacco use. However, the study did not reveal an operational multi-sectoral national policy, strategy, or action plan integrating NCDs and their shared risk factors; an evidence-based national guideline on NCD management through a primary care approach; or an NCD surveillance and monitoring system. It is unknown as to whether there is an operational NCD-specific unit within the MOH (WHO Noncommunicable Diseases Country Profiles, 2014).

Jordan

In Jordan, there exists an operational policy, strategy, or action plan for cardiovascular diseases, diabetes, physical activity and tobacco use. Prior to 2014, Syrian refugees in Jordan were provided necessary health care services free of charge via UNHCR in both camp and non-camp settings (UNHCR Jordan Factsheet, January 2017). However, with the increase of costs, refugees are currently required to pay out-of-pocket for health care services at a rate equal to the subsidized rate given to uninsured Jordanians (Jordan has low out-of-pocket expenditure as a percentage of total expenditure on health for the general population (See Figure 64). Though health care services are subsidized, this increased cost burden on refugees hinders care-seeking and continuity of care for chronic conditions, such as NCDs. Besides cost, displacement was shown to have large implications for the refugee population residing in Jordan including: 1) treatment interruptions due to inability to access medicines, creating acute and chronic disease complications; 2) poor disease monitoring; and 3) deterioration in lifestyle risk factors due to lack of control over living circumstances and the experience of traumatic events. These complications risk NCD control and require health systems to integrate NCD care throughout all stages of the refugee cycle, including in contingency planning for future crises (52).

The Jordan Ministry of Planning and International Cooperation performed a comprehensive vulnerability assessment for Jordan that had some key findings regarding health system resilience and NCDs. The assessment highlights the essential and ongoing need to strengthen the MOH to promote resilience within the national health system. This is of importance as the health system is stretched due to increased demand for health services from refugees, changing population demographics, and changing epidemiology of disease towards chronic diseases. To promote resilience and the delivery of high quality, integrated health services, the assessment suggests that the MOH strengthen provision of consumables, equipment, infrastructure, and human resources. The country does have a multi-sectoral mechanism for NCDs in the form of an NCD country plan aligned with WHO's global targets.

Interestingly, the 2016 joint external evaluation (JEE) assessment revealed that the country has attained reasonable capacity to detect events of significance for both human and animal health as well as for other health security threats of concern, by establishing and enhancing indicator-based surveillance with an automated electronic notification surveillance system that enhances real-time surveillance and analysis. (53)

According to the WHO NCD Fact Sheet for Jordan, the country has an evidence-based national guideline for NCD management through primary care, but lacks a dedicated operational NCD unit within the MOH or an operational multi-sectoral national policy, strategy, or plan integrating NCDs and their risk factors. Jordan also lacks an NCD surveillance and monitoring system (WHO Noncommunicable Diseases Country Profiles, 2014). In Jordan, the basic package of essential health services, including NCD prevention, covers registered Syrian refugees (through UNHCR) and Palestinian refugees (through the United Nations Relief and Works Agency for Palestine Refugees [UNRWA]). These services, including medicines, are provided free of charge. On the other hand, unregistered refugees have no access to UNHCR or UNRWA services. This often results in out-of-pocket payment. The primary health system in Jordan along with health financing mechanisms

(health insurance) functions well. These primary facilities are also equipped to deal with NCD situations, such as diabetes and hypertension. For refugees, an emergency kit developed by WHO has NCD essential medications. In contrast, perceptions of quality in primary health facilities continue to vary, thus influencing the role of higher-levels of care, as noted by the key informant on specialized care in service provision in Jordan.

The Jordanian health system faces challenges that impede the effectiveness of NCD prevention and control services. Major challenges reported for quality NCD prevention, early detection and treatment services in outpatient settings, as highlighted by the key informant, include capacity of staff, who may not be well trained in the provision of quality of care. Another challenge is monitoring of such services. Jordan has data systems for registered patients (not including new refugees), which include data collection on malaria and HIV/AIDS but not NCDs. Finally, access to medicines remains an issue. With the concept of UHC, national health insurance is expanding to cover the majority of Jordanians. However, the cost implication of providing access to all remains an issue. Rational use of chronic care medications for NCD prevention and control is a concern as this is heavily driven by specialists, who often do not adhere to the standard guidelines.

> *Quality of care in NCD prevention is the most important thing because NCDs are lifelong conditions, with the majority of people being asymptomatic and needing close follow-up care.*
>
> UNRWA Jordan

Syria

Due to the ongoing conflict in the Syrian Arab Republic, the health care system has been severely compromised. Critical shortages in availability of staff and medical supplies and damaged infrastructure have disrupted the delivery of both routine and life-saving health care. The Humanitarian Response Plan developed by the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) determined that this "non-resilient" health system puts individuals who are already vulnerable, including people living with chronic disease, survivors of trauma, children, and many other vulnerable populations, at risk. In the response plan, a focus is placed on the health system: Improve access to basic services and livelihoods by supporting community resilience, institutional and response capacity (Health objective #3, UNOCHA Humanitarian Response Plan, 2017).

According to the WHO NCD Fact Sheet, the Syrian Arab Republic has an evidence-based national guideline for the management of major NCDs through primary care, but does not have a dedicated, operational NCD unit within the MOH; an operational multi-sectoral national policy, strategy, or plan integrating NCDs and their risk factors; or an NCD surveillance and monitoring system (WHO Noncommunicable Diseases Country Profiles, 2014). The collected data for this study did not reveal any governance arrangements for NCDs or their associated risk factors.

Lebanon

In Lebanon, the Ministry of Health has partnered with the YMCA to provide a number of Syrian refuges access to free medications in the primary health care system. Recently, additional sources of funding are coming in to support NCD services for forcibly displaced individuals. Lebanon has several policies to support improved prevention and management for NCDs; namely, the existence of operational policy, strategy, action plan for cardiovascular diseases, cancer, diabetes, chronic respiratory disease, harmful use of alcohol, unhealthy diet, physical inactivity and tobacco use. In contrast, the country does not have an operational NCD unit within the MOH or an NCD surveillance and monitoring system. It is unknown if Lebanon has an operation policy, strategy, or action plan integrating NCDs and their shared risk factors (WHO Noncommunicable Diseases Country Profiles, 2014). The basic package of essential health services in Lebanon does include NCDs. A national multi-sectoral strategy for preparedness and response as well as formal coordination and information sharing mechanisms that involve all stakeholders does not currently exist.

Coordination of development agencies has been a focus of the Ministry of Health in Lebanon. Through engagement with development agencies, Lebanon also has capacity for rapid response teams who can be deployed during an emergency; however, roles and responsibilities can be improved. The rapid response teams are based on various contingency plans available both at the government level and the donor/partner level. Such teams are typically composed of government and development agency representatives and representatives from Red Cross and other international and local NGOs, depending on the scale and nature of the emergency. It is important to note that not all emergencies within the country are health-related. If an emergency is health-related, then a standard procedure exists for an individual with expertise in NCD to be a part of the contingency plan. Further, the joint external evaluation conducted in 2016 in Lebanon revealed three cross-cutting needs for preparedness and response: (i) systems/structures for adequate coordination of information sharing, rapid response, and multi-sectoral engagement; (ii) representation of the private sector, which has an important role in providing services related to international health regulations (IHR) capacity; and (iii) IHR-related human resource capacity at different levels of administration (54).

In service delivery, the primary health systems are well-functioning and generally well distributed. In addition to this, small mobile units supported by the Lebanon Red Cross, which in turn make referrals to the primary health facilities, are available. The government in Lebanon has provided available funding to cover NCD prevention and early detection and treatment services for displaced persons. OOP expenses for health in Lebanon have decreased since 2003 (see Figure 64). The majority of primary health care clinics are private and not owned by the ministry; instead they are supported by either international or national NGOs and UNHCR. The government in Lebanon has provided available funding to cover NCD prevention and early detection and treatment services for displaced persons. With regard to the health workforce, inadequate numbers of qualified staff are reported across the various levels.

Morocco

Morocco does not have evidence-based national guidelines for management of NCDs through primary care; an operational policy, strategy, or action plan integrating NCDs and their risk factors; or an NCD surveillance or monitoring system (WHO Noncommunicable Diseases Country Profiles, 2014). However, the country does possess a dedicated NCD unit within the MOH.

Results of the 2016 joint external evaluation revealed that a mechanism to coordinate the response among the different sectors to potential public health emergencies of international concern is in place through the Crisis Coordination Centre (PCC, Poste de Coordination Central) at the national level and through prefectural or provincial coordination centers. For gathering data, the surveillance system in Morocco addresses national and international health priorities including compliance with the internal health regulations. The system is decentralized with a reporting flow from provinces to regions to the Ministry of Health.

Tunisia

Tunisia does have an operational policy, strategy, or action plan for cardiovascular diseases, cancer, and diabetes. NCDs account for 49% of the total deaths reported in country, yet the research did not reveal an operational, dedicated NCD unit within the MOH or an NCD surveillance or monitoring system (WHO Noncommunicable Diseases Country Profiles, 2014). Additionally, as reported in Figure 64, OOPs have reduced in the last decade though catastrophic expenditure (using surgical care as proxy) is at 41%.

Libya

Libya does not have a basic package of essential health services and currently lacks an existing policy relating to NCDs. The overall health sector operational multi-sectoral policy mentions NCDs. Though fragmentation and siloed health systems strengthening approaches continue to persist, a multi-sectoral mechanism on NCD exists to bring all sectors involved in NCD prevention. A recurrent theme in Libya, as shared during the qualitative interviews, is the heavy focus on treatment and management with limited attention to the prevention of NCDs.

At the sub-national level, district and hospital leadership are not adequately trained on dealing with and responding to public health events and mass casualties. In a country where access to essential health services remains an issue (1.3 million people were in need of health humanitarian aid in 2017 (55)), no formal arrangement exists to ensure protection of health care facility infrastructure and personnel during peacetime or emergencies. A recent assessment revealed that out of the 97 hospitals in the country, 17 were damaged by conflict, rendering the facilities completely closed. For the remaining 80, only four were performing above 75% efficiency. Partners, such as the United Nations Development Program (UNDP), are supporting the rebuilding of these health facilities. In terms of health financing, Libya presently has no public financing mechanism, such as insurance or co-payment, but the government provides a large subsidy for health facilities. However, the system is not operating at full capability due to the limited government funds available to support hospitals. This has resulted in high out-of-pocket health expenditure (though out-of-pocket expenditure has decreased in the last decade) for both the general and forcibly displaced populations (Figure 64).

At the local operational level, consideration may be given to quality of care during service delivery. However, a key respondent shared that quality of care is rarely considered at the national programmatic level. Informant interviews revealed that the majority of health services are delivered in secondary and tertiary facilities due to the deficient nature of some primary health systems in the country. The majority of high impact NCD services (such as tobacco cessation, CVD risk assessment, multi-drug treatment and counselling for prevention of CVDs, and patient self-management support) are addressed in the pre-service curricula of training professionals. Due to limited funds, the government is dependent on external donors and technical agencies, such as WHO, to conduct training on quality NCD service provision.

The HMIS has a placeholder for reporting on high-risk factors for NCDs. Data reporting is done at the facility-level and varies among the 22 districts in the country, particularly between conflict and non-conflict zones. Respondents reported a lack of capacity to properly record, report and use data for decision-making and suggested this was an area needing improvement. Very little is known about the use of data for rational decision-making at either the local or national level in Libya.

Yemen

Yemen does not have an operational, dedicated NCD unit within the MOH; an operational multi-sectoral national policy, strategy, or action plan integrating NCDs and their risk factors; evidence-based national guidelines for management of NCDs through primary care; or an NCD surveillance or monitoring system (WHO Noncommunicable Diseases Country Profiles, 2014).

Additionally, the country has been plagued by violent conflict since political uprisings in 2011 and has been in a state of civil war since 2015, with much of the fighting taking place in the port city of Al-Mokha. Based on the WHO special situation report on the conflict in Al-Mokha City, Ta'izz Governorate, the conflict has negatively affected the health system and reduced its ability to provide routine health services to the population. Therefore, a main health priority recommended by the WHO is to "support health facilities to maintain essential and lifesaving services to internally displaced peoples and host communities" (WHO Special Situation Report, Conflict in Al-Mokha City, Ta'izz Governorate, Yemen, 2017).

Palestine

In the Palestinian territories (West Bank and Gaza), the burden of NCDs is high and are responsible for some of the leading causes of death like cardiovascular disease, cancer, cerebrovascular disease, and diabetes (Health conditions in the occupied Palestinian territory, including east Jerusalem, and in the occupied Syrian Golan, 2016). Due to the high burden of NCDs and prevalence of related risk factors leading to NCDs, Palestine does have a dedicated NCD unit within the MOH and has established a multi-stakeholder committee for NCDs. Additionally, the MOH has introduced the WHO Package of Essential Non-Communicable (PEN) Disease Interventions for Primary Health Care in Low-Resource Settings (15) to combat NCDs. The MOH has initiated training of staff, adapting of record-keeping and health information systems, and strengthening of supervision, which has shifted most NCD management responsibilities to general practitioners and nurses in primary health clinics.

The MOH is also moving towards a people-centered approach through a family practice model of primary care (WHO Palestine Health Profile, 2015).

Data from desk review reveal that the health sector in Gaza was originally able to maintain the continuity of the services provided during the beginning of blockade of the Gaza Strip, which began in 2007. This is largely due to extensive external support through emergency drug and medical supply donation and MOH, NGO, and United Nations (UN) surge capacity to fill urgent gaps in the health system. However, even at the beginning of the current conflict, the health sector was already in a dire situation due to the previous conflict conditions, the financial situation of the MOH, and a fragmented health sector. While services have been continued, these services were already severely lacking in meeting the needs of the population. Additionally, the scope of the conflict exceeded expectations and contingency plans were insufficient to mitigate the challenges on the health system. The absence of quality preparedness plans, at both the central level and individual facility level, hampered an adequate emergency response and reduced the quality of services provided throughout and after the conflict. The system was plagued by recurrent power cuts, deteriorated medical equipment due to inadequate maintenance and spare parts, and high percentage of out of stock essential drugs and medical items. Additionally, coordination between health service providers was insufficient leading to inefficient use of information for service availability and potential resource sharing. The main impact of the recent conflict on NCD care is related to access to primary health care for medication refills, access to hospital care for acute events, and access to referral care abroad. For the health sector in Gaza to recover and gain resilience to future emergency situations, chronic issues must be addressed through comprehensive and sustainable health system strengthening by the MOH and strong support from external donors. Additionally, it will be challenging to rebuild, in particular the Gaza health sector, while the Israeli blockade remains in place (WHO Gaza Strip Joint Health Sector Assessment Report, 2014).

While the international community has been contributing significantly to the capacity building of the health sector in Palestine, the fragile political situation remains a major challenge in building a strong, resilient health system. More recently the national health strategy has begun to focus attention on quality and safety of services, which is crucial towards building health system resilience. Despite this new focus, the culture within MOH hospitals is punitive and blaming often occurs in response to errors, which greatly hinders event reporting and positive quality growth. Changing the culture around quality and improvement will be an important step towards building resilient health systems that provide accessible and safe health care services (56).

IV. ANALYSIS

A. Common Health System and Service Delivery Challenges

1. Cardiovascular and chronic pulmonary diseases

No evidence that policies restricting marketing of food and beverages high in saturated fats, trans fatty acids, free sugars or salt, or limiting partially hydrogenated vegetable oils in the food supply either existed or had been enforced in any of the countries studied. The only exception was Tunisia, where policies to reduce salt and saturated fatty acid consumption existed. While effective national policy is an important precondition of an effective national response, proper implementation of the policy is equally critical. However, due to unavailability of data on salt consumption or energy intake from saturated fatty acids (NCD GMF measures), it is not possible to analyze whether the existence of these policies in Tunisia affected individual's behavior (primary prevention) compared to other countries.

The fact that policies on restricting unhealthy diets or promoting physical activities were available in several of the countries (Iraq, Jordan, Lebanon, Tunisia) cannot explain why there has been an increase in the prevalence of overweight and obese persons in these countries while the prevalence of overweight and obese persons was relatively low in some of the countries without such policies (e.g., Morocco and Yemen). It is likely that the policies in Lebanon or Tunisia appeared in response

to increased prevalence, but as stated above, effective execution of such policies is equally important to reach desired outcomes.

Policies on restricting harmful use of alcohol were available in Jordan (in 2013, not in 2015) and Morocco. Compared to other countries, Jordan and Morocco were positioned in the middle of the study countries for average per capita alcohol consumption, consuming three times less than adults in Tunisia and Lebanon. Considering the low consumption of alcohol in many of the study countries due to religious and cultural reasons (Figure 29), the absence of policies restricting the harmful use of alcohol is not a policy/health system gap in the given context.

Tobacco use among adolescents and adults in the study countries fell somewhere on the lower end of global averages, but the higher end of regional averages. The prevalence of adolescents who smoke was 36.2% of adolescents in Lebanon and 24% in Jordan. In Lebanon, 37% of adults smoke or use tobacco (barely higher than adolescent use); whereas, in Jordan, 38.4% of adults do, indicating that many people take up tobacco use after their adolescent years in Jordan (see Figure 41 on page 35). With 23% of the population using tobacco, Yemen and Libya are positioned in the middle of the study countries based on average tobacco consumption, but neither had a policy to decrease tobacco use. Again, a policy's existence does not seem to predict positive outcomes ("reduction of tobacco use"); rather, policies seem to be created in response to public health problems. On the other hand, the availability of nicotine replacement therapy in Jordan and Lebanon could be perceived as the national response to the spread of this risky behavior (as an example of the implementation of national policies on reducing tobacco use).

Unavailability of total cholesterol tests in public health facilities in Libya, Tunisia (and presumably in Yemen) is another health system gap that hinders timely detection and control of hypercholesterolemia to prevent the development of cardiovascular disease. However, without knowing the actual coverage of testing for cholesterol level in blood, it is impossible to assess the quality of services to detect and control biological risk factors (measurement block I-A-SD). The epidemiologic data we used in this assessment, like prevalence of raised total cholesterol (or blood pressure), are collected mostly through dedicated studies. This means that even if it was difficult to test for total cholesterol in Tunisia or Libya due to unavailability or low coverage of existing cholesterol testing in public facilities, we still collected information through a population-based study on total cholesterol to understand the epidemiologic picture: in Tunisia, almost 40% of population had a total cholesterol level above 5 mmol/L and 10% were above 6.2 mmol/L, while it was 36% and 7% in Libya respectively (Figure 90).

Figure 90: Share of population with raised total cholesterol (TCH) by countries (2008)

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)
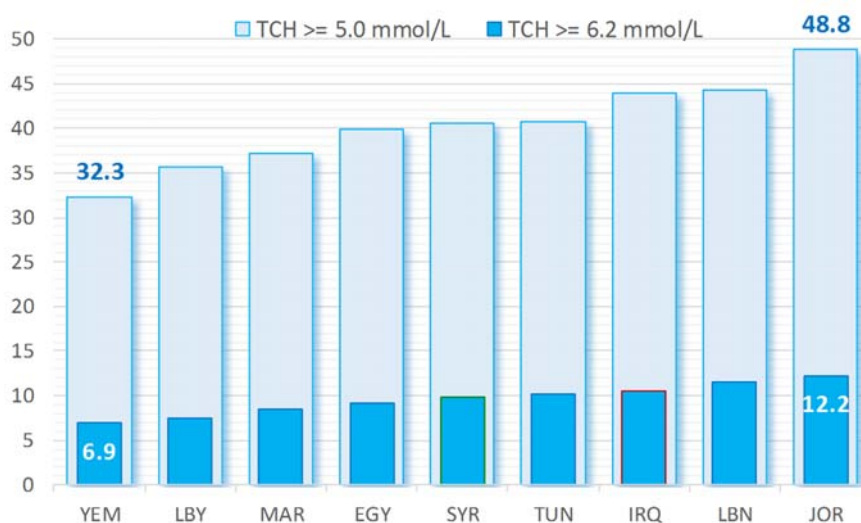
Another important biological risk factor, raised blood pressure, was lowest in Lebanon; a country with one of the highest shares of overweight and obese people and tobacco users among the selected countries. The second lowest prevalence of high blood pressure was found in Jordan, which is also close to Lebanon in terms of high prevalence of risky behavior (e.g., smoking) or and biological factors (overweight and obesity, high blood cholesterol level). For this to be possible – that in two countries where risk factors for hypertension were high, but high blood pressure prevalence was low – something must be mitigating these risk factors.

Could it be the health system? We can test a hypothesis: "The health system succeeded in controlling blood pressure in Lebanon and Jordan compared to other countries." In order to test this hypothesis, we need to justify, at a minimum, the following: a) medical personnel were able to detect high blood pressure and 10-year CVD risk as early as possible; b) physicians provided evidence-based care to control blood pressure through modifiable risk factors and/or needed medications to prevent development of CVD (if applicable); c) essential medicines for hypertension control and CVD prevention were available and accessible to patients; d) patients consistently adhered to prescribed treatment and lifestyle change recommendations from doctors.

Information was not available to assess how regularly blood pressure had been measured during a visit to a general practitioner or a family physician in an outpatient clinic. Therefore, we could not conclude whether the system has the ability to detect cases of raised blood pressure at an early stage (similar to early detection of cancer in determining treatment/health outcome). If we assume that blood pressure is regularly checked when visiting a doctor (irrespective of a purpose of the visit), then Jordan, with 11.5 outpatient/primary care visits per capita (in 2014), and Lebanon, with 6.2, have a higher probability of detecting raised blood pressure in the population (as well as other biological risk factors, such as raised blood cholesterol and glucose and CVD risk, than the rest of the countries in the study (the next closest country, Libya, reported only three visits per capita per annum; Egypt: 0.5 visits). Assuming that the opportunity for measuring blood pressure had never been missed, the probability of detecting raised blood pressure was 2 to12 times higher in Lebanon and 4 to 22 times higher in Jordan compared to Libya and Egypt. While compliance with blood pressure measurement practices cannot be assumed, the fact that service delivery coverage and utilization in other countries is very low is indisputable. Low primary care service utilization rates in these countries provide less space for NCD early detection, prevention and control across the NCD continuum. If we knew the outpatient service utilization rate by age group, we could be more accurate about the gaps in PHC service delivery that serves as a gate into prevention and control of most of NCDs (including cancer). Nevertheless, regardless of age structure or case mix, when the utilization of outpatient care is less than one visit per person per year, an effective NCD prevention and control response, at the service delivery level, cannot be guaranteed.

Do more frequent visits to outpatient clinics translate into better detection and subsequent control of NCDs? We will try to answer this question concerning cancer and mental health later, but with respect to CVD only Lebanon reported "Yes" on the indicator "Availability of cardiovascular risk stratification in 50% or more primary health care facilities (134)" (Figure 50). If that is the case, then more frequent visits to primary health care or outpatient clinics in Lebanon combined with existing cardiovascular risk stratification practices, which include blood pressure (BP) measurement, are the most convincing explanation as to why a high prevalence of behavior and biological risk factors does not result in a proportionally high incidence of raised blood pressure in the country.

What happens in the health system and how does it contribute to the containment of the progress of CVD (level II1) and then the reduction of CVD complications (level II2 in Figure 130 on page 133)? As explained in section **III.A. Measurement Practices and Data Availability** (on page 15), there is no information on the incidence of CVDs and their complications. There is also no existing data on access to and quality of outpatient and inpatient services on secondary prevention of CVDs and their complications. Data gaps do not allow us to use the conceptual framework of ambulatory care sensitive conditions (ACSC) to assess health system or health service delivery effectiveness in relation to diabetes, hypertension, or heart failure (57). The fact that aspirin and calcium channel blockers were available in public health sector in all countries, while beta-blockers and statins were

available in only a few countries (see Figure 58 on page 46), does not give us sufficient information to understand the gaps in the continuum of prevention and control of CVD.

On the another hand, can the availability of beta-blockers and statins in the public health sector (together with the highest utilization rates of outpatient care and availability of coronary bypass or stenting and thrombolytic therapy) in Jordan explain why the death rates caused by ischemic heart disease or stroke were the lowest (see Figure 12 on page 21 and Figure 13 on page 22, respectively), or why the overall disease burden related to CVDs was the lowest in the country with one of the highest prevalence rates for CVD risk factors[13] compared to other focus countries? The only answer is that the performance of health system succeeded in mitigating all these factors; preventing CVD-related deaths and disabilities among their patients.

Jordan is also noteworthy in terms of having one of the lowest disease burdens (after Iraq) caused by COPD despite having the highest share of the population using tobacco.

Acute stroke care and rehabilitation in more than 50% public health facilities was found in Lebanon, Morocco and Palestine. Lebanon and Morocco were positioned closer to the lower end of disease burden (DALYs and YLLs) caused by stroke, so we cannot assess the contribution of this health system input to the effectiveness of CVD control. If we had stroke incidence or prevalence figures, we would have standardized disease burden (per case of stroke) to understand if outcomes were better in Lebanon and Morocco once stroke occurred.

What are the features that make health systems more effective in Jordan and Lebanon in terms of control of CVDs? Interestingly, health systems in these countries are very different: Lebanon has a free market-based health system and service delivery while Lebanon has a very strong public health sector and universal health coverage. The similarities between the two countries at first glance are as follows:

- High level of urbanization – above 80% in 2016 (see Figure 56 on page 44).

- Better maternal and child health outcomes as compared to others:

    o Relatively low maternal mortality ratios (15 deaths per 100,000 live births in Lebanon and 58 in Jordan, see Figure 80 on page 57)

    o Relatively low neonatal mortality rates (5 deaths per 1,000 live birth in 2014 in Lebanon and 11 in Jordan)

    o Relatively low stillbirth rates (around 10 stillbirths per 1,000 total births, see Figure 82 on page 57)

    o Lowest share of children under 5 who were stunted (7.3% in Lebanon and 8% in Jordan)

- Better health care financing outlook:

    o Relatively high level of total health expenditure as a percentage (%) of GDP (6.4% Lebanon, 7.5% Jordan, see Figure 62 on page 48)

    o Highest expenditure per capita (785 PPP$ per capita in Jordan and 987 PPP$ per capita in Lebanon)

    o Relatively low risk of catastrophic expenditures for surgical care (see Figure 66) on page 50

- Highest health workforce density after Libya (see Figure 59 on page 46).

Undoubtedly, lower density of health workers and lower level of health care financing are health system challenges in the ten study countries, but they are not specific to NCD prevention and control

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[13] In Jordan, 64% population was overweight, 30% were obese, 38% used tobacco and 12% had raised blood cholesterol.

and cannot lead us to tailored interventions to address NCD prevention- and control-related gaps in health systems.

2. Diabetes

In addition to other behavioral and biological risk factors, the population with raised blood sugar was again highest in Lebanon (22.1%) (see Figure 31 on page 30). This was not confirmed by statistics from another WHO source, according to which the prevalence of diabetes (level II) was the highest in Egypt (16.7%) in 2015, followed by Lebanon (13%) (Figure 32 on page 31).

Figure 91 below presents information on diabetes prevalence through three similar indicators from different sources:

* "Diabetes prevalence (% of population ages 20 to 79) (201)" for 2015 (from WB NHPS);

* "Age-standardized prevalence of raised blood glucose/diabetes among persons aged 18+ years or on medication for raised blood glucose (12)" for 2014 (from WHO EMRO defined in the source as "Raised blood glucose among persons 18+ years, Age-standardized"); and

* "Population (in %) with raised fasting blood glucose (>=7.0 mmol/L or on medication) (age-standardized estimate)" for 2014 disaggregated by sex (from WHO Global Health Observatory).

The reason of such a significant difference is unclear. If the same method was used for data collection and the only difference is the year, then there is unlikely to have been a threefold reduction in diabetes prevalence in Yemen in a year and not as dramatic but still substantial reductions in other countries (Figure 91). The original assumption that "Age standardized prevalence of raised blood glucose/diabetes" captured a biological risk factor, while another shows the spread of diabetes mellitus as a disease, is also questionable since a majority of these countries do not have diabetes registries.

Figure 91: Comparison of the values of diabetes prevalence indicators from three sources
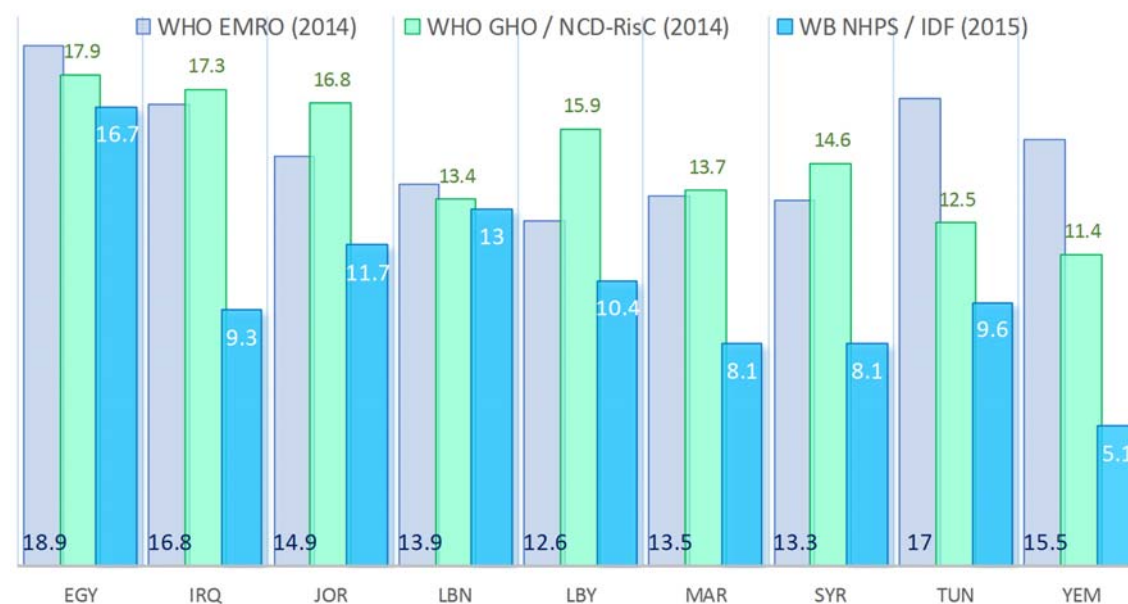
Sources: World Bank Nutrition, Health and Population Statistics, WHO Global Health Observatory

For consistency, we will use "Age standardized prevalence of raised blood glucose/diabetes" based on the figures provided by WHO EMRO (although both data sources are depicted in Figure 92 on diabetes prevalence).

Let's understand how health system and service delivery inputs were able to prevent diabetes-related mortality and disease burden (level IV) among people with diabetes/raised blood glucose (level II).

Specifically, we will explore whether: "The health systems in Morocco and Tunisia failed to mitigate biological risk (raised blood glucose) and therefore, despite the relatively low prevalence of raised blood glucose, had the highest disease burdens (expressed in DALYs or death rates) caused by diabetes."

For this analysis, we placed countries sorted by DALYs caused by diabetes from lowest to highest (light wide columns) and projected diabetes prevalence. Figure 92 helps to visualize that the diabetes disease burden in Morocco and Tunisia was the highest (2,300 and 2,100 DALYs per 100,000 population, respectively) while in the countries with much higher diabetes prevalence (like Egypt, Libya, Syria, etc.) the disease burden was much lower. In the two countries on the left with the lowest diabetes disease burden, Syria and Yemen, the prevalence of diabetes was higher than in Morocco and Tunisia.

Figure 92: From the prevalence of diabetes to its burden (in DALYs)
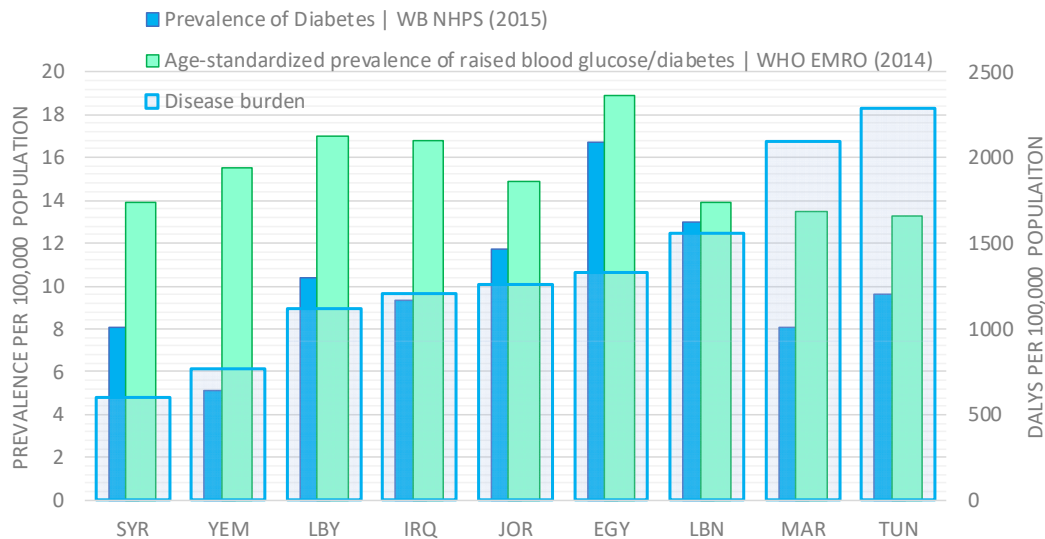
Is this because health system gaps (in Morocco or Tunisia) implied a reduction of the disease burden caused by diabetes after the occurrence of the disease (i.e., the health system failing to prevent advance of the disease, which is disabling patients at level II of the NCD prevention and control continuum or causing premature death at level III)?

Constructing the diabetes care cascade, like the one used recently for the analysis of diabetes prevention and control in 12 sub-Saharan countries (58), would have been ideal to answer this question and get systematic insight into the performance of diabetes-related medical services and gaps at different stages of the diabetes continuum. However, this method requires personal-level data, to define cohorts of the population with diabetes and then losses at each stage, that was not available and/or feasible within the rapid assessment.

How can this phenomenon be explained? Why did a case of diabetes result in losing 0.26 disability-adjusted years of life in Morocco as opposed to 0.045 DALYs in Syria and 0.049 in Yemen (Figure 93)? If we further adjust the epidemiology for prevalence by using mortality rate – the number of deaths that occurred in a given period per 1,000 patients with diabetes – and project it on the chart with decomposed disease burden per case of diabetes (Figure 93), we can find that:

- The mortality rate among diabetes patients was the highest in Syria (5.3 per 1,000 diabetes cases), while the disease burden per case was the lowest (0.074).

- The lowest mortality rate among diabetes patients was in Lebanon (0.5 per 1,000 diabetes cases).

- Although years of life lost (YLL) per case of diabetes were the same in Tunisia and Morocco, the mortality rate in Morocco was 4 times higher than in Tunisia (and was the 2nd highest after Syria).

High mortality rates despite low YLLs per case of diabetes (Syria vs. the rest of countries), or higher mortality rates despite the same level of YLLs (Morocco vs. Tunisia) can be explained by two factors:

1. Late occurrence or detection of the disease (among elderly people) and/or dying from diabetes at older ages (in countries with relatively high mortality but low YLL, such as Syria); or

2. Dying from diabetes at a relatively younger age (most likely, due to missed cases and severe/rapidly progressing forms of the disease) in countries with relatively low mortality rate but higher YLLs per case of diabetes (for example, how Tunisia produced the same quantity of YLL per diabetes case as Morocco, which had 4.4 times more frequent deaths but presumably at older ages). It also implies that irrespective of the age of detecting diabetes, the life with diabetes was prolonged and the number of years lost due to disability (dark blue segment of the column) was higher in Morocco than in Tunisia.

Figure 93: Disease burden in DALYs per case of diabetes/raised blood glucose in 2014 (WHO EMRO prevalence figures)[14]
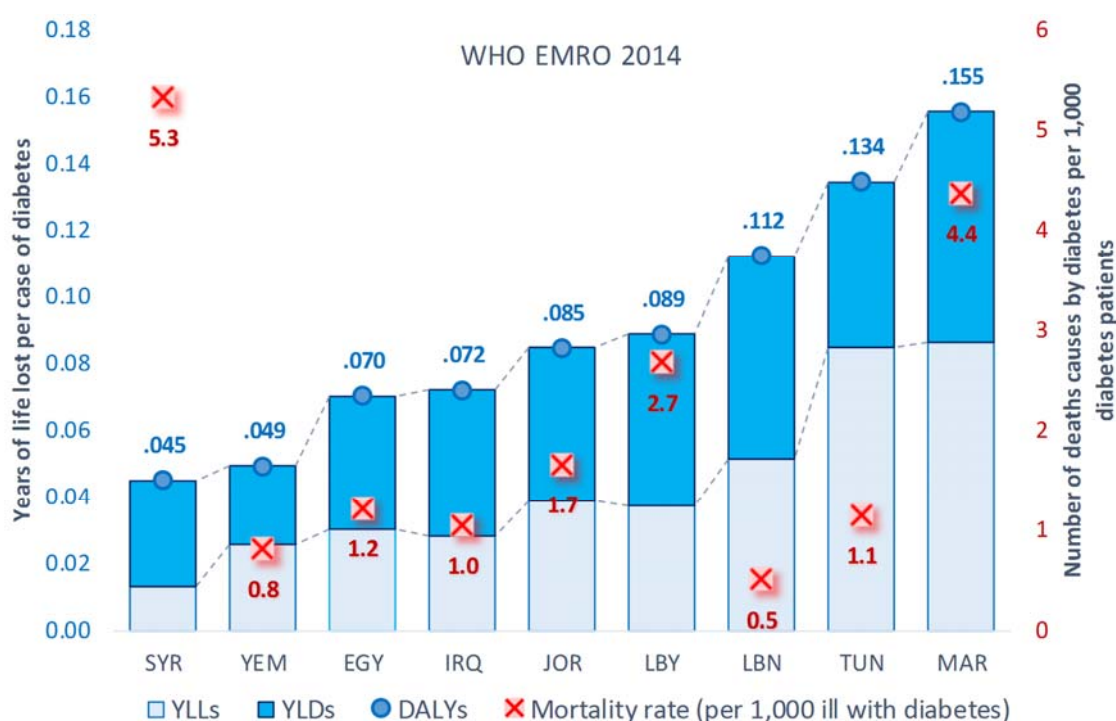
According to the International Diabetes Federation (IDF), 40.6% of people living with diabetes are not diagnosed (30 p. 56) and are missed by health service delivery. Unfortunately, the IDF did not share country specific proportions of undiagnosed cases of diabetes, so we cannot use it to explain variations in mortality rates and disease burden structure.

Theoretically, countries with relatively high shares of YLDs (such as Syria, Iraq or Libya) as shown Figure 94 below, better prevent diabetes-related deaths and shift the disease burden toward disability assuming that most (or almost all) cases of diabetes occur in the same age group. Since onset of the diseases (irrespective of the age it was diagnosed) happens in different age groups, we cannot use YLL/YLD proportions as a proxy for assessing the health system's ability to manage diabetes control. However, the fact that the probability of dying from diabetes among diabetes patients is 3 to 5 times

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[14] A similar chart using the WB NHPS/IDF prevalence statistics is presented in Figure 123 on page 83.

higher in Syria, Morocco and Libya than in other countries clearly indicates low performance of health service delivery in these countries to manage diabetes and its complications.

Figure 94: Structure of DALYs caused by diabetes: proportion of YLLs to YLDs

YLLs and YLDs in absolute numbers per 100,000   YLLs and YLDs as % of DALYs
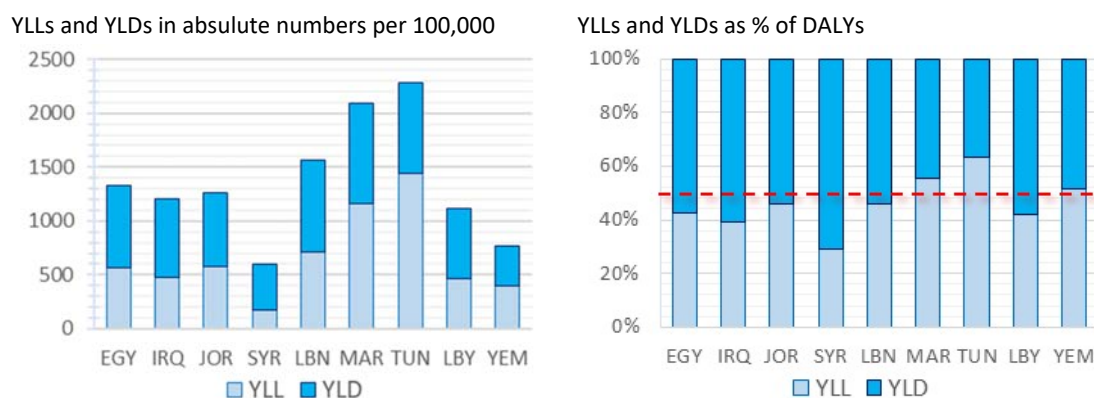
Source: WHO Global Health Estimates (http://www.who.int/healthinfo/global_burden_disease/en/)

Renal transplantation was not available in Tunisia, Lebanon or Jordan, with relatively low mortality rates, and in Syria, with a high mortality rate. The fact that dialysis was available everywhere except Libya cannot explain why YLD was the highest in this country after Morocco (0.061 and 0.069, respectively).

Insulin and metformin were available in the public health sector in 2015 in all countries except Libya and Yemen (see Figure 58), and Libya was the only country where diagnostic testing for blood glucose or HbA1c were not available. While HbA1c measurement is essential to determine blood glucose control, there is no indication that this affected diabetes-related mortality or disease burden in the country.

3. Cancer

Breast cancer screening programs were available in all countries except Libya, but cervical cancer screening programs (population-based) were only available in Morocco (see Figure 54 on page 43). This could explain the lowest incidence of breast cancer in Libya (inability of the health system to detect the disease among general population or high-risk groups).

Morocco had the highest incidence of cervical cancer (14.3 per 100,000 population), higher than world or EMRO averages. Was that because of the population-based screening? Perhaps not, if we consider its low coverage (<10%). The absence of cervical cancer screening programs with no HPV vaccine in the routine immunization calendar can be considered a health system gap in all countries except Morocco concerning cervical cancer prevention.

With respect to the breast cancer screening, there is no data about coverage. Therefore, we cannot be certain that nominal existence of the screening program is sufficient to detect breast cancer at early stages. The density of mammographs can serve as proxy indicator of the health system's ability to screen for breast cancer. It was the highest in Lebanon, well above the density in the other five countries.[15] It is noteworthy that Lebanon led the list of countries ranked by breast cancer incidence and prevalence. Mammographs were more accessible in Jordan (second most after Lebanon) than in the remaining four countries, and breast cancer incidence was highest in Jordan after Lebanon (see Figure 18 on page 24). Can this be attributed to the availability of mammographs? It could be, to a certain extent. However, the low access to mammography in the other four countries, and no

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[15] Data on availability of mammographs were only available for six study countries: Jordan, Iraq, Lebanon, Morocco, Tunisia, and Yemen. There was no data for Egypt, Libya, Palestine, and Syria.

information about the capacity of the system to screen for breast cancer, is certainly a health system challenge.

Routine immunization coverage with the Hepatitis B antigen was high in all countries except Syria, Iraq and Yemen in 2015. This gap, if not addressed, would affect liver cancer incidence in the coming decades. There is no explanation (in terms of risk factors) as to why liver cancer incidence in Egypt was three times the regional average (7.4) in 2012. Prostate cancer and lung cancer were the second and third major causes of cancer detected in Lebanon in 2012 (after breast cancer) and the highest in the region. In Morocco, which had the second highest incidence of prostate cancer among the study countries, prostate cancer incidence was two times less than in Lebanon (18.5 vs 37.2 per 100,000 population) (as shown in Figure 102 on page 109).

Breast cancer mortality in Lebanon was similar to other countries (Morocco, Palestine and Egypt), while the cancer incidence was almost twice as high (Figure 95). Why did the high incidence of cancer in Lebanon (and in Jordan to some extent) not result in a proportionally high cancer mortality?

Figure 95: Breast cancer incidence and mortality by focus countries, regional and global averages (2012)
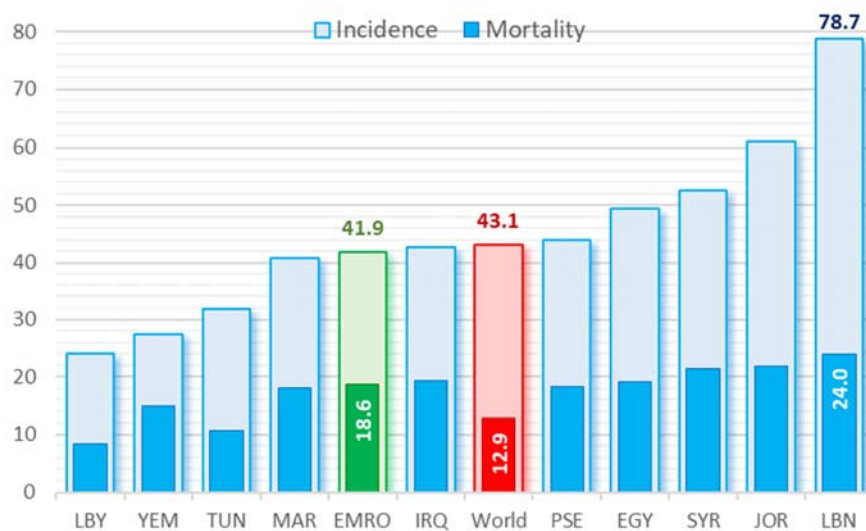
Source: International Agency for Research on Cancer

We can assume that the better functioning health system mitigated the consequences of more frequent breast cancer thanks to its early detection, timely and adequate treatment and follow-up. We have no evidence to prove or reject it. However, this resembles the situation of diabetes in Lebanon and CVD in Jordan that indirectly supports the hypothesis that at level 2 and 3 (disease progression and prevention of complications), the health systems of Lebanon and Jordan are more capable of minimizing losses along the NCD prevention and control continuum.

It is noteworthy that indicators on the availability of essential medicines do not include ones for cancer treatment (chemotherapy) or interventions such as radiotherapy. Therefore, we cannot assess whether prerequisites for effective cancer management at clinical stages were present in the health systems of ME countries.

The absence of palliative care in Egypt, Jordan, Palestine, Syria and Yemen is a substantial gap in health service delivery. This, together with unavailability of oral morphine in all countries in 2015 (see Figure 57 on page 45), indicates a health system challenge that has to be addressed regardless of the progress made in other areas of cancer prevention and control.

4. Mental health

Unlike in the case of emerging priorities such as CVD, diabetes or cancer, we did not try to cover a wide range of risk or protective factors that, by nature, fall beyond the scope of the health care system

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(60 p. 21). Even when well detected, the leading social, environmental and economic determinants cannot be addressed through health system strengthening interventions. Adverse childhood experiences, including child abuse and neglect, that are considered one of the risk factors do fall partially under the auspices of health policy. Home visitation programs were implemented at large scale only in Morocco, and the implementation was limited in Tunisia, Egypt and Iraq (home visiting services or community services) (Figure 75 on page 54). These interventions are often included in the package of maternal and child preventive services (including home visiting for antenatal, postnatal and infant care) and can efficiently address mental health prevention when integrated into MCH interventions.

Depression prevalence was the highest in Tunisia, followed closely by Lebanon, and then Libya and Morocco (Figure 22 on page 26). Once developed, the distribution of disease burden attributed to depressive disorders showed the same pattern – it was the highest in Tunisia followed by Lebanon, Libya and Morocco.

Figure 96: "Standardized" burden of depressive disorder and suicide rates

Figure 96 above shows that DALY per each case of depressive disorder did not vary significantly across countries (the lowest 0.163 in Egypt to 0.173 DALY per case of depressive disorder in Syria). We may assume that health service delivery in Yemen or Syria faces more challenges in managing depressive disorders compared to other countries, which could be attributed to military conflicts.

The variation in the pattern of suicide rates does not match that of "standardized" DALY (being the highest in Yemen – 8.2, and lowest in Iraq, Jordan and Egypt). However, it does match the pattern of DALY distribution across these countries (see Figure 20), although the life lost due to suicide is not counted as YLLs caused by depressive disorders.

The highest density of mental health professionals (combined) was found in Tunisia at 3.64 per 100,000 population. Psychiatrists and psychologists together "served" in average 1,100 persons with depression in Tunisia and Lebanon, ten times less compared to Syria and Iraq (Figure 97).

Figure 97: Density of psychologists and psychiatricians per 100,000 population and number of people with depression per mental health doctor, by country (2014)
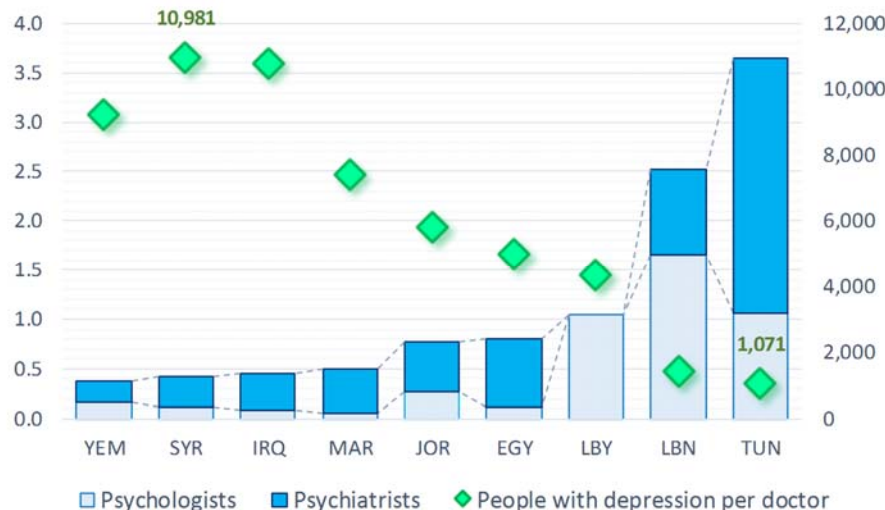
The health workforce shortage in Syria and Iraq in particular can be considered as a serious gap limiting access to essential mental health services. Considering the relatively high proportion of the population living in rural areas in these countries, the ratio of people with depression to mental health doctors can be even worse for most of the population in need.

Lebanon was the only country where there were more psychologists than psychiatrists.[16] This is not surprising given the low ratio of mental hospital beds (0.9 per 100,000 population). Social workers are better mobilized for mental health services in Lebanon than in any other ME country (2.3 per 100,000 population). Overall, in the way mental health service delivery is organized, Lebanon demonstrates the most community/outpatient care-oriented approach and is probably the most efficient; treating one out of three hospitalized patients in general (versus specialized) mental hospitals. Can all these preconditions for higher quality, more efficient mental health service delivery in Lebanon explain the relatively lower disease burden once depression occurred (0.163 per case of depression, Figure 96 on page 78)? Most likely, yes. In Tunisia, with the highest hospital admissions to both general and mental health hospitals (80 per 100,000 population in 2011, that cannot be attributed to the management of depressions) and with more reliance on psychiatrists, a higher suicide rate (5.5 per 100,000) and a higher "standardized" DALY per case of depression (0.169) was observed compared to Lebanon (as shown in Figure 96 above).

B. Gaps and Opportunities in Addressing Emerging Health Priorities in the Context of Emergencies

The analysis presented across the 10 priority countries highlights several similarities across the region. The following discussion is presented against the backdrop of protracted emergencies and acknowledging the instability that exists within the region.

Quality improvement is a widely recognized driver to address service delivery and health system challenges and improve its performance. Continuous improvement though identification of the gaps in processes and content of care and planning, testing, implementing, assessing, refining and instituting successful changes not only allows maximization of health gains and improvement of care

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[16] There was no data on the number of psychiatrists in Libya, therefore it cannot be treated as if all services to patients with mental disorders were provided by psychologists.

outcomes, but also contributes to the expansion and effective utilization of health spending to reach universal health coverage (UHC). Enhancing correct and consistent delivery of high-impact, cost-effective services contributes to rationalization of the benefit package for essential services and improves access to care; improving care of high-burden conditions allows more patients to benefit from improved health services; and reducing inefficiencies decreases the cost of care and improves financial protection for vulnerable and poor populations in particular.

Despite significant progress made in the availability of essential inputs and coverage with basic health services in some Middle East (ME) focus countries, the use of quality improvement as a tool to identify and solve local problems in service delivery and supporting systems is not effectively utilized. Critical gaps prevent these countries from delivering safe, effective, patient-centered, timely, efficient and equitable care[17] in priority areas to improve the target population's health.

For the priority countries in this study, improvements in primary health services are needed. Since the launch of the Alma Ata Declaration of 1948, primary health care has been viewed as the most important health service level. It is the first point of contact of individuals, the family and community with the national health system, bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process.[18] Primary health care is often the first line of defense against any potential threats to a health system. Investments in primary health care systems during peacetime efforts can lead to the rapid detection of such threats at the frontline and trigger action at the national level which can then activate regional- and global-level actions. Strong people-centered primary health care that is integrated and involves the continuum of care (promotive, preventive, curative, rehabilitative and palliative health services) has the potential to address overall health service access gaps, including NCDs. This can be pivotal to enhancing the quality of services received by the populations covered.

Most of the countries in this study reported a reduced number of primary care facilities per population, particularly in the countries where the majority of the population lives in rural settings (e.g., Egypt). Utilization of outpatient visits is also very low in all countries (except Jordan and Lebanon). While availability and utilization of services do not guarantee quality of primary care services, it clearly demonstrates low level of readiness of primary care services to prevent and control NCDs at the primary care level. Very low utilization of primary health care (or outpatient services) undermines the effectiveness of the diagnostic tests available in public health facilities and system readiness to provide essential medicines for the control of CVD and/or diabetes. Other clinical area-specific gaps, revealed by the rapid assessment are as follows:

- Health system challenges that affect early diagnosis and management of breast and cervical cancers include: absence of cervical cancer screening programs in all countries (except Morocco), limited availability of mammography in several counties, plus unknown (presumably very low) coverage of target groups.

- Despite the lack of information on the coverage of people with depressive disorders with outpatient mental health services, the capacity and organization of outpatient mental health services (e.g., outpatient versus inpatient) is challenging in most of countries except Lebanon.

- Inability to stratify cardiovascular risks in most of the surveyed countries during outpatient clinic visits further narrows the opportunity window for directing limited resources to patients with high risk of CVD to prevent development of heart attack and stroke, major killers among the adult population.

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17 The Institute of Medicine describes quality as the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (NAS, 2003) and are safe, effective, patient centered, timely, efficient and equitable (Agency for the Health Care Research and Quality)

18 http://www.who.int/publications/almaata_declaration_en.pdf

The assessment revealed that some countries (e.g., Lebanon, Jordan, Morocco) are more likely to be effective in reducing mortality from NCDs (YYLs) while maintaining a relatively high level in years of living with disabilities. This fact, together with high prevalence of risk factors and NCDs in the region, suggests that these countries were successful in treatment of NCDs while they are ineffective in their efforts to prevent NCDs and their risk factors. A heavy focus on the treatment of NCD services and not on prevention of developing NCDs requires transformational action since it may save lives but creates significant health and economic burden to patients, their families and society. The WHO outlines five inter-dependent strategies to move essential health services to become more people-centered. These services are defined as all services dealing with the promotion, maintenance and restoration of health and include both individual- and population-based services. The strategies entail: engaging and empowering people and communities; strengthening governance and accountability; reorienting the model of care; coordinating services within and across sectors; and creating an enabling environment. Quality of essential health services is embedded in all five of these inter-dependent strategic action areas. For health systems in the affected countries to become resilient, and as seen by the research results above, a transformational shift is required to strengthen PHC that is people-centered and integrated. Strong PHC systems grounded in the five interwoven strategies can serve to improve overall health service resilience for NCDs both at the individual and population level.

Another important finding of the assessment is the need to further enhance efforts to improve quality and coverage with maternal and child care services and nutrition. Integration of NCDs into USAID's (and other donors') health priorities, that heavily support the region, provides a unique opportunity of grand convergence of key regional priorities to maximize health gains and prevent diseases (e.g., gestational diabetes, hypertensive disorders during the pregnancy) and their complications among women, children and adolescents. For example, home visiting/community health services that usually serve as a platform for maternal and child health preventive interventions, can be efficiently utilized for the prevention of mental health problems through integration of violence prevention programs (aiming at child abuse and neglect, or family violence detection and prevention) into postnatal visits. Similarly, home or primary care visits can be effectively used for early identification and referral of mothers with possible cardiovascular risks (e.g., mothers with obesity and high blood pressure). Lack of integration of NCD and MCH services, particularly at the primary care level, is a significant missed opportunity for achieving synergies within NCD and MCH programming in most of the 10 countries.

Understanding patients' perspectives, particularly related to their knowledge, skills and practices regarding major NCDs and cross-cutting risk factors, as well as their experience of care, adherence to treatment and self-management of chronic conditions, are essentially important for planning an effective national/regional response. Unfortunately, data on patients' perspectives could not be retrieved in the study countries. In addition to patients', family and community perspectives are also key considerations in the move to drive trust in the quality of essential NCD prevention and control services, particularly in the context of emergencies. Indeed, earlier definitions of resilience place communities at the heart of the concept, emphasizing that resilience is "determined by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need."[19] Engaging, educating and empowering patients, communities and people to demand better quality services can serve as a means of improving service delivery interventions and reducing the risk factors for NCDs at the population level.

Delivery of quality essential health services can be seen as a litmus test for a well-functioning health system. Rapid adjustments are of course required during emergencies, particularly when these become protracted. This rapid adjustment can be prepared for through effective health service planning with a mindset that blends quality principles alongside emergency management. This is applicable to all of the countries considered in this review.

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[19] http://www.unisdr.org/we/inform/publications/7817

With the largest and increasing mobile population worldwide, the intersection between mobility, health, and migration management is a critical area of discussion to achieve "universal health coverage, global health security, public health, human rights, gender, equity, and human and sustainable development" in the region[20]. The Eastern Mediterranean Region hosts more than half of the world's refugees and has the largest caseload of displaced persons (145). Unprecedented migration in the region has brought new challenges to addressing the health needs of migrants and forcibly displaced populations, improving their equitable access to and coverage with quality health services and taking into account the needs of the affected local/host communities. Displaced populations in different locations (source, transit and destination places) of the region suffer from various health challenges including, trauma, injury, communicable disease, mental health disorders, illness related to maternal and child health, etc. The complexity of such distribution is further compounded by the increased burden of NCDs among mobile populations, who often managed chronic conditions present in their home country, but find management of these conditions more difficult during migration or forced displacement. This is due to the destruction of key health infrastructure and the medical supply chains of chronic care medications, inability to maintain contact with regular primary care providers, lack of financial access to health care services and chronic medications, degradation of living conditions, stress and psychological effects of displacement and other factors. Delayed care and lack of appropriate preventive and follow up services may lead to life-threatening complications and subsequent need for costly treatment. WHO has developed an NCD emergency kit to be used for emergency settings and initiated the development of standard operating procedures to address NCDs during emergencies. These procedures intend to "facilitate horizontal and vertical integration with national NCD responses and other aspects of the relief efforts" (146) and provide unified guidance for different types of refugee settlements at different phases of the emergency.

Despite these developments, ME countries face sizable service delivery challenges to address health care needs and provide quality equitable health services to growing displaced populations. Given the unique context of the study countries, structural improvements at the facility level also become key for delivering quality essential health services before, during and post-shock. A recent assessment shows that Syria[21] has suffered acute loss of health professionals with an estimated 45% drop since the pre-crisis situation, a 70% drop in local production of pharmaceuticals and a 50% increase in prices of locally produced pharmaceuticals. An estimated 57% of health facilities and 51% of public health centers are either only partially functional or closed. In Yemen[22], 16 out of Yemen's 22 governorates show that out of total 3507 surveyed health facilities, only 1579 (45%) are fully functional and accessible, 1343 (38%) are partially functional and 504 (17%) are non-functional. Services for NCD diseases and mental health conditions are only fully available in 21% of health facilities. In Libya[23], due to on-going conflict, only 33% of the primary health care facilities are fully functioning with interrupted supply of essential medicines and lack of core PHC services delivery, including maternal and child care, routine immunization and non-communicable diseases. The damage of primary health care is particularly concerning given that structural aspects of health facilities influence the level of trust in communities of the care provided at the institutional level.

A recurrent theme that emerged from the analysis was the lack of government funding and cost barriers to support the health sector. At the national level, out-of-pocket (OOP) expenditure as a

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[20] UN General Assembly High-level Meeting to Address Large Movements of Refugees and Migrants: Health in the Context of Migration and Forced Displacement Side Event, available at http://www.who.int/who-un/events/migration.pdf

[21] The Essential Primary Health Care Package. Northern Syria. WHO/HEALTH CLUSTER Gaziantep. August 2016

[22] Final findings from WHO's Health Resources Availability Mapping System (HeRAMS*)

[23] Post conflict health facility assessment. El Zanati Associate. 2012

percentage of total expenditure on health was reported at over 50% in Syria, Egypt, Morocco and Yemen (see Figure 64). In order to have resilient health services, innovative approaches to health financing, including various means of mobilizing and pooling resources for health service provision is needed. Specifically, this will require engagement of various health financing mechanisms, both internal (public and private health insurance) as well as donor/partner contributions and financial management. As evidenced by past outbreaks, fragility of health systems is often magnified during outbreaks. At the individual level, barriers to accessing quality health services, when not removed, create delays in seeking health care and often result in fatality. Additionally, high out-of-pocket expenditures render populations vulnerable to shocks due to high catastrophic expenditure (the risk of catastrophic expenditure [using surgery as proxy] was reported at over 50% for some countries, see Figure 66). Resilient health services and systems cannot be achieved if individuals contribute significant portions of their income to health care.

Resilient health services and systems are dependent on individuals having affordable access to quality essential health services, including those required for NCDs. Multiple approaches to financing are being taken on by several of the priority countries including subsidies. Equally, the Basic Benefit Package (BBP) of essential services exists in some of the countries (Egypt, Jordan, Lebanon and Libya). However, the fact that these packages do not include essential palliative care medications (e.g., oral morphine) and screening tests (e.g., cervical cancer screening) further highlights the need to improve public resource allocations by incorporating essential, high-impact, cost-effective NCD prevention and treatment services and medications in the benefit package. No access to oral morphine in public health sector, the absence of palliative care in most of countries and unknown coverage in others calls for immediate interventions to address this health system/service delivery gap that is critical for pain management, irrespective of the progress in cancer prevention and control in other stages.

In addition, further exploration is needed to understand the extent of coverage for forcibly displaced persons, except in Jordan where coverage is granted to registered refugees. For countries that have the basic package, the degree of its implementation is unknown due to constraints such as funding for essential commodities and the cost of treatment.

To address the growing burden of NCDs and related challenges, the UN High Level Meeting on Prevention and Control of NCDs and its adopted resolution by member states (147) enhanced regional efforts toward NCDs. In line with the resolution, the WHO Eastern Mediterranean Regional Office (EMRO), in collaboration with the member states, developed (2012) and revised (2015) a regional framework of action (61) and assisted countries to develop their own implementation plans. To track the progress of national NCD efforts, the Country Capacity Survey 2015, STEPS surveys, a "progress monitor instrument" (with 10 indicators) and country scorecards have also been developed, implemented and routinely discussed at the regional annual meetings. The report on the prevention and control of NCDs in EMR (61) highlights progress made by some member states in one or more priority areas of the Regional Framework for Action, but the majority of countries in the region are not on track to fully implement their national NCD responses. In all the study countries, long-term health strategic plans exist. However, very little is known about the link with emergencies and NCD in the focus countries.

Some countries reported strategies/guidelines on certain risk factors for NCDs. A clear strategic direction from national leadership articulates a pathway for addressing the high burden of priority diseases such as NCDs and improving overall quality of care. Tied to this, tools to support the overall strategic direction are required. Although countries reported existing guidelines for NCDs (with the exception of Syria, Yemen and Palestine) uptake and use remain challenges. This creates significant issues for integrated services as parallel pathways to service delivery for the general population and forcibly displaced individuals are created. These vertical pathways are also evident in private and public facilities. Regulation for both private and public facilities is needed to assure the quality of health services.

Absence of multi-sectoral policies targeting reduction of behavioral risks or exposure to common risk factors of NCDs in some countries is a health system gap, but nominally. The more critical issue is whether health systems succeed in implementing this policy and achieving desired results (i.e. reduced tobacco use, or "physical inactivity"). There is little evidence demonstrating such success or mechanism in place overseeing the entire policy cycle.

A lack of strong national strategic direction and donor coordination mechanisms has resulted in fragmentation of the health sector in the affected countries. Three of the 10 countries in this study (Jordan, Lebanon and Morocco) have undergone a JEE assessment. In all three countries, cross-sector coordination was identified as relatively weak. Given the increased level of donor funding in the region, the cross-sectorial nature and the long-term impact of NCDs in the region, a coordinated multi-sectoral response to health sector improvements, including NCD prevention, control and treatment is required to improve efficiency of resources and avoid duplication of different stakeholders' efforts.

Shortage of the provider cadre has been identified as one of the important health system challenges in the region. For example, the shortage of qualified mental health specialists in Morocco, Yemen, Syria and Iraq (combined with presumably uneven distribution between urban and rural areas) can be considered as one of the major constraints for accessing basic mental health services.

The assessment of resilience revealed that, overall, pre-service education of health workers includes aspects on NCD. The role of local district/provincial management health teams in supporting training, capacity-building efforts and preparedness efforts for overall health emergencies, including NCDs becomes critical. The study revealed that in-service training, in most countries, is taken forward by donors who have significant presence in the region given the unique situation. Without data on quality and compliance with evidence-based clinical practices along with information on knowledge, skills and competencies of different provider cadres, the effectiveness of pre-service, in-service or continuous professional development programs is not known. Clearly, in the region, where 2.2 million lives are lost annually to NCDs, donor support should include focused attention on building local capacity in NCDs. Additionally, to support the resiliency of health systems, embedding quality approaches in capacity building for health workers both at the pre-service and in-service levels is key.

> *Investment in the health workforce, in improving health service coverage and in emergency and disaster risk management not only builds health resilience and health security, it also reduces health vulnerability and provides the human resources required to prevent, prepare for, respond to, and recover from emergencies.*
>
> WHO Global Strategy on Human Resources for Health: Workforce 2030 (101)

Across countries, data systems were noted as areas needing urgent improvements. There is a lack of strategic information to inform policy-makers on progress made in NCD prevention and control in order to design new and adjust existing programs and interventions. Improving services requires collecting and analyzing data and improvements cannot be made if we cannot measure. All countries reported fragmented data systems, particularly in conflict areas and very limited data availability on the quality of NCD prevention, early detection and treatment services and their outcomes (incidence and prevalence of NCDs and their complications, etc.).

Another important finding is the limited integration of fragmented data into national health systems to strengthen its resilience and improve NCD services. This finding is significant as available robust data and surveillance systems are key for emergency preparedness efforts and can trigger a timely response from local teams for emergencies. For NCD services, it becomes important to track

patterns and behavior to manage and improve the quality of NCD services on one hand and measure quality of health service delivery and its ultimate outcomes through facility-based surveys and disease registries on another. In parallel, capacity of data generation, collection, analysis and use requires urgent attention to strengthen evidence-based clinical, management, policy and programmatic decisions at all levels of health systems.

Some countries in the region (e.g., Jordan) achieved significant gains in the development of a national, population-based cancer registry. In April 2015, with support from WHO, the Jordanian MOH also developed a case-based, real-time, mobile technology-based, integrated disease surveillance system for mental health as well as communicable and non-communicable diseases. The surveillance system is projected to be scaled up in about 293 sites throughout Jordan by the end of 2015 (151). In addition to supporting improved access to real-time disease surveillance, the system also enables care providers to access evidence-based clinical guidelines via mobile technology. Although it is not yet clear how the integrated surveillance system would affect data collection on screening and modification of NCD risk factors at the facility level and allow the country to track the progress on key process and outcome measures on prevention and control of NCDs at the individual (health facility) level.

In addition to strengthening surveillance and monitoring systems for NCDs, it is essential to systematically assess (and, consequently, address) health care needs of displaced populations. WHO and its Regional Office for the Eastern Mediterranean (WHO EMRO) provided valuable guidance on assessing the health needs of refugees and the responsiveness of health systems to address these needs through the Health Resources Availability Monitoring System (HeRAMS). Recommendations from this guidance include the need for a collection of stratified data on this target population via WHO STEPS, SARA (Service Availability and Readiness Assessment), and national registries. However, the actions to incorporate essential measures into the existing HMIS system are not implemented in a majority of the ME focused countries.

V. CONCLUSIONS AND RECOMMENDATIONS

The rapid assessment of health system and service delivery challenges in emerging priority areas in ten focus countries of the Middle East revealed a lack of essential information on most of the indicators prioritized through the assessment methodology. The data gaps were particularly evident on quality and coverage of NCD prevention and treatment practices and their outcomes (incidence and prevalence of NCDs and their complications); effectiveness of implementation of national policies targeting prevention and control of NCDs; understanding knowledge, attitude and practices of patients and communities regarding NCDs and their risk factors; and health care needs of refuges and other target populations.

A. Key observations

While the exploratory nature of the rapid assessment and the data gaps precluded us from comprehensive assessment of the key service delivery and health system challenges, a few important observations emerged from this assessment. These results are briefly summarized below:

- A heavy focus on services for the treatment of NCDs with relative progress in managing NCDs (e.g., Lebanon, Jordan, Morocco) but efforts to prevent NCDs and behaviors that increase their risk at the primary care level have largely been ineffective.

- In conflict-affected countries and rural settings, there has been a reduced number of primary care facilities and a deterioration of conditions in those that remain (EGY, IRQ, MAR, SYR, YEM).

- Low level of utilization of outpatient services in all countries (except Jordan and Lebanon) undermines the effectiveness of the diagnostic tests available in public health facilities and system readiness to provide essential medicines for the control of CVD and/or diabetes.

- Gaps in quality and coverage of high impact maternal and child health and nutrition services and skilled birth attendance (e.g., ANC coverage, early initiation and exclusive breastfeeding, syphilis testing), particularly in rural settings (except Jordan). However, there was still an overall positive trend in the reduction of maternal (except in Yemen) and newborn mortality (except Yemen, Iraq and Morocco).

- Lack of integration of NCD and MCH services, particularly at the primary care level (e.g., missed opportunity to use home visits/community health services for mothers and children for depression screening and child/family violence prevention programs)

- Inability to stratify cardiovascular risks in most of the surveyed countries (except Lebanon) during outpatient clinic visits with subsequent challenges in preventing the development of a heart attack and stroke; major killers among the adult population.

- Limited availability of secondary prevention practices for rheumatic fever and heart disease in most countries (except Jordan, Lebanon and Morocco) and acute stroke care and rehabilitation

- Limited availability of NCD risk factor screening and counselling practices, including tobacco cessation and counselling at the PHC level

- Absence of cervical cancer screening programs in all countries (except Morocco), limited availability of mammography in several counties and unknown (likely very low) coverage of target groups

- Coordinated, multidisciplinary management of cancer patients in Jordan is weak.

- Limited capacity and poor organization of outpatient mental health services (e.g., outpatient versus inpatient) in most countries (except Lebanon)

- *Areas requiring further exploration:*

  o Access to and coverage of essential NCD services and outpatient medications among general population and specific target groups (rural, displaced, low income/consumption quintiles) at facility level

  o Coverage of depression screening and treatment services at the primary care level, including availability of antidepressant medications

- Occasional delays of delivery of essential medications (including for chronic NCDs) at PHC facilities due to central procurement issues

- No coverage with nicotine replacement therapy or tobacco cessation programs and counselling in most countries (except Jordan, Lebanon and Yemen)

- Lack of availability of cancer pain relief medications at the PHC level (in most countries)

- Irrational use and prescription of medications in Jordan (data lacking in other countries)

- Variable health system capability to recognize and respond to emerging challenges (as measured by six criteria) with Jordan, Morocco and Tunisia ranking highest.

- Strong national leadership to integrate NCDs into national policies and strategies in most countries

- Limited operational governance structures responsible for NCDs (except Morocco and Tunisia)

- Absence of multi-sectoral policies targeting reduction of behaviors that can increase risk of NCD (i.e., poor diet, smoking) or exposure to common risk factors of NCDs (i.e., pollution) in some

countries (nominal gap) coupled with little evidence of health systems successes in implementing multi-sectoral policies and achieving desired results (critical gap)

- Limited uptake and use of the existing guidelines for NCDs (except for Syria, Yemen and Palestine)

- Parallel, vertical pathways of implementation of policies and guidelines for the general population and forcibly displaced individuals, as well as for public and private facilities

- Limited use of the joint external evaluation (JEE) assessment [24] (conducted only in Jordan, Lebanon and Morocco) and relatively weak cross-sectoral coordination within all surveyed countries

- Lack of sustainable government funding and cost barriers to support the health sector, including growing costs associated with management of NCDs.

- High out-of-pocket (OOP) expenditure as a percentage of total expenditure on health in Syria, Egypt, Morocco and Yemen.

- High risk of catastrophic expenditures for surgical care in all countries (>25%), except Iraq and Jordan.

- Limited coverage (<10%; except Morocco) of specific NCD screening and diagnostic services within blood-borne pathogens (e.g., cervical cancer screening program) through organized population-based screening

    o No coverage with oral glucose tolerance test (OGTT), regular foot exam, total cholesterol measurement, and spirometry and peak flow measurement (to diagnose asthma and COPD and assess the disease control status) and HPV vaccination in Jordan (data lacking in other countries)

- Good coverage with Hepatitis B vaccination in all countries (except Syria, Iraq and Yemen).

- Absence of coverage of palliative care in most countries and unknown coverage in others. No coverage of oral morphine in the public health sector.

- *Areas requiring further exploration:*

    o Coverage of essential NCD prevention, detection and treatment services and outpatient medications among forcibly displaced populations (except Jordan, where coverage is granted to registered refugees)

    o Effectiveness of the benefit package in terms of financial access to essential NCD services and medications and equity of access

- Shortage of primary care physicians and certain specialists in most of the surveyed countries (e.g., shortage of qualified mental health specialists in Morocco, Yemen, Syria and Iraq) combined with presumably uneven distribution between urban and rural areas.

- Lack of a regular schedule of continuing medical education (CME) to update skills; CME and other trainings, where they exist, are mostly supported by donors.

- *Areas requiring further exploration:*

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[24] More information on JEE is available on the WHO website: http://www.who.int/ihr/procedures/mission-reports/en/.

- o Readiness of local district/provincial management health teams to support clinical and quality improvement training, capacity building efforts and preparedness efforts for overall health emergencies, including NCDs

- o Quality of and coverage with NCD prevention, early detection and treatment services at the facility level (particularly at the primary care level)

- o Knowledge, skills and competencies of different provider cadres regarding an essential package of NCD services

- Lack of strategic information, particularly at the service delivery level, to inform national/regional NCD response and health system strengthening (detailed information of data availability by measurement blocks, by health system building blocks, and by country is provided in Figure 100 and Figure 101 on page 109 in the Annex).

- Good availability of population-based cancer registry in all countries (except Iraq and Syria)

- No other NCD registries (except diabetes registry in Iraq and Jordan)

- No routine stepwise approach to surveillance (STEPS) or other comprehensive health examination survey conducted every five years

- Fragmented data systems, particularly in conflict areas

- Poor integration of available data into national health systems

- *Areas requiring further exploration*

  - o Quality of NCD prevention, early detection and treatment services and their outcomes (incidence and prevalence of NCDs and their complications, etc.)

  - o Further studies are needed to understand quality of integrated NCD and MCH services, including barriers and opportunities of integrating NCD and MNH care at primary care level

  - o Limited data on patient/population knowledge, attitudes and practices, care-seeking behavior, experience of care, and self-management practices (adherence to treatment and counselling recommendations)

  - o Health care needs of displaced populations and the responsiveness of health systems to address these needs

  - o Capacity of data generation, collection, analysis and use at all levels of the health system

- Low utilization of primary care services, pneumonia case-seeking behavior and composite coverage of reproductive, maternal, newborn, child and adolescent (RMNCHA) health services, particularly in the rural settings of Egypt, Iraq, Tunisia and Yemen.

- *Areas requiring further exploration:*

  - o Patients' perspectives, particularly related to their knowledge, skills, care-seeking behavior and self-management practices for NCDs and their risk factors

  - o Family and community perspectives and the degree to which the community has the necessary resources and is capable of organizing itself to prevent and control NCDs, both prior to and during times of emergencies

The exploration of the linkages between quality essential health services and resilience point to a number of key themes:

- Resilience in times of acute and protracted crises is quite different. Protracted emergencies, experienced by the majority of the focus countries, require the resilience of the entire health

system for a prolonged period. When managing NCDs, resilience is particularly important for service delivery. The continuation of health services in a protracted emergency are vital to keeping all populations safe, not only from the immediate emergency but also from routine health issues that are often neglected in emergencies.

- Building health service resiliency prior to a crisis can prevent routine health service neglect and potentially alleviate the high morbidity and mortality of NCDs that is often associated with crises (37).

- Vulnerable populations are an additional consideration during public health crises (38). Health services and systems must take into consideration these populations' specific health needs to create inclusive services that can lessen the burden of disease for all.

- With NCD prevalence continuing to rise globally, it is crucial to address NCDs as significant threats to personal, family, and national health security (38). Additionally, the security risk of NCDs is increasingly elevated in emergency situations, due to the increased risk of acute NCD exacerbation and decreased ability of health systems to respond effectively (3). Viewing NCDs as a health security issue makes the case for investment into the strengthening of health services worldwide to create resilience in times of crisis.

- Resilient systems/services are created through developing organizational capacities to adjust to and learn from challenges, which preserve or even improve health system/service functioning (45). To allow for the continuation of quality health services, it is crucial that services be strengthened in a manner best fitting the system's particular environment (41). Resilience has the ability to bridge the different international health and development agendas – such as universal health coverage, the Global Health Security Agenda, and the Sustainable Development Goals – creating a common incentive to invest in health systems moving forward (47).

- *Areas requiring further exploration:*

  o Gaps in the national response and the delivery of essential care and commodities during emergencies, including development and implementation of standard operating procedures to address NCDs within various types of refugee settlements at different phases of the emergency.

B. Moving forward to improve NCD services and health system resilience

Data from this study indicates the importance of:

National policy and a focus on quality: There is a need to refine existing national policies and align them with an integrated approach to service delivery, health systems strengthening and health emergencies; reflecting progress made in NCD services, quality of care and lessons learned from protracted emergencies. Establishing proper programmatic, financial, regulatory and other policy implementation and evaluation tools and mechanisms are also crucially important. Special focus is required to reduce modifiable risk factors for non-communicable diseases and underlying social determinants through creation of an enabling environment for health promotion on one hand and improving quality of NCD prevention, early detection and care at the primary care level on the other.

Multi-sectoral approach – NCDs meet emergencies: Establish multi-sectoral coordination mechanisms within countries and regionally to effectively prevent, detect and respond to potential threats; and identify joint ways of improving both the software (guidelines, protocols, processes) and the hardware (coordination, infrastructure) of health service resilience.

Package of essential services and medications: It is important to further explore the basic benefit package, accounting for quality of care and with a focus on NCDs, for all populations, including forcibly displaced persons. While sustainable funding mechanisms are needed to increase physical and financial access to essential services for priority diseases, efforts need to be directed to integrate public funding, donor financial support, and innovative financing mechanisms (including public-private partnerships). On the other hand, there is a need to increase effectiveness and cost-effectiveness of state resource investments by integrating high-impact, cost-effective services for the prevention,

timely diagnosis, and management of priority diseases in publicly funded health care programs and insurance schemes. Given that many essential outpatient medicines (e.g., oral morphine, statins, nicotine replacement therapy) are not available or not covered, it is critically important to integrate essential outpatient medicines for prevention and treatment of priority acute and chronic conditions in the National List of Essential Medications to address limited treatment compliance caused by limited financial access to essential medications. For improved access to essential outpatient medicines, countries could also establish effective cost-containment and rational medication use strategies (including but not limited to: supporting the prescription of generic medications through different regulatory and financial tools, improving rational medication prescription practices through capacity-building of medical personnel, and supporting patient/parent education activities at population and facility levels).

Primary health care: Strengthening primary health systems requires reorienting care models and creating integrated people-centered service delivery models that engage the people and community in the design, delivery and evaluation of health services and systems in the affected countries.

Quality and clinical effectiveness of health services: An integrated effort is needed by the government and donor community to invest in continuous quality improvement in health service delivery settings. This is done by supporting facility QI teams to assess the quality of care for priority clinical conditions and continuously plan, implement, routinely monitor and refine changes in their health care processes to address the gaps in quality of care. Considering the critical gaps in data availability (and consequently, data use), investments need to be made to support generation, collection, and use of clinical data for routine quality monitoring through capacity building in data analysis and use at all levels of health system and integration of key QI indicators for prevention and management of priority NCDs in standard medical documentation, routine reporting forms, and the national HMIS.

To support compliance with evidence-based clinical practices, enhanced efforts are needed to improve access to and use of evidence-based medical information by care providers. It is particularly important to support professional health care associations in continuous development/adaptation of evidence-based medical information applicable for local settings and provide regular support to their peers to improve their knowledge and compliance with evidence-based clinical practices. The development of proper supporting mechanisms is also required at local (e.g., district, regional) levels to provide continuous supportive supervision, coaching and clinical/improvement skills-building of health facility teams and promote shared learning on effective improvement practices at each and between different levels of care.

Community engagement: Addressing service delivery and health system challenges in emerging priority areas in the ME requires a strong health systems approach. To build resilient health systems that properly respond to the needs of people at risk or living with NCDs, displaced populations, conflicts and emergencies, it is essential to develop the capacity for continuous improvement at all levels of the health system and to enhance patient, family, and community engagement.

Capacity building for health workers: To improve professional knowledge, skills, and practices of human resources in screening, management, and counseling of high-burden clinical conditions, enhanced efforts are needed to integrate updated recommendations on evidence-based care of these diseases into all pre-service, post-diploma, and continuous professional development for health providers, pharmacists, health administrators, and public health providers, through close involvement of respective professional associations. In addition to supporting increased participation of medical personnel in continuous professional development programs through different regulatory and/or financial tools, some countries need to heavily invest in human resources for health to address critical shortages of primary care and mental health professionals particularly in rural settings. For timely and effective emergency responses, where applicable, focus on designing, developing and executing emergency training programs for front line workers, with emphasis on refresher courses to sustain skills gained, is needed.

Data systems: Fundamental investments are also needed to improve data systems and the capacity to generate, collect, analyze and use data to address the growing burden of NCDs and their

devastating socio-economic consequences. It is critically important to routinely monitor tendencies in the burden of disease and mortality caused by priority clinical conditions and evaluate the effectiveness of their prevention, early diagnosis, and management practices at the service delivery level. Efforts must be specifically directed to: a) define national targets for prevention and management of priority clinical conditions in compliance with national priorities, global targets, and monitoring frameworks; b) integrate these targets and their assessment indicators into the national HMIS; c) promote routine generation, collection, analysis, and use of data; d) periodically plan and implement population- and facility-level studies to assess prevention, screening, and management practices along with investments in disease registries for priority NCD conditions; e) improve quality of vital statistics and registration of mortality causes; and f) strengthen human and institutional capacity for generation, analysis and data use.

Analytical frameworks: Continuum of care models for CVD, CPD, cancer and mental health and analytical frameworks, together with indicator mapping and the prioritization tool developed as part of this assessment, could help Middle Eastern countries and others to systematically and comprehensively assess service delivery and health system challenges and opportunities throughout continuum of care for major NCDs and depressive disorders and adapt it to local settings/priorities. Aligned with the global monitoring framework and consistent with the available evidence around high impact, cost-effective NCD prevention and control practices, the tool proposes standardized measures throughout the NCD care continuum. On the other hand, identified gaps in data availability for each dimension of the results chain could help countries to easily identify, prioritize and, consequently, address data gaps.

Surveillance: Understanding the quality and coverage of NCD prevention, early detection and treatment services and their outcomes is essential to any effort to strengthen NCD service delivery and health system resilience. While several standardized tools are available for these purposes, for long-term sustainability it is essential to incorporate NCD modules into relevant facility and population-based surveys (DHS2, SARA, STEP) and the routine HMIS. These assessments should also focus on understanding patients' experiences of care; knowledge, attitudes and practices to manage/modify chronic NCDs; and underlying health behaviors. In the context of a growing displaced population, important investments need to be made to understand the health care needs of this group. Properly addressing the health needs of migrants and forcibly displaced populations improves health, facilitates their integration into local communities, and contributes to achieving sustainable development goals in the host country (goal 3.8 and 10.7) to ensure "healthy lives for all and to leave no-one behind". Lastly, more substantive research is needed to further explore health service resilience and health security in the ME region.

C. Rationale and the priority areas for USAID's investments to address emerging health system and service delivery challenges in the Middle East

The 2030 Sustainable Development Goals (SDGs) give prominence to NCDs in the global development agenda. They aim at reducing premature deaths from NCDs by one-third by 2030 (SDG target 3.4), strengthening the implementation of the WHO Framework Convention on Tobacco Control (SDG target 3.a), strengthening efforts to reduce the harmful use of alcohol (SDG target 3.5), supporting the research and development of medicines for NCDs that primarily affect developing countries (SDG target 3.b), and achieving universal health coverage (SDG target 3.8). The conceptual framework for non-communicable diseases and injuries (NCDI), developed by the USAID Bureau for Global Health (13), also recognizes NCDs as "complementary to and not competitive with existing health priorities." According to Dr. Ariel Pablos-Méndez, USAID Assistant Administrator for Global Health, "USAID is identifying cost-effective interventions to address NCDs, the win-win interventions for both the SDGs and the NCDs" (62). He added, "We are strategically integrating our program support for women and families including in family planning, maternal and child health, and nutrition programs." As shown above, it is increasingly clear that NCDs are a major component of USAID's health priorities; thus, addressing NCDs would advance and accelerate progress on those priorities—especially those in maternal, newborn, and child health (MNCH), HIV/AIDS, family

planning/reproductive health (FP/RH), tuberculosis (TB), and health systems strengthening (HSS).[25] In addition to emphasizing the prospects for a "grand convergence" in child and maternal mortality, another strong case for USAID's investment in NCDs would be its positive impact on the universal health care (UHC) and health systems strengthening (HSS) initiatives (63).

USAID has a wide range of NCD-related priority activities and interventions; there are several ways USAID could contribute to ME countries' improved access to and quality of NCD prevention, early detection, and treatment services. USAID already employs a range of tools and systemic changes to help prevent and address NCDs, particularly:

- Through its strong support of health systems strengthening and integrated health care, health promotion, health financing, and operational research initiatives, USAID is helping to build the foundation upon which NCD efforts can be based.

- In a growing number of countries, USAID is measuring the prevalence and trends of NCDs and behavioral risk factors, such as smoking and obesity, through NCD and adult-health modules of the Demographic and Health Surveys (DHS, DHS2) to inform evidence-based policy decisions; these modules could be expanded in technical scope, including NCDs and geographic coverage, according to the local context.

- USAID has partnered with the donor community to build fiscal policy capacity in host countries. That capacity empowers ministries of finance and national governments to address tobacco and other NCD-related risk factors through fiscal policy.

- In some countries, USAID has already delivered impressive results through modest programs in NCDs, mostly funded through Economic Support Funds (ESF) and Assistance to Eastern Europe and Central Asia (AEECA) accounts, where the burden of NCDs and associated mortality, similar to that of the Middle East region, is very high. These efforts were directed to systematically assess and improve quality of care for NCD prevention, early detection and treatment practices among general population, women of reproductive age and pediatric patients (e.g., care of asthma among children).

Considering the rapid assessment results, investments in three major areas are particularly needed: a) improving integrated maternal, child, and adolescent care and NCDs; b) strengthening data systems, particularly around quality and coverage of care for priority NCDs and their clinical outcomes; and c) understanding and systematically addressing the needs of displaced populations through a health system strengthening approach.

USAID has successfully implemented QI programs and built the QI capacities of care providers and managers in many different countries and across several priority clinical content areas (e.g., MNCH, FP, HIV/AIDS, TB, nutrition). The package of priority clinical interventions could be expanded to incorporate high-impact NCD prevention, early detection and treatment services. An economic evaluation, supported by the USAID Applying Science to Strengthen and Improve Systems Project, to assess the effectiveness and cost-effectiveness of QI interventions in addressing high-burden NCDs in adult patients and respiratory tract infections (RTIs) in children demonstrated that "an intervention directed to improve vertically- and horizontally-integrated care delivery of high-burden NCDs and RTIs is more efficient and effective than traditional single-disease management at one level of care." (153) As described above, NCDs account for a substantial share of indirect causes of maternal deaths. For example, in 2009, maternal deaths due to indirect causes accounted for 27.5% (672,000; 95% UI 19.7–37.5) of all deaths globally. Of these indirect causes, diabetes, cardiovascular diseases, respiratory disorders, and cancers are of particular concern for women of reproductive age. Thus, due to their potential contribution as indirect causes of both maternal morbidity and mortality, there is a strong rationale for addressing the needs of women with pre-existing co-morbid disorders, such as

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[25]Those activities will meet the general requirements for "direct impact" and "optimal use of funds" as defined in USAID's Guidance on the Definition and Use of the Global Health Programs Account.

cardiac and endocrine disease (including hypertension and gestational diabetes/diabetes mellitus), and nutrition through an integrated primary care model (154).

Depending on the local context, priority clinical areas for the intervention could be selected based on several factors, including: local priorities, known disease burden (mortality and morbidity) to ensure a higher coverage of the population with improved services, demonstrated poor quality of care (as seen through facility-level assessments), potential for dramatic improvements in quality of care due to strong evidence on high impact of these clinical interventions, and needs of the most vulnerable groups (women, children, the poor, and refugees in host communities). To support evidence-based decisions on prioritization of clinical interventions aimed at prevention and control of NCDs, Figure 142 summarizes essential "best buys" (high-impact, cost-effective interventions) and the suggested implementation phase of these interventions at the service-delivery level.

Depending on USAID and national priorities, investments could focus on improving the quality of high-impact, cost-effective priority clinical interventions in specific target populations (such as a cardiovascular disease prevention package for women of reproductive age and youth or a mental health and cardiovascular disease package for refugees) or clinical packages. Alternative investment options aiming to improve quality and coverage of high-impact, cost-effective NCD and MNCH services are summarized in Figure 143. Irrespective of the target group of focus, improvement in quality of integrated MCH and NCD services will benefit not only particular group, but all individuals receiving care at supporting facilities.

The evidence on effectiveness and cost-effectiveness of priority NCD clinical interventions (64) clearly demonstrates the potentially positive impact of such an investment on averting NCD-related disability and death, as well as reducing overall disease burden and associated costs. Investment in improving the service delivery of NCD prevention, early detection and treatment practices through an integrated primary care approach would align well with USAID's FY2012−FY2016 Global Health Strategic Framework, which outlines USAID's global health vision, core priorities, targets and key health interventions. Investment in NCDs fully aligns with the Global Health Initiative's principles, especially those on integration, partnerships and private sector engagement, country ownership, health systems strengthening, and focus on women and girls. In particular, it will support the Agency's efforts in eliminating extreme poverty and preventing child and maternal deaths and will accelerate progress towards achieving the SDGs.

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ANNEX

The Annex contains additional technical information to support content in the main text. References to specific figures were made in the body of the main report.

Figure 98: High burden NCDs, associated high impact clinical interventions and corresponding indicators to assess quality, coverage or availability of these services

High Burden NCDs	Best-buy interventions	Indicators assessing quality and coverage with individual clinical intervention	Availability/physical access
CVD (Myocardial Infarction, Stroke, Heart Failure)	**Primary care package** • Screening of behavioral and physiologic risk factors: Tobacco use, Obesity, Physical Inactivity, High blood pressure, Elevated lipids, Alcohol abuse	• % of patients over 10+ years who's smoking status was assessed at the last outpatient visit • % of patients/population with BP assessed at the last outpatient visit • % of patients/population with BMI assessed during the last year	• Number of primary care, facilities per 10,000 population • Service-specific availability per 10 000 population • Health worker density and distribution (per 1000 population) • Geographic access to Health Services

	• Modification of risk factors:
	  ○ Tobacco cessation
	  ○ HTN treatment
		• % of currently smoking patients over 10+ years who received brief tobacco cessation intervention (patch, oral medications or counseling) at the last outpatient visit
		• % of patients with hypertension (HTN) with established BP control during the last visit
			• General availability of nicotine replacement in the public health sector

	• Integrated screening and modification (counselling and treatment) of high CVD risk ≥30% (or ≥20%)* • Counseling and multi-drug therapy (including glycemic control for diabetes mellitus) for people (≥30 years), with10-year risk of fatal or non-fatal cardiovascular events ≥30% (or ≥20%)*	• Assessment of 10-year CVD risk (%) among adult patients • Multi-drug therapy and counseling to prevent heart attacks and stroke among individuals with high (≥20%) CVD risk with aspirin, statin and BP medication	• availability of total cholesterol measurement at the primary health care level • Availability of cardiovascular risk stratification in 50% or more primary health care facilities • General availability of aspirin (100 mg) in the public health sector • General availability of thiazide diuretics, ACE inhibitors, statins • Availability of CC blockers
	• Multi-drug therapy (including glycemic control for diabetes mellitus) to individuals who have had a heart attack or stroke (secondary prevention)	• Drug therapy and counseling to prevent heart attacks and stroke in high CVD risk individuals, people with diabetes and established CVD (%) (combined measure, included in GMF) • % of ambulatory medical charts of patients with CAD on multi-drug treatment to avoid heart attack (ASA, beta-blocker, ACE-I, statin)	• Provision for secondary prevention of rheumatic fever and rheumatic heart disease in more than 50% of public sector health facilities

High Burden NCDs	Best-buy interventions	Indicators assessing quality and coverage with individual clinical intervention	Availability/physical access
		• % of ambulatory medical charts of patients with cerebrovascular disease on multi-drug treatment to avoid stroke (ASA, low dose thiazide, ACE-I, Statin)	
	Hospital Package • Aspirin therapy for acute heart attack (Acute coronary syndrome, ACS)* • Addition of streptokinase to aspirin and beta-blockers for the treatment of acute heart attack	• % of patients diagnosed with ACS given (aspirin) or expanded initial anti-ischemic treatment with morphine, oxygen, titrated nitrate and aspirin (MONA) • % of patients diagnosed with ACS treated with β-blocker • % of patients diagnosed with ACS with streptokinase treatment	• Availability of Beta-blockers • General availability of coronary bypass or stenting in the public health system • General availability of thrombolytic therapy in the public health system • Provision for care of acute stroke and rehabilitation in more than 50% of public sector health facilities
Diabetes	• Screening for diabetes (fasting blood sugar, A1C at-risk patients) • Dietary & exercise counseling	• % of patients/population ≥45 years screened for Diabetes during the last 3 years	• availability of diabetes testing (by blood glucose measurement, OGTT) at the primary health care level • availability of diabetes testing (by HbA1c) at the primary health care level
	• Aspirin, Statin, antihypertensive • Oral agent (metformin); Insulin (when indicated) • ACEI to delay diabetic kidney disease	• % of patients aged 18 through 75 years with type 2 diabetes mellitus taking multi-drug therapy (aspirin, statin and antihypertensive) • % of patients aged 18 through 75 years with type 2 diabetes mellitus and HbA1c >9% who are taking EB medications for glycemic control • Percentage of patients aged 18 through 75 years with type 2 diabetes mellitus who had a most recent hemoglobin A1c (HbA1c) <7% or fasting blood sugar controlled at last 2 follow up visits	• General availability of insulin in the public health sector • General availability of metformin in the public health sector • General availability of sulphonyl urea(s) in the public health sector • General availability of retinal photocoagulation in the public health system
	• Regular surveillance and treatment of microvascular complications (feet, eye, kidney)	• % of Percentage of patients aged 18 through 75 years with type 2 diabetes mellitus with foot exam conducted twice during the 12 months • % of patients aged 18 through 75 years with type 2 diabetes mellitus who had retinopathy screening during last 12 months	• General availability of urine testing for albumin • General availability of dialysis in the public health system • General availability of renal replacement by transplantation in the public health system
Cancer (cervical, breast, colorectal, lung)	• - Prevention of cervical cancer	• Vaccination coverage against HPV	• Availability, as appropriate, if cost-effective and affordable, of vaccines against human papillomavirus, according to national program and policies

High Burden NCDs	Best-buy interventions	Indicators assessing quality and coverage with individual clinical intervention	Availability/physical access
	through screening HPV[26]		
	• Prevention of cervical cancer through screening (visual inspection with acetic acid [VIA]) and treatment of pre-cancerous lesions	• Proportion of women between the ages of 30–49 screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes or policies or • % of women aged 30–49 years who have been screened for the first time with VIA or another screening test in the previous 12-month period • % of women aged 30–49 years who have been screened with visual inspection with acetic acid (VIA) or another screening test at least once between the ages of 30 and 49 years • Percentage of VIA-positive women receiving treatment in the previous 12-month period	• Most widely used screening method in national cervical cancer screening program • Type of national cervical cancer screening program
	• -Prevention of liver cancer through hepatitis B immunization	• Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants	
	• Breast cancer - early case finding through mammographic screening (50–70 years) and treatment of all stages • Breast cancer - treatment of stage I	• % of women between 50–70 years covered through mammographic screening	
	• Colorectal cancer - screening at age 50 and treatment	• % of patient > 50 years ever screened for colorectal cancer • % of cancer diagnosed at the I or II stage (only breast, cervical and colorectal) • Access to palliative care assessed by morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per death from cancer	

[26]Although the WHO package does not include HPV vaccination, the WHO recommendations were made before the recent HPV vaccine price reductions. With today's lower price, Lancet Commission suggests that HPV vaccination should also be included in this first phase of scale-up.

High Burden NCDs	Best-buy interventions	Indicators assessing quality and coverage with individual clinical intervention	Availability/physical access
	• Palliative care		• General availability of palliative care in primary health care in the public health system • General availability of palliative care in community or home-based care in the public health system • General availability of oral morphine in the public health sector
Chronic Respiratory Diseases	• Screening of COPD/asthma symptoms (chronic cough, dyspnea, wheezing) and Spirometry, when indicated • Environmental & allergic risk factor modification • Treatment of persistent asthma with inhaled corticosteroids and beta-2 Agonists • Treatment of moderate to severe COPD with LABA, anti-cholinergic or ICS	• % of patients with persistent asthma who are taking inhaled corticosteroids and beta-2 Agonists • % of patients with moderate to severe COPD treated with LABA, anti-cholinergic or ICS • % patients with asthma requiring treatment for asthma exacerbation in last six months	• availability of peak flow measurement spirometry at the primary health care level • General availability of steroid inhalers in the public health sector • bronchodilators in the public health sector
Mental Health (depression)	• Depression screening • Anti-depressants • Brief psychotherapy	• % of patients who were asked screening or diagnostic questions for depression/anxiety during the last visit • % of patients with depression who were treated with SSRI anti-depressants or referred to physiatrist • Psychotherapy: % of patients with depression who were provided with psychotherapy and/ or referred for psychotherapy	

Figure 99: Fifteen health system challenges and opportunities to improve NCD outcomes

Political commitment to NCDs	Explicit priority-setting approaches	Interagency cooperation	Population empowerment
Effective model of service delivery	Coordination across providers	Regionalization	Incentive systems
Integration of evidence into practice	Distribution and mix of human resources	Access to quality medicines	Effective management
Adequate information solutions	Managing change	Ensuring access and financial protection	

Minor challenge	This issue does not prevent delivery of core interventions and services or has been fully addressed
Moderate challenge	This challenge has a moderate impact on the delivery of core interventions and services. The country has already found ways to address it, or has solid plans to do so
Major challenge	This challenge has a large negative impact on the delivery of core interventions and services. The country has been struggling to find the right ways to address it, or the chosen paths have not worked.
Major persistent challenge	This is a systematic problem that is persistently on the health system reform agenda and the country has not found a sustainable implementable solution or has failed numerous times to implement it

Source: (5 p. 15)

Figure 100: Availability of data[27]: data completeness analysis by measurement blocks and countries

Measure-ment blocks	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE	All	Number of Indicators
I-ABC	0.80	0.80	0.70	0.80	0.80	0.70	0.70	0.50	0.50	0.40	**0.67**	10
I-ABC-SD	0.43	0.57	0.57	0.43	0.14	0.43	0.43	0.29	0.43	0.14	**0.39**	7
I-ABC-HS	1.00	1.00	1.00	1.00	0.92	1.00	0.92	0.92	0.92	0.08	**0.88**	12
I-A	1.00	1.00	0.75	1.00	0.83	0.83	0.67	0.67	0.75	0.67	**0.82**	12
I-A-SD	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.00	**0.36**	5
I-A-HS	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.60	0.60	0.00	**0.66**	5
I-B-SD	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.50	0.00	**0.65**	4
I-D-SD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	**0.90**	3
I-D-HS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	**0.80**	1
II1-AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	2
II1-AC-SD	0.80	0.80	0.80	0.80	0.80	0.80	0.60	0.80	0.70	0.10	**0.70**	10
II2-AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	10
II2-AC-SD	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.50	0.50	0.00	**0.50**	14
II1-B	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	**1.00**	1
II2-B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	1
II2-B-HS	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	**0.80**	2
II2-B-SD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	**0.90**	1
II3-B	0.00	0.33	0.33	0.00	0.33	0.33	0.33	0.00	0.33	0.00	**0.20**	3
II3-B-SD	0.50	0.20	0.20	0.20	0.20	0.30	0.20	0.20	0.20	0.00	**0.22**	10
II1-D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	2
II2-D	0.67	0.50	0.67	0.67	0.33	0.50	0.67	0.00	0.50	0.00	**0.45**	6
II2-D-SD	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	**0.30**	1
III-A	0.73	0.73	0.82	0.73	0.73	0.73	0.73	0.73	0.73	0.00	**0.66**	11
III-A-SD	0.70	0.70	0.70	0.70	0.70	0.70	0.60	0.70	0.70	0.00	**0.62**	10
III-B	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.20	**0.74**	5
III-B-SD	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.00	**0.30**	3
III-D	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	**0.86**	21
III-D-SD	1.00	1.00	0.75	1.00	1.00	0.50	1.00	0.25	0.75	0.00	**0.73**	4
IV-ABC	0.83	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.17	**0.83**	12
IV-D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	**0.90**	1
A-HS	1.00	1.00	1.00	0.75	1.00	1.00	1.00	1.00	1.00	0.00	**0.88**	4
B-HS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	**0.90**	2
C-HS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	**0.90**	1

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[27] Data availability score: 0 = Not Available, 1 – Available. Example: 10 indicators were mapped to block I-ABC; score 0.7 means that data was available for 7 out of 10 indicators for a particular country. For all countries, data availability score refers to average availability, e.g. 0.7 means data was available in average for 7 out of 10 indicators.

Measure-ment blocks	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE	All	Number of Indicators
D-HS	1.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	**0.40**	1
ABCD-HS	0.86	0.77	0.86	0.86	0.82	0.82	0.82	0.64	0.82	0.27	**0.75**	22
												219

Figure 101: Availability of data: data completeness analysis by health system building blocks and countries

	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE	All	Number of Indicators
Health	0.79	0.80	0.77	0.80	0.78	0.77	0.74	0.72	0.73	0.20	**0.71**	81
Financial fairness	1.00	0.50	1.00	0.50	1.00	1.00	1.00	0.50	0.75	0.25	**0.75**	4
Responsiveness	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	1
Service delivery	0.51	0.49	0.50	0.49	0.41	0.45	0.41	0.36	0.46	0.08	**0.41**	76
Governance	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.88	0.92	0.00	**0.87**	24
Human Resources	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	**0.90**	5
Medicines	0.88	0.88	0.88	1.00	0.88	0.88	0.88	0.82	0.76	0.00	**0.79**	17
Financing	0.50	0.33	0.33	0.50	0.50	0.33	0.50	0.33	0.33	0.17	**0.38**	6
Information	1.00	1.00	1.00	0.67	1.00	1.00	1.00	1.00	1.00	0.00	**0.87**	3
Demand	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.50	**0.85**	2
												219

Figure 102: Cancer statistics (2012)

	EGY	IRQ	JOR	LBN	LBY	MAR	PSE	SYR	TUN	YEM
Incidence										
Lip, oral cavity	2.4	2.3	1.7	2.0	1.3	2.5	3.8	2.0	2.1	2.2
Other pharynx	0.8	0.8	0.3	0.3	0.4	0.4	0.4	0.5	0.7	0.6
Nasopharynx	0.3	0.7	1.1	0.7	2.3	2.3	0.5	0.8	2.3	1.5
Esophagus	2.1	1.2	0.9	0.7	0.9	1.2	1.6	1.0	0.5	4.3
Stomach	2.5	5.3	5.9	5.5	3.6	4.0	5.5	5.6	4.2	4.0
Colorectal	5.6	7.1	**25.6**	**16.1**	**14.5**	8.5	15.4	16.2	10.9	4.5
Liver	**25.6**	4.0	4.2	2.6	4.8	1.2	3.6	4.1	1.1	2.9
Gallbladder	1.1	0.9	2.4	1.6	2.2	1.7	2.8	1.7	2.1	0.1
Pancreas	3.4	2.7	4.2	3.1	4.7	2.0	2.9	3.5	2.0	2.0
Larynx	2.1	5.5	3.4	3.6	2.8	2.7	1.6	4.6	3.1	2.2
Lung	7.2	14.0	**15.7**	**19.8**	**15.6**	13.6	13.0	15.1	16.0	3.8
Melanoma of skin	0.2	0.3	0.5	1.1	0.4	0.4	0.9	0.4	0.5	0.3
Kaposi sarcoma	0.1	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.5	0.2
Breast	**49.5**	**42.6**	**61.0**	**78.7**	**24.1**	**40.8**	**44.0**	**52.5**	**31.8**	**27.4**
Cervix uteri	2.3	2.8	2.4	4.6	9.7	14.3	2.0	2.6	4.8	3.1
Corpus uteri	3.8	1.4	5.2	7.7	3.8	3.0	7.8	3.3	3.3	0.1
Ovary	6.4	4.3	5.4	7.5	5.0	4.7	5.7	4.8	4.2	3.8
Prostate	7.8	8.7	**15.3**	**37.2**	**15.5**	**18.5**	15.2	11.9	11.3	2.7
Testis	0.5	1.1	1.7	2.4	0.7	0.8	1.6	1.4	0.5	0.1
Kidney	2.4	2.9	3.2	3.2	2.7	1.5	3.1	3.1	2.2	0.6

	EGY	IRQ	JOR	LBN	LBY	MAR	PSE	SYR	TUN	YEM
Bladder	13.1	11.4	7.1	16.6	8.6	5.8	7.6	9.6	8.3	1.8
Brain, nervous system	7.4	6.0	3.9	4.0	4.0	2.9	5.8	4.9	2.1	4.0
Thyroid	2.7	2.0	4.5	4.4	2.4	3.4	3.8	3.3	2.0	2.3
Hodgkin lymphoma	1.5	1.8	2.3	3.7	1.9	1.7	3.3	2.1	1.9	2.2
Non-Hodgkin lymphoma	7.8	6.6	5.9	13.0	4.8	6.0	7.4	6.3	5.1	4.9
Multiple myeloma	0.8	0.8	2.6	2.2	1.5	1.7	1.5	1.7	1.3	0.1
Leukemia	5.9	6.8	6.1	7.0	5.1	2.9	8.1	6.4	3.9	5.6
All cancers	**152.0**	**135.3**	**155.4**	**197.4**	**124.1**	**117.8**	**145.7**	**145.9**	**110.6**	**80.4**

Mortality

	EGY	IRQ	JOR	LBN	LBY	MAR	PSE	SYR	TUN	YEM
Lip, oral cavity	1.0	1.1	0.6	0.6	0.3	1.2	1.6	0.8	0.7	1.5
Other pharynx	0.6	0.7	0.3	0.2	0.3	0.3	0.3	0.4	0.5	0.5
Nasopharynx	0.2	0.5	0.6	0.3	1.2	1.4	0.3	0.5	1.2	1.2
Esophagus	2.0	1.1	0.9	0.7	0.9	1.1	1.6	1.0	0.5	4.1
Stomach	2.3	4.9	5.1	4.5	3.0	3.7	5.1	5.1	3.6	3.9
Colorectal	3.7	5.0	15.5	8.8	8.2	5.9	10.6	10.8	6.4	3.5
Liver	24.5	3.9	4.1	2.4	4.5	1.2	3.6	3.9	1.0	2.9
Gallbladder	1.1	0.9	2.2	1.5	2.1	1.6	2.7	1.6	2.0	0.1
Pancreas	3.3	2.7	4.2	2.9	4.6	1.9	2.9	3.4	1.9	2.1
Larynx	1.0	2.8	1.4	1.3	1.1	1.4	0.8	2.1	1.3	1.5
Lung	6.5	12.6	14.1	17.5	14.1	12.2	11.7	13.5	14.3	3.4
Melanoma of skin	0.1	0.2	0.2	0.3	0.1	0.2	0.5	0.2	0.2	0.2
Kaposi sarcoma	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Breast	19.2	19.3	21.8	24.0	8.4	18.0	18.3	21.5	10.8	14.9
Cervix uteri	1.0	1.5	1.0	1.7	4.0	7.0	0.9	1.2	1.9	2.0
Corpus uteri	1.1	0.5	1.3	1.6	1.1	1.0	2.7	1.0	0.8	0.1
Ovary	4.5	3.5	3.8	4.7	3.4	3.4	4.7	3.6	2.8	3.4
Prostate	5.1	6.4	8.3	17.1	7.4	12.9	10.3	7.7	5.9	2.3
Testis	0.3	0.8	0.8	0.7	0.2	0.5	0.7	0.8	0.2	0.1
Kidney	1.8	2.3	2.2	2.0	1.7	1.3	2.4	2.3	1.5	0.5
Bladder	6.5	6.3	3.2	6.3	3.2	3.1	3.9	4.9	3.5	1.2
Brain, nervous system	5.2	4.7	2.5	2.3	2.3	2.1	4.1	3.5	1.3	3.6
Thyroid	1.1	1.2	1.8	1.0	0.7	1.7	2.2	1.6	0.6	1.8
Hodgkin lymphoma	0.9	1.5	1.3	1.6	0.8	1.2	2.4	1.4	0.9	2.0
Non-Hodgkin lymphoma	5.3	5.2	3.9	7.5	3.0	4.3	5.5	4.5	3.2	4.3
Multiple myeloma	0.6	0.7	2.0	1.6	1.2	1.4	1.3	1.5	1.0	0.1
Leukemia	5.1	6.5	5.1	5.1	3.7	2.7	7.7	5.7	3.0	5.3
All cancers	**103.4**	**96.6**	**95.5**	**103.2**	**75.1**	**78.4**	**100.5**	**97.1**	**66.0**	**64.4**

5-Year Prevalence

	EGY	IRQ	JOR	LBN	LBY	MAR	PSE	SYR	TUN	YEM
Lip, oral cavity	6.7	4.7	4.1	5.7	3.2	6.7	8.5	5.0	6.6	4.2
Other pharynx	2.2	1.8	0.7	1.1	0.5	2.2	0.0	1.3	2.1	1.0
Nasopharynx	1.1	1.8	2.7	2.5	7.6	1.1	1.0	2.4	8.5	3.7
Esophagus	2.4	0.9	0.8	0.9	1.1	2.4	1.4	1.0	0.7	2.8
Stomach	4.3	6.3	7.7	10.0	5.0	4.3	6.7	8.0	7.4	3.7
Colorectal	15.9	14.4	50.5	49.1	35.9	15.9	31.1	36.6	31.1	9.1
Liver	18.4	1.9	2.1	2.0	2.8	18.4	1.9	2.3	0.9	1.4

	EGY	IRQ	JOR	LBN	LBY	MAR	PSE	SYR	TUN	YEM
Gallbladder	1.6	0.9	2.6	2.5	2.8	1.6	3.0	2.0	3.0	0.1
Pancreas	2.9	1.6	2.7	2.8	3.5	2.9	1.7	2.5	1.8	1.2
Larynx	6.7	12.2	8.1	12.8	7.3	6.7	3.8	12.1	10.0	4.8
Lung	7.4	9.8	11.8	22.8	13.3	7.4	9.3	12.7	17.3	2.4
Melanoma of skin	0.6	0.6	1.7	4.3	1.1	0.6	3.7	1.0	1.4	0.6
Kaposi sarcoma	0.3	0.5	0.5	0.6	0.6	0.3	0.4	0.6	1.3	0.4
Breast	222.5	161.0	212.9	391.7	106.0	222.5	161.8	212.2	153.4	93.7
Cervix uteri	8.3	8.7	7.3	18.6	31.3	8.3	5.3	9.2	18.0	7.2
Corpus uteri	17.2	5.4	16.7	39.4	13.4	17.2	26.5	12.6	15.5	0.5
Ovary	19.7	11.8	13.0	25.6	14.1	19.7	15.6	13.5	13.3	9.1
Prostate	20.9	14.8	34.1	129.7	37.8	20.9	26.2	27.3	38.2	4.2
Testis	2.2	4.7	10.1	15.5	3.8	2.2	12.7	7.9	2.9	1.1
Kidney	6.5	5.9	6.7	9.5	6.2	6.5	6.3	7.1	5.1	0.9
Bladder	41.2	24.8	16.6	60.9	22.3	41.2	17.2	24.7	28.3	3.0
Brain, nervous system	13.2	8.3	6.1	7.4	6.6	13.2	8.9	7.8	4.1	4.9
Thyroid	12.1	8.3	20.6	23.4	10.3	12.1	18.6	15.6	10.3	11.1
Hodgkin lymphoma	5.2	6.3	9.1	15.4	9.5	5.2	9.2	7.9	7.2	6.3
Non-Hodgkin lymphoma	16.1	12.0	10.5	29.0	8.9	16.1	11.8	12.2	11.3	6.0
Multiple myeloma	1.5	1.2	3.6	4.5	2.2	1.5	2.0	2.8	2.6	0.1
Leukemia	7.8	7.4	6.4	8.9	6.0	7.8	8.5	7.2	4.6	6.6
All cancers	372.2	274.3	337.4	633.0	282.4	372.2	306.8	344.9	310.1	153.7

Source: International Agency for Research on Cancer

Figure 103: "Fatality ratio" – number of deaths caused by cancer as a percentage (%) of sum of people living with cancer and people who died because of cancer in 2012

	EGY	IRQ	JOR	LBN	LBY	MAR	PSE	SYR	TUN	YEM	EMRO
Lip, oral cavity	0.145	0.175	0.120	0.127	0.095	0.164	0.141	0.148	0.127	0.228	0.184
Other pharynx	0.246	0.269	0.282	0.239	0.343	0.251	1.000	0.266	0.229	0.275	0.264
Nasopharynx	0.183	0.187	0.164	0.156	0.145	0.191	0.242	0.187	0.156	0.220	0.190
Esophagus	0.494	0.490	0.500	0.531	0.453	0.533	0.460	0.500	0.491	0.518	0.495
Stomach	0.389	0.412	0.390	0.391	0.373	0.394	0.391	0.402	0.398	0.427	0.404
Colorectal	0.222	0.239	0.218	0.207	0.196	0.233	0.223	0.230	0.220	0.244	0.226
Liver	0.612	0.636	0.642	0.623	0.620	0.665	0.593	0.632	0.601	0.614	0.614
Gallbladder	0.437	0.452	0.443	0.464	0.434	0.489	0.420	0.448	0.473	0.391	0.445
Pancreas	0.576	0.582	0.577	0.587	0.571	0.565	0.552	0.579	0.582	0.574	0.576
Larynx	0.143	0.163	0.132	0.127	0.126	0.159	0.138	0.147	0.143	0.196	0.163
Lung	0.512	0.516	0.518	0.517	0.515	0.512	0.495	0.514	0.521	0.510	0.512
Melanoma of skin	0.136	0.181	0.101	0.108	0.113	0.180	0.140	0.166	0.173	0.190	0.167
Kaposi sarcoma	0.194	0.208	0.154	0.136	0.138	0.211	0.182	0.200	0.178	0.240	0.233
Breast	0.100	0.112	0.091	0.083	0.085	0.108	0.100	0.101	0.089	0.129	0.108
Cervix uteri	0.134	0.143	0.115	0.118	0.118	0.146	0.108	0.129	0.121	0.184	0.156
Corpus uteri	0.074	0.082	0.067	0.058	0.068	0.081	0.076	0.075	0.067	0.098	0.080
Ovary	0.223	0.231	0.215	0.211	0.201	0.228	0.219	0.222	0.220	0.236	0.224
Prostate	0.201	0.220	0.184	0.167	0.159	0.218	0.200	0.206	0.185	0.245	0.205

Testis	0.133	0.149	0.097	0.065	0.056	0.166	0.106	0.110	0.085	0.147	0.134
Kidney	0.254	0.289	0.238	0.220	0.220	0.319	0.248	0.264	0.277	0.425	0.269
Bladder	0.155	0.175	0.150	0.133	0.125	0.172	0.147	0.162	0.147	0.207	0.160
Brain, nervous system	0.323	0.369	0.318	0.292	0.285	0.352	0.313	0.340	0.295	0.423	0.331
Thyroid	0.098	0.106	0.075	0.065	0.061	0.096	0.086	0.092	0.075	0.117	0.093
Hodgkin lymphoma	0.183	0.203	0.147	0.125	0.095	0.209	0.212	0.173	0.144	0.240	0.184
Non-Hodgkin lymphoma	0.284	0.298	0.269	0.268	0.267	0.298	0.288	0.284	0.276	0.412	0.297
Multiple myeloma	0.337	0.339	0.333	0.336	0.342	0.343	0.329	0.345	0.340	0.381	0.340
Leukemia	0.461	0.513	0.480	0.437	0.419	0.497	0.475	0.490	0.465	0.520	0.473
All cancers	**0.251**	**0.248**	**0.213**	**0.189**	**0.218**	**0.223**	**0.221**	**0.229**	**0.223**	**0.276**	**0.235**

Figure 104: Inclusion of palliative care in the national non-communicable disease action plan and funding availability in countries of the Eastern Mediterranean Region

	Inclusion of palliative care in national NCD Action Plan	Funding for palliative care
Afghanistan	No	No
Bahrain	Yes	Yes
Egypt	No	No
Iran	Yes	No
Iraq	Yes	No
Jordan	No	No
Kuwait	Yes	Yes
Lebanon	Yes	Yes
Libya	No	Yes
Morocco	Yes	Yes
Occupied Palestinian territory	No	Yes
Oman	No	Yes
Pakistan	No	No
Qatar	Yes	Yes
Saudi Arabia	Yes	Yes
Somalia	No	No
Sudan	No	No
Syria	No	Yes
Tunisia	Yes	Yes
United Arab Emirates	Yes	Yes
Yemen	No	No

Source: Lancet Oncology (68)

Figure 105: Disease burden details: DALYs caused by hypertensive health disease, by country and year
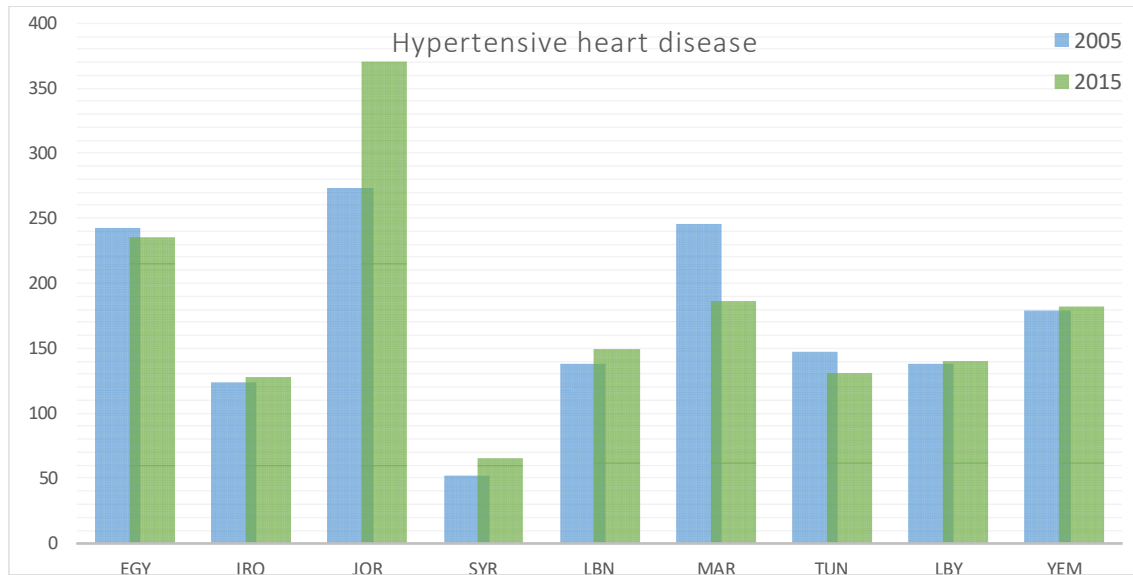
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 106: Disease burden details: YLDs caused by ischemic heart disease, by country and year
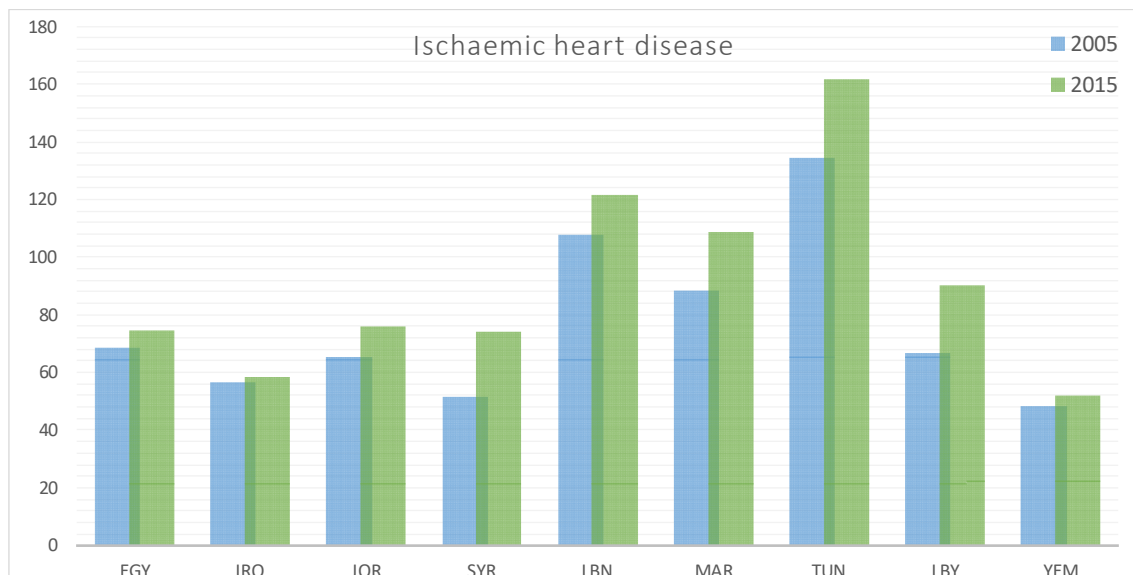
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 107: Disease burden details: YLLs caused by ischemic heart disease, by country and year
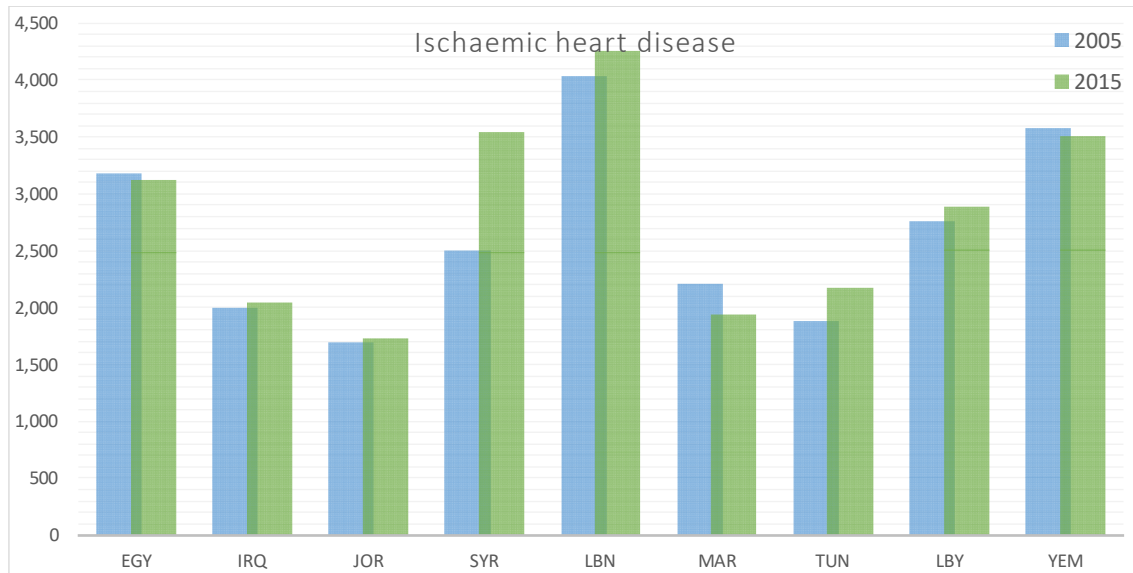
Ischaemic heart disease

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 108: Disease burden details: DALYs caused by stroke, by country and year
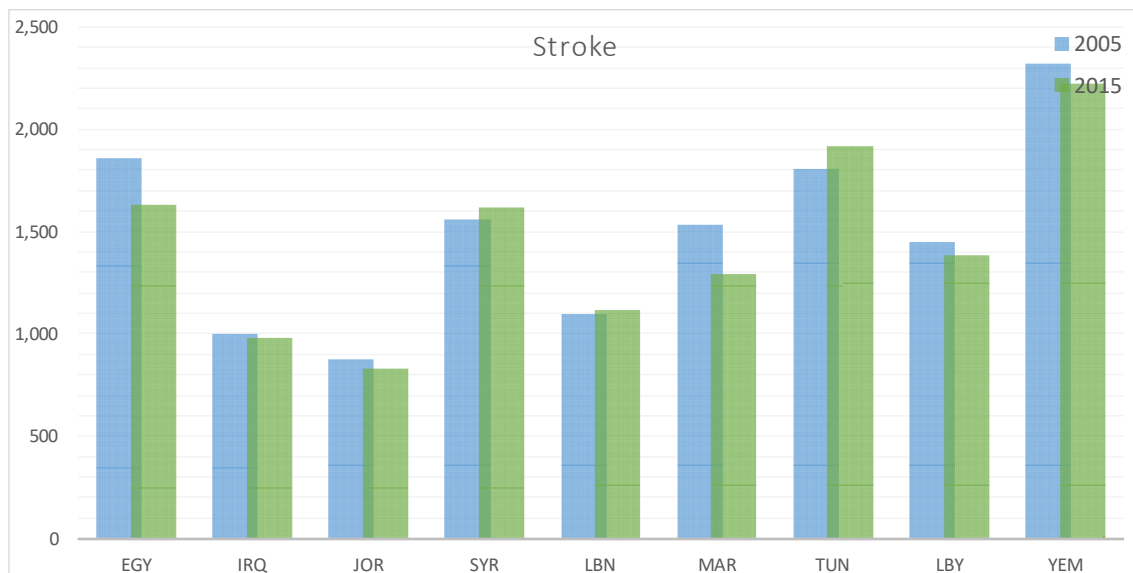
Stroke

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 109: Disease burden details: DALYs caused by chronic obstructive pulmonary disease, by country and year
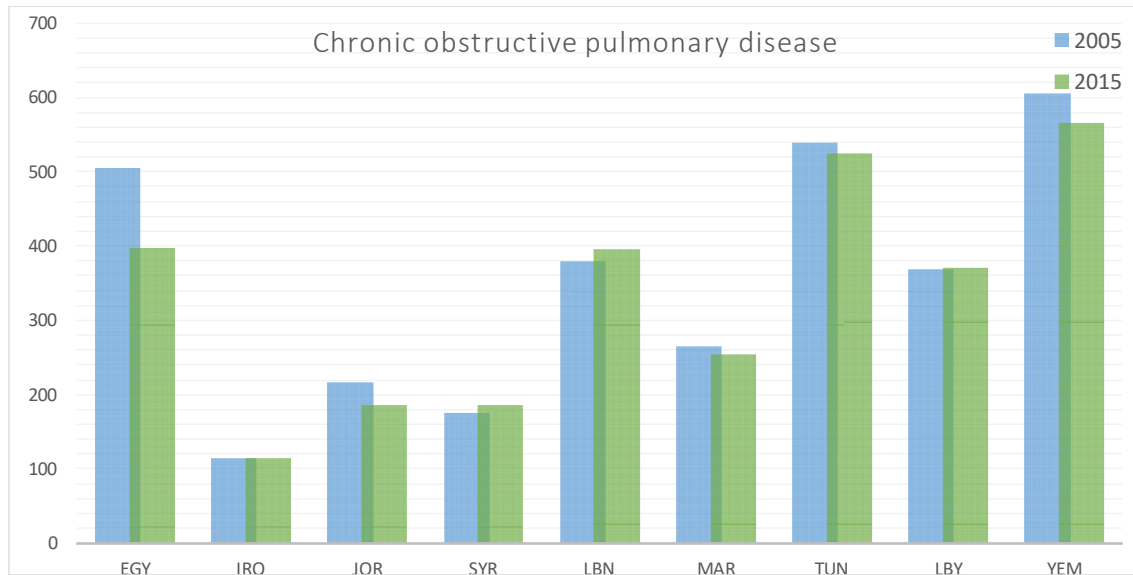
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 110: Disease burden details: YLDs caused by cardiovascular diseases, by country and year
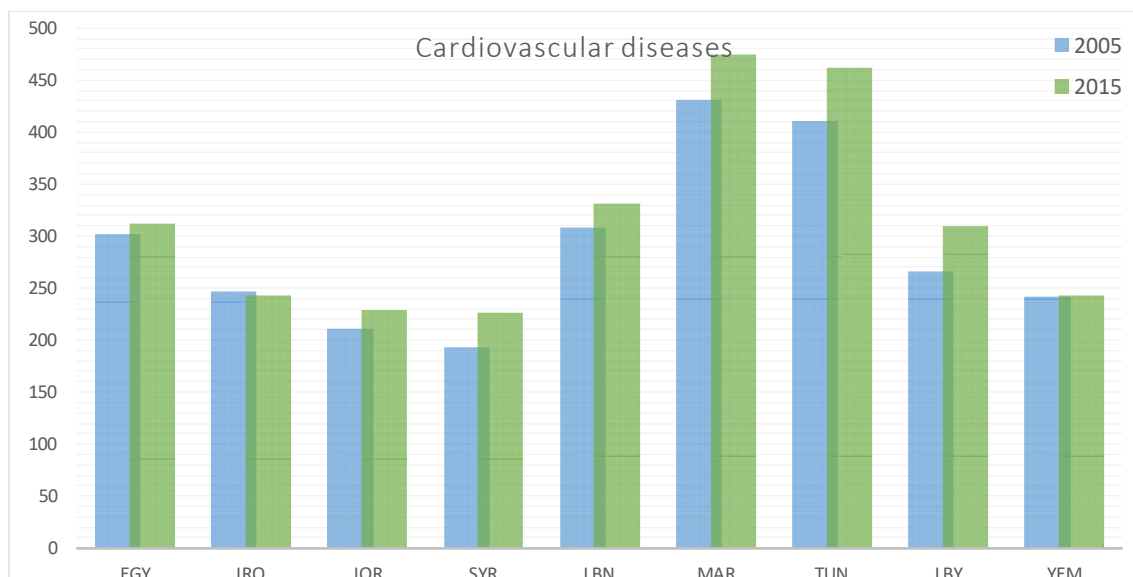
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 111: Disease burden details: YLDs caused by diabetes, by country and year
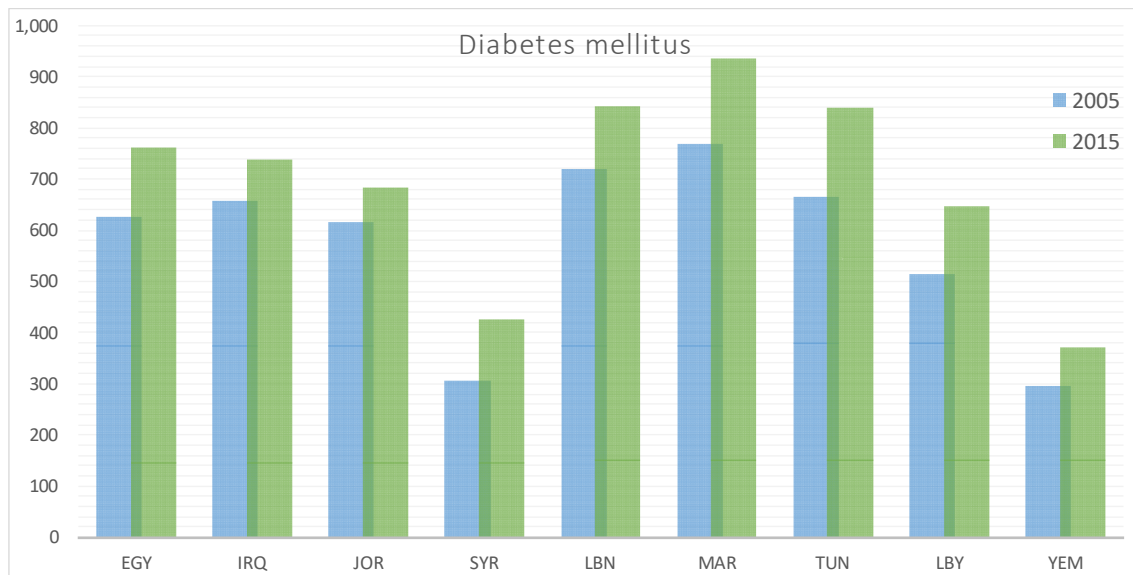
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 112: Disease burden details: YLLs caused by diabetes, by country and year
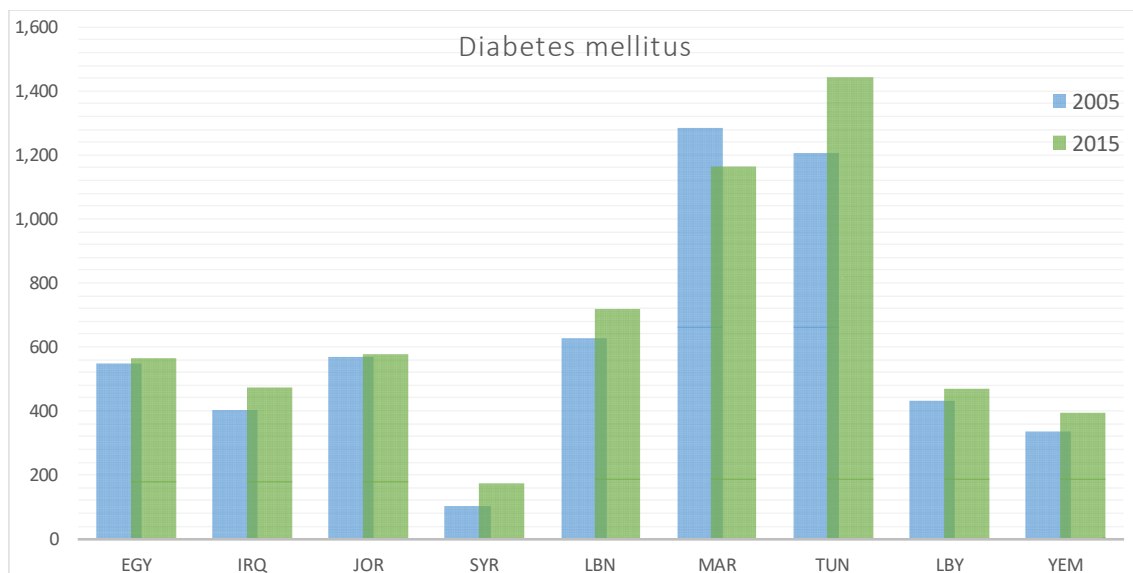
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 113: Disease burden details: YLDs caused by depressive disorders, by country and year
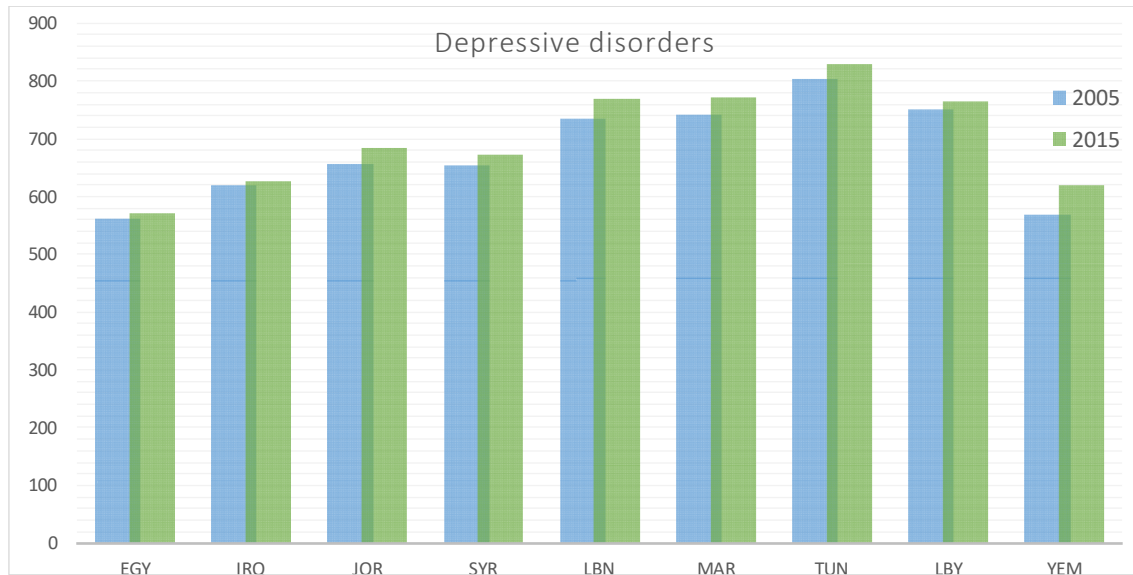
Depressive disorders

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 114: Disease burden details: YLDs caused by cancer, by country and year
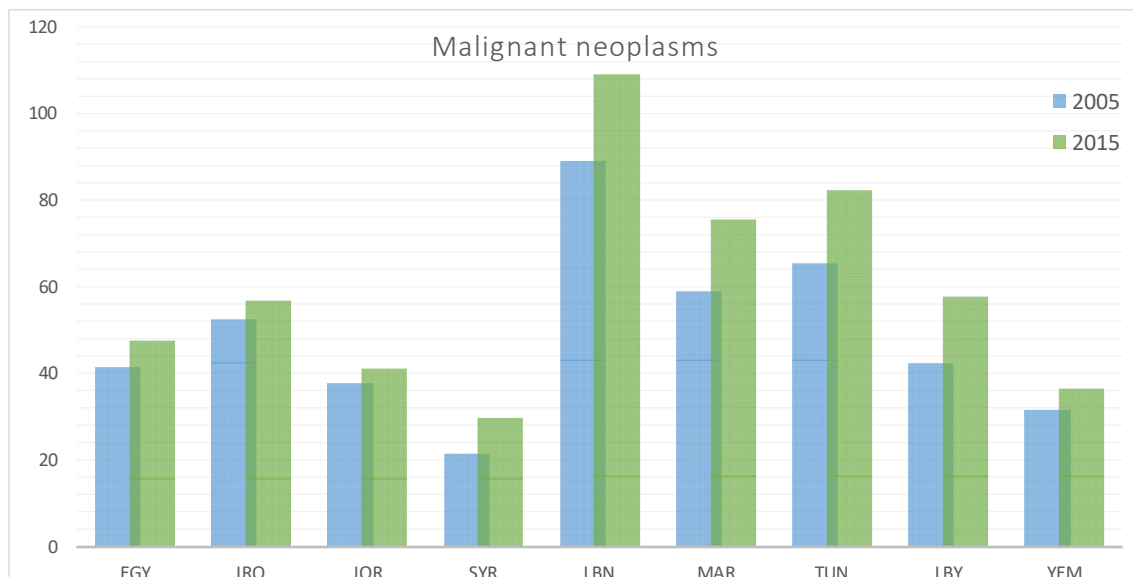
Malignant neoplasms

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 115: Disease burden details: YLLs caused by cancer, by country and year
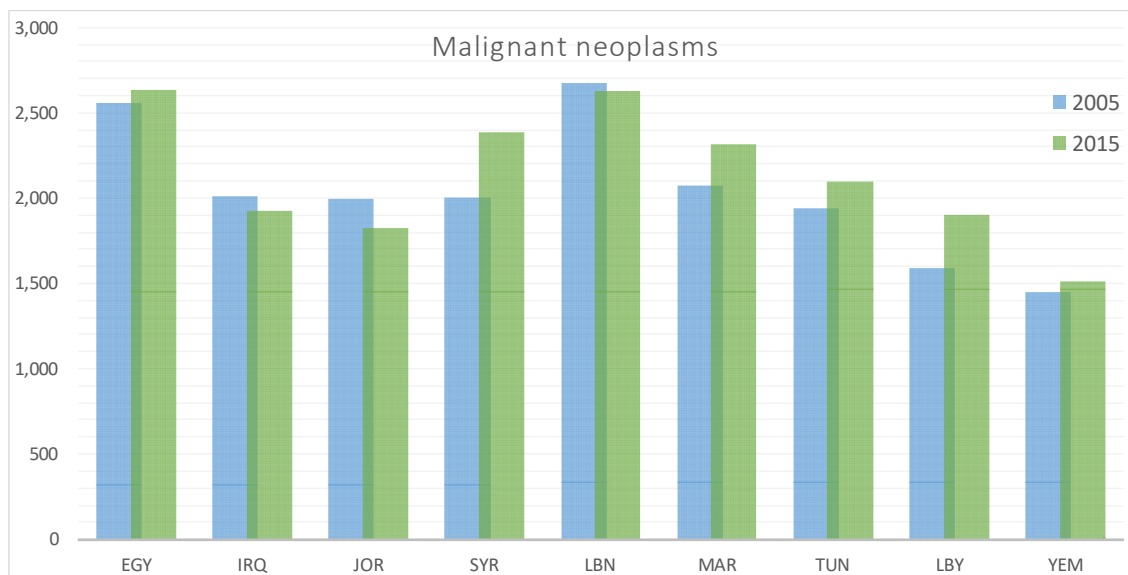
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 116: Proportion of YLL and YLD for all selected NCDs, by country and year
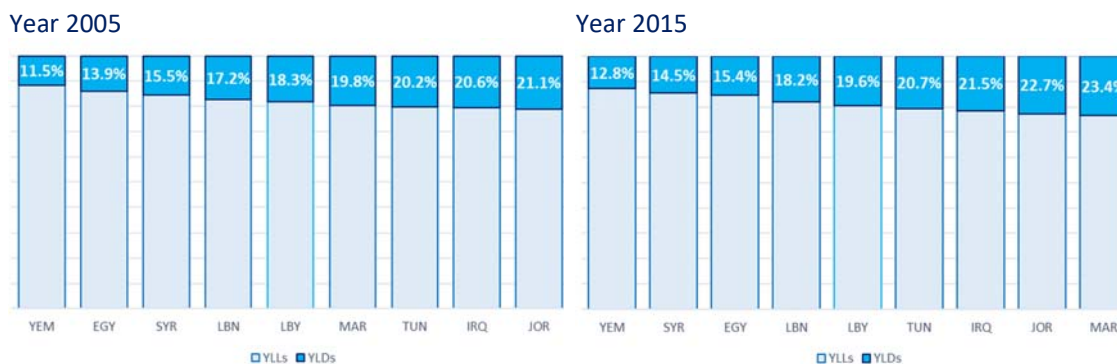
Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

Figure 117: International health regulations (IHR) capacity scores, by country and year

	Legislation	Coordination	Surveillance	Response	Preparedness	Risk communication	Human resources	Laboratory	Points of entry	Zoonosis	Food safety	Chemical	Radio nuclear
Egypt													
2010	75	100	88	95	80	100	100	88	100	84	86	85	66
2011	75	66	90	100	87	86	75	80	100	89	75	67	92
2012	75	83	90	94	80	86	80	86	100	89	73	77	57
2013	75	100	90	94	90	100	100	70	97	89	80	92	69
2014	75	100	90	100	90	100	100	100	100	89	87	92	85
2016	75	83	90	100	100	100	100	96	97	100	93	92	100

	Legislation	Coordination	Surveillance	Response	Preparedness	Risk communication	Human resources	Laboratory	Points of entry	Zoonosis	Food safety	Chemical	Radio nuclear
Iraq													
2010	50	66	84	75	35	90	16	28	15	61	60	35	26
2011	100	100	95	100	80	71	75	60	50	78	17	50	33
2012	100	83	90	100	70	57	60	91	57	89	33	38	64
2013	100	100	100	100	100	100	100	100	91	100	93	54	77
2014	100	90	95	100	100	100	100	81	94	100	87	62	77
Jordan													
2010	75	100	84	95	78	100	83	100	79	84	100	64	53
2011	100	100	100	100	87	71	100	90	75	100	100	67	58
2012	50	50	100	89	100	100	100	100	18	100	93	100	100
2013	100	100	100	77	61	57	80	96	88	100	87	85	77
2014	100	100	100	94	100	100	80	100	97	100	100	92	100
2016	75	90	80	83	55	100	80	88	88	89	67	46	
Lebanon													
2010	50	55	64	78	28	80	33	56	42	76	80	7	66
2011	100	66	65	28	20	29	25	50	54	89	67	8	67
2012	100	56	65	47	20	29	40	49	46	100	60	54	71
2013	100	56	80	63	81	57	60	66	46	89	73	69	82
2014	100	56	80	88	90	57	60	66	49	89	87	69	92
Libya													
2010	75	56	59	58	78	70	66	61	60	53	66	0	0
2011	75	63	70	57	55	71	50	60	37	44	50	0	83
2012	75	73	65	54	60	29	40	33	12	33	33	0	71
2013	75	56	45	83	60	29	40	61	59	78	93	15	83
2014	75	83	45	83	60	43	60	66	66	78	93	15	77
2015	75	83	45	83	60	43	60	66	63	78	93	15	77
2016	75	83	55	83	43	43	60	66	63	78	93	8	77
Morocco													
2010	100	100	92	95	75	100	66	72	84	100	80	64	66
2011	100	100	95	100	100	100	100	100	42	100	83	33	100
2012	100	100	95	100	100	100	100	86	83	100	100	38	100
2013	100	100	100	100	100	100	100	86	93	100	100	77	100
2014	100	100	100	100	100	100	100	90	71	100	100	77	100
2016	100	100	100	100	100	100	100	90	72	100	100	77	100
Syrian													
2010	50	20	48	54	19	60	0	88	49	69	53	71	0
2011	50	36	50	64	30	57	25	80	54	56	50	67	0
2012	50	53	70	58	20	29	60	96	42	67	87	46	71
2013	25	53	85	82	16	43	20	90	12	67	80	46	85
2014	50	63	95	88	16	43	20	90	68	78	80	46	85

	Legislation	Coordination	Surveillance	Response	Preparedness	Risk communication	Human resources	Laboratory	Points of entry	Zoonosis	Food safety	Chemical	Radio nuclear
Tunisia													
2011	75	90	75	43	32	57	25	70	46	89	92	67	58
2012	75	100	85	48	40	43	80	49	60	89	73	31	50
2013	75	80	90	47	8	43	40	39	26	89	80	77	38
2014	75	80	95	94	16	86	40	47	29	89	80	77	38
2016	75	63	100	50	27	14	20	62	46	78	53	62	69
Yemen													
2012	75	56	70	34	40	29	80	81	25	78	40	15	0
2013	75	46	70	28	18	0	100	46	25	100	33	15	0
2014	75	46	70	34	18	0	100	86	25	100	33	8	0

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

Middle East NCD rapid assessment

Figure 118: Health workforce density (per 10,000 population), by year

	Physicians	Nursing and midwifery	Community and traditional health	Laboratory health workers	Pharmaceutical personnel	Dentistry personnel	Other health workers	Health management &	Environmental and public health	Total	Medical service provider	Nurse to Physician Ratio
Egypt												
2003	5.3									5.3	5.3	
2004		19.9		2.7		1.4	0.5	0.7	1.3	26.5	19.9	
2005	24.0									24.0	24.0	
2007	26.0									26.0	26.0	
2009	28.0									28.0	28.0	
2014	8.1	14.3			3.3	1.7				27.4	22.5	1.8
Iraq												
2010	6.4				1.8	1.6				9.8	6.4	
2014	8.5	18.1			2.4	2.2				31.3	26.6	2.1
Jordan												
1998	10.6	30.1			7.8	5.4				53.8	40.6	2.8
1999	20.7	31.3			8.2	5.8				65.9	51.9	1.5
2000	20.1	32.7			9.1	6.1				67.9	52.7	1.6
2001	21.9	32.8			10.3	5.9				70.9	54.7	1.5
2002	23.7	30.4			12.1	4.8				71.0	54.1	1.3
2003	24.5	32.1			12.6	6.9				76.1	56.6	1.3
2004	22.0	35.2	1.9	10.9		14.1	12.7	49.3	2.7	148.8	57.2	1.6
2005	24.2	32.7			13.3	7.9				78.1	56.9	1.3
2006	24.8	35.8			12.2	8.3				81.1	60.7	1.4
2007	26.5	32.8			14.0	8.5				81.8	59.3	1.2
2008	24.3	32.3			12.8	8.5				77.8	56.5	1.3
2009	23.4	38.5			13.4	7.0				82.3	61.9	1.6
2010	24.9	39.4			14.0	8.7				87.0	64.2	1.6
2012					19.8					19.8		
2014	26.5	28.6			16.5	9.3				80.8	55.1	1.1
Lebanon												
2001	34.2	12.4			10.0	12.8				69.4	46.6	0.4
2004					7.8					7.8		
2005		11.8		2.9	10.3		2.8			27.8	11.8	
2006	29.0					10.0				39.0	29.0	
2007	27.4	17.0			11.4	10.3				66.1	44.4	0.6
2009		19.8			10.9	11.9				42.6	19.8	
2010	26.7	20.3			12.7	12.4				72.1	47.0	0.8
2011	29.7	25.2			14.6	13.6				83.1	54.9	0.9
2014	23.8	25.6			13.6	10.0				73.0	49.4	1.1
Libya												
1997	12.6	35.1			2.4	1.4				51.5	47.7	2.8
2004	12.4	47.6			2.0	1.5				63.5	60.0	3.8
2008	18.2	54.7			3.7	3.3				79.9	72.9	3.0
2009	19.3	69.2			3.7	6.1				98.3	88.6	3.6
2014	20.9	69.1			6.3	7.3				103.6	90.0	3.3
Morocco												
2004	5.3	8.1		0.5	2.5	1.0	0.4	3.2	0.2	21.1	13.4	1.5
2007	5.9									5.9	5.9	
2009	6.5	9.4			2.8	0.8				19.6	15.9	1.4
2014	6.2	8.7				1.4				16.3	14.9	1.4

	Physicians	Nursing and midwifery	Community and traditional health	Laboratory health workers	Pharmaceutical personnel	Dentistry personnel	Other health workers	Health management &	Environmental and public health	Total	Medical service provider	Nurse to Physician Ratio
Syrian Arab Republic												
1997	13.0	22.3			4.8	6.4	13.2			59.7	35.3	1.7
1998	13.4	23.2			5.1	6.7	13.2			61.7	36.7	1.7
1999	13.4	19.1			5.1	6.7	7.0			51.4	32.5	1.4
2000	13.7	19.6			5.4	6.8	7.4			52.9	33.3	1.4
2002	14.8	19.7			5.9	8.6	8.3			57.3	34.5	1.3
2003	14.1	18.6			6.3	8.6	8.6			56.2	32.8	1.3
2004	14.7	19.3			7.2	8.7	9.4			59.2	34.0	1.3
2005	15.6	19.1			7.3	8.7	9.6			60.2	34.7	1.2
2007	15.2	19.3			6.7	7.6				48.9	34.6	1.3
2008	15.3	18.9			8.3	8.1				50.5	34.2	1.2
2009	14.6	19.0			8.3	7.7				49.6	33.6	1.3
2010	15.1	19.3			8.0	7.7				50.1	34.4	1.3
2014	15.5	23.0			14.8	8.8				62.1	38.5	1.5
Tunisia												
1990	5.4				1.5	1.0	28.8			36.7	5.4	
1991	5.4				1.6	1.0	29.2			37.0	5.4	
1992	5.9				1.6	1.1	29.1			37.8	5.9	
1993	6.0				1.5	1.1	28.8			37.4	6.0	
1994	6.0				1.6	1.1	28.4			37.1	6.0	
1995	6.5				1.6	1.1	28.4			37.7	6.5	
1996	6.7				1.7	1.2	28.2			37.8	6.7	
1997	6.9				1.7	1.3	28.1			37.9	6.9	
1998	7.2				1.7	1.3	28.1			38.3	7.2	
1999	7.4				1.8	1.4	28.2			38.7	7.4	
2000	7.7				2.0	1.4	28.2			39.3	7.7	
2001	7.9				2.0	1.4	31.1			42.5	7.9	
2002	8.1				2.1	1.4	29.0			40.6	8.1	
2003	8.2	20.8								29.0	29.0	2.5
2004	13.3	28.5		3.9	2.9	2.5	10.8	17.6	0.9	80.3	41.8	2.1
2005	9.3				2.1	1.8	29.3			42.6	9.3	
2006					2.2	1.8	39.7			43.7		
2007	10.3						30.8			41.1	10.3	
2008	11.6	33.0			2.0	2.2				48.8	44.6	2.8
2009	11.9	32.8			2.0	2.4				49.2	44.8	2.8
2010	12.2				3.0	2.9	32.1			50.3	12.2	
2014	16.5	31.9			2.2	3.8				54.4	48.4	1.9
Yemen												
1997	2.3	4.1		0.7	0.7	0.2	2.3			10.3	6.4	1.7
2004	3.4	6.9	3.0	2.4	1.3	0.4	2.3	6.5	0.4	26.7	10.3	2.0
2008	3.1									3.1	3.1	
2009	3.1									3.1	3.1	
2010		7.0	0.0	1.7	1.0	0.4	3.2	4.5	0.3	17.9	7.0	
2014	3.1	7.6			1.0	0.2				11.9	10.7	2.4

Source: WHO Global Health Observatory 2016 (http://www.who.int/gho/en/)

Middle East NCD rapid assessment

Figure 119: Percentile ranking of selected countries based on scoring of six governance criteria (2010)

	Voice and Accountability	Political Stability and Absence of Violence/Terrorism	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Egypt	13.74	19.43	43.06	46.89	51.18	34.29
Iraq	17.54	2.37	9.09	15.79	**1.90**	**4.29**
Jordan	27.49	34.60	59.33	56.94	61.14	59.52
Lebanon	35.07	5.69	44.98	53.59	30.33	20.48
Libya	2.84	45.02	**13.40**	**9.57**	**18.96**	**5.24**
Morocco	28.91	**33.18**	50.72	51.20	50.24	53.33
Palestine	27.96	4.27	41.15	59.33	48.34	46.19
Syria	**4.74**	**21.80**	32.54	20.57	36.49	12.86
Tunisia	9.95	44.08	63.16	53.11	59.72	54.76
Yemen	10.90	**1.90**	14.35	30.14	13.27	10.00

Source: The World Bank, World Governance Indicators

Figure 120: Composite coverage index (%) of RMNCH by country, residence and year

	1995	1997	2000	2002	2003	2005	2006	2007	2008	2011	2012	2013	2014
Egypt													
Rural	55.9		68.1			73.0			74.6				78.7
Urban	70.9		78.2			80.0			81.3				80.1
Iraq													
Rural							72.4			68.5			
Urban							81.5			77.5			
Jordan													
Rural		75.2		77.4				82.4			85.3		
Urban		78.5		81.0				82.9			83.9		
Morocco													
Rural					64.2								
Urban					80.1								
Syria													
Rural							74.0						
Urban							80.2						
Tunisia													
Rural										82.8			
Urban										85.7			
Yemen													
Rural							43.9					45.5	
Urban							69.0					66.5	

Figure 121: Composite coverage index (%) of RMNCH by country, education level and year

	1995	1997	2000	2002	2003	2005	2006	2007	2008	2011	2012	2013	2014
Egypt													
None	53.3	65.4				70.3			72.3				75.4
Primary	61.7	70.1				74.4			75.2				77.3
Secondary or higher	73.3	78.6				79.0			79.6				80.2
Iraq													
None							71.7			67.1			
Primary							77.3			73.0			
Secondary or higher							82.7			80.9			
Jordan													
None		67.2	70.1					77.2			75.9		
Primary		75.8	76.5					77.4			79.9		
Secondary or higher		79.2	81.1					83.3			84.7		
Morocco													
None					67.6								
Primary					76.9								
Secondary or higher					82.8								
Syrian Arab Republic													
None							64.8						
Primary							76.2						
Secondary or higher							82.4						
Tunisia													
None										82.7			
Primary										84.4			
Secondary or higher										85.2			
Yemen													
None							45.1					44.3	
Primary							58.8					56.7	
Secondary or higher							70.5					67.9	

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)

Figure 122: Children aged < 5 years with pneumonia symptoms taken to a health facility (%) by countries, residence and years

	2005	2006	2007	2008	2011	2012	2013	2014
Egypt								
Rural	60.6			69.5				67.8
Urban	68.1			78.4				67.5
Iraq								
Rural		78.9			70.5			
Urban		83.3			76.5			
Jordan								
Rural			83.2			84.2		
Urban			74.0			75.8		
Morocco								
Rural								
Urban								
Syrian Arab Republic								
Rural		72.1						
Urban		80.5						
Tunisia								
Rural					52.9			
Urban					63.1			
Yemen								
Rural		39.5					32.8	
Urban		55.2					37.8	

Source: WHO Global Health Observatory 2017 (http://www.who.int/gho/en/)

Figure 123: Disease burden in DALYs per case of diabetes/raised blood glucose in 2015
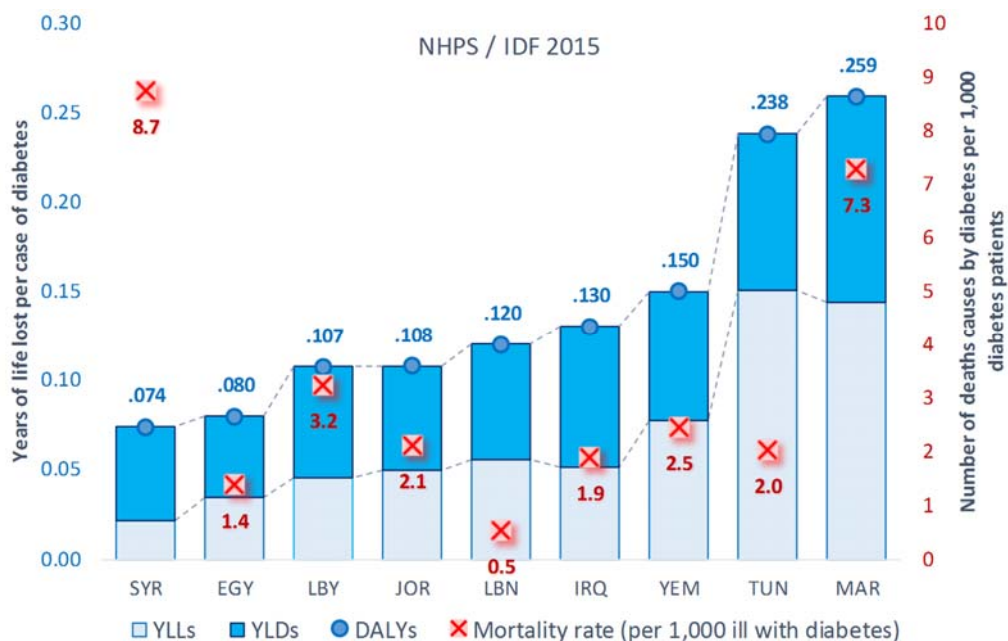
Sources: World Bank Nutrition, Health and Population Statistics and International Diabetes Federation

Figure 124: NCD Global Monitoring Framework with 9 NCD prevention and control targets and 25 indicators

Mortality and Morbidity	Premature mortality from NCDs	**A 25% relative reduction in the overall-mortality from-cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases**
	Indicator 1: Chronic diseases	Unconditional probability of dying between ages of 30 and 70 from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases
	Indicator 2: Cancer	Cancer incidence, by type of cancer, per 100 000 population
Behavioral Risk Factors	Harmful use of alcohol	**At least 10% relative reduction in the harmful use of alcohol 2, as appropriate, within the national context**
	Indicator 3: Alcohol consumption	Total (recorded and unrecorded) alcohol per capita (aged 15+ years old) consumption within a calendar year in liters of pure alcohol, as appropriate, within the national context
	Indicator 4: Prevalence of heavy drinking	Age-standardized prevalence of heavy episodic drinking among adolescents and adults, as appropriate, within the national context
	Indicator 5: Morbidity and mortality	Alcohol-related morbidity and mortality among adolescents and adults, as appropriate, within the national context
	Physical inactivity	**A 10% relative reduction in prevalence of insufficient physical activity**
	Indicator 6: Adolescents	Prevalence of insufficiently physically active adolescents, defined as less than 60 minutes of moderate to vigorous intensity activity daily
	Indicator 7: Persons aged 18+ years	Age-standardized prevalence of insufficiently physically active persons aged 18+ years (defined as less than 150 minutes of moderate-intensity activity per week, or equivalent)
	Salt/sodium intake	**A 30% relative reduction in mean population intake of salt/sodium 3**
	Indicator 8: Intake of salt	Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years
	Tobacco use	**A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ years**
	Indicator 9: Adolescents	Prevalence of current tobacco use among adolescents
	Indicator 10: Persons aged 18+ years	Age-standardized prevalence of current tobacco use among persons aged 18+ years
Biological risk factors	Raised blood pressure	**A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances**
	Indicator 11: Prevalence among persons aged 18+ years	Age-standardized prevalence of raised blood pressure among persons aged 18+ years (defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg) and mean systolic blood pressure
	Diabetes and obesity	**Halt the rise in diabetes & obesity**
	Indicator 12: Diabetes	Age-standardized prevalence of raised blood glucose/ diabetes among persons aged 18+ years (defined as fasting plasma glucose concentration ≥ 7.0 mmol/l (126 mg/dl) or on medication for raised blood glucose)
	Indicator 13: Obesity in adolescents	Prevalence of overweight and obesity in adolescents (defined according to the WHO growth reference for school-aged children and adolescents, overweight – one standard deviation body mass index for age and sex, and obese – two standard deviations body mass index for age and sex)

	Indicator 14: Obesity in persons aged 18+ years	. Age-standardized prevalence of overweight and obesity in persons aged 18+ years (defined as body mass index ≥ 25 kg/ m² for overweight and body mass index ≥ 30 kg/m² for obesity)
	Additional indicators	
	Indicator 15: Saturated fatty acids	Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ years
	Indicator 16: Fruit and vegetables	Age-standardized prevalence of persons (aged 18+ years) consuming less than five total servings (400 grams) of fruit and vegetables per day
	Indicator 17: Cholesterol	Age-standardized prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol ≥5.0 mmol/l or 190 mg/dl); and mean total cholesterol concentration
National systems response	**Drug therapy and essential medicines**	**At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes**
	Indicator 18: Drug therapy	Proportion of eligible persons (defined as aged 40 years and older with a 10-year cardiovascular risk ≥30%, including those with existing cardiovascular disease) receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes
	Essential medicines and basic technologies	**An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major non-communicable diseases in both public and private facilities**
	Indicator 19: Medicines and technologies	Availability and affordability of quality, safe and efficacious essential non-communicable disease medicines, including generics, and basic technologies in both public and private facilities
	Additional indicators	
	Indicator 20: Palliative care	Access to palliative care assessed by morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per death from cancer
	Indicator 21: Saturated fatty acids	Adoption of national policies that limit saturated fatty acids and virtually eliminate partially hydrogenated vegetable oils in the food supply, as appropriate, within the national context and national programmes
	Indicator 22: Vaccines against human papillomavirus	Availability, as appropriate, if cost-effective and affordable, of vaccines against human papillomavirus, according to national programmes and policies
	Indicator 23: Marketing of foods to children	Policies to reduce the impact on children of marketing of foods and non-alcoholic beverages high in saturated fats, trans fatty acids, free sugars, or salt
	Indicator 24: Vaccination coverage: hepatitis B	Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants
	Indicator 25: Cancer screening	Proportion of women between the ages of 30–49 screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes or policies

Source: WHO Global Monitoring Framework

Figure 125: NCD prevention and control interventions used for guiding the health system assessments for better NCD outcomes in Europe

Populations interventions

Anti-smoking interventions
o Raise tobacco taxes to reduce affordability
o Smoke-free environments
o Warning about the dangers of tobacco and tobacco
o smoke
o Bans on tobacco advertising, promotion and sponsorship
o Quit lines and nicotine replacement therapy*

Interventions to prevent harmful alcohol use
o Use pricing policies on alcohol
o Restrictions and bans on alcohol advertising and promotion
o Restrictions on the availability of alcohol in the retail sector
o Minimum purchase age regulation and enforcement*
o Allowed blood alcohol level for driving

Interventions to improve diet and physical activity
o Reduce salt intake and salt content
o Virtually eliminate trans-fatty acids
o Implement public awareness programmes on diet and physical activity
o Reduce free sugar intake*
o Increase intake of fruit and vegetables*
o Reduce marketing pressure of food and non-alcoholic beverages to children
o Promote awareness about diet and physical activity

Personal services

CVD and diabetes - first line
o Risk stratification in primary health care, including hypertension, cholesterol, diabetes and other CVD risk factors
o Effective detection and management of hypertension, cholesterol, and diabetes through multidrug therapy based on risk stratification
o Effective prevention in high-risk groups and secondary prevention after AMI, including acetylsalicylic acid

CVD and diabetes – second line
o Rapid response and secondary care interventions after AMI and stroke*

Diabetes
Effective detection and general follow-up*
Patient education and intensive glucose management
Hypertension management among diabetes patients
Prevention of complications (e.g. eye and foot examination

Cancer - first line
Prevention of liver cancer through hepatitis B immunization
Screening for cervical cancer and treatment of precancerous lesions

Cancer - second line
o Vaccination against human papilloma virus as appropriate if cost-effective according to national policies
o Early case-finding for breast cancer and timely treatment of all stages
o Population-based colorectal cancer screening at age >50 linked with timely treatment
o Oral cancer screening in high risk groups linked with timely treatment

Source: WHO (14)

Figure 126: NCD prevention and control continuum from healthy state to NCD related death

Figure 127: NCD prevention and control continuum for cancer

Figure 128: Mapping of 25 GMF indicators to the NCD prevention and control continuum

Figure 129: NCD prevention and control continuum for depression

Figure 130: An explanatory analytical model for the rapid assessment of health system and service delivery challenges for NCD prevention and control

Enablers and inputs (health / national systems response)

Result chain

IV-ABC — Reduced disease burden by causes CVD, Diabetes, Cancer and CPD

Level IV — Impact

Reduced Premature Death caused by Heart Attack, Stroke, Diabetes and CPD — III-A

Reduced premature death caused by Cancer — III-B

Quality services (emergency, inpatient and outpatient) to manage complications and control CVD are available and accessible — III-AC-SD

Quality services for cancer treatment are accessible and affordable — III-B-SD

Level III — Outcome

Reduced complications of CVD & CPD — II2-AC

Improved palliative care of cancer — II2-B

Increased early detection of cancer and treatment success — II3-B

Quality care to prevent complications of CVD, Diabetes and CPDs are available and accessible (outpatient) — II2-AC-SD

Capacity for and coverage with Cancer screening and initiation of effective treatment increased — II3-B-SD

Reduced prevalence of CVD & CPD — II1-AC

Reduced incidence of cancer — II1-B

Quality service to detect onset of CVDs and CPD and control them (in outpatient settings) are available and accessible — II1-AC-SD

Availability of and access to medicines, technologies and palliative care improved — II2-B-HS

Level II — Intermediate Results

Reduced biological risk factors — I-A

Reduced biological risk factors (hepatitis B, HPV) — I-B

Policies in place that reduce consumption of or exposure to harmful substances — I-A-HS

Availability of and coverage with vaccination against hepatitis B and HPV — I-B-SD

Quality services to detect and control biological risk factors (overweight, raised blood cholesterol, sugar and pressure), are available and accessible — I-A-SD

Reduced behavioral risks — I-ABC

Quality services (outpatient) to screen and counsel on behavioral risk factors are available and accessible — I-ABC-SD

Policies and public health programs promoting healthy life style and reducing risk behaviors are available — I-ABC-HD

Level I — Outputs

A – Cardiovascular diseases, B – Cancer, C – Chronic pulmonary diseases, D – Depression | SD – Service Delivery, HS – Health System

Figure 131: Custom indicators to fill the gap in the measurement of NCD epidemiology and health system inputs (globally or at the regional level) and data availability by country

#	Indicator	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE
01|148	Percentage of patients aged 18 through 75 years with type 2 diabetes mellitus who had a most recent hemoglobin A1c (HbA1c) <7% or fasting blood sugar controlled at last 2 follow up visits (#95)										
02|149	% of patients aged 18 through 75 years with type 2 diabetes mellitus and HbA1c >9% who are taking EB medications for glycemic control (#96)										
03|150	% of patients aged 18 through 75 years with type 2 diabetes mellitus and high blood pressure (>165/95) who are taking EB medications for BP control (#97)										
04|151	Depression screening: % of patients who were asked screening or diagnostic questions for depression/anxiety during the last visit (#100)										
05|152	Depression treatment or referral: % of patients with depression who were treated with SSRI anti-depressants or referred to physiatrist (#101)										
06|153	% of women aged 30–49 years who have been screened for the first time with VIA or another screening test in the previous 12-month period (#103)										
07|154	Percentage of VIA-positive women receiving treatment in the previous 12-month period. (#105)										
08|155	% of patients with persistent asthma who are taking inhaled corticosteroids and beta-2 Agonists (#106)										
09|156	% of patients with moderate to severe COPD treated with LABA, anti-cholinergic or ICS (#107)										
10|157	% patients with asthma requiring treatment for asthma exacerbation in last six months (we can find hospital treatment of Asthma and COPD as the proxy measures of exacerbations) (#108)										
11|158	% of ambulatory medical charts of patients with CAD on multi-drug treatment to avoid heart attack (ASA, Beta-blocker, ACE-I, Statin) (#175)										
12|159	% of ambulatory medical charts of patients with cerebrovascular disease on multi-drug treatment to avoid stroke (ASA, low dose thiazide, ACE-I, Statin) (#176)										
13|160	% of patients over 10+ years who's smoking status was assessed at the last outpatient visit (#177)										
14|161	% of currently smoking patients over 10+ years who received brief tobacco cessation intervention (patch, oral medications or counseling) at the last outpatient visit (#178)										
15|162	Estimated prevalence of coronary heart disease (#180)										
16|163	Estimated prevalence of cerebrovascular disease (#181)										
17|164	% of cancer diagnosed at the I or II stage (only high burden/mortality cancers, such as breast, cervical and colorectal) (#182)										
18|165	% of patient completely cured from (5-year and 10-year survival rates) (#183)										
19|166	% of patients/population ≥45 years screened for Diabetes during the last 3 (#184)										
20|167	% of patients aged 18 through 75 years with type 2 diabetes mellitus taking multi-drug therapy (aspirin, statin and antihypertensive) (#185)										
21|168	Vaccination coverage with HPV (#186)										
22|169	% of patients/population with BP assessed at the last outpatient visit (#191)										

#	Indicator	EGY	IRQ	JOR	SYR	LBN	MAR	TUN	LBY	YEM	PSE
23|170	% of patients/population with BMI assessed during the last year (#192)										
24|171	% of patients receiving multi-drug therapy and counseling to prevent heart attacks and stroke among individuals with high (≥20%) CVD risk with Aspirin, Statin and BP medication (#193)										
25|172	% of patients diagnosed with ACS given (Aspirin) or expanded initial anti-ischemic treatment with morphine, oxygen, titrated nitrate and aspirin (MONA) (#194)										
26|173	% of patients diagnosed with ACS treated with β-blocker (#195)										
27|174	% of patients diagnosed with ACS with streptokinase treatment (#196)										
28|175	% of women between 50-70 years covered through mammographic screening (#197)										
29|176	% of patient > 50 years ever screened for colorectal cancer (#198)										
30|177	% of patients aged 18 through 75 years with type 2 diabetes mellitus who had retinopathy screening during last 12 months (#99)										
31|178	Psychotherapy: % of patients with depression who were provided with psychotherapy and/ or referred for psychotherapy (#102)										
32|179	Fully Immunized Children (in %) (#262)	🟩	🟩	🟦	🟦	🟥	🟥	🟥	🟥	🟩	🟩

🟥 *Data not available*

🟦 *Only most recent data is available*

🟩 *Baseline and most recent data is available*

Figure 132: Disease burden details: disability-adjusted life years (DALYs) by selected causes of non-communicable disease burden, by country and year[28]

Disease burden by DALYs per 100,000 population (both sexes, all ages)

GHE Causes	EGY		IRQ		JOR		SYR		LBN		MAR		TUN		LBY		YEM	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
All Causes	34,003	31,819	42,211	36,074	24,831	22,324	21,934	47,597	28,128	27,052	32,327	27,929	26,370	26,803	25,623	26,401	52,994	40,063
Malignant neoplasms	2,598	2,682	2,061	1,980	2,036	1,867	2,021	2,415	2,763	2,737	2,136	2,394	2,010	2,179	1,630	1,963	1,479	1,546
Diabetes mellitus	1,173	1,328	1,060	1,209	1,183	1,259	409	597	1,344	1,560	2,052	2,097	1,868	2,285	945	1,116	633	764
Depressive disorders	562	571	620	627	656	684	653	673	735	769	742	772	803	830	750	766	568	618
Cardiovascular diseases	6,640	6,403	3,989	3,996	3,271	3,372	4,581	5,794	5,941	6,247	5,221	4,451	4,785	5,248	5,274	5,236	7,352	7,039
Hypertensive heart disease	243	235	124	127	273	370	52	65	138	149	245	186	147	131	138	140	179	182
Ischaemic heart disease	3,246	3,200	2,054	2,099	1,763	1,805	2,549	3,615	4,141	4,382	2,295	2,051	2,020	2,330	2,820	2,972	3,628	3,560
Stroke	1,859	1,630	1,002	980	874	830	1,559	1,620	1,096	1,118	1,532	1,290	1,807	1,919	1,448	1,382	2,321	2,222
Chronic obstructive pulmonary disease	506	398	114	113	216	186	176	186	380	396	265	254	538	525	370	371	605	566

Disease burden by DALY as % of the Total DALYs (both sexes, all ages)

GHE Causes	EGY		IRQ		JOR		SYR		LBN		MAR		TUN		LBY		YEM	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
All Causes	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Malignant neoplasms	7.6	8.4	4.9	5.5	8.2	8.4	9.2	5.1	9.8	10.1	6.6	8.6	7.6	8.1	6.4	7.4	2.8	3.9
Diabetes mellitus	3.4	4.2	2.5	3.4	4.8	5.6	1.9	1.3	4.8	5.8	6.3	7.5	7.1	8.5	3.7	4.2	1.2	1.9
Depressive disorders	1.7	1.8	1.5	1.7	2.6	3.1	3.0	1.4	2.6	2.8	2.3	2.8	3.0	3.1	2.9	2.9	1.1	1.5
Cardiovascular diseases	19.5	20.1	9.5	11.1	13.2	15.1	20.9	12.2	21.1	23.1	16.2	15.9	18.1	19.6	20.6	19.8	13.9	17.6
Hypertensive heart disease	0.7	0.7	0.3	0.4	1.1	1.7	0.2	0.1	0.5	0.6	0.8	0.7	0.6	0.5	0.5	0.5	0.3	0.5
Ischaemic heart disease	9.5	10.1	4.9	5.8	7.1	8.1	11.6	7.6	14.7	16.2	7.1	7.3	7.7	8.7	11.0	11.3	6.8	8.9
Stroke	5.5	5.1	2.4	2.7	3.5	3.7	7.1	3.4	3.9	4.1	4.7	4.6	6.9	7.2	5.7	5.2	4.4	5.5
Chronic obstructive pulmonary disease	1.5	1.3	0.3	0.3	0.9	0.8	0.8	0.4	1.4	1.5	0.8	0.9	2.0	2.0	1.4	1.4	1.1	1.4

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

[28] Red cells depict >=5% increase in disease burden in 10 years, dark green cells – over 5% reduction in disease burden in 10 years, light green cells – less than 5% reduction in disease burden in 10 years

Figure 133: Disease burden details: years of life lost (YLL) by selected causes of non-communicable disease burden, by country and years[29]

Disease burden by YLLs per 100,000 population (both sexes, all ages)

GHE Causes	EGY		IRQ		JOR		SYR		LBN		MAR		TUN		LBY		YEM	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
All Causes	24,104	21,941	32,545	26,465	16,562	14,103	14,267	35,545	15,292	15,253	22,224	17,456	16,708	16,799	17,001	16,804	44,436	30,476
Malignant neoplasms	2,557	2,634	2,008	1,924	1,999	1,826	2,000	2,385	2,674	2,628	2,077	2,319	1,945	2,097	1,588	1,906	1,447	1,509
Diabetes mellitus	547	566	403	471	567	577	103	172	625	717	1,283	1,162	1,204	1,445	432	468	337	394
Depressive disorders																		
Cardiovascular diseases	6,339	6,091	3,743	3,753	3,060	3,143	4,388	5,568	5,632	5,916	4,790	3,977	4,374	4,786	5,008	4,927	7,110	6,796
Hypertensive heart disease	239	231	121	125	270	366	50	63	133	144	240	180	142	125	135	136	178	181
Ischaemic heart disease	3,177	3,126	1,998	2,041	1,698	1,729	2,497	3,542	4,034	4,261	2,206	1,942	1,885	2,169	2,753	2,882	3,580	3,508
Stroke	1,797	1,564	944	921	828	781	1,503	1,555	1,030	1,048	1,474	1,224	1,732	1,835	1,394	1,316	2,268	2,167
Chronic obstructive pulmonary disease	440	335	75	74	180	153	132	140	308	321	204	182	465	452	304	303	518	481

Disease burden by DALY as % of the Total YLLs (both sexes, all ages)

GHE Causes	EGY		IRQ		JOR		SYR		LBN		MAR		TUN		LBY		YEM	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
All Causes	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Malignant neoplasms	10.6	12.0	6.2	7.3	12.1	12.9	14.0	6.7	17.5	17.2	9.3	13.3	11.6	12.5	9.3	11.3	3.3	5.0
Diabetes mellitus	2.3	2.6	1.2	1.8	3.4	4.1	0.7	0.5	4.1	4.7	5.8	6.7	7.2	8.6	2.5	2.8	0.8	1.3
Depressive disorders																		
Cardiovascular diseases	26.3	27.8	11.5	14.2	18.5	22.3	30.8	15.7	36.8	38.8	21.6	22.8	26.2	28.5	29.5	29.3	16.0	22.3
Hypertensive heart disease	1.0	1.1	0.4	0.5	1.6	2.6	0.4	0.2	0.9	0.9	1.1	1.0	0.8	0.7	0.8	0.8	0.4	0.6
Ischaemic heart disease	13.2	14.2	6.1	7.7	10.3	12.3	17.5	10.0	26.4	27.9	9.9	11.1	11.3	12.9	16.2	17.1	8.1	11.5
Stroke	7.5	7.1	2.9	3.5	5.0	5.5	10.5	4.4	6.7	6.9	6.6	7.0	10.4	10.9	8.2	7.8	5.1	7.1
Chronic obstructive pulmonary disease	1.8	1.5	0.2	0.3	1.1	1.1	0.9	0.4	2.0	2.1	0.9	1.0	2.8	2.7	1.8	1.8	1.2	1.6

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

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[29] Red cells depict >=5% increase in disease burden in 10 years, dark green cells – over 5% reduction in disease burden in 10 years, light green cells – less than 5% reduction in disease burden in 10 years

Figure 134: Disease burden details: years lived with disability (YLD) by selected causes of non-communicable disease burden, by country and year[30]

Disease burden by YLDs per 100,000 population (both sexes, all ages)

GHE Causes	EGY 2005	EGY 2015	IRQ 2005	IRQ 2015	JOR 2005	JOR 2015	SYR 2005	SYR 2015	LBN 2005	LBN 2015	MAR 2005	MAR 2015	TUN 2005	TUN 2015	LBY 2005	LBY 2015	YEM 2005	YEM 2015
All Causes	9,899	9,878	9,666	9,609	8,269	8,221	7,667	12,052	12,836	11,799	10,104	10,473	9,662	10,004	8,623	9,598	8,558	9,586
Malignant neoplasms	41	48	52	57	38	41	22	30	89	109	59	76	66	82	42	58	31	37
Diabetes mellitus	626	762	656	738	616	682	306	425	719	842	769	935	664	840	514	648	296	370
Depressive disorders	562	571	620	627	656	684	653	673	735	769	742	772	803	830	750	766	568	618
Cardiovascular diseases	301	312	247	243	211	229	193	227	308	332	431	474	411	462	266	310	242	243
Hypertensive heart disease	4	4	3	3	4	4	2	2	4	5	5	6	5	6	3	3	2	2
Ischaemic heart disease	69	74	57	58	65	76	52	74	108	122	88	109	134	162	67	90	48	52
Stroke	63	66	58	59	47	48	57	65	66	70	58	65	75	84	54	66	54	56
Chronic obstructive pulmonary disease	65	63	39	39	36	34	44	47	72	75	61	72	73	74	66	68	87	85

Disease burden by DALY as % of the Total YLDs (both sexes, all ages)

GHE Causes	EGY 2005	EGY 2015	IRQ 2005	IRQ 2015	JOR 2005	JOR 2015	SYR 2005	SYR 2015	LBN 2005	LBN 2015	MAR 2005	MAR 2015	TUN 2005	TUN 2015	LBY 2005	LBY 2015	YEM 2005	YEM 2015
All Causes	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Malignant neoplasms	0.4	0.5	0.5	0.6	0.5	0.5	0.3	0.2	0.7	0.9	0.6	0.7	0.7	0.8	0.5	0.6	0.4	0.4
Diabetes mellitus	6.3	7.7	6.8	7.7	7.5	8.3	4.0	3.5	5.6	7.1	7.6	8.9	6.9	8.4	6.0	6.8	3.5	3.9
Depressive disorders	5.7	5.8	6.4	6.5	7.9	8.3	8.5	5.6	5.7	6.5	7.3	7.4	8.3	8.3	8.7	8.0	6.6	6.5
Cardiovascular diseases	3.0	3.2	2.6	2.5	2.6	2.8	2.5	1.9	2.4	2.8	4.3	4.5	4.3	4.6	3.1	3.2	2.8	2.5
Hypertensive heart disease	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Ischaemic heart disease	0.7	0.8	0.6	0.6	0.8	0.9	0.7	0.6	0.8	1.0	0.9	1.0	1.4	1.6	0.8	0.9	0.6	0.5
Stroke	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.6	0.7	0.6	0.6
Chronic obstructive pulmonary disease	0.7	0.6	0.4	0.4	0.4	0.4	0.6	0.4	0.6	0.6	0.6	0.7	0.8	0.7	0.8	0.7	1.0	0.9

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

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[30] Red cells depict >=5% increase in disease burden in 10 years, dark green cells – over 5% reduction in disease burden in 10 years, light green cells – less than 5% reduction in disease burden in 10 years

Figure 135: Death rates (per 100,000 population) by selected causes of non-communicable disease, by country and year[31]

Disease burden by Deaths per 100,000 population (both sexes, all ages)

GHE Causes	EGY		IRQ		JOR		SYR		LBN		MAR		TUN		LBY		YEM	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
All Causes	653	624	623	534	398	383	367	783	561	624	609	566	582	652	462	510	763	599
Malignant neoplasms	80	84	57	54	60	56	61	76	91	97	62	73	63	72	50	63	34	36
Diabetes mellitus	21	23	15	18	24	25	4	7	28	34	57	59	57	71	17	19	10	13
Depressive disorders																		
Cardiovascular diseases	257	248	158	153	126	133	164	220	264	298	203	195	207	237	184	197	221	214
Hypertensive heart disease	10	10	6	5	12	17	2	3	7	8	11	9	8	7	6	6	7	6
Ischaemic heart disease	141	138	92	89	67	69	96	143	189	213	101	100	89	105	109	119	124	119
Stroke	70	62	42	39	38	38	54	60	50	56	65	63	86	96	52	54	68	67
Chronic obstructive pulmonary disease	19	14	4	3	8	7	5	6	15	17	8	8	23	23	13	13	16	16

Disease burden by the Deaths as % of the Total Deaths (both sexes, all ages)

GHE Causes	EGY		IRQ		JOR		SYR		LBN		MAR		TUN		LBY		YEM	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
All Causes	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Malignant neoplasms	12.2	13.4	9.1	10.1	15.0	14.7	16.5	9.7	16.2	15.5	10.2	12.9	10.8	11.0	10.9	12.3	4.5	5.9
Diabetes mellitus	3.3	3.7	2.5	3.3	5.9	6.5	1.1	0.9	5.0	5.4	9.4	10.4	9.7	10.9	3.7	3.8	1.4	2.1
Depressive disorders																		
Cardiovascular diseases	39.3	39.7	25.3	28.6	31.7	34.7	44.6	28.1	47.1	47.7	33.4	34.4	35.5	36.3	39.8	38.6	28.9	35.7
Hypertensive heart disease	1.5	1.5	0.9	1.0	3.1	4.5	0.6	0.4	1.2	1.2	1.8	1.7	1.4	1.1	1.2	1.2	0.9	1.1
Ischaemic heart disease	21.6	22.1	14.7	16.8	16.9	18.1	26.2	18.2	33.7	34.1	16.6	17.7	15.2	16.2	23.6	23.3	16.2	19.9
Stroke	10.7	9.9	6.7	7.4	9.6	9.8	14.7	7.6	9.0	9.0	10.7	11.1	14.7	14.7	11.2	10.7	9.0	11.2
Chronic obstructive pulmonary disease	2.9	2.3	0.6	0.6	2.0	1.8	1.5	0.8	2.7	2.8	1.4	1.5	3.9	3.5	2.7	2.6	2.1	2.6

Source: WHO Global Health Estimates 2016 (http://www.who.int/healthinfo/global_burden_disease/en/)

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[31] Red cells depict >=5% increase in disease burden in 10 years, dark green cells – over 5% reduction in disease burden in 10 years, light green cells – less than 5% reduction in disease burden in 10 years

Figure 136: Total health expenditure as percentage (%) of GDP for selected countries (1995-2014)
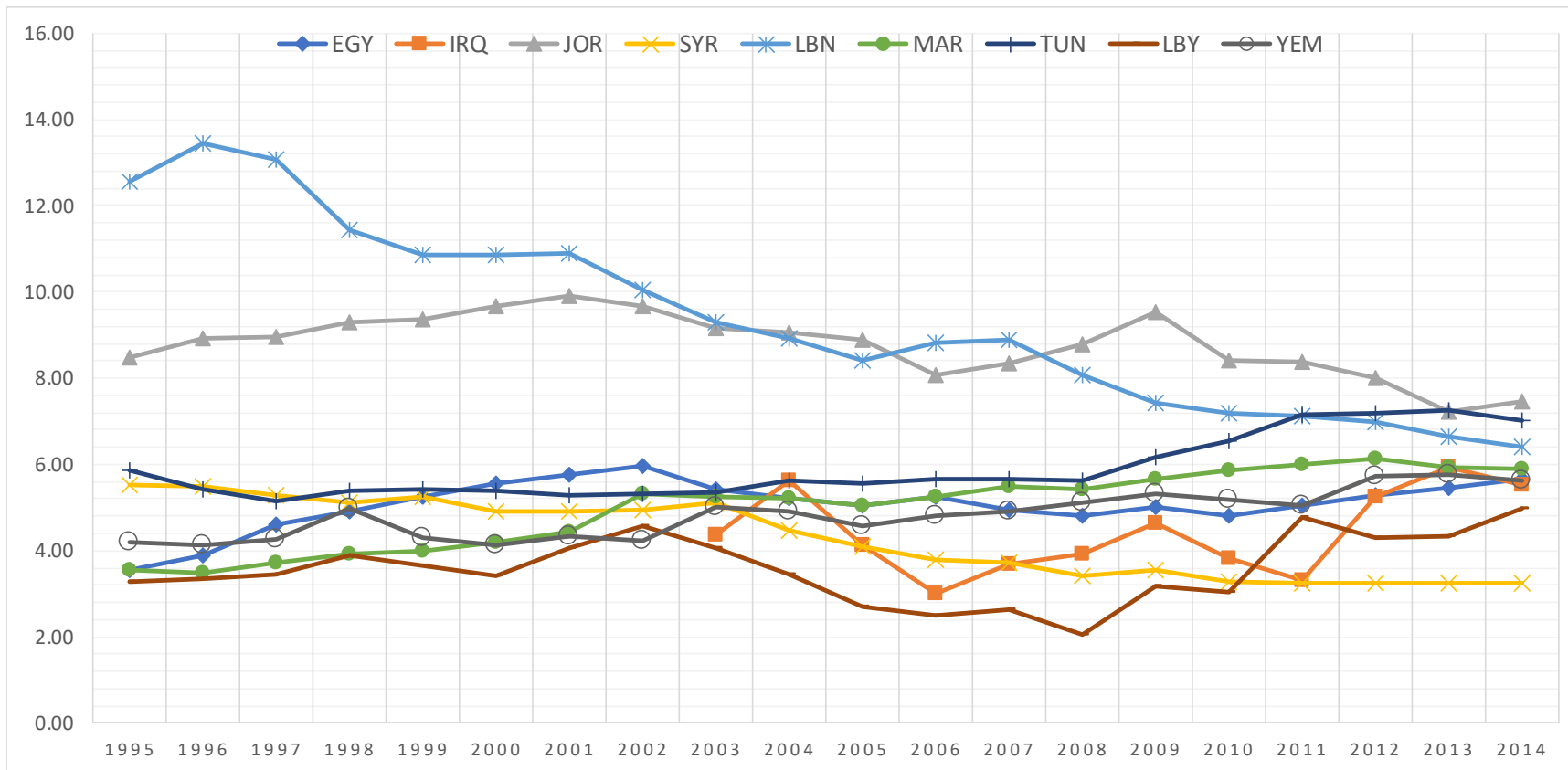
Source: World Bank, World Development Indicators

Figure 137: Out-of-pocket expenditure as a percentage (%) of total health expenditure for selected countries (1995-2014)
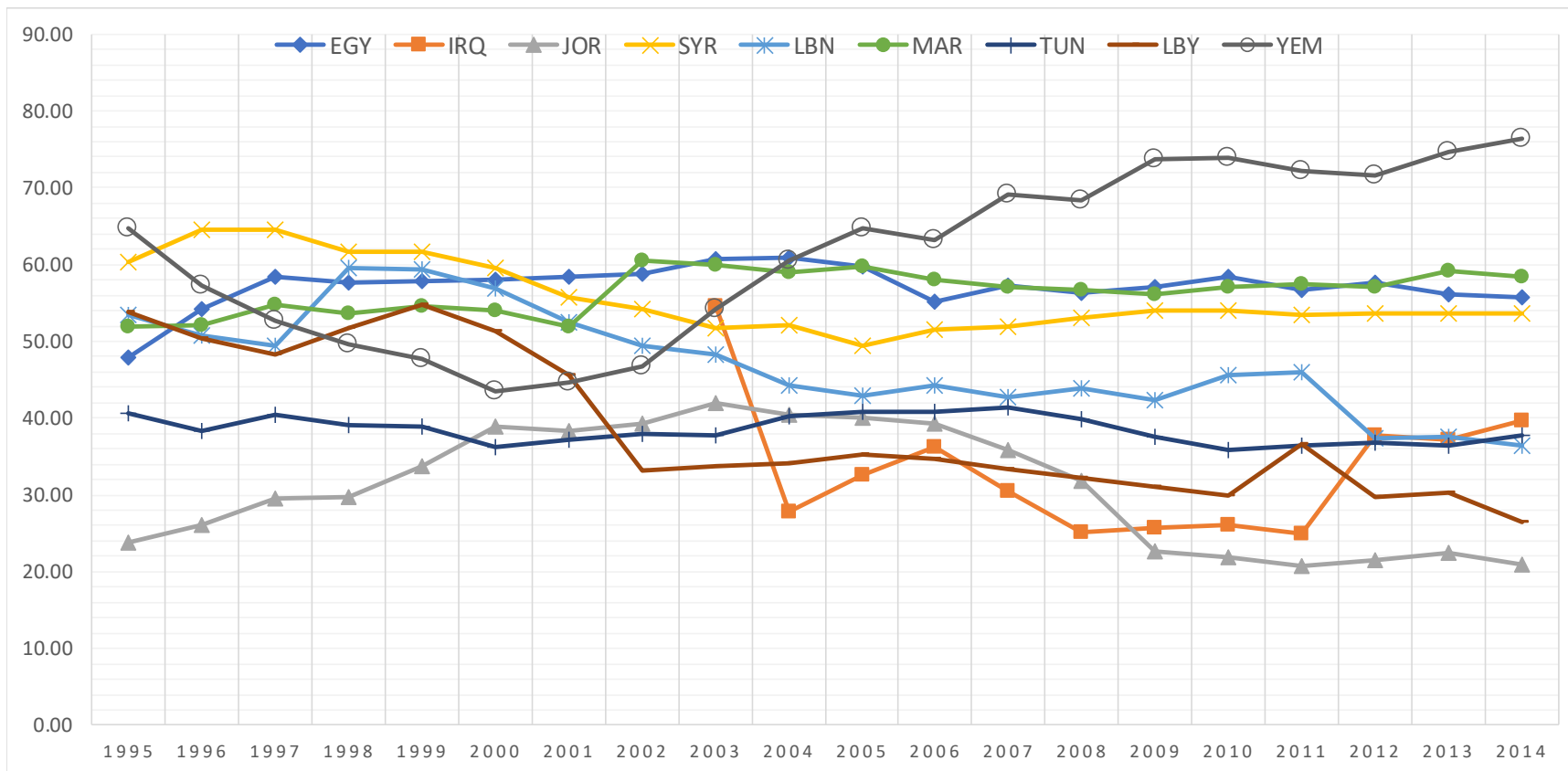
Source: World Bank, World Development Indicators

Figure 138: Public health expenditure as percentage (%) of total health expenditure for selected countries (1995-2014)
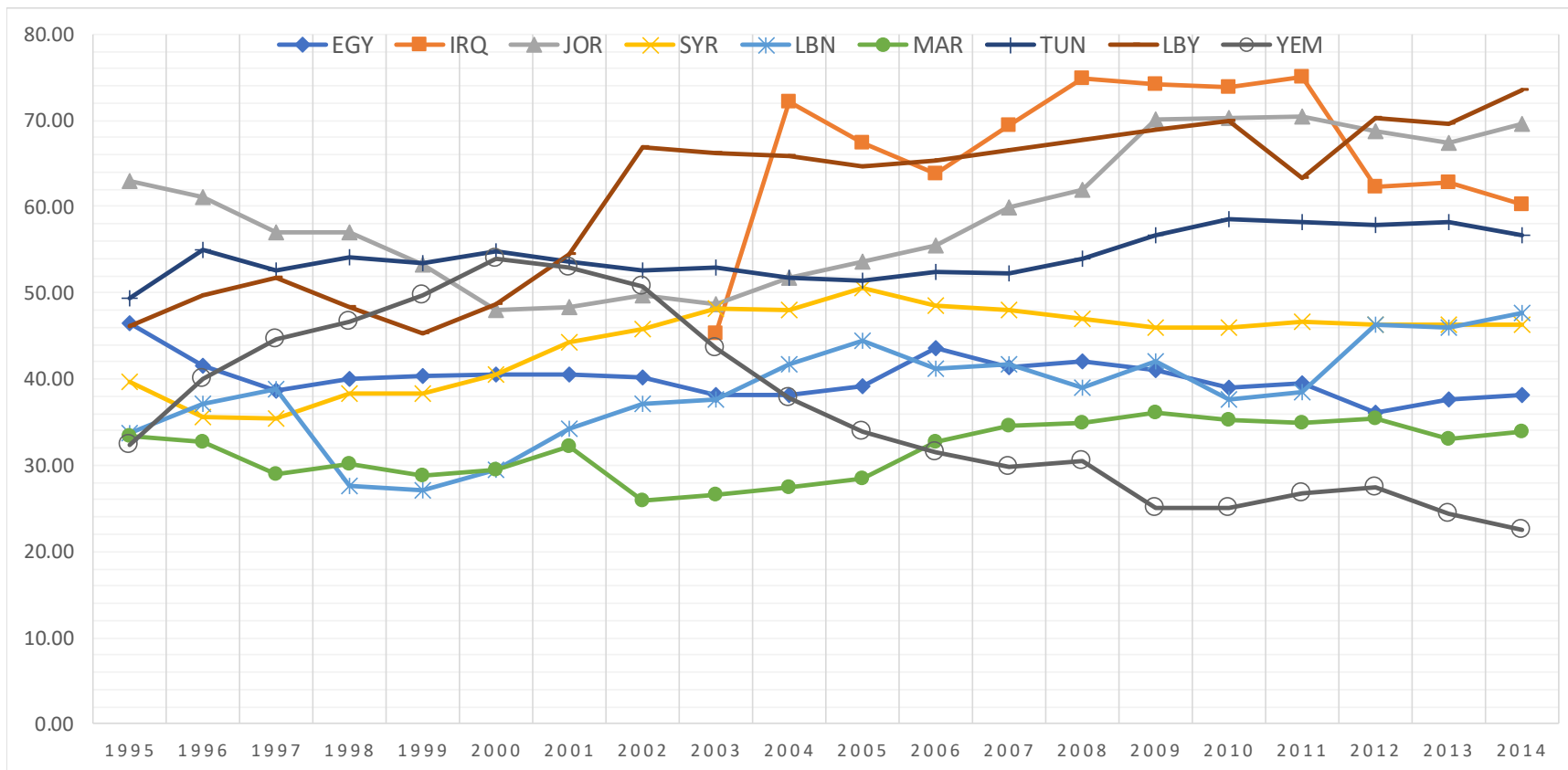
Source: World Bank, World Development Indicators

Figure 139: Total mean cholesterol (mmol/L) trends for selected countries, by sex (1980-2009)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Finland																														
Female	6.2	6.1	6.1	6.1	6.0	6.0	6.0	5.9	5.9	5.9	5.8	5.8	5.7	5.7	5.7	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.3
Male	6.2	6.1	6.1	6.0	6.0	6.0	5.9	5.9	5.9	5.8	5.8	5.7	5.7	5.6	5.6	5.5	5.5	5.5	5.4	5.4	5.4	5.3	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.2
France																														
Female	6.0	6.0	5.9	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.7	5.7	5.7	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4	5.4	5.3	5.3
Male	6.0	6.0	6.0	6.0	5.9	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.7	5.7	5.7	5.7	5.6	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.3
Iran																														
Female	5.1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.3	5.3	5.3	5.3
Male	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Jordan																														
Female	5.0	5.0	5.1	5.1	5.1	5.2	5.2	5.2	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.1	5.1	5.1	5.0	5.0
Male	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.9
Poland																														
Female	5.4	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.1
Male	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
UK																														
Female	6.2	6.2	6.1	6.1	6.1	6.0	6.0	6.0	5.9	5.9	5.9	5.8	5.8	5.7	5.7	5.7	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Male	6.2	6.2	6.2	6.1	6.1	6.1	6.0	6.0	5.9	5.9	5.9	5.8	5.8	5.8	5.7	5.7	5.7	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4
USA																														
Female	5.7	5.7	5.7	5.7	5.7	5.6	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4	5.3	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.1
Male	5.6	5.6	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4	5.4	5.3	5.3	5.3	5.3	5.3	5.2	5.2	5.2	5.2	5.1	5.1	5.1	5.0

Source: WHO Global Health Observatory 2017

Figure 140: Prevalence of diabetes, by sex and years (1980-2014)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Egypt																																			
Men	6.5	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8	9.1	9.3	9.5	9.8	10.0	10.3	10.5	10.8	11.1	11.4	11.7	12.0	12.3	12.7	13.0	13.4	13.8	14.2	14.6	15.1	15.5	16.0
Women	8.0	8.2	8.4	8.6	8.8	9.0	9.2	9.4	9.7	9.9	10.2	10.4	10.7	10.9	11.2	11.5	11.8	12.2	12.5	12.9	13.3	13.7	14.0	14.4	14.8	15.3	15.7	16.1	16.6	17.1	17.6	18.2	18.7	19.3	19.8
Iraq																																			
Men	7.5	7.7	7.9	8.0	8.2	8.4	8.6	8.7	8.9	9.1	9.4	9.5	9.6	9.8	10.0	10.2	10.4	10.6	10.9	11.2	11.5	11.8	12.2	12.4	12.8	13.1	13.5	13.9	14.3	14.8	15.2	15.7	16.2	16.7	17.2
Women	8.7	8.9	9.0	9.2	9.4	9.6	9.8	9.9	10.1	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	11.6	11.8	12.1	12.4	12.7	13.0	13.2	13.5	13.8	14.2	14.5	14.9	15.3	15.7	16.1	16.6	17.0	17.5
Jordan																																			
Men	7.0	7.2	7.4	7.6	7.9	8.1	8.4	8.7	8.9	9.2	9.4	9.6	9.8	10.1	10.3	10.6	10.8	11.1	11.4	11.7	12.0	12.3	12.6	12.9	13.2	13.5	13.8	14.1	14.4	14.8	15.1	15.5	15.8	16.2	16.5
Women	9.2	9.4	9.6	9.9	10.1	10.4	10.7	10.9	11.2	11.4	11.6	11.9	12.1	12.3	12.5	12.8	13.0	13.3	13.5	13.8	14.0	14.3	14.5	14.7	14.9	15.1	15.3	15.5	15.8	16.0	16.2	16.5	16.7	16.9	17.2
Lebanon																																			
Men	7.1	7.2	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.2	8.3	8.4	8.5	8.6	8.8	9.0	9.2	9.4	9.7	10.0	10.4	10.7	11.1	11.6	12.0	12.5	12.9	13.4	13.9	14.5
Women	6.7	6.9	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.5	7.5	7.6	7.6	7.7	7.8	7.8	7.9	8.0	8.2	8.3	8.4	8.6	8.8	9.0	9.2	9.4	9.7	9.9	10.2	10.5	10.8	11.2	11.5	11.9	12.2
Libya																																			
Men	7.5	7.7	7.9	8.1	8.3	8.5	8.6	8.7	8.8	8.9	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.3	10.5	10.7	11.0	11.3	11.6	11.9	12.2	12.6	12.9	13.3	13.7	14.0	14.2	14.6	14.9	15.2
Women	9.1	9.2	9.4	9.6	9.7	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.7	10.8	11.0	11.2	11.4	11.6	11.8	12.0	12.2	12.5	12.7	13.0	13.3	13.7	14.0	14.4	14.7	15.1	15.4	15.6	15.9	16.3	16.6
Morocco																																			
Men	4.9	5.0	5.2	5.3	5.5	5.6	5.8	6.0	6.1	6.3	6.5	6.7	6.9	7.1	7.3	7.6	7.8	8.1	8.4	8.7	9.0	9.3	9.6	10.0	10.3	10.7	11.0	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0
Women	5.4	5.6	5.7	5.8	6.0	6.1	6.3	6.5	6.6	6.8	7.0	7.2	7.3	7.5	7.7	7.9	8.2	8.4	8.7	8.9	9.2	9.4	9.7	10.0	10.3	10.6	10.9	11.1	11.4	11.8	12.1	12.4	12.7	13.1	13.4
Palestine																																			
Men	6.6	6.7	6.8	6.9	7.1	7.2	7.4	7.5	7.7	7.8	8.0	8.2	8.4	8.6	8.8	9.0	9.2	9.5	9.8	10.2	10.6	10.9	11.3	11.7	12.2	12.6	13.0	13.4	13.8	14.3	14.7	15.1	15.6	16.0	16.5
Women	7.4	7.6	7.7	7.9	8.0	8.2	8.4	8.5	8.7	8.9	9.1	9.3	9.5	9.7	9.9	10.2	10.4	10.7	11.0	11.4	11.8	12.1	12.5	12.9	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.1	16.5	17.0	17.5
Syria																																			
Men	5.6	5.7	5.8	5.9	6.1	6.2	6.4	6.5	6.7	6.9	7.1	7.3	7.6	7.8	8.1	8.4	8.7	9.0	9.3	9.5	9.8	10.1	10.4	10.6	10.9	11.1	11.4	11.7	12.0	12.3	12.7	13.1	13.4	13.7	14.0
Women	6.8	6.9	7.1	7.2	7.3	7.5	7.6	7.7	7.9	8.1	8.3	8.5	8.7	9.0	9.2	9.5	9.8	10.1	10.3	10.6	10.9	11.2	11.4	11.7	12.0	12.3	12.6	12.9	13.2	13.5	13.9	14.3	14.6	15.0	15.3
Tunisia																																			
Men	4.8	4.9	5.0	5.1	5.3	5.4	5.5	5.7	5.8	6.0	6.2	6.4	6.6	6.8	6.9	7.2	7.4	7.6	7.8	8.0	8.3	8.5	8.8	9.1	9.3	9.6	9.9	10.2	10.4	10.7	11.0	11.3	11.5	11.8	12.1
Women	6.0	6.1	6.3	6.4	6.6	6.8	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.3	8.4	8.7	8.9	9.1	9.3	9.5	9.7	9.9	10.1	10.3	10.5	10.7	11.0	11.2	11.4	11.6	11.9	12.1	12.3	12.6	12.9
Yemen																																			
Men	3.3	3.4	3.5	3.7	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.5	5.8	6.0	6.2	6.5	6.8	7.1	7.4	7.7	8.1	8.4	8.8	9.1	9.5	9.9	10.3	10.6	11.0	11.4	11.8	12.2	12.6
Women	3.1	3.2	3.2	3.3	3.4	3.5	3.7	3.8	3.9	4.0	4.2	4.3	4.5	4.7	4.9	5.0	5.2	5.5	5.7	5.9	6.2	6.4	6.7	6.9	7.2	7.5	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1

Source: NCD Risk Factor Collaboration (43)

Middle East NCD rapid assessment

Figure 141: Calculations for the analysis of NCD prevention and control of diabetes by sources of prevalence, by country

| | Prevalence of diabetes (in %) | | Disease burden (2015) per 100,000 population | | | Death rate[32] (per 100,000) | Death caused by diabetes per 1,000 patients | | Disease burden per case of diabetes | | | | | |
| | | | | | | | | | NHPS/IDF 2015 | | | WHO EMRO 2014 | | |
	NHPS/IDF 2015	WHO EMRO 2014	YLLs	YLDs	DALYs		NHPS/IDF 2015	WHO EMRO 2014	YLLs	YLDs	DALYs	YLLs	YLDs	DALYs
EGY	16.7	18.9	566	762	1,328	23.0	1.4	1.2	0.034	0.046	0.080	0.030	0.040	0.070
IRQ	9.3	16.8	471	738	1,209	17.5	1.9	1.0	0.051	0.079	0.130	0.028	0.044	0.072
JOR	11.7	14.9	577	682	1,259	24.7	2.1	1.7	0.049	0.058	0.108	0.039	0.046	0.085
LBN	13.0	13.9	717	842	1,560	7.0	0.5	0.5	0.055	0.065	0.120	0.052	0.061	0.112
LBY	10.4	12.6	468	648	1,116	33.7	3.2	2.7	0.045	0.062	0.107	0.037	0.051	0.089
MAR	8.1	13.5	1,162	935	2,097	59.0	7.3	4.4	0.143	0.115	0.259	0.086	0.069	0.155
SYR	8.1	13.3	172	425	597	70.8	8.7	5.3	0.021	0.052	0.074	0.013	0.032	0.045
TUN	9.6	17.0	1,445	840	2,285	19.4	2.0	1.1	0.151	0.088	0.238	0.085	0.049	0.134
YEM	5.1	15.5	394	370	764	12.5	2.5	0.8	0.077	0.073	0.150	0.025	0.024	0.049

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[32] Age standardized, WHO global health estimates 2016

Figure 142: Suggested "best buy" clinical interventions (based on a phased expansion for improving packages of clinical interventions), according to WHO

Phase	Primary Care	Hospital Care
Phase One Priority Interventions	**Basic Cardiovascular Package** Integrated screening and modification/treatment of CVD risk factors and CVD risk assessment Primary prevention of heart attack and stroke Counseling and multi-drug therapy (including glycemic control for diabetes mellitus) for people (≥30 years), with10-year risk of fatal or non-fatal cardiovascular events ≥30% * Secondary prevention of heart attack and stroke Multi-drug therapy (including glycemic control for diabetes mellitus) to individuals who have had a heart attack or stroke (secondary prevention)	Basic Injury and Surgical Package Aspirin therapy for acute myocardial infarction*
	Basic Pulmonary package Treatment of persistent asthma with inhaled corticosteroids and beta-2 Agonists	
	Basic Mental health and neurological package Epilepsy: anti-epileptic drugs Depression: anti-depressants, brief psychotherapy; Psychosis: antipsychotic drugs, lithium, psychosocial support	
	Basic Cancer package -Prevention of liver cancer through hepatitis B immunization - Prevention of cervical cancer through screening (visual inspection with acetic acid [VIA]) and treatment of pre-cancerous lesions - Prevention of cervical cancer through screening HPV[33]	
	Expanded cardiovascular package	**Expanded cardiovascular package**

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[33]Although the WHO package does not include HPV vaccination, the WHO recommendations were made before the recent HPV vaccine price reductions. With today's lower price, Lancet Commission suggests that HPV vaccination should also be included in this first phase of scale-up.

| Phase Two Priority Interventions | -Primary CVD prevention with multidrug therapy among individuals 10-year risk of cardiovascular events ≥20% - interventions to promote treatment adherence | Addition of streptokinase to aspirin and beta-blockers for the treatment of acute heart attack |
| | | **Basic Cancer package**
Breast cancer - treatment of stage I
Breast cancer - early case finding through mammographic screening (50–70 years) and treatment of all stages
Colorectal cancer - screening at age 50 and treatment
Oral cancer - early detection and treatment |

Figure 143: USAID investment options to improve NCD prevention, early detection and treatment

Options	Clinical Domains for Improvement Intervention (improvement content)
Option 1: Cardiovascular package for adolescents and adults at the primary care level (if possible, combined with a population-based intervention for modifiable risk factors, particularly with tobacco-free regulation and taxation)	Expanded cardiovascular disease package at primary care level a) Systematic Screening and Modification/treatment of • Behavioral risk factors: tobacco, alcohol, unhealthy diet, physical inactivity • Physiologic risk factors: HTN, hyperlipidemia, obesity, high glucose levels b) Assessment of risk of CVD event in next 10 years in individuals with 2 or more CVD risk factors c) Primary prevention of CVD (antihypertensive, aspirin, statin in individuals at ≥ 20% risk of CVD event in next 10 years or diabetes) d) Secondary prevention of CVD (beta blocker; aspirin; ACE-I/ARB; statin in patients with heart attack)
Option 2: Integrated antenatal (ANC) care and NCD package at the primary care level (if possible, combined with population-based intervention for modifiable risk factors, particularly tobacco-free regulation and taxation)	a) Essential ANC package (including tetanus) b) Screening and counseling/treatment of behavioral risk factors • Smoking/avoidance of second-hand smoking • Unhealthy diet/nutrition (including calcium, folic acid and iron) • Physical inactivity c) Screening/measurement of HTN, hyperlipidemia, obesity, diabetes, gestational diabetes d) Screening/counseling on depression and family violence e) Counseling on FP

Option 3: Integrated preventive package for women of reproductive age at primary care level (if possible, combined with population-based intervention for modifiable risk factors, particularly tobacco-free regulation and taxation and public BCC on healthy lifestyle choices)	a) Expanded cardiovascular disease package at primary care level • Systematic screening and modification/treatment of <u>behavioral risk factors</u> (tobacco, alcohol, unhealthy diet, physical inactivity) and <u>Physiologic risk factors</u> (HTN, hyperlipidemia, obesity, high glucose) • CVD risk assessment, primary and secondary prevention of CVDs c) Basic cancer package • Prevention of liver cancer through hepatitis B immunization • Prevention of cervical cancer through screening (VIA) and treatment of pre-cancerous lesions • Prevention of cervical cancer through HPV[34] d) Screening/ brief psychotherapy and treatment/referral for depression e) Screening/counseling/referral for family violence e) Counseling on FP
Option 4: Prevention and management of NCDs in the refugee population at the primary care level	a) Expanded cardiovascular package at primary care level • Systematic screening and modification/treatment of behavioral and physiologic Risk Factors • CVD risk assessment, primary and secondary prevention of CVDs b) Basic Mental health and neurological package • Depression: anti-depressants, brief psychotherapy; • Psychosis: anti-psychotic drugs, lithium, psychosocial support • Epilepsy: anti-epileptic drugs; c) Basic Cancer package • Prevent liver cancer through hepatitis B immunization • Prevent cervical cancer through screening (VIA) and treatment of pre-cancerous lesions • Prevent cervical cancer through HPV vaccine d) Basic Pulmonary package • Diagnosis and treatment of persistent asthma with inhaled corticosteroids and beta-2 Agonists

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[34]Although the WHO package does not include HPV vaccination, the WHO recommendations were made before the recent HPV vaccine price reductions. With today's lower price, Lancet Commission suggests that HPV vaccination should also be included in this first phase of scale-up.