Sustainable Development Goals Realisation: A National Indicator Framework for Iranian Health Monitoring

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Abstract

Sustainable Development Goals (SDGs) provide a global inclusive indicator framework for improving the population’s health, adapted to each country’s socio-political context. This study aimed to propose a national indicator framework for Iran as a reference list toward SDGs realisation in health and health-related. SDGs and three additional complementary frameworks (WHO Core Health Indicators, Action on Social Determinants of Health Core Indicators and Iranian National Health Equity Indicators) were selected to provide the theoretical base for the National Indicator Framework and to identify, compare, and select the potential indicators based on the country’s contextual needs and capacities. WHO’s “result chain pattern for health core indicators classification” was used as a conceptual basis to facilitate identifying indicators and to link those to underlying country data systems and data gathering methods. After identifying the initial list of 181 indicators, senior informants from the Ministry of Health and Medical Education-related departments and other health-related organisations were consulted to reduce and verify the initial list. A National Indicator Framework for health monitoring in Iran has been developed to contain 101 indicators (including 12 input/process indicators, 13 output indicators, 44 outcome indicators, and 32 impact indicators) organised within four domains of “health status”, “risk factors”, “service coverage” and “the health system”. This framework addresses the health core indicators gap identified in paragraph No. 3 under article NO.7 of the Law on Permanent Provisions of Country Development Programs. It will be used to notify policies and programs to improve the health system and population health status at the national level.

Keywords: Iran, national indicator framework, sustainable development goals, systematic mapping

1. Introduction

A comprehensive, health-oriented and contextually-adjusted set of indicators is essential to monitor population health and guide national health and health-related policies accordingly toward Sustainable Development Goals (SDGs) realisation (Schirnding, 2002).

The trajectory of the development of public health policies started with the Alma-Ata Primary Health Care (PHC) Policy Collection entitled “Health for All” in 1978 (WHO, 1998) and reached “All for Health” in 1988 (Mahler, 1988). This trend continued in developing its theoretical and practical foundations, leading to the “quality assessment of data on social determinants of health” in 2005 (WHO, 2010) and finally to “Health for All by All” in 2017 (Al-Mandhari, El-Adawy, Khan, & Ghaffar, 2019).

In recent years, special attention has been paid to the SDGs for human development as the newest and the most comprehensive framework for improving the quality of life. Moreover, it is evident that almost all international agencies and institutions, such as the World Health Organisation (WHO), align their indexes with SDG indices.
(FAO, 2018; UNICEF, 2018; WHO, 2015). Given this paradigm shift from a uni-lens approach to health in the 1980s (WHO, 1981) to a multi-lens approach of sustainable development in 2015, countries need to integrate their health indicators with health-related sustainable development indicators to provide an adapted list of 21st-century health indicators at the national level (Mohammadi et al., 2019) as it is getting an accepted trend at the international level (EC, 2018; OECD, 2019; WHO-EMRO, 2016). All countries committed to achieving the SDGs in the health sector must develop their National Indicator Framework (NIF) that is perfectly proportioned and in line with their local health priorities and socio-political context (Mohammadi et al., 2019).

Three significant considerations have resulted in developing the NIF for health monitoring in Iran. The first is related to the growing political commitment among United Nations Member States, including Iran, to sustainable development through improving their population health status and reporting the achievements. Second, since the Millennium Development Goals (MDGs), Iran’s health system has been shifting gradually from a purely medical approach to health (Etches, Frank, Di Ruggiero, & Manuel, 2006) to a social approach to health (Mohammadi et al., 2019). This transition has necessitated health reconceptualisation to underlie the social, economic and environmental determinants of health (Marmot & Wilkinson, 2005). Developing a NIF present an opportunity to promote this transition toward SDGs realisation, as health plays an essential role in sustainable development by reducing disease burden and producing equitable and sustainable health outcomes (Acharya, Lin, & Dhingra, 2018; Buch, Masuku, & Mathee, 2002). Furthermore, a significant national regulation called the executive regulation of the Supreme Council for Health and Food Security (SCHFS) has made it necessary to develop a set of core indicators for monitoring health (Minutes 15th: Supreme Council for Health and Food Security, 2017). SCHFS is a council for multisectoral policy making chaired by the country’s president. As a result, a concern for having a set of high-priority major indicators was formed to propose a NIF to monitor SDGs realisation of health status. This article presents how we developed a proposed NIF based on four nationally and internationally authorised health-centric indicator frameworks. We also present the final set of indicators proposed to be adopted at the national level.

2. Methods

2.1 Study Context

There are various data sources for collecting health data in Iran. Based on the Health Transformation Plan (HTP) in 2011, the improvement of the electronic health records was one of the priorities in this program for outpatients and inpatients services. Currently, near to 98% of PHC facilities are using electronic health information system and more than 95% of the population are registered in PHC electronic health records, 100 % of public and private hospitals have eHIS, and 89 % of all deaths were registered in 2018 (WHO-EMRO, 2020). Despite such systems in the health system of Iran, their poor interconnection and fragmentation between registry systems reduce their efficiency.

2.2 Study Design

We used a set of criteria to design the methodology of the present NIF. First, we considered the national commitment to achieving SDGs. Second, there was a need to consider the current framework of key indicator framework being worked on and reported by various national institutions. Third, there was a need to consider the legal requirement to monitor national health equity indicators. Moreover, there was a need to integrate health indicators with health-related sustainable development indicators to provide a reliable list of 21st-century health indicators at the national level. The model for developing the framework consisted of two main phases illustrated in figure 1.
2.3 Preliminary Phase

2.3.1 Identification of Indicator Frameworks

With regards to criteria as mentioned above, we took into consideration four health (note 1) and health-related (note 2) indicator frameworks (Valentine, Koller, & Hosseinpoor, 2016): SDGs indicators (SDGIs) (UN, 2017), WHO Core Health Indicators (CHIs) (WHO, 2018), Action on SDH Core Indicators (AoSDHCIs) (WHO, 2016) and Iranian National Health Equity Indicators (INHEIs) (Minutes 15th: Supreme Council for Health and Food Security, 2017). All contain high-priority indicators developed to monitor the international or national progress toward population health promotion (see table 1).

Table 1. Selected indicator frameworks and their description

| Indicator Frameworks               | Description                                                                                                                                 |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Health and health-related SDGs indicators | Comprises 43 health & health-related targets, of which 13 are in SDG 3 for health, and 30 are divided between 12 other SDGs (1, 2, 4, 5, 6, 7, 8, 9, 11, 13, 16, 17), with 66 indicators (of which 26 are in this health goal, 14 are confirmed by WHO as health-related (WHO, 2017, 2018) and 26 are recognised health-related based on the technical opinions of the study team) |
| WHO Core Health Indicators        | Comprises four domains, comprising 27 subdomains within which 121 indicators are nested, 52 indicators of which are chosen among health-related SDGs indicators;                                           |
| Action on SDH core indicators     | Comprises five domains, comprising 23 measurement concepts within which the core basket of 27 indicators is nested, 15 indicators of which are chosen among health-related SDGs indicators;                   |
| Iranian National Health Equity indicators | Comprises five domains, comprising 69 Indicators developed in 2016 based on Urban Health Equity Assessment and Response Tool (Urban Heart);                                    |
2.3.2 Building a Mapping Scheme

The study team developed a systematic creative mapping approach to explore each framework compared to others; this approach could help us consider overlapping between the different collections of indicators and to what extent. Thus, after considering the different plausible mapping schemes, the team agreed on the “SDGs area-based concentric circles model”. A model on which each circle represents each indicator framework. SDGs thematic areas are situated at the centre of the model, showing the thematic areas of each collection’s focus set around it. These areas, marked with a specific colour, help to pinpoint the areas addressed in each framework located in different circles. The position of circles from the centre out was arranged according to their conceptually historical development. Hence the AoSDHCIs, INHEIs, SDGIs and CHIs formed the layers, respectively. For depicting the common and unique indicators among the frameworks, the team agreed on a set of pre-defined guiding signs (see Figure 2). All selected frameworks were compared with the SDGs health and health-related indicators due to being the most inclusive and globally accepted reference.

2.3.3 Making a Rapid Comparative Analysis

In this stage, we analysed each set of indicators comparatively for within- and across- indicator frameworks’ variation and overlaps (one to multi or multi to one indicator), as each set were developed historically and methodologically different. The aim was to see how much they overlap or differ. Due to being the most inclusive and globally latest accepted reference, the SDGs health and health-related indicators were considered as the central and fixed comparator in case of binary comparison. This comparison included four sequential levels: (1) SDGIs versus INHEIs; (2) SDGIs versus AoSDHCIs; (3) SDGIs versus CHIs; and (4) SDGIs versus all the other selected indicator frameworks; (see figure 3)

2.4 Development Phase

2.4.1 Identification of Selection Criteria

The study team used eight selection criteria to select the candidate frameworks’ indicators and prioritise them for inclusion in the proposed NIF (see table 2). The definitions adopted for these criteria are widely used to assess indicators (Hall, Correa, Yoon, Braden, & Prevention, 2012).

| Criteria       | Definition                                                                                                                                 |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Prominence     | Well-known enough and used extensively at international level by different major UN agencies or reference organisations (UN, 2015a; WHO, 2015) |
| Robustness     | Strong enough to be representative of major health status (health system or population) (UN, 2015a; WHO, 2015)                              |
| Actionable/Usefulness | Being useful in making evidence-informed policy decisions or interventions (Orpana, Vachon, Dykxhoorn, McRae, & Jayaraman, 2016; UN, 2015a; WHO, 2015) |
| Accessible     | Easy enough to access to data needed for its calculation (Orpana et al., 2016; UN, 2015a; WHO, 2015)                                      |
| Understandable | Easy enough to comprehend the way it is calculated (UN, 2015a; WHO, 2015)                                                                |
| Measurable     | Easy enough to quantify the data needed for its calculation (UN, 2015a; WHO, 2015)                                                        |
| Achievable     | Easy enough to change the current undesirable status toward the targeted desirable one (Orpana et al., 2016; UN, 2015a; WHO, 2015)         |
| Necessity      | Necessary to be measured according to the developmental need of the country (Zeijl-Rozema & Martens, 2010)                               |

2.4.2 Indicators Selection

Among the potential indicators mapped in Bound Master Goals’ Indicators (BMGI) (see figure 2), and based on comparative analysis results, with the criteria on hand, a preliminary list of 181 initial indicators (without repetition) was nominated. WHO’s “result chain pattern for health core indicators classification” including four main areas of “health status”, “risk factors”, “service coverage” and “the health system” (WHO, 2018) was used to (1) get the
conceptually similar indicators into groups based on the main areas as well as the results chain and (2) to facilitate identifying indicators and to link those to underlying country data systems and data gathering methods.

2.4.3 Indicators Reduction and Verification through Key Stakeholders Consultation

To reduce the initial list of 181 indicators to a more concise list, the study team conducted repetitive counselling sessions with senior informants from the Ministry of health and medical education (MOHME) related departments and other health-related organisations in a multisectoral collaboration. In doing so, the team invited each technical field’s key informants according to the determined custodians and reference organisation to a face-to-face meeting. In each session, they reviewed relevant initial indicators, discussed each indicator’s concepts, and provided feedback. They were asked to decide if any of the indicators in question were unnecessary or missing. They came to a consensus on a set of indicators based on the pre-defined selection criteria. According to the informants’ collective agreement, this selection process directed one indicator to be replaced and 80 indicators removed from the initial list because they did not meet the criteria (stated in table 2). This resulted in a complete list of 101 indicators (see table 3), including 12 input/ process indicators, 13 output indicators, 44 outcome indicators, and 32 impact indicators entered in the proposed NIF (for more information on indicators’ general characteristics, see appendix B).

3. Result

The attempt to propose the NIF led to the approval and agreement on 101 indicators. Table 3 presents these indicators by results chain and distribution pattern among the indicator frameworks.

Table 3. Division pattern of NIF by indicator frameworks and results chain

| Distribution Pattern | Indicator Frameworks | National Indicators by Results Chain |
|----------------------|---------------------|-------------------------------------|
| 18                   | SDGs, CHIs          | Inputs and Processes | Output | Outcome | Impact                      |
|                      |                     | Ir.1.4.3. Health worker density and distribution |                   | Ir.13.4.2. Access to a core set of relevant essential medicines | Ir.26.2.1. Under-5 overweight |
|                      |                     | Ir.2.4.4. Birth registration |                   | Ir.27.2.4. Alcohol per capita (15+) | Ir.70.1.2. Unintentional poisoning MR | N\R |
|                      |                     | Ir.3.4.4. Death registration |                   | Ir.28.2.5. Domestic violence | Ir.71.1.2. Disasters casualties |
|                      |                     | Ir.4.4.5. Total net ODA on | Ir.29.2.5. Sexual violence against children | Ir.72.1.2. Homicide MR |
|                      |                     | health | Ir.30.3.1. Skilled birth attendance | Ir.73.1.4. HIV IR | |
|                      |                     | Ir.31.3.2. Immunisation coverage | Ir.32.3.6. Cervical cancer screening | Ir.74.1.4. HB incidence |
|                      |                     | Ir.33.3.8. Coverage of essential health services | Ir.34.2.1. Under-5 stunting | Ir.75.1.1. Under-5 MR |
|                      |                     | Ir.35.2.1. Under-5 wasting | Ir.36.2.4. Tobacco use (15+) | Ir.76.1.1. NMR |
|                      |                     | Ir.37.2.4. Adult BP | Ir.38.2.4. Adult BG/diabetes | Ir.77.1.2. MMR |
|                      |                     | Ir.39.2.5. Occupational injuries | | Ir.78.1.2. Premature MR (NCD) |
| 16                   | SDGs, CHIs, INHEIs  | | Ir.35.2.1. Under-5 wasting | Kg.79.1.2. Suicide |
|                      |                     | | | Kg.80.1.2. RTIs MR |
|                      | | | | Kg.81.1.2. Conflict-related MR |
|                      | | | | Kg.82.1.3. Adolescent FR |
|                      | | | | Kg.83.1.4. TB-IR |
|                      | | | | Kg.84.4.5. Catastrophic health expenditures |
| Distribution Pattern | Indicator Frameworks | National Indicators by Results Chain |
|----------------------|----------------------|--------------------------------------|
| 11                   | SDGIs, CHIs, AoSDHClIs | Inputs and Processes | Output | Outcome | Impact |
|                      | Ir.5.4.8. Effective monitoring frameworks | Ir.14.4.8. Rese arch of diarrhoea and expenditure development | Ir.15.4.6. IHR | Ir.40.2.3. Population with primary reliance on clean fuels and technologies | Ir.41.3.1. ECD |
|                      |                      |                       | Ir.42.3.1. Antenatal care coverage | Ir.43.3.1. Postpartum care coverage | Ir.44.3.1. Postnatal care coverage |
|                      |                      |                       | Ir.45.3.1. Care-seeking for pneumonia | Ir.46.3.1. Coverage of diarrhea treatment | Ir.47.3.1. Vitamin A supplementation coverage |
|                      |                      |                       | Ir.48.2.3. Population using safely managed drinking-water services | Ir.49.2.3. Population using safely managed sanitation services |
| 2                    | SDGIs, CHIs, INHEIs, AoSDHClIs |                      |                       |                       |                      |
| Distribution Pattern | Indicator Frameworks | National Indicators by Results Chain |
|----------------------|----------------------|---------------------------------------|
| 43                   | CHIs                 | Input: CHIs Ir.6.4.2. Health facility density and distribution  |
|                      |                      | Output: CHIs Ir.16.1.4. TB notification rate  |
|                      |                      | Impact: CHIs Ir.85.4.5. Population with impoverishing expenditure  |
|                      |                      | Ir.7.4.2. Hospital bed density  |
|                      |                      | Ir.17.3.4. HIV test results for TB patients  |
|                      |                      | Ir.9.4.4. Completeness of reporting by facilities  |
|                      |                      | Ir.10.4.5. THE  |
|                      |                      | Ir.11.4.5. Public domestic sources of current spending on health as % of CHE  |
|                      |                      | Ir.12.4.7. Existence of national health sector policy/strategy/plan  |
|                      |                      | Ir.16.1.4. TB notification rate  |
|                      |                      | Ir.50.2.1. EIBF  |
|                      |                      | Ir.51.2.1. Anaemia prevalence in children  |
|                      |                      | Ir.7.4.2. Hospital bed density  |
|                      |                      | Ir.52.2.1. Anaemia in WRA  |
|                      |                      | Ir.8.4.3. Output training institutions  |
|                      |                      | Ir.53.2.2. HIV prevention  |
|                      |                      | Ir.9.4.4. Completeness of reporting by facilities  |
|                      |                      | Ir.54.2.4. Salt intake  |
|                      |                      | Ir.10.4.5. THE  |
|                      |                      | Ir.55.3.3. HIV-infected who knows their status  |
|                      |                      | Ir.11.4.5. Public domestic sources of current spending on health as % of CHE  |
|                      |                      | Ir.56.3.3. Prevention of mother-to-child transmission  |
|                      |                      | Ir.12.4.7. Existence of national health sector policy/strategy/plan  |
|                      |                      | Ir.57.3.3. (ART) coverage  |
|                      |                      | Ir.16.1.4. TB notification rate  |
|                      |                      | Ir.58.3.3. HIV viral load suppression  |
|                      |                      | Ir.17.3.4. HIV test results for TB patients  |
|                      |                      | Ir.59.3.4. Coverage of treatment for LTBI  |
|                      |                      | Ir.20.4.1. Institutional maternal mortality ratio  |
|                      |                      | Ir.60.3.4. HIV-positive new and relapse TB patients on ART during TB treatment  |
|                      |                      | Ir.21.4.1. Maternal death reviews  |
|                      |                      | Ir.61.3.5. Drug susceptibility testing coverage for TB  |
|                      |                      | Ir.22.4.1. ART retention rate  |
|                      |                      | Ir.62.3.5. TB treatment coverage  |
|                      |                      | Ir.23.4.1. TB treatment success rate  |
|                      |                      | Ir.63.3.5. Treatment coverage for drug-resistant TB  |
|                      |                      | Ir.24.4.1. Service-specific availability and readiness  |
|                      |                      | Ir.64.3.7. Services for severe mental health disorders  |
|                      |                      | Ir.25.4.1. Outpatient service utilisation  |
|                      |                      | Ir.65.2.1. Exclusive breastfeeding  |
|                      |                      | Ir.11.4.5. Public domestic sources of current spending on health as % of CHE  |
|                      |                      | Ir.66.2.1. LBW  |
|                      |                      | Ir.12.4.7. Existence of national health sector policy/strategy/plan  |
|                      |                      | Ir.67.2.3. Air pollution level  |
|                      |                      | Ir.9.4.4. Completeness of reporting by facilities  |
|                      |                      | Ir.68.2.4. Overweight/obesity in adult  |
|                      |                      | Ir.10.4.5. THE  |
|                      |                      | Ir.69.2.4. Insufficient PA in adults  |
|                      |                      | Ir.85.4.5. Population with impoverishing expenditure  |
|                      |                      | Ir.96.1.1. Life expectancy  |
|                      |                      | Ir.11.4.5. Public domestic sources of current spending on health as % of CHE  |
|                      |                      | Ir.97.1.1. Adult MR  |
|                      |                      | Ir.12.4.7. Existence of national health sector policy/strategy/plan  |
|                      |                      | Ir.98.1.1. Infant MR  |
|                      |                      | Ir.100.1.4. TB-MR  |
|                      |                      | Ir.99.1.3. TFR  |
|                      |                      | Ir.101.1.4. Cancer-MR  |
|                      |                      | Ir.101.1.4. Cancer-MR  |
|                      |                      | Ir.96.1.1. Life expectancy  |
|                      |                      | Ir.97.1.1. Adult MR  |
|                      |                      | Ir.98.1.1. Infant MR  |
|                      |                      | Ir.99.1.3. TFR  |
|                      |                      | Ir.100.1.4. TB-MR  |
|                      |                      | Ir.101.1.4. Cancer-MR  |

Note: *Ir: Iran; *MR: mortality rate; *FR: fertility rate; *IR: incidence rate, *PR: prevalence rate.

The names of the indicators are summarised. However, the full names are available in appendix B.

In indicator codes, the first number indicates the indicator’s exclusive number, the second number indicates the area code and the third number indicates the issue code.

Area and issues codes: 1: Health Status (1: Mortality by age and sex, 2: Mortality by cause, 3: Fertility, 4: Morbidity), 2: Risk Factor (1: Nutrition, 2: Infections, 3: Environmental risk factors, 4: Non-communicable diseases, 5: Injuries/ harmful traditional practices), 3: Service Coverage (1: Reproductive, maternal, newborn, child and adolescent, 2: Immunisation, 3: HIV, 4: HIV/TB, 5: Tuberculosis, 6: Screening and preventive care, 7: Mental Health, 8: Essential health services), 4: Health Systems (1: Quality and safety of care, 2: Access, 3: Health workforce, 4: Health information, 5: Health financing, 6: Health security, 7: Governance, 8: Health policy)
The ultimate goal of the NIF was developing a management tool of localised indicators to have a comprehensive and strategic picture of the health situation through monitoring the (1) population’s health -affected by health and non-health sectors, and (2) the health system performance toward SDGs. It could help determine the strategic orientations and interventions and facilitate international accountability. Nevertheless, some additional indicators were adopted from other indicator frameworks for the following reasons.

First, it is essential to note that although the monitoring focus for SDGs is at the national level, its indicators are typically concerned with worldwide public health issues and consider the outcome of priority problems in this field at the international level. Therefore, SDGs’ collection has insufficient knowledge and attention to different regions’ specific socio-cultural conditions (UN, 2015b). It was necessary for the study team to selectively look at local needs in selecting and adopting the national indicators within a locally coherent framework. Second, as the institutions involved in developing SDGs and indicators strongly recommend, it is necessary to adopt complementary national indicators tailored to the country’s needs and capacity to collect and analyze data (UN, 2015b). Finally, the legal requirement to develop a set of core health indicators at the national level and the possibility of final approval of these indicators in the country’s policy making venues required the study team to have an indigenous perspective in the review and selection of indicators. As a result, out of 101 proposed indicators, 54 indicators (43 indicators of CHIs and 11 indicators common between CHIs and INHEIs) were considered complementary indicators.

Conversely, based on consultancy meeting results, the study team removed 30 health and health-related SDGs indicators from the final framework based on the criteria listed in table 2, however the main reasons in detail for removing these indicators were as follow: (1) security-political consequences of providing public access to official data through their publications (e.g. indicators related to “violence” and “access to information”), (2) incompatibility of the indicators’ values with the core values underlying the country’s health system (e.g. indicators related to “family planning”), (3) lacking for significant priority to be considered at the national level due to encompassing minor populations in limited geographical areas (e.g. indicators related to “malaria” (note 3) and “treatment of tropical diseases”), (4) High sociocultural sensitivity of some statistics and the impossibility of reporting them, especially at the international level (e.g. “gender -related indicators”) and (5) the novelty of some indicators at the international level and lack of capacity and a coherent and specific system for collecting and analysing data across the country (e.g. indicators related to “climate change”, “civil society participation”, and “government spending on essential services”). It is worth mentioning that eliminating these indicators will not contradict the efforts of the health system to create the necessary capacity to calculate these indicators.
Figure 2. Bound Master Goals’ Indicators (BMGI)

- On the SDGs circle: indicators mapped at least with one indicator from at least one of the other indicator frameworks.
- On the other circles are indicators mapped with one indicator from the SDGs framework.
- On the SDGs circle: indicators that are not mapped with any indicator from any other indicator framework.
- On the other circles: indicators that are not mapped with any thematic areas of SDGs framework.

The study team also used the following criteria in the selection of complementary indicators: (1) addressing high-priority public problems related to population health and the country’s health system, (2) having the data collection and analysis system, and (3) regarding the country’s sociopolitical constraints and capacities. In doing so, without considering the overlapping indicators with sustainable development indicators, 9, 12, and 29 indicators were removed from CHIs, AoSDHCIs, and INHEIs, respectively. The main reasons for the elimination of these
indicators were (1) lacking for significant priority to be considered at the national level (e.g. indicators related to the mortality, treatment, and control of “malaria”, “syphilis” and, “tropical diseases”), (2) not being useful and necessary to represent the health status at the national level (e.g. “infertility rate” and the number of mosques and prayer rooms”), (3) lack of meaningfulness examples in the country (e.g. “external source of current spending on health”), or (4) lack of capacity to collect and analyse the required data nationwide (for instance, the “mean number of Decayed, Missing, and Filled Permanent Teeth (DMFT) in the population aged 6 and 12”, “the participation of vulnerable populations in policy making” or the indicators related to “extending the equity in health”). As illustrated in figure 3, the initial comparison between indicator frameworks indicates the comprehensiveness of the approach adopted in the SDGs framework in terms of overlapping with stakeholders’ concerns in developing other selected frameworks. However, due to the broader level of sustainable development indicators, composite indicators and indexes have been used more in developing its target monitoring system, e.g. the Universal Health Coverage (UHC) index, which covers a significant number of indicators related to “maternal and child health”, “infectious diseases”, “non-communicable diseases”, and “capacity and access to services” within the framework of CHIs, INHEIs, and AoSDHCIs.

Figure 3. Comparative exploration of health and health-related SDGIs versus CHIs, INHEIs and AoSDHCIs

As it is shown in figure 2, except for six indicators related to domains of “water” (one indicator), “hunger” (two indicators), “poverty” (one indicator), “climate change” (one indicator) and “peace and strong institutions” (one indicator), other indicators of SDGs matched with at least one indicator from the selected frameworks of the study. However, it was impossible to establish one-to-one correspondence for all indicators due to these frameworks’ different origins and goals.

The comparison between the frameworks in the final list showed a significant overlap between the indicators adopted from SDGs (47) and the indicators adopted from other frameworks studied in the present study. This overlap is well illustrated in table 3. The highest overlap was with CHIs (100%), followed by INHEIs (38%) and AoSDHCIs (28%), respectively.

As shown in appendix B, out of 101 proposed indicators, the data custodians of 26 indicators are non-health sector organisations. It means that the data related to these indicators are produced outside the health sector, but the health system reports them.

Among these organisations, the Statistical Centre of Iran (SCI) has the highest number of indicators to answer in terms of verifying the accuracy of the indicators (13 indicators), followed by the Forensic Medicine Organisation (six indicators), Ministry of Cooperatives, Labor and Welfare (MCLS) [Welfare organisation] (two indicators), MCLS, Ministry of Interior (MI) [municipalities], Ministry of Petroleum (MOP), police force, Ministry of Energy (ME) [Iran Water Resources Management Company (IWRMC)], ME [Water and Wastewater Engineering Company (NWWEC)] (one indicator each) which have the highest responsiveness respectively. However, some indicators such as “domestic violence” or “violence against children” have more than one official custodian for
data reporting in the country.

The responsibility for collecting and aggregating data related to these 26 indicators, in most cases, lies with the custodians themselves, except for three indicators of “life expectancy”, “the adult mortality rate of 15-60 years”, and “total fertility rate”, which lie on the MOHME. The two indicators of “reporting progress in multi-stakeholder development effectiveness monitoring frameworks” and “the existence of national health sector policy/strategy/plan” are among the indicators for which there is no single custodian in charge of collecting and integrating data at the ministry level. Nonetheless, the Secretariat of SCHFS, the highest authority for multisectoral policy making in the country, located in the MOHME and responsible for coordinating health-related agencies and organisations, can be the custodian of both indicators. The MOHME, especially the deputy for public health (DPH), is responsible for the remaining indicators, data collection, aggregation and reporting.

Regarding the data collection system, data related to more than half of the proposed indicators (61 indicators) are among the routine data and thus have a routine gathering system (see appendix B). These data mainly related to the population’s health are generated inside or outside the health sector, regularly collected and annually reported. Such a system for most indicators shows the significant capacity for health data collection at the national level in Iran so that there is the routine data for three following indicators of “coverage of diarrhoea treatment”, “Care-seeking for symptoms of pneumonia” and “population using safely-managed drinking water services”, which their gathering relies on periodic surveys according to WHO recommendations.

Another standard system for population health indicators is the survey, which covers 26 indicators and runs over two to five years. A routine gathering system can be run for three indicators of “early initiation of breastfeeding”, “antenatal care coverage”, and “raised blood glucose/ diabetes among adults” in the short term and with the cooperation of technical deputies and the Statistics and Information Technology Department of MOHME. Nevertheless, we still rely on periodic surveys for 22 other indicators; including “tobacco use among persons (age 15+ years)”, “total alcohol per capita consumption (age 15+ years)”, “sexually transmitted infections incidence rate”, and the like which are addressed in appendix B. Although there is a surveillance system for collecting the data on “sexually transmitted infections incidence rate”, the data are not reliable, making it necessary to either develop it or gather required data through surveys.

There are complementary or alternative methods for some population’s health-related indicators, such as “outpatient service utilisation” or “overweight among children under five years of age”, in case of not having access to the required data from the primary method, which is mainly the system.

Another type of data collection system, which primarily includes health system performance indicators, is dedicated registry systems. These systems are used for data gathering on four indicators, including “health workers density and distribution”, “births and deaths”, “tuberculosis incidence”, and “mortality rate for children under five years and infants”. However, data on the latest indicator is gathered and recorded routinely.

There are other categories of performance indicators (eight indicators), including “total current expenditure on health as % of gross domestic product” and “International Health Regulations (IHR) core capacity index”, which relies on administrative reporting systems and the like which are addressed in appendix B.

There is another category of proposed indicators that are considered essential. However, their reporting at the national level is challenging due to their novelty. These include “Proportion of children under five years of age who are developmentally on track in health, learning and psychosocial well-being”, “coverage of essential health services”, “services-specific availability and readiness”, and “reporting progress in multi-stakeholder development effectiveness monitoring frameworks”.

5. Discussion

This study was principally involved in developing an integrated consensus-based NIF for monitoring health status. In this regard, we moved toward SDGs realisation as it is becoming an acceptable trend in different levels in the world to take an adaptive approach to SDGs. [See European Union (EC, 2018), Organisation for Economic Co-operation and Development (OECD) countries (OECD, 2019), as well as WHO Regional Office for the Eastern Mediterranean (EMRO) (WHO-EMRO, 2018; WHO, 2018), which have their adaptive health indicator frameworks]. Moreover, some countries like Canada have defined their first nations and Inuit health and wellness indicators (CanadaGov., 2017).

This framework is assumed to detect problems and thus identify areas that would profit from being addressed through good governance and evidence-informed responses.

The effort made in developing the set of indicators proposed in the present study showed that even though health has a substantial and decisive role in sustainable national development (Acharya et al., 2018; Buch et al., 2002),
monitoring its status is associated with significant limitations and challenges in Iran (WHO, 2018). Here we discuss some of the most prominent ones.

The breadth of the concept of health, especially with the introduction of the new paradigm of “health in all policies” (Puska, 2007), makes the health sector’s responsibilities heavier. These responsibilities include the continual redefinition of institutional boundaries, regulating relations with other institutions involved in the health sector, and the development of structural and cultural governance mechanisms. The dispersion of responsibility for the indicators included in the proposed framework among non-health organisations is indicative of this issue. Access to information on these indicators, such as “population using safely-managed drinking water services” and “air pollution level in cities”, requires close cooperation between the MOHME and the institutions producing these indicators. This interaction is especially true in the case of multidimensional indicators, the calculation of which requires the broader interplay of several governmental bodies. To perform this, it is necessary that information-gathering systems and monitoring of cross-sectoral cooperation have a proper and coherent infrastructure. One effective measure in this direction is to strengthen the position of the Secretariat of the SCHFS as the authority for multisectoral policy making in the field of health. This unit will act as the custodian to follow and monitor the proposed indicators with all stakeholder organisations and executive bodies’ maximum participation. This fact is especially significant in the case of indicators that do not have a single custodian inside or outside the MOHME.

The current data-gathering system in the health sector, especially on indicators related to the population’s health, is not robust and reliable, so in some cases, we have to perform costly surveys to provide the information we need. This issue is essential because there is yet no robust data as a baseline for some of our national health indicators in Iran. So, it is not easy to strictly judge the trend changing of some indicators (Attaran, 2005). However, considering the country’s health care network’s potential capacities, a significant part of the information needed to calculate the proposed indicators such as “immunisation coverage rate” “birth and death registration” can be extracted from routine data. The recent paradigm shift to orthodox medicine has weakened the health network and the lack of funding and manpower required. As a result, the performance of this system has deteriorated in some cases.

Therefore, except for the indicators that still require periodic surveys, for data needed to assess the health system’s health and functions, it is better to strengthen the existing data gathering system and/or design a stable and reliable system for unsystematic data. Another challenge is the multiplicity of data gathering systems and custodians on some of the proposed indicators. “Domestic violence” and “violence against children” are examples that question the reliability of information for judgment in practice. Addressing this challenge also requires integrating data gathering systems and, if possible, the appointment of a single custodian for such indicators.

Extraction of some indicators is associated with difficulties due to the social stigma. This problem exists in many countries (Schomerus et al., 2011), such as “tobacco use among persons aged 15+ years” (Stuber, Galea, & Link, 2008) and “total alcohol per capita consumption (age 15+ years)” (Lankarani & Afshari, 2014) and “sexually transmitted infection incidence” (Newton & McCabe, 2005). Therefore, a way must be found to calculate such indicators. For example, in the field of this study, Iran, it is not possible to calculate the indicator of “women or girls subjected to violence by intimate or non-intimate partner” due to cultural and social considerations. Instead, the study team replaced it with a “domestic violence” indicator by reaching a consensus with consultants. Although this indicator may not show all partner violence cases, it will reflect this indicator.

Some indicators, including “Proportion of children under five years of age who are developmentally on track in health, learning and psychosocial well-being, coverage of essential health services”, “services-specific availability and readiness” and “reporting progress in multi-stakeholder development effectiveness monitoring frameworks” are among novel complex indicators (WHO, 2018). These do not have specific data sources in the health sector, requiring an effective data gathering and aggregating system.

Another noteworthy point is the considerable weight of the indicators related to the Deputy of Public Health's (DPH) specialised area in the proposed framework. However, the policies adopted in recent decades indicate the health system's orientation towards treatment-centeredness and the apparent dominance of medical interventions instead of promoting the prevention and public health interventions (Doshmangir, Moshiri, Mostafavi, Sakha, & Assan, 2019; Mousavi & Sadeghifar, 2016). The consequences have been proven in the form of weakness of the management and expertise of this field. While reemphasising the importance and role of this specialised area in providing and protecting society's health, the proposed framework strengthens the information infrastructure and redefines its functions in the new culture of governance for health. At the same time, the pandemic of the Covid-19 in the course of developing this framework showed that the emergence of non-communicable diseases in recent decades and significant progress of countries, especially in Iran, in the fight against these diseases and risk factors
attributed to them should not lead to neglect of structures and mechanisms for coping with and managing communicable diseases and widespread epidemics (Huttner, Catho, Pano-Pardo, Pulcini, & Schouten, 2020). In particular, Iran has lost a significant portion of its organisational capacity to deal strategically with such diseases following the health system's weakening (Yektadoost et al., 2018). Therefore, adding indicators to the proposed framework (related to managing such diseases) associated with the needs can increase this framework's effectiveness.

In addition to the limitations and challenges, selecting some of the proposed framework indicators from the study's selected frameworks as complementary indicators provides the possibility of assessing the health status from those frameworks' perspective and provides a comprehensive platform for multiple responses to national and international regulatory authorities including WHO. However, this proposed framework does not contradict the specific indicators of the health system's technical deputies. Each deputy will report its indicators. However, the responsibility for compiling and analysing the NIF's indicators will be borne by a reference that deals with policy making at the supra-deputy level like SCHFS.

5.1 Lessons Learned

Although this study was conducted for Iran, we believe that there are lessons about the outcome or method of doing this study that could be instructive for other similar countries and beyond, especially for countries that have not yet developed their framework at the regional or beyond to practice the same experience and then share their knowledge and values.

5.1.1 The Need for a Multi-dimensional Perspective of Sustainable Development

Sustainable development is a synchronous idea that will affect many aspects of health policies (Bohloli, 2011). We are in the age of transitioning from a one-dimensional view to a multi-dimensional perspective to address all human needs based on sustainable development. Countries and communities need to use comprehensive and reliable indicators to evaluate policies and measure development sustainability.

5.1.2 The Need for Reducing the Burden of Indicators by Moving Toward Integration

Over the past few decades, introduced indicators in different frameworks have put much burden on the system due to the focus on recording more technical details and a one-dimensional look. These micro-indicators cannot provide a holistic picture of the development view. On the other hand, development indicators alone cannot go into detail. Countries need an interconnected set of meaningful indicators structures that, while creating a logical link between macro-development and micro-technical data, impose fewer burdens on the country's development management system.

5.1.3 The Importance of Cooperation and Consultation in the Development of the NIF

Multisectoral cooperation and active participation of experts and managers from different development fields to create a framework of national indicators to evaluate policies and achievements are necessary. This partnership allows participants to transfer the knowledge and experience of different technical and geographical sectors and effectively help in the logical development of indicators, accept the final result, and not block or ignore it in data collection.

5.1.4 The Importance of Considering Politico-economic Constraints and Socio-cultural Determinants

Each country and region can have its own set of cultural values, socio-political determinants, and economic constraints that must be considered while designing or communicating indicators. Sometimes it is necessary to replace some indicators with other suitable less-sensitive indicators.

5.1.5 Developing a National Health Platform for Constant Monitoring of Health Situations Can Help to Reduce Health Inequalities.

As countries try to improve the health situation and its determinants in the SDGs era, national health monitoring will be prioritised. Developing an indicator framework at the national level is the first step towards closing the health inequalities gap embedded well in the SDGs framework's heart (UNICEF, 2018).

6. Conclusion

The sustainable development approach makes it possible to bring all parts of the country’s development together in a joint development path. In this regard, having a localised framework of indicators as the backbone of progress towards achieving SDGs from a health perspective is a fundamental necessity but not sufficient. The health system and the MOHME need a paradigmatic policy shift to adapt to sustainable development in the country. In doing so, it needs to continually redefine its communication borders with all the other sectors affecting communities’ health
and expand its influence over their behaviours in the interest of community health. This NIF adapts to sustainable development in the country and will notify policies and programmes to improve the health system and population health status. It also will form the basis for governance for health by addressing the potential role of each sector and their behaviours’ impact on health outcomes, and MOHME as the central coordinator. To put this shifting in effect, legitimising the framework by passing it through a multisectoral policy venue like SCHFS will be the conventional path. However, some indicators may be removed or added to the proposed list in the approved version of the framework. Continuous participatory updating of the framework following the laws of the country and the population’s needs changes, especially in the face of widespread socio-economic consequences of the pandemic, is another essential requirement in this direction.

References

Acharya, S., Lin, V., & Dhingra, N. (2018). The role of health in achieving the sustainable development goals. *Bulletin of the World Health Organization, 96*(9), 591.

Al-Mandhari, A., El-Adawy, M., Khan, W., & Ghaffar, A. (2019). Health for all by all-pursuing multi-sectoral action on health for SDGs in the WHO Eastern Mediterranean Region. *Globalization and Health, 15*(1), 1-4. https://doi.org/10.1186/s12992-019-0504-8

Attaran, A. (2005). An immeasurable crisis? A criticism of the millennium development goals and why they cannot be measured. *PLoS medicine, 2*(10), e318. https://doi.org/10.1371/journal.pmed.0020318

Boholi, H. (2011). *The Public Policy Process in the Revolutionary Context: The Politics of Health System Reform in Iran*: VDM Verlag Dr. Müller.

Buch, E., Masuku, N., & Mathee, A. (2002). Health and sustainable development meeting of senior officials and ministers of health. *Johannesburg, South Africa: World Health Organization.*

CanadaGov. (2017). *First Nations and Inuit Health and Wellness Indicators.* Retrieved from https://healthinfobase.canada.ca/fnih/

Doshmangir, L., Moshiri, E., Mostafavi, H., Sakha, M. A., & Assan, A. (2019). Policy analysis of the Iranian Health Transformation Plan in primary healthcare. *BMC health services research, 19*(1), 1-8. https://doi.org/10.1186/s12913-019-4505-3

EC. (2018). *ECHI - European Core Health Indicators.* Retrieved from https://ec.europa.eu/health/indicators/echi/list_en

Etches, V., Frank, J., Di Ruggiero, E., & Manuel, D. (2006). Measuring population health: a review of indicators. *Annu. Rev. Public Health, 27*, 29–55. https://doi.org/10.1146/annurev.publhealth.27.021405.102141

FAO. (2018). *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition.* Rome, FAO: FAO, WHO, UNICEF, IFAD,WFP.

Hall, H. I., Correa, A., Yoon, P. W., Braden, C. R., & Prevention, C. f. D. C. a. (2012). Lexicon, definitions, and conceptual framework for public health surveillance. *MMWR Surveill Summ, 61*(Suppl), 10–14 %! Hall, Correa et al. 2012 – Lexicon, definitions %~ EndNote Tagged Import Format.

Huttner, B., Catho, G., Pano-Pardo, J., Pulcini, C., & Schouten, J. (2020). COVID-19: don't neglect antimicrobial stewardship principles! *Clinical Microbiology and Infection, 26*(7), 808-810. https://doi.org/10.1016/j.cmi.2020.04.024

Lankarani, K. B., & Afshari, R. (2014). Alcohol consumption in Iran. *The Lancet, 384*(9958), 1927-1928. https://doi.org/10.1016/S0140-6736(14)62279-0

Mahler, H. (1988). Health for all-all for health. *World health* (January-February 1988), 3-4.

Marmot, M., & Wilkinson, R. (2005). *Social determinants of health.* Oup Oxford.

Minutes 15th: Supreme Council for Health and Food Security. (2017).

Mohammadi, N. K., Sayyari, A., Farshad, A., Jahanmehr, N., Siddiqi, S., Taghizadeh, R., & Dye, C. (2019). From MDGs to SDGs: New Impetuses to Advance Health in Iran. *Health Scope*(In Press).

Mousavi, S. M., & Sadeghifar, J. (2016). Universal health coverage in Iran. *The Lancet Global Health, 4*(5), e305-e306. https://doi.org/10.1016/S2214-109X(16)00068-1

Newton, D. C., & McCabe, M. P. (2005). The impact of stigma on couples managing a sexually transmitted infection. *Sexual and Relationship Therapy, 20*(1), 51-63. https://doi.org/10.1080/14681990500058341
OECD. (2019). *OECD Health Statistics 2019*. Retrieved from https://www.oecd.org/els/health-systems/health-data.htm

Orpana, H., Vachon, J., Dykxhoorn, J., McRae, L., & Jayaraman, G. (2016). Monitoring positive mental health and its determinants in Canada: the development of the Positive Mental Health Surveillance Indicator Framework. *Health promotion and chronic disease prevention in Canada: research, policy and practice*, 36(1), 1. https://doi.org/10.24095/hpcdp.36.1.01

Puska, P. (2007). Health in all policies. *The European Journal of Public Health*, 17(4), 328-328. https://doi.org/10.1093/eurpub/ckm048

Schirmding, Y. v. (2002). *Health in sustainable development planning: the role of indicators*. World Health Organization.

Schomerus, G., Lucht, M., Holzinger, A., Matschinger, H., Carta, M. G., & Angermeyer, M. C. (2011). The stigma of alcohol dependence compared with other mental disorders: a review of population studies. *Alcohol and alcoholism*, 46(2), 105-112. https://doi.org/10.1093/alcalc/agq089

Stuber, J., Galea, S., & Link, B. G. (2008). Smoking and the emergence of a stigmatized social status. *Social science & medicine*, 67(3), 420-430. https://doi.org/10.1016/j.socscimed.2008.03.010

UN. (2015a). Discussion paper on principles of using quantification to operationalize the SDGs and criteria for indicator selection.

UN. (2015b). Indicators and a Monitoring Framework for the Sustainable Development Goals.

UN. (2017). *Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*. United Nations Statistics Division: New York, NY, USA.

UNICEF. (2018). *UNICEF BRIEFING NOTE SERIES ON SDG global indicators related to children*. Retrieved from https://data.unicef.org/resources/sdg-global-indicators-related-to-children/

Valentine, N. B., Koller, T. S., & Hosseinpoor, A. R. (2016). Monitoring health determinants with an equity focus: a key role in addressing social determinants, universal health coverage, and advancing the 2030 sustainable development agenda. https://doi.org/10.3402/gha.v9.34247

WHO. (1981). *Development of indicators for monitoring progress towards Health for All by the Year 2000*. Retrieved from https://apps.who.int/iris/handle/10665/40672

WHO. (1998). *The World health report: 1998: Life in the 21st century: a vision for all: executive summary*. World Health Organization.

WHO. (2008). *Urban heart: urban health equity assessment and response tool: user manual*. WHO. (2015). *Global reference list of 100 core health indicators*. World Health Organization.

WHO. (2016). *Global monitoring of action on the social determinants of health: a proposed framework and basket of core indicators*. Consultation paper. Retrieved from http://www.who.int/socialdeterminants/consultation-paper-SDH-Action-Monitoring.pdf

WHO. (2017). *World health statistics 2016: monitoring health for the SDGs sustainable development goals*. World Health Organization.

WHO. (2018). *2018 Global reference list of 100 core health indicators (plus health-related SDGs)*. World Health Organization.

WHO-EMRO. (2016). *Framework for health information systems and core indicators for monitoring health situation and health system performance Geneva (Switzerland): World Health Organization*. WHO, Eastern Mediterranean Region Office

WHO-EMRO. (2018). *Framework for health information systems and core indicators for monitoring health situation and health system performance*. Cairo: WHO, Eastern Mediterranean Region Office

WHO-EMRO. (2020). *PHC Country Profile, Islamic Republic of Iran*. Retrieved from http://www.emro.who.int/images/stories/phc/iran_phcp.pdf?ua=1

Yektadoost, A., Ebrahim, F., Mashouf, M., Hadidi, N., Koopaei, N. N., & Kebriae ezadeh, A. (2018). Trend analysis of medicine consumption based on therapeutic categories in Iran: 2000–2016. *Journal of research in pharmacy practice*, 7(2), 95.
Zeijl-Rozema, A. v., & Martens, P. (2010). An adaptive indicator framework for monitoring regional sustainable development: a case study of the INSURE project in Limburg, The Netherlands. *Sustainability: Science, Practice and Policy, 6*(1), 6-17. https://doi.org/10.1080/15487733.2010.11908038

**Notes**

Note 1. By health, we mean indicators that explicitly reference reductions in morbidity, mortality, or burden of disease.

Note 2. By health-related, we mean indicators that make explicit reference to improving the coverage of health services and reducing harmful physical exposures related to water, pollution, chemicals, violence, and climate change, to health status (e.g. malnutrition) and health and health service events (e.g. coverage, births).

Note 3. The proposed NIF in this article includes only the core macro-indicators at the national level. Therefore, excluding micro-indicators such as malaria, syphilis, tropical diseases, and those related to technical departments does not mean that they are not reported at the provincial or national level if necessary. Hence all such indicators will be reported like before.

**Appendix A**

**Abbreviations**

SDGs: Sustainable Development Goals

NIF: National Indicator Framework

CHIs: Core Health Indicators

AoSDHCIs: Action on SDH Core Indicators

INHEIs: Iranian National Health Equity Indicators

BMGI: Bound Master Goals’ Indicators

MOHME: Ministry of Health and Medical Education

WHO: World Health Organisation

SCHFS: Supreme Council for Health and Food Security

**Appendix B**

**General Characteristics of proposed indicators for national level**

| Indicator Code | National Indicator | Custodian | Gathering/Aggregating Reference | Method for Data Collection/Period of Reporting |
|----------------|--------------------|-----------|----------------------------------|-----------------------------------------------|
| Ir.1.4.3       | Health worker density and distribution | MOHME     | MOHME-DMDRP                      | Health worker registry/Annual                  |
| Ir.2.4.4       | Birth registration | SCI       | SCI                              | Civil registration, vital statistics systems/Annual |
| Ir.3.4.4       | Death registration | SCI       | SCI                              | Civil registration, vital statistics systems/Annual |
| Ir.4.4.5       | Total net official development assistance (ODA) to medical research and basic health sectors | MOHME | MOHME-DRT                        | Administrative reporting systems/Annual        |
| Ir.5.4.8       | Multi-stakeholder development effective monitoring frameworks | MOHME | MOHME                           | Administrative reporting systems/Annual        |
| Ir.6.4.2       | Health facility density and distribution | MOHME | MOHME-DMDRP                      | Routine facility information system/Annual     |
| Indicator Code | National Indicator                                                                 | Custodian          | Gathering/Aggregating Reference | Method for Data Collection/Reference | Period of Reporting |
|----------------|-----------------------------------------------------------------------------------|--------------------|---------------------------------|--------------------------------------|---------------------|
| Ir.7.4.2       | Hospital bed density                                                              | MOHME              | MOHME-DT                        | Routine facility information system   | Annual or Biannual  |
| Ir.8.4.3       | Output training institutions                                                       | MOHME              | MOHME-DE                        | Administrative reporting systems      | Annual              |
| Ir.9.4.4       | Completeness of reporting by facilities                                            | MOHME              | MOHME-DMDRP                     | Routine facility information systems  | Annual              |
| Ir.10.4.5      | Total current expenditure on health as % of gross domestic product (THE)           | SCI                | SCI                             | Administrative reporting systems      | Annual              |
| Ir.11.4.5      | Public domestic sources of current spending on health as % of current health expenditure (CHE) | SCI                | SCI                             | Administrative reporting systems      | Annual              |
| Ir.12.4.7      | Existence of national health sector policy/strategy/plan                           | MOHME              | MOHME                           | Administrative reporting systems      | Every 5 years       |
| Ir.13.4.2      | Access to a core set of relevant essential medicines                              | MOHME              | MOHME-DFD                       | Surveys                              | Every 3–5 years     |
| Ir.14.4.8      | Research and development expenditure as a proportion of GDP                        | MOHME              | MOHME-DMDRP                     | Administrative reporting systems      | Annual              |
| Ir.15.4.6      | International Health Regulations (IHR) core capacity index                        | MOHME              | MOHME- DPH DPH                  | Administrative reporting systems- Internal and external evaluation | Annual              |
| Ir.16.1.4      | TB notification rate                                                               | MOHME              | MOHME-DPH                       | Routine data                          | Annual              |
| Ir.17.3.4      | HIV test results for TB patients                                                   | MOHME              | MOHME-DPH                       | Routine data                          | Annual              |
| Ir.18.4.1      | Perioperative mortality rate                                                       | MOHME              | MOHME-DT                        | Hospital routine data                 | Annual              |
| Ir.19.4.1      | Obstetric and gynecological admissions owing to abortion                           | MOHME              | MOHME-DPH                       | Routine data                          | Annual              |
| Ir.20.4.1      | Institutional maternal mortality ratio                                             | MOHME              | MOHME-DPH                       | Routine data                          | Annual              |
| Ir.21.4.1      | Maternal death reviews                                                             | MOHME              | MOHME-DPH                       | Routine data                          | Annual              |
| Ir.22.4.1      | Antiretroviral therapy (ART) retention rate                                        | MOHME              | MOHME-DPH                       | Routine data                          | Annual              |
| Ir.23.4.1      | TB treatment success rate                                                           | MOHME              | MOHME-DPH                       | Electronic TB registers                | Annual              |
| Ir.24.4.1      | Service-specific availability and readiness                                        | MOHME              | MOHME-DPH                       | Health facility assessments           | Annual or Biannual  |
| Ir.25.4.1      | Outpatient service utilisation                                                     | MOHME              | MOHME-DT                        | Routine facility information systems Survey’ | Annual              |
| Ir.26.2.1      | Prevalence of overweight among children under 5 years of age                       | MOHME              | MOHME-DPH                       | Routine data, Survey’                 | Annual              |
| Indicator Code | National Indicator                                                                                                                                                                                                 | Custodian       | Gathering/Aggregating Reference                                                                 | Method for Data Collection/Reference | Period of Reporting |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------|-------------------------------------|---------------------|
| Ir.27.2.4      | Total alcohol per capita consumption (age 15+ years)                                                                                                                                                                     | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Ir.28.2.5      | Domestic violence                                                                                                                                                                                                       | Forensic medicine, Police force, MCLS [Welfare organisation] | Population-based surveys                                                                     |                                     | Every 3–5 years     |
| Ir.29.2.5      | Sexual violence against children                                                                                                                                                                                       | Forensic medicine, Police force, MCLS [Welfare organisation] | Surveys                                                                                         |                                     | Every 3–5 years     |
| Ir.30.3.1      | Births attended by skilled health personnel                                                                                                                                                                             | MOHME           | MOHME - DPH                                                                                      | Routine data                        | Annual              |
| Ir.31.3.2      | Immunization coverage rate by vaccine for each vaccine in the national schedule                                                                                                                                       | MOHME           | MOHME - DPH                                                                                      | Routine data                        | Annual              |
| Ir.32.3.6      | Cervical cancer screening                                                                                                                                                                                                | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Ir.33.3.8      | Coverage of essential health services                                                                                                                                                                                    | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Ir.34.2.1      | Prevalence of stunting among children under 5 years of age                                                                                                                                                               | MOHME           | MOHME - DPH                                                                                      | Routine Data, Survey’               | Annual              |
| Ir.35.2.1      | Prevalence of wasting among children under 5 years of age                                                                                                                                                                 | MOHME           | MOHME - DPH                                                                                      | Routine Data, Survey’               | Annual              |
| Ir.36.2.4      | Tobacco use among persons aged 15+ years                                                                                                                                                                                  | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Ir.37.2.4      | Raised blood pressure among adults                                                                                                                                                                                      | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Ir.38.2.4      | Raised blood glucose/diabetes among adults                                                                                                                                                                                 | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Ir.39.2.5      | Frequency rates of occupational injuries                                                                                                                                                                                 | MCLS            | MCLS                                                                                             | Routine data, Administrative records | Annual              |
| Ir.40.2.3      | Population with primary reliance on clean fuels and technologies                                                                                                                                                       | MOP             | MOP                                                                                               | Household surveys                   | Every 3–5 years     |
| Ir.41.3.1      | Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being (ECD)                                                                                     | MOHME           | MOHME - DPH                                                                                      | Surveys                             | Every 3–5 years     |
| Indicator Code | National Indicator                                      | Custodian          | Gathering/Aggregating Reference | Method for Data Collection/Iran | Period of Reporting |
|----------------|--------------------------------------------------------|--------------------|--------------------------------|---------------------------------|---------------------|
| Ir.42.3.1      | Antenatal care coverage                                | MOHME              | MOHME-DPH                      | Survey, Routine Data*           | Every 3-5 years     |
| Ir.42.3.1      | Antenatal care coverage                                | MOHME              | MOHME-DPH                      | Survey, Routine Data*           | Every 3-5 years     |
| Ir.43.3.1      | Postpartum care coverage- women                        | MOHME              | MOHME-DPH                      | Survey, Routine Data*           | Every 3-5 years     |
| Ir.43.3.1      | Postpartum care coverage- women                        | MOHME              | MOHME-DPH                      | Survey, Routine Data*           | Every 3-5 years     |
| Ir.44.3.1      | Postnatal care coverage- newborn                       | MOHME              | MOHME-DPH                      | Survey, Routine Data*           | Every 3-5 years     |
| Ir.44.3.1      | Postnatal care coverage- newborn                       | MOHME              | MOHME-DPH                      | Survey, Routine Data*           | Every 3-5 years     |
| Ir.45.3.1      | Care-seeking for symptoms of pneumonia                 | MOHME              | MOHME-DPH                      | Surveys                         | Every 3–5 years     |
| Ir.46.3.1      | Coverage of diarrhea treatment                         | MOHME              | MOHME-DPH                      | Routine Data, Survey’           | Annual              |
| Ir.47.3.1      | Vitamin A supplementation coverage                    | MOHME              | MOHME-DPH                      | Surveys                         | Every 3–5 years     |
| Ir.48.2.3      | Population using safely managed drinking-water services| ME [IWRMC]         | ME [IWRMC]                     | Routine data                    | Annual              |
| Ir.49.2.3      | Population using safely managed sanitation services    | ME [NWWEC]         | ME [NWWEC]                     | Linear regression               | Every 2–5 years     |
| Ir.50.2.1      | Early initiation of breastfeeding (EIBF)               | MOHME              | MOHME-DPH                      | Surveys                         | Annual              |
| Ir.51.2.1      | Anemia prevalence in children                          | MOHME              | MOHME-DPH                      | Routine Data, Survey’           | Annual              |
| Ir.52.2.1      | Anemia prevalence in women of reproductive age (WRA)   | MOHME              | MOHME-DPH                      | Routine Data, Survey’           | Annual              |
| Ir.53.2.2      | Prevention of HIV in key populations                   | MOHME              | MOHME-DPH                      | Surveys                         | Every 2–5 years     |
| Ir.54.2.4      | Salt intake                                            | MOHME              | MOHME-DPH                      | Surveys                         | Every 3–5 years     |
| Ir.55.3.3      | People living with HIV who know their status           | MOHME              | MOHME-DPH                      | Routine Data, Survey’           | Annual              |
| Ir.56.3.3      | Prevention of mother-to-child transmission             | MOHME              | MOHME-DPH                      | Routine data                    | Annual              |
| Ir.57.3.3      | ART coverage                                           | MOHME              | MOHME-DPH                      | Routine data                    | Annual              |
| Ir.58.3.3      | HIV viral load suppression                             | MOHME              | MOHME-DPH                      | Routine data                    | Annual              |
| Indicator Code | National Indicator | Custodian | Gathering/Aggregating Reference | Method for Data Collection/Reference | Period of Reporting |
|----------------|--------------------|-----------|---------------------------------|--------------------------------------|--------------------|
| Ir.59.3.4      | Coverage of treatment for latent TB infection (LTBI) | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.60.3.4      | HIV-positive new and relapse TB patients on ART during TB treatment | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.61.3.5      | Drug susceptibility testing coverage for TB patients | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.62.3.5      | TB treatment coverage | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.63.3.5      | Treatment coverage for drug-resistant TB | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.64.3.7      | Services for severe mental health disorders | MOHME     | MOHME - DPH, Population-based surveys, Routine facility information systems* | Every 3–5 years | |
| Ir.65.2.1      | Exclusive breastfeeding rate 0–5 months of age | MOHME     | MOHME - DPH                     | Surveys                              | Every 1–5 years    |
| Ir.66.2.1      | Incidence of low birth weight (LBW) among newborns | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.67.2.3      | Air pollution level in cities | MI [Municipality] | MI [Municipality] | Routine data, Data integration from satellite remote sensing, Population estimates, Topography and ground measurements | Annual             |
| Ir.68.2.4      | Overweight and obesity in adults | MOHME     | MOHME - DPH                     | Surveys                              | Every 3–5 years    |
| Ir.69.2.4      | Insufficient physical activity (PA) in adults | MYS       | MOHME - DPH                     | Population-based surveys             | Every 3–5 years    |
| Ir.70.1.2      | Mortality from unintentional poisoning | MOHME     | MOHME - DPH, Population census | Routine data                         | Annual             |
| Ir.71.1.2      | Number of deaths, missing persons and persons affected by disaster per 100 000 people | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.72.1.2      | Mortality rate due to homicide | Forensic medicine | MOHME- Mental health dept. | Routine data                         | Annual             |
| Ir.73.1.4      | HIV incidence rate | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.74.1.4      | Hepatitis B incidence | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Ir.75.1.1      | Under-five mortality rate | MOHME     | MOHME - DPH, Civil registration | Routine data                         | Annual             |
| Ir.76.1.1      | Neonatal mortality rate | MOHME     | MOHME - DPH, Civil registration | Routine data                         | Annual             |
| Ir.77.1.2      | Maternal mortality ratio | MOHME     | MOHME - DPH                     | Routine data                         | Annual             |
| Indicator Code | National Indicator                                                                 | Custodian | Gathering/Aggregating Reference | Method for Data Collection/Reference | Period of Reporting |
|----------------|----------------------------------------------------------------------------------|-----------|---------------------------------|-------------------------------------|---------------------|
| Ir.78.1.2      | Premature non-communicable disease (NCD) mortality                               | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.79.1.2      | Suicide rate                                                                      | Forensic  medicine | MOHME - DPH | Routine data                        | Annual              |
| Ir.80.1.2      | Mortality rate from road traffic injuries (RTIs)                                  | Forensic  medicine | MOHME - DPH | Routine data                        | Annual              |
| Ir.81.1.2      | Conflict-related deaths per 100000 population                                     | Forensic  medicine | MOHME - DPH | Routine data                        | Annual              |
| Ir.82.1.3      | Adolescent fertility rate                                                         | SCI       | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.83.1.4      | TB incidence rate                                                                 | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.84.4.5      | Proportion of the population with large household expenditure on health consumption or income (catastrophic health expenditures) | SCI       | SCI                               | Surveys                             | Every 1–5 years     |
| Ir.85.4.5      | Proportion of the population with impoverishing health expenditure                | SCI       | SCI                               | Surveys                             | Every 1–5 years     |
| Ir.86.1.1      | Adolescent mortality rate                                                         | SCI       | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.87.1.1      | Stillbirth rate                                                                   | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.88.1.2      | TB mortality rate                                                                 | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.89.1.2      | AIDS-related mortality rate                                                        | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.90.1.4      | New cases of vaccine-preventable diseases                                         | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.91.1.4      | New cases of IHR-notifiable diseases and other notifiable diseases                | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.92.1.4      | Hepatitis B surface antigen prevalence                                             | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.93.1.4      | Sexually transmitted infections (STIs) incidence rate                             | MOHME     | MOHME - DPH                     | Surveillance                        | Annual              |
|                |                                                                                  |           |                                 |                                     |                     |
| Ir.94.1.4      | TB prevalence rate                                                                | MOHME     | MOHME - DPH                     | Routine data                        | Annual              |
| Ir.95.4.5      | Out of Pocket (OOP) rate                                                          | SCI       | SCI                               | Routine data, Household survey      | Annual              |
| Ir.96.1.1      | Life expectancy at birth                                                          | SCI       | MOHME - DPH                     | Routine data, Population census     | Annual              |
| Ir.97.1.1      | Adult mortality rate between 15 and 60 years of age                               | SCI       | MOHME - DPH                     | Routine data, Population census     | Annual              |
| Ir.98.1.1      | Infant mortality rate                                                              | MOHME     | MOHME - DPH                     | Routine data, Civil registration    | Annual              |
| Indicator Code | National Indicator                                      | Custodian   | Gathering/Aggregating Reference | Method for Data Collection/Reference | Period of Reporting |
|----------------|--------------------------------------------------------|-------------|---------------------------------|--------------------------------------|---------------------|
| Ir.99.1.3      | Total fertility rate                                    | SCI         | MOHME - DPH                     | Routine data                         | Annual              |
| Ir.100.1.4     | HIV prevalence rate                                     | MOHME       | MOHME - DPH                     | Routine data                         | Annual              |
| Ir.101.1.4     | Cancer incidence, by type of cancer                     | MOHME       | MOHME - DPH                     | Routine data                         | Annual              |

Note: * indicates complementary/alternative methods for data collection in case the needed data from the main method are not available.

MOHME: Ministry of Health and Medical Education, DPH: Deputy of Public Health, DT: Deputy of Treatment, DMDRP: Deputy of Management Development, Resources and Planning, DRT: Deputy of Research and Technology, DFD: Deputy of Food and Drug, DE: Deputy of Education, SCI: Statistical Centre of Iran, MYS: Ministry of Youth Affairs and Sport, MCLS: Ministry of Cooperatives, Labour, and Social Welfare, MI: Ministry of Interior, ME: Ministry of Energy, IWRMC: Iran Water Resources Management Company, NWWEC: National Water and Waste water Engineering Company, MOP: Ministry of Petroleum.

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