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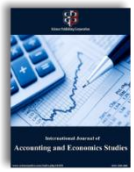

# Analyzing The Impact of Investment Expenditure on Selected Health Care Indicators in Iraq (2007-2022)

**Firas Ali Abdulhussein *, Dr. Nassr Hammood Maznan**

*University of Babylon / College of Administration and Economics / Department of Banking and Financial Sciences*
**Corresponding author E-mail: bus739.firas.ali@student.uobabylon.edu.iq*

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**Abstract**

This study explores the impact of public investment in healthcare on selected health indicators in Iraq over the period 2007-2022. It centers on two critical indicators: the infant mortality rate and the maternal mortality rate. The analysis reveals substantial fluctuations in healthcare investment, reaching a peak of 2.14% of total public investment in 2013, followed by significant declines in subsequent years. These vestment trends often correlate with variations in mortality rates, indicating inefficiencies in resource allocation and inequities in the geographic distribution of healthcare services. The study highlights the pressing need for strategic financial planning and effective oversight to enhance the efficiency of health investment in reducing mortality and fostering sustainable health development.

***Keywords***: *Investment Expenditure; Healthcare; Infant Mortality Rate; Maternal Mortality Rate.*

## 1. Introduction

Public investment in healthcare constitutes a fundamental pillar of national development strategies, aimed at enhancing population health and improving quality of life. By funding hospital construction, procurement of medical technologies, and infrastructure development, such investment plays a vital role in reducing mortality rates and strengthening health system performance.
In Iraq, despite increased investment allocations to the health sector between 2007 and 2022, critical health indicators—especially infant and maternal mortality—continue to reflect gaps in impact and effectiveness. This raises serious questions about the efficiency of spending and its alignment with broader development objectives.
This research gains its relevance from its focus on the relationship between healthcare investment and health outcomes, while shedding light on governance, planning, and equity-related challenges that may limit investment returns. The study employs both descriptive and deductive approaches to analyze official data, integrating findings with public policy frameworks. It ultimately proposes an analytical foundation to support more effective and equitable investment strategies, including the use of smart technologies in the allocation and management of health resources.

## 2. Theoretical review of the relationship between research variables

Investment spending constitutes a core component of government expenditure allocated to achieve long-term developmental goals. It is primarily directed by public authorities to enhance the productive capacity of the economy through the financing of capital projects such as infrastructure, hospitals, schools, and road construction (Al-Taie, 2020). Public investment also serves as a key driver of GDP, reflecting the state's strategic role in planning and resource allocation for infrastructure development (Allen, 2004). From an economic perspective, investment spending also includes private sector expenditures on capital goods used in the production of final goods and services. This encompasses machinery, equipment, and buildings, as well as changes in commodity inventories, i.e., the difference in the value of raw materials and unfinished goods at the beginning and end of a given period (al-Idrissi, 1986). Moreover, investment spending encompasses state-led financial activities aimed at enhancing infrastructure and public services to stimulate long-term sustainable economic growth (Hicks, 2019).
Investment spending is one of the fundamental pillars relied upon by public authorities to achieve sustainable development. It is distinguished by its focus on long-term projects, in contrast to current expenditures that cover short-term operational costs.
Investment expenditure can be categorized into several types. These include:

- Direct public investment for establishing or expanding infrastructure under direct governmental control (Miyazaki, 2009).
- Productive investment, which increases production capacity.
- Non-productive investment, targeting sectors like education and healthcare.
- Collaborative investments in public-private partnerships.

- Externally financed investments, funded by international loans and grants and often used for large-scale projects such as energy and telecommunications.
- Indirect investment, which involves the provision of services such as transport, education, and healthcare, or the use of infrastructure inputs like energy and transportation in the production process to reduce overall production costs (Dagher, 2010; European Commission: Directorate-General for et al., 2015).

Generally, the overarching goal of investment spending is to foster sustainable economic growth that promotes social equity, enhances the quality of public services, and strengthens both human and physical capital—thereby driving development and long-term progress.

However, planners and implementers of investment spending may encounter numerous challenges, including limited funding, weak planning and oversight, structural imbalances within the national economy, rising public debt, inefficient resource allocation, and political instability due to internal conflicts and institutional fragility. These obstacles often hinder the attainment of investment objectives, World Bank. (2020).

Health, as defined by the World Health Organization, is a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity (Organization, 2018). Health services encompass medical care, health education, and infrastructure development, and they serve as the cornerstone of maintaining individual and public health. World Health Organization, (2019).

Health services are provided through coordinated efforts by public and private institutions aiming to improve community well-being and individual quality of life (Al-Taie, 2020). These services span across a continuum of care, preventive, curative, and rehabilitative, and are organized to meet the population's needs at all stages (Smith, 2019). According to the Iraqi Ministry of Health, "health services include all activities that support individual health through preventive, curative, and rehabilitative care."

Thus, health services can be broadly defined as all structured efforts to prevent illness, deliver treatment, and promote health, delivered through a system composed of hospitals, clinics, and health centers. Healthcare is stratified into primary, secondary, and tertiary care, including both preventive and rehabilitative services (Mays et al., 2009). The concept of primary health care emphasizes health promotion, community empowerment, and poverty reduction. A central mechanism supporting this structure is the referral system, which organizes patient movement between care levels based on geographic distribution and case severity, ensuring integration across all three levels (Bashar et al., 2019). Primary Health Centers play a vital role in maternal and child health, immunization campaigns, the monitoring of communicable and epidemic diseases (e.g., cholera and AIDS), and the treatment of chronic conditions (G, 2008).The significance of health services lies in their contribution to enhancing productivity, expanding the labor force, increasing life expectancy, promoting equity, reducing social disparities, and developing human capital. World Bank, (2020).

Achieving health system sustainability is a strategic objective of any successful healthcare model. It entails the continuous provision of high-quality health services even amid economic, political, or security challenges (Braithwaite et al., 2020). A key enabler of sustainability is the effective management of financial resources, where investment health spending serves as a central pillar (Dion & Evans, 2024). It facilitates the renovation of facilities, acquisition of technology, and deployment of skilled human resources, ultimately improving the quality and equity of health services and addressing systemic gaps. This underscores the need to critically examine the role of health investment in achieving long-term health sustainability (Parveen et al., 2025).

In addition to the theoretical foundations discussed, recent global studies offer critical insights into health investment trends after COVID-19. These perspectives help contextualize the Iraqi case within international efforts toward sustainable health development.

Recent post-COVID evidence underscores the urgency of sustained and equitable health investment. The 2023 WHO Global Health Expenditure Report records global health spending at an all-time high of US$9.8 trillion (10.3 % of world GDP) in 2021, yet government spending declined in many low-income countries, deepening cross-country inequalities (Jakovljevic & Getzen, 2016). Likewise, the World Bank's "From Double Shock to Double Recovery" discussion paper warns that post-pandemic fiscal pressures threaten to squeeze health budgets precisely when greater investment is required to achieve the health-related SDGs.

Empirical studies published after 2021 continue to confirm the inverse relationship between public health expenditure and mortality. Panel evidence from thirteen Southern-African economies (2000 – 2022) shows that higher government health spending significantly reduces maternal mortality, even after accounting for external-debt dynamics (Nyamuranga & Shin, 2019). At the same time, a 2025 systematic review highlights how artificial-intelligence tools in primary health-care management are improving the allocative efficiency of scarce investment resources (Atallah, 2025).

## 3. Historical overview of the Iraqi economy

Iraq is classified as a developing country that relies heavily on oil revenues to finance its public expenditures. The country's economic policies have been profoundly influenced by decades of political transitions and crises, which have had significant repercussions on both economic development and the provision of public services, particularly healthcare.

During the 1980s, Iraq's economy suffered severely due to consecutive wars, most notably the Iran-Iraq War. This period witnessed a sharp decline in investment spending on public services, including the health sector. In the 1990s, the situation further deteriorated under the weight of a comprehensive economic embargo and international sanctions, which disrupted virtually all economic activities and weakened institutional capacity, especially in health service delivery.

Following the fall of the regime in 2003, Iraq experienced a partial economic liberalization marked by the lifting of the embargo and renewed efforts to rebuild the country's devastated infrastructure. Government policies during this phase aimed to restore essential public services, including health. However, the structural dependency on oil exports persisted, leaving the economy vulnerable to global oil price volatility, which in turn affected the consistency and adequacy of public investment spending. In the past decade, the economic landscape in Iraq has been further complicated by escalating security and political crises, including the emergence of terrorist groups and prolonged instability. These challenges disrupted economic planning, undermined investor confidence, and diverted public resources toward operational expenditures. Consequently, investment allocations, particularly in sectors such as health, experienced significant reductions in favor of short-term, crisis-oriented spending. (Petrović et al., 2021)

## 4. Evolution of public investment expenditure for the period (2007-2022)

The period from 2007 to 2022 witnessed significant fluctuations in public investment spending in Iraq, both as a share of total public expenditure and in absolute terms. These fluctuations were closely linked to the country's economic and political developments. Following the lifting of international sanctions, Iraq saw a rise in oil exports, which boosted public revenues and enabled increased investment in infrastructure and health services (see Table 1).

**Table 1:** Development of Investment Expenditure in Iraq for the Period (2007-2022)

| years | Public Expenditure of Iraq (million dinars) (1) | (*) Annual rate of change (%) (2) | General Investment Expenditure of Iraq (million dinars) (3) | (**) Annual rate of change (%) (4) | Percentage (***)(2) of (1) (%)(5) |
|---|---|---|---|---|---|
| 2007 | 51,727,468 | ... | 12,665,305 | ... | 24.484 |
| 2008 | 59,861,973 | 15.725 | 15,671,227 | 23.733 | 26.178 |
| 2009 | 69,165,523 | 15.541 | 15,017,442 | 4.171 | 21.712 |
| 2010 | 84,657,467 | 22.398 | 23,676,772 | 57.661 | 27.967 |
| 2011 | 96,662,766 | 14.181 | 30,066,292 | 26.986 | 31.104 |
| 2012 | 117,122,930 | 21.166 | 37,177,897 | 23.653 | 31.742 |
| 2013 | 138,424,608 | 18.187 | 55,108,602 | 48.229 | 39.811 |
| 2014 | Failure to approve the budget | ... | Failure to approve the budget | … | … |
| 2015 | 119,462,429 | ... | 41,214,037 | … | 34.499 |
| 2016 | 105,895,722 | -11.356 | 25,746,311 | -37.530 | 24.312 |
| 2017 | 100,671,160 | -4.933 | 25,454,018 | -1.135 | 25.284 |
| 2018 | 104,158,183 | 3.463 | 24,650,112 | -3.158 | 23.666 |
| 2019 | 133,107,616 | 27.793 | 33,048,506 | 34.070 | 24.828 |
| 2020 | 76,082,442 | -42.841 | 3,208,905 | -90.290 | 4.217 |
| 2021 | 129,993,009 | 70.858 | 29,136,869 | 808 | 22.414 |
| 2022 | 116,959,581 | -10.026 | 12,018,490 | -58.751 | 10.275 |

Source: (Iraqi Ministry of Finance, Public Budgets Law, 2007-2022) (Iraqi Ministry of Health, Annual Statistical Reports, 2007-2022)
Notes: Column (2), (4), and (5) of the work of the researcher
Column (2) = ((Public expenditure for the current year - public expenditure for the previous year) ÷ public expenditure for the previous year) × 100
(**) Column (4) = ((General Investment Expenditure for the current year - General Investment Expenditure for the previous year) ÷ General Investment Expenditure for the previous year) × 100
(***) column (5) = (column (3) ÷ column (1)) × 100

Year 2014, the budget was not approved due to the situation in the country and the delay of the government in that year, which led to the spending of an operating budget only for the Ministry of Health.
Year 2020 and 2022, health expenditure adopted a ratio of (1/12) [1] (*) for not approving the general budget.
Table 1 presents the development of investment expenditure in Iraq during this period. From 2007 to 2013, there was a consistent upward trend in both public and investment spending. Public expenditure increased from 51,727,468 million dinars in 2007 to 138,424,608 million dinars in 2013, a cumulative growth of over 167%. Simultaneously, public investment expenditure rose from 12,665,305 million dinars to 55,108,602 million dinars, marking a growth rate of 335.2%. The share of investment in total public expenditure also rose from 24.4% in 2007 to a peak of 39.8% in 2013, indicating a strategic fiscal policy that prioritized developmental investment, supported by relative political stability and high oil prices.
In contrast, the period from 2014 to 2017 was marked by severe security and economic challenges, including the rise of ISIS and the failure to approve the general budget in 2014. As a result, investment expenditure declined sharply from 55,108,602 million dinars in 2013 to 25,454,018 million dinars in 2017, a decrease of approximately 53.9%. The share of investment expenditure in total public spending also dropped to 25.2% in 2017, reflecting a shift toward operational expenditures and a suspension of development projects in response to the crisis.
The subsequent period (2018-2022) was characterized by sharp volatility due to the COVID-19 pandemic and falling oil prices. In 2020, public spending declined by 42.8%, while investment expenditure plummeted by 90.2%—the sharpest decline during the entire study period. Investment represented only 4.2% of total public spending, indicating an almost complete halt in development projects. Although 2021 saw a temporary recovery in investment spending (29,136,869 million dinars), supported by oil price recovery, this was short-lived. In 2022, investment spending dropped again by 58.7%, and its share of public spending fell to just 10.2%, despite rising oil revenues raising critical questions about fiscal policy priorities and the sustainability of public investment strategies.
In the period (2019–2022), health investment spending showed partial recovery. In 2019, it rose to 351,300 million dinars with an impressive annual growth rate of 257.7%, accompanied by a rise in total health spending to 3,291,900 million dinars. However, the share of investment remained modest, not exceeding 10.6%. In 2020, despite a 74.9% increase in total health spending, health investment spending declined by 69.8%, reflecting the diversion of funds toward urgent operational needs during the COVID-19 pandemic. By 2022, although the Ministry of Health's public expenditure reached its highest level (8,235,590 million dinars), investment accounted for only 6.84% highlighting the ongoing deprioritization of strategic infrastructure in favor of routine expenditures.

## 5. The evolution of health investment spending for the period (2007-2022)

Iraq has tried to increase health investment spending to develop infrastructure and improve the quality of life for the individual and society to expand the productive base and increase the formation of human capital, as shown in Table 2.

**Table 2:** Volume of Health Investment Expenditure for the Period (2007-2022)

| years | Ministry of Health Public Expenditure (million dinars) (1) | Annual rate of change (2) | Health Investment Expenditure (million dinars) (3) | (**) Annual rate of change (4) | Percentage (***) of (1) (%)(5) (2) |
|---|---|---|---|---|---|
| 2007 | 2,291,250 | ... | 430,500 | ... | 18.788 |
| 2008 | 2,347,343 | 2.448 | 100,000 | -76.771 | 4.260 |
| 2009 | 4,133,634 | 76.098 | 481,500 | 381.5 | 11.648 |
| 2010 | 6,547,752 | 58.401 | 1,577,189 | 227.557 | 24.087 |
| 2011 | 5,722,442 | -12.604 | 1,050,000 | -33.425 | 18.348 |
| 2012 | 6,292,892 | 9.968 | 746,202 | -28.933 | 11.857 |
| 2013 | 7,323,202 | 16.372 | 1,183,986 | 58.668 | 16.167 |
| 2014 | 4,998,814 | -31.740 | 465,496 | -60.683 | 9.312 |
| 2015 | 5,417,292 | 8.371 | 340,000 | -26.959 | 6.276 |
| 2016 | 5,129,037 | -5.321 | 148,200 | -56.411 | 2.889 |
| 2017 | 1,503,619 | -70.684 | 41,276 | -72.148 | 2.745 |
| 2018 | 1,919,487 | 27.657 | 98,198 | 137.905 | 5.115 |
| 2019 | 3,291,900 | 71.498 | 351,300 | 257.746 | 10.671 |
| 2020 | 5,757,693 | 74.904 | 106,110 | -69.795 | 1.842 |

| | | | | | |
|---|---|---|---|---|---|
| 2021 | 2,748,783 | -52.258 | 434,101 | 309.104 | 15.792 |
| 2022 | 8,235,590 | 199.608 | 563,981 | 29.919 | 6.848 |

Source: (Iraqi Ministry of Finance, Public Budgets Law, 2007-2022) (Iraqi Ministry of Health, Annual Statistical Reports, 2007-2022)
Notes: Columns (2), (4), and (5) of the work of the researcher
(*) Column (2) = ((General Health Expenditure for the Current Year - Public Health Expenditure for the Previous Year) ÷ Public Health Expenditure for the previous year) × 100
(**) Column (4) = (Health investment expenditure for the current year - health investment expenditure for the previous year) ÷ health investment expenditure for the previous year. × 100
(***) column (5) = (column (3) ÷ column (1)) × 100

Iraq has made efforts to increase health investment spending to develop infrastructure, improve the quality of life, expand the productive base, and enhance human capital. Table 2 presents the volume of health investment expenditure from 2007 to 2022.
During the period 2007-2013, public expenditure by the Ministry of Health showed steady growth, increasing from 2,291,250 million dinars in 2007 to 7,323,202 million dinars in 2013 and an approximate increase of 220%. This expansion is largely attributed to post-2003 government policy, which prioritized service sectors, particularly healthcare, supported by rising oil prices and growing public revenues. Health investment spending also rose significantly, from 430,500 million dinars in 2007 to 1,183,986 million dinars in 2013, reflecting a growth rate of more than 175%. Despite this growth, the proportion of investment expenditure relative to total health expenditure did not exceed 24.08% during this period, indicating the continued dominance of operational over investment spending in Ministry of Health budgets.
The subsequent period (2014–2018) witnessed sharp fluctuations and noticeable declines in both public health spending and investment. The year 2014 marked a turning point, as public health spending decreased by 31.74%, while investment spending dropped by 60.68%. These declines were the result of escalating security and political crises, particularly the war on terrorism, and ineffective financial resource management. The lowest level of health investment was recorded in 2017, amounting to only 41,276 million dinars (2.74% of public health spending), reflecting a critical decline in the government's capacity or willingness to support infrastructure development during crisis periods.
In the period (2019–2022), health investment spending showed partial recovery. In 2019, it rose to 351,300 million dinars with an impressive annual growth rate of 257.7%, accompanied by a rise in total health spending to 3,291,900 million dinars. However, the share of investment remained modest, not exceeding 10.6%. In 2020, despite a 74.9% increase in total health spending, health investment spending declined by 69.8%, reflecting the diversion of funds toward urgent operational needs during the COVID-19 pandemic. By 2022, although the Ministry of Health's public expenditure reached its highest level (8,235,590 million dinars), investment accounted for only 6.84% highlighting the ongoing deprioritization of strategic infrastructure in favor of routine expenditures.

## 6. Analysis of some health care indicators

The study adopted a descriptive and interpretive analytical approach to examine the relationship between health investment expenditure and the two main indicators: infant and maternal mortality rates. By tracking official annual data and comparing the temporal evolution of both variables, the analysis inferred a logical inverse relationship without applying econometric or statistical models. This methodological choice aligns with the study's objective to provide a contextual and policy-oriented understanding of how investment trends affect health outcomes in Iraq's specific socio-economic environment. To assess the effectiveness of investment spending on health outcomes, specific quantitative indicators must be employed. Within this framework, the child mortality rate and maternal mortality rate serve as key indicators.

### 6.1. Child mortality index analysis

Child mortality rates are important indicators of the efficiency of the country's health system and medical infrastructure. These rates fluctuated due to political and security challenges, but the overall trend points to relative improvement with increased investment in the health sector. Child mortality rates also witnessed a significant decrease in Iraq during the period (2007-2022, Table 3).

**Table 3:** Child Mortality Rate in Iraq for the Period (2007-2022)

| years | Neonatal mortality (0-28) days (per 1000 live births) (1) | (**) Under-one-year infant mortality rate (per 1,000 live births) (2) | (***) Under-5 mortality rate (per 1,000 live births) (3) | Health Investment Spending (million dinars)(4) |
|---|---|---|---|---|
| 2007 | NA | 30 | 35 | 430,500 |
| 2008 | NA | 29 | 34 | 100,000 |
| 2009 | NA | 24 | 29.5 | 481,500 |
| 2010 | NA | 24 | 28.7 | 1,577,189 |
| 2011 | NA | 21 | 25 | 1,050,000 |
| 2012 | 18.3 | 19.9 | 24.2 | 746,202 |
| 2013 | 13.2 | 17.9 | 22.5 | 1,183,986 |
| 2014 | 12.4 | 17.3 | 21.7 | 465,496 |
| 2015 | 13.9 | 19.7 | 25.2 | 340,000 |
| 2016 | 13.3 | 18.1 | 22.7 | 148,200 |
| 2017 | 13.6 | 18.6 | 23.1 | 41,276 |
| 2018 | 13.8 | 18.6 | 22.8 | 98,198 |
| 2019 | 13.9 | 19.6 | 24.3 | 351,300 |
| 2020 | 13.7 | 18.5 | 23.6 | 106,110 |
| 2021 | 13.2 | 17.8 | 21.8 | 434,101 |
| 2022 | 13 | 18.1 | 22 | 563,981 |

Source: (Iraqi Ministry of Health, Annual Statistical Reports, 2007-2022)
Neonatal mortality rate = (Number of newborn deaths ÷ number of live births) × 1000
Infant mortality rate = (Number of infant deaths ÷ number of live births) × 1000
(***) Under-five mortality rate = ((Number of deaths of children under five ÷ number of live births) × 1000)

1) Year (2007) to Year (2011): Data for column (1) not available (NA) in the Iraqi Ministry of Health for unknown reasons.
2) Year (2012 and 2013): Data for column (1) without Kurdistan Region.
3) Year (2014): Data for columns (1) and (2) without Kurdistan Region and Tikrit, while data for column (3) without Tikrit.

4) Year (2015): Data for columns (1), (2), and (3) without Kurdistan Region and Anbar.
5) Year (2016): Data of column (1) without Nineveh and Anbar, while columns (2) and (3) are without Nineveh.
6) Year (2017): Data for columns (1), (2), and (3) without Nineveh Governorate only.
7) Year (2019): Data for columns (1), (2), and (3) without Sulaymaniyah Governorate only.

Table (3) reflects child mortality rates and their relationship to health investment spending, as follows:

Duration (2007-2013) Despite the absence of neonatal mortality data in some years, where it was not available (NA) to (2011) and it was (18.3) deaths and (13.2) deaths in (2012) and (2013) respectively, and the infant mortality rate under one year showed a decrease from (30) deaths per (1000) live births in (2007) to (17.9) in (2013), as well as the under-five mortality rate decreased from (35) deaths to (22.5) deaths per (1000) Live birth in the same duration. This indicates a relative improvement in primary health care, expansion of immunization programmes, and children's health centers.

This improvement was associated with a relative increase in health investment spending, with the highest amounts recorded in 2010 and 2013, which contributed to strengthening health infrastructure and providing preventive services.

As for the period (2014-2017), this period witnessed a slight decline or stagnation in the decline in mortality rates, as newborn mortality stabilized between (12.4-13.9) deaths, while infant deaths under one year stabilized between (17.3-19.7) deaths and deaths of children under five between (21.7-25.2) deaths. This is due to the impact of security crises after ISIS overran areas of the country, and the subsequent deterioration in services, especially in the liberated governorates. This coincided with a sharp decline in investment spending, which fell to its lowest level in 2017 (only 41,276 million dinars), slowing the momentum of improvement in child mortality indicators.

As for the period (2018-2022), the indicators were relatively stable, as the neonatal mortality rate reached 13 deaths in 2022, infant mortality (18.1 deaths in 2022, and deaths of children under five (22 deaths in 2022). This indicates a gradual but slow improvement in health services, in conjunction with a relative recovery in funding, as health investment spending recorded (563,981) million dinars in 2022.

It should be noted, however, that Iraq continues to record child mortality rates above the global average for middle-income countries, demonstrating continued deficiencies in prevention and primary care.

## 6.2. Maternal mortality index analysis

Maternal mortality during childbirth reflects the quality of maternal health care. Despite challenges, such as the shortage of medical staff in some areas, the maternal mortality rate has gradually decreased because of increased investment spending in developing maternity centers, equipping them with modern equipment, and providing training programs. However, data show that challenges persist in rural areas due to the shortage of medical staff and the difficulty of accessing health services. (Moscovice & Rosenblatt, 2000)Maternal mortality is defined by the World Health Organization as the death that occurs to the mother during the period of pregnancy or childbirth or (42) days after birth, i.e., the postpartum period. (Firoz et al., 2013)

**Table 4:** Maternal Mortality Rate During Childbirth in Iraq for the Period (2007-2022)

| years | Maternal mortality rate (per 100,000 live births) | Healthy Investment Spending (million dinars) |
|---|---|---|
| 2007 | 30.1 | 430,500 |
| 2008 | 29.5 | 100,000 |
| 2009 | 28.9 | 481,500 |
| 2010 | 23.1 | 1,577,189 |
| 2011 | 28.4 | 1,050,000 |
| 2012 | 31.1 | 746,202 |
| 2013 | 35 | 1,183,986 |
| 2014 | 30.1 | 465,496 |
| 2015 | 32 | 340,000 |
| 2016 | 36.1 | 148,200 |
| 2017 | 31 | 41,276 |
| 2018 | 33.5 | 98,198 |
| 2019 | 31.5 | 351,300 |
| 2020 | 34.2 | 106,110 |
| 2021 | 46.1 | 434,101 |
| 2022 | 26.2 | 563,981 |

Source: (Iraqi Ministry of Health, Annual Statistical Reports, 2007-2022) (Iraqi Ministry of Health, Maternal Mortality Report, 2010-2012) (World Health Organization, Annual Mortality Reports, 2007-2009)

Maternal mortality rate = ((Number of maternal deaths ÷ number of live births) × 100,000)

The data of Table (4) reflect the maternal mortality rate and its relationship to investment expenditure, as the period (2007-2010) witnessed a significant improvement, as the maternal mortality rate decreased from (30.1 deaths in 2007) to (23.1 deaths in (2010) per (1000) live births. This improvement coincided with a significant increase in investment spending, which peaked in 2010) by (1,577,189) million dinars, as the relationship was positive and positive at this stage, as spending contributed significantly investment in improving maternity care services, reducing health risks at birth.

As for the period (2011-2015) in this period, the maternal mortality rate gradually increased from (28.4) deaths (in 2011) to (32) deaths (in 2015), despite the existence of relatively acceptable investment spending, such as the year (2013) in which health investment spending reached (1,183,986) million dinars, despite the existence of health investment spending, but the lack of efficiency in implementation, poor management and geographical distribution, weakened the positive impact of this spending on maternal mortality.

As for the period (2016-2020), this period recorded the worst results, and the maternal mortality rate reached 36.1 deaths in 2016 and increased to 34.2 deaths in 2020. These results were accompanied by a sharp decline in health investment spending, reaching only 41,276 million dinars in 2017 and 106,110 million dinars in 2020. This stage confirms a clear correlation between the decline in spending and the deterioration of health indicators, due to security crises (post-ISIS) and fluctuations in oil prices and poor staff and services, especially in rural and affected areas.

As for the period (2021-2022), in 2021, the maternal mortality rate recorded its highest value in the entire period (46.1) deaths, despite recording a good investment expenditure of 434,101 million dinars. However, in (2022), the maternal mortality rate witnessed a significant improvement by decreasing to (26.2) with the increase in health investment spending to (563,981) million dinars, as the improvement in (2022) may be attributed to the start of the implementation of some delayed projects, and the relatively improved political and financial

environment. The rise in Maternal mortality rate in 2021 is a direct result of the repercussions of the COVID-19 pandemic and the weak efficiency of the health system in responding to crises.

It is clear from the above that high spending alone is not enough to improve indicators, but it must be studied and implemented effectively. and there is a general inverse relationship between spending and maternal mortality, but this relationship is weakened considering crises and administrative corruption. Achieving sustainable improvement in maternal mortality requires financial stability, equitable distribution, and rational use of resources.

Geographic disparities in health investment are pronounced across Iraq's governorates. Per-capita capital spending on health facilities in 2022, for example, exceeded IQD 45,000 in Baghdad but fell below IQD 20,000 in conflict-affected provinces such as Nineveh and Anbar— a gap of more than 100 percent. These spending differences are mirrored in health outcomes: infant and maternal mortality remain markedly higher in the underfunded northern and western regions than in the centre and south. (Atallah, 2025)

To close these gaps, we propose a four-pillar strategy.

1) Adopt a needs-based allocation formula that weighs up by population size, poverty incidence, and distance to tertiary facilities.
2) Create ring-fenced contingency funds for lagging governorates to guarantee a minimum capital outlay each fiscal year.
3) Deploy mobile clinics and diagnostic laboratories to remote rural districts, thereby reducing access barriers while permanent infrastructure is rebuilt.
4) Introduce a digital dashboard powered by real-time expenditure data allowing the Ministry of Health and provincial councils to track monthly disbursements and link them to performance indicators such as facility utilisation and reductions in under-five mortality.

# 7. Conclusions and recommendations

## 7.1. Conclusions

1) Research has shown a general inverse relationship between the volume of health investment spending and child and maternal mortality rates, with higher spending often contributing to reducing mortality.
2) The highest proportion of health investment spending (2.14%) of public investment expenditure in 2013, but it was not enough to sustainably reduce all mortality indicators.
3) In 2021, despite the increase in health investment spending to 434,101 million dinars, maternal mortality recorded its highest level at 46.1 deaths per 100,000 live births, which indicates poor implementation efficiency.
4) The decline in investment spending in crisis years such as 2017 and 2020 was associated with a relative rise in mortality rates, which confirms the impact of health services on the political and security situation.
5) The percentage of health investment expenditure did not exceed (24.08%) of the total expenditure of the Ministry of Health in the best case, which indicates the dominance of operating expenses at the expense of structural investments.
6) Spending in recent years has focused on crisis response rather than long-term investment, reducing the developmental impact of health spending.
7) Irregular financial planning and weak oversight have weakened the positive impact of investment spending, although allocations have increased in some years.

## 7.2. Recommendations

1) Gradually increase the proportion of health investment spending beyond the effective minimum (3% of public investment spending), thus enhancing the ability to reduce mortality rates and achieve national health goals.
2) Adopting flexible financing policies that ensure the continuation of financing the health sector in times of crisis, to avoid a sharp decline in health indicators when spending decreases.
3) Improving the efficiency of the implementation of investment health projects by activating monitoring and follow-up systems, and linking financing to actual performance indicators, not just the planned.
4) Ensure the equitable distribution of health resources among governorates, especially in rural and remote areas, to reduce disparities in mortality rates and achieve equity in delivery service.
5) Link investment spending allocations to vital health indicators (such as child and maternal mortality), rather than just undirected public spending.
6) Benefiting from international experiences in managing health investment spending, especially in countries with good performance in reducing mortality rates and adapting them to the Iraqi context.
7) Adopt artificial intelligence (AI) tools to support investment decisions in the health sector. AI-powered dashboards can help identify high-risk regions, track real-time spending, and optimize the allocation of limited resources across provinces.

# References

[1] al-Idrissi, A. a.-S. Y. (1986). Macroeconomics. International Library of University Books.
[2] Al-Taie, A. (2020). Health Care and Development (Second Edition). Dar Al-Shorouk.
[3] Allen, T. T. M. a. M. (2004). Public Investment and Fiscal Policy. International Monetary Fund.
[4] Atallah, M. E. H., R.; Singh. (2025). Artificial Intelligence in Primary Health Investment Allocation: A Systematic Review. Journal of Digital Health Systems, 9(1).
[5] Bank, W. (2020). Investment Project Management Efficiency Report.
[6] Bashar, M. A., Bhattacharya, S., Tripathi, S., Sharma, N., & Singh, A. (2019). Strengthening primary health care through e-referral system. Journal of Family Medicine and Primary Care, 8(4), 1511-1513. https://doi.org/10.4103/jfmpc.jfmpc_184_19.
[7] Braithwaite, J., Ludlow, K., Testa, L., Herkes, J., Augustsson, H., Lamprell, G., McPherson, E., & Zurynski, Y. (2020). Built to last? The sustainability of healthcare system improvements, programmes and interventions: a systematic integrative review. BMJ Open, 10(6), e036453. https://doi.org/10.1136/bmjopen-2019-036453.
[8] Dagher, M. M. A. (2010). Public Spending on Infrastructure Projects and its Impact on Economic Growth in Libya. Journal of Arab Economic Research.
[9] Dion, H., & Evans, M. (2024). Strategic frameworks for sustainability and corporate governance in healthcare facilities; approaches to energy-efficient hospital management. Benchmarking: An International Journal, 31(2), 353-390. https://doi.org/10.1108/BIJ-04-2022-0219.

[10] European Commission: Directorate-General for, E., Financial, A., Kalantzis, F., Arnoldus, P., Maincent, E., & Brons, M. (2015). Infrastructure in the EU – Developments and impact on growth. Publications Office.
[11] Firoz, T., Chou, D., von Dadelszen, P., Agrawal, P., Vanderkruik, R., Tunçalp, O., Magee, L. A., van Den Broek, N., & Say, L. (2013). Measuring maternal health: focus on maternal morbidity. Bull World Health Organ, 91(10), 794-796. https://doi.org/10.2471/BLT.13.117564.
[12] G, A. (2008). Introduction to Health Economics.
[13] Hicks, J. (2019). Public Investment Policies. Oxford University Press.
[14] Jakovljevic, M., & Getzen, T. E. (2016). Growth of global health spending share in low and middle income countries. Frontiers in pharmacology, 7, 21. https://doi.org/10.3389/fphar.2016.00021.
[15] Mays, G. P., Smith, S. A., Ingram, R. C., Racster, L. J., Lamberth, C. D., & Lovely, E. S. (2009). Public health delivery systems: evidence, uncertainty, and emerging research needs. Am J Prev Med, 36(3), 256-265. https://doi.org/10.1016/j.amepre.2008.11.008.
[16] Miyazaki, T. (2009). Public investment and business cycles: The case of Japan. Journal of Asian Economics, 20(4), 419-426. https://doi.org/10.1016/j.asieco.2009.04.001.
[17] Moscovice, I., & Rosenblatt, R. (2000). Quality-of-care challenges for rural health. J Rural Health, 16(2), 168-176. https://doi.org/10.1111/j.1748-0361.2000.tb00451.x.
[18] Nyamuranga, C., & Shin, J. (2019). Public health expenditure and child mortality in Southern Africa. International Journal of Social Economics, 46(9), 1137-1154. https://doi.org/10.1108/IJSE-12-2018-0643.
[19] Organization, P. t. t. C. o. t. W. H. (2018).
[20] Organization, W. H. (2019). Health for All Report.
[21] Parveen, S., Coccorese, P., Umer, M., & Tahir, A. H. (2025). Synergizing Financial Inclusion and Green Finance: Advancing Sustainable Development Goals 2030 and 2050 in Alignment with COP 29 Commitments. Sustainable Development, n/a(n/a). https://doi.org/10.1002/sd.3553.
[22] Petrović, P., Arsić, M., & Nojković, A. (2021). Increasing public investment can be an effective policy in bad times: Evidence from emerging EU economies. Economic Modelling, 94, 580-597. https://doi.org/10.1016/j.econmod.2020.02.004.
[23] Smith, J. (2019). Health Systems Management.