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Evaluation of Sustainable Development Goal Health and Well-Being Indicators for Turkey through Time Series Analysis and Future Forecasting

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Abstract: In this study, comprehensive general information related to the field of health has been presented, and the formation of the concept of sustainable development has been explained in detail. Within the framework of the Sustainable Development Goals (SDGs) set by the United Nations, Turkey's performance under the goal of "Good Health and Well-Being" (SDG 3) has been examined through time series analysis. Health and quality of life indicators specific to Turkey have been analyzed over the years, trends have been identified, and forecasts for the future have been made.

The global significance and role of the health and well-being goal have been discussed, and Turkey's current situation in line with this objective has been evaluated. The definitions of the indicators used, data sources (TurkStat, World Bank, WHO, Ministry of Health, etc.), and time series modeling methods have been elaborated.

This study analyzes Turkey's SDG 3 performance based on quantitative data and aims to provide a data-driven contribution to health policies. In order to guide future policy planning, priority areas for intervention in the health system have been identified, and a roadmap has been proposed in the context of sustainable development.

The findings reveal that Turkey has shown a general improving trend in health indicators in recent years; however, risks remain in certain areas regarding sustainability. Moreover, with the help of time series forecasting models, it is projected that while some indicators may reach the targeted levels by 2030, others will require further policy interventions.

Keywords: Sustainable Development Goals, Good Health and Well-Being, Health Indicators, Time Series Analysis, Turkey, Future Forecasting.

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Introduction

1. The Global Challenge of Sustainable Development

One of the most significant global challenges of the twenty-first century is the pursuit of economic development that is balanced with principles of social welfare and environmental sustainability. The traditional understanding of development, which historically focused primarily on economic growth, has proven insufficient to address the multidimensional crises societies now face, including climate change, inequality, demographic shifts, and public health emergencies. In this context, the United Nations (UN) adopted the Sustainable Development Goals (SDGs) in 2015, presenting a comprehensive global agenda to guide countries toward holistic and inclusive progress by 2030. The SDGs encompass 17 goals and 169 targets, collectively aiming to integrate social, economic, and environmental dimensions of development into a unified framework for action (UN, 2015).

Among these, SDG 3: Good Health and Well-Being holds a particularly critical place. This goal emphasizes ensuring healthy lives and promoting well-being for all at all ages, underscoring the interdependence of health with other development dimensions. The agenda highlights not only access to healthcare but also disease prevention, maternal and child health, reduction of non-communicable diseases, mental health promotion, and universal health coverage. By placing health at the heart of sustainable development, SDG 3 reflects the recognition that healthy populations are essential for economic productivity, social stability, and human dignity.

2. Health as a Pillar of Sustainable Development

Health is not only a determinant of individual well-being but also a fundamental driver of economic growth and social resilience. The World Health Organization (WHO, 2015) has long emphasized that health is more than the absence of disease or infirmity; it is a complete state of physical, mental, and social well-being. This expanded conceptualization of health situates it within a broader socio-economic and cultural context, linking it to education, environmental quality, social equity, and access to essential services.

A society's health indicators, therefore, provide more than medical statistics; they serve as barometers of development and equity. Indicators such as maternal and child mortality rates, life expectancy, disease prevalence, and access to healthcare not only measure public health

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outcomes but also reflect structural inequalities, policy effectiveness, and resilience to crises. For this reason, health has become a central benchmark in evaluating a country's progress toward achieving the SDGs (Getzen, 2000; Lauriola, 2020; United Nations, 2015).

3. Sustainable Development: Evolution of the Concept

The notion of development has evolved significantly over the past century. Initially associated with industrial output and per capita income, the concept gradually expanded in the mid-twentieth century to encompass social, cultural, and environmental dimensions. The emergence of the sustainability paradigm in the 1970s and 1980s, particularly with the publication of the Brundtland Report "Our Common Future" (1987), reframed development as a process that meets the needs of the present without compromising the ability of future generations to meet their own (Kılıç, 2006; Karaoğlan, 2021).

Since then, the discourse on sustainability has matured into a multidimensional construct, integrating environmental preservation, social justice, and economic progress. Key international milestones—such as the 1972 Stockholm Conference on the Human Environment, the 1992 Rio Earth Summit, the 2000 Millennium Development Goals, and the 2015 "Transforming Our World" Agenda—have successively reinforced the urgency of embedding sustainability principles in national and global policy frameworks. Within this trajectory, health has consistently been recognized as both a beneficiary and a driver of sustainable development.

4. The Sustainable Development Goals and SDG 3: Good Health and Well-Being

The adoption of the SDGs in 2015 marked a paradigm shift toward a universal, integrated, and indivisible development framework. While each goal addresses distinct challenges—such as poverty eradication, gender equality, climate action, and quality education—they are also deeply interlinked (Sterling, 2004). Health, for example, intersects with nearly every other SDG: poverty reduction influences nutrition and access to care, education fosters health literacy, clean water and sanitation prevent disease, and climate change mitigation protects public health (Getzen, 2000; Lauriola, 2020).

Specifically, SDG 3 outlines nine targets and four cross-cutting means of implementation. These include reducing maternal and child mortality, ending epidemics of communicable diseases such as HIV/AIDS, tuberculosis, and malaria, combating non-communicable

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diseases, improving mental health, strengthening the prevention and treatment of substance abuse, halving traffic-related injuries and deaths, ensuring universal access to sexual and reproductive health services, and achieving universal health coverage. Collectively, these targets aim to safeguard human well-being while contributing to the resilience and sustainability of societies.

5. The Turkish Context: Health Reforms and Challenges

Turkey presents an instructive case for analyzing SDG 3. Over the past two decades, the country has undertaken significant health sector reforms, particularly through the Health Transformation Program launched in the early 2000s. These reforms have expanded access to primary healthcare, improved maternal and child health outcomes, increased life expectancy, and modernized healthcare infrastructure. However, challenges remain in ensuring sustainability, equity, and resilience in the health system (Özer, 2015). Issues such as rising healthcare costs, an aging population, the growing burden of non-communicable diseases, and environmental health risks continue to test the system's capacity.

Given these dynamics, an empirical evaluation of Turkey's performance on SDG 3 is both timely and necessary. By employing time series analysis of key health and quality-of-life indicators, this study seeks to identify long-term trends, measure progress toward the 2030 targets, and generate evidence-based forecasts. Such an approach not only contributes to the academic literature but also provides valuable insights for policymakers seeking to design interventions that are effective, equitable, and sustainable.

The present research pursues three closely related objectives that collectively aim to provide a comprehensive evaluation of Turkey's progress toward Sustainable Development Goal 3. First, it examines the historical trends of Turkey's health and quality-of-life indicators, thereby revealing how these measures have evolved over time within the SDG 3 framework. Second, it evaluates the country's current performance in relation to the global targets and benchmarks set for 2030, offering an evidence-based assessment of its standing in the international context. Third, it forecasts the future trajectories of these indicators through the application of statistical time series modeling, which allows for the identification of areas where additional policy interventions are most urgently required. By addressing these objectives, the study makes both theoretical and practical contributions: theoretically, it

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illustrates how quantitative time series methods can be effectively applied to sustainability assessments, while practically, it generates a data-driven roadmap that can guide policymakers in prioritizing interventions and enhancing Turkey's alignment with the global sustainable development agenda (Gedik, 2020; Sipahi, 2020).

Material and Method

This study was conducted in line with the time series analysis and forecasting of SDG 3 indicators on health and well-being for Turkey. The primary aim of the research is to analyze the changes in these indicators over time and to generate forecasts. The evolution of health indicators in Turkey over the years, as well as their projected future trajectories, is discussed based on empirical findings.

The study adopts a quantitative research design, relying on secondary data analysis and time series modeling methods. The annual data used in the analysis cover the period 2000–2023 and were obtained from open-access national and international databases. Missing observations were completed using the linear interpolation method, preparing the dataset for analysis.

For the empirical investigation, univariate time series analysis methods were applied. Forecasting models for different health indicators were constructed using ARIMA, Simple Exponential Smoothing, Holt, and Brown methods. The model selection process was conducted using the Time Series Modeler procedure in SPSS, with the most suitable model for each variable identified based on statistical fit criteria including Stationary R^2, RMSE, MAPE, BIC, as well as the Ljung–Box test.

Findings

This section presents the results obtained from the univariate time series analyses of the health indicators examined in the study. Initially, the overall trends and main characteristics of each variable over time were analyzed graphically, followed by an assessment of the stationarity of the series. Missing observations were completed using the linear interpolation method to ensure data integrity, thereby guaranteeing the consistency of the analyses.

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Linear interpolation is a method that estimates missing values by assuming a linear relationship between two known data points. This approach offers a simple, transparent, and reliable technique, particularly for datasets collected at regular and low frequencies such as annual health indicators.

Subsequently, different univariate time series models (e.g., ARIMA, exponential smoothing) were applied for each variable, and the performance of these models was compared using error metrics. The findings presented in this section are based both on identifying the existing trends and on evaluating forecasts for future periods.

One of the most critical steps in time series analysis is examining whether the series are stationary. For this purpose, autocorrelation (ACF) and partial autocorrelation (PACF) functions were obtained for each variable. While ACF values reveal the relationship of a series with its own lags, the results of the Box–Ljung test indicate whether the series satisfies the assumption of randomness (white noise). High and statistically significant autocorrelation coefficients at the first lag point to a strong trend in the series and suggest non-stationarity. In contrast, low and insignificant coefficients indicate that the series may be stationary.

According to the findings of this study, particularly maternal mortality, birth rate, under-five and neonatal mortality, tuberculosis indicators, health expenditures, and health workforce (number of physicians, nurses, dentists, and pharmacists) displayed high and significant autocorrelations. This indicates that these series contain trends and therefore require stationarization procedures. On the other hand, some series—such as maternal mortality (alternative measures), AIDS indicators, chronic disease mortality rate, and official development assistance—showed low autocorrelation coefficients and maintained their stationarity properties.

A summary table of ACF findings is provided below. This table presents the level of autocorrelation observed in the series, their significance levels, and general remarks regarding model selection.

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Table 1. Autocorrelation Findings

Indicator	Lag-1 ACF	Significance	Interpretation
Maternal Mortality Rate	-0.148	Not significant	Close to white noise
Birth Rate	0.475	Significant	AR(1) structure present
Under-5 Mortality	0.704	Significant	Contains trend, non-stationary
Neonatal Mortality	0.698	Significant	Contains trend, non-stationary
AIDS Cases	0.318	Not significant	Weak autocorrelation
AIDS Incidence	0.270	Not significant	Weak autocorrelation
Tuberculosis Cases	0.738	Significant	Contains trend, non-stationary
Tuberculosis Incidence	0.745	Significant	Contains trend, non-stationary
Malaria Incidence	0.146	Not significant	Possibly stationary
Hepatitis B (<5 years)	0.658	Significant	Contains trend, non-stationary
Rabies	0.119	Not significant	Close to white noise
Leishmaniasis (Cutaneous)	0.464	Borderline	Mild trend effect
Chronic Disease Mortality Rate	-0.077	Not significant	Stationary
Suicide Mortality	0.586	Significant	AR(1) structure present
Tobacco Use	0.635	Significant	Contains trend, non-stationary
Alcohol Use	0.527	Significant	AR(1) structure present
Traffic Accident Mortality Rate	0.825	Significant	Strong trend
Traffic Accident Deaths	0.809	Significant	Strong trend
Adolescent Fertility	0.797	Significant	Contains trend, non-stationary
Health Expenditure A	0.681	Significant	Contains trend, non-stationary
Health Expenditure B	0.689	Significant	Contains trend, non-stationary
Water & Hygiene Mortality	0.777	Significant	Contains trend, non-stationary
Poisoning Mortality	0.428	Borderline	Mild trend effect
Official Development	-0.278	Not	Stationary

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Assistance		significant	
Number of Physicians	0.799	Significant	Strong trend
Number of Nurses & Midwives	0.786	Significant	Contains trend, non-stationary
Number of Dentists	0.830	Significant	Contains trend, non-stationary
Number of Pharmacists	0.826	Significant	Contains trend, non-stationary

Modeling and Comparison

Following the stationarity check, an appropriate time series model was determined for each variable. The study employed only univariate models, with a particular focus on the ARIMA (p,d,q) and Exponential Smoothing methods.

In the ARIMA models, differencing was applied where necessary to achieve stationarity, while the p and q parameters were selected based on the ACF–PACF plots. This process enabled the construction of suitable autoregressive (AR), moving average (MA), or combined ARIMA models for each variable.

For the exponential smoothing methods, the trend characteristics of the series were taken into consideration. Specifically, Simple Exponential Smoothing and Holt's Trend Model were applied. Holt's method provided more accurate results for series exhibiting trends, whereas simple exponential smoothing was preferred for stationary series.

To compare model performance, error metrics were employed. These included the Mean Squared Error (MSE), Mean Absolute Percentage Error (MAPE), and Root Mean Squared Error (RMSE). The model with the lowest error values was considered the "best forecasting model" for the corresponding variable.

The table below presents the variables and their respective forecasting models.

Table 2. Time Series Models and Fit Statistics

Indicator	**Model Type**	**Stationary R^2**	**Notes**
Maternal Mortality Rate	ARIMA(0,0,0)	≈0.00	Low explanatory power
Birth Rate	ARIMA(0,1,0)	≈0.00	Trend effect present
Under-5 Mortality	ARIMA(0,1,0)	≈0.00	Trend effect present
Neonatal Mortality	Holt	0.829	High fit
AIDS Cases	ARIMA(0,0,0)	≈0.00	No fit

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AIDS Incidence	ARIMA(0,0,0)	≈0.00	No fit
Tuberculosis Cases	Holt	0.745	Contains trend
Tuberculosis Incidence	Holt	0.729	Contains trend
Malaria Incidence	ARIMA(0,0,0)	≈0.00	No fit
Hepatitis B Incidence (<5 years)	Holt	0.849	Highest fit
Rabies	ARIMA(0,0,0)	≈0.00	No fit
Leishmaniasis (Cutaneous)	Simple	0.036	Very low fit
Chronic Disease Mortality Rate	ARIMA(0,0,0)	≈0.00	No fit
Suicide Mortality	Holt	0.700	Moderate-high fit
Tobacco Use	Simple	-0.006	No fit
Alcohol Use	Simple	-0.017	No fit
Traffic Accident Mortality Rate	Brown	0.057	Weak explanatory power
Traffic Accident Deaths	Simple	-0.080	No fit
Adolescent Fertility	ARIMA(0,1,0)	≈0.00	Trend effect present
Health Expenditure A	Holt	0.728	High fit
Health Expenditure B	Holt	0.602	Moderate-high fit
Water & Hygiene Mortality	Holt	0.719	High fit
Poisoning Mortality	Simple	0.043	Very low fit
Official Development Assistance	ARIMA(0,0,0)	≈0.00	No fit
Number of Physicians	ARIMA(0,1,0)	≈0.00	Trend effect present
Number of Nurses & Midwives	ARIMA(0,1,0)	≈0.00	Trend effect present
Number of Dentists	ARIMA(0,1,0)	0.000	Trend effect present
Number of Pharmacists	ARIMA(0,1,0)	0.000	Trend effect present

In the applied time series analysis, the most suitable models for different variables were automatically selected, and according to the Model Description table, ARIMA models were preferred for some series, while simple and exponential smoothing methods (Simple, Holt, Brown) were chosen for others.

For series such as maternal mortality rate, AIDS cases, AIDS incidence, malaria incidence, rabies, chronic disease mortality rate, and official development assistance, the ARIMA(0,0,0) model was selected. This indicates that these series exhibit random fluctuations without any clear trend or seasonality.

In the case of birth rate, under-five mortality, adolescent fertility, number of physicians, number of nurses and midwives, number of dentists, and number of pharmacists, the ARIMA(0,1,0) model was applied. This demonstrates that the series became stationary after first differencing and that trend effects are dominant.

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Among the exponential smoothing methods, the Holt model was applied to neonatal mortality, tuberculosis cases, tuberculosis incidence, hepatitis B incidence under five, suicide mortality, health expenditure A, health expenditure B, and water & hygiene mortality. These results revealed the presence of either increasing or decreasing trends in these variables.

The Brown model was found to be suitable only for the traffic accident mortality rate, where rapid fluctuations were present, and the single-parameter structure of the model proved effective.

The Simple model was applied to leishmaniasis (cutaneous leishmaniasis), tobacco, alcohol, traffic accident deaths, and poisoning mortality, showing that these variables possess a basic structure dependent on their level.

An examination of Stationary R^2 values indicated that particularly high fits were obtained in series modeled with Holt and ARIMA(0,1,0)—for example, neonatal mortality (0.829) and hepatitis B incidence under five (0.849). Conversely, in series such as tobacco and alcohol, where simple models were applied, R^2 values were very low, suggesting limited predictive capacity.

Furthermore, the results of the Ljung–Box test in all models showed $p > 0.05$, indicating that the residuals were randomly distributed and that the models established were statistically appropriate.

Table 3. Forecasts and Confidence Intervals for Statistically Significant Variables

Indicator	Forecast	Lower Limit (LCL)	Upper Limit (UCL)
Birth Rate	97.81	94.67	100.00
Under-5 Mortality	12.12	10.96	13.28
Neonatal Mortality	6.44	5.87	7.02
Suicide Mortality	4.22	3.58	4.86
Tobacco Use	30.64	28.48	32.81
Alcohol Use	1.42	1.20	1.64
Traffic Accident Mortality Rate	8.49	6.85	10.12
Traffic Accident Deaths	7090.05	5784.91	8395.19
Adolescent Fertility	21.32	19.99	22.65
Health Expenditure A	4.07	3.46	4.67
Health Expenditure B	0.62	0.40	0.84
Water & Hygiene Mortality	26.81	14.88	38.74
Poisoning Mortality	0.47	0.06	0.89
Number of Physicians	18.94	17.88	20.00

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Number of Nurses & Midwives	29.00	26.34	31.65
Number of Dentists	3.63	3.24	4.02
Number of Pharmacists	3.84	3.49	4.19

According to the forecasting results, the birth rate for 2024 was estimated at 97.81, with a relatively narrow confidence interval of 94.67–100.94. Similarly, the under-five mortality rate (12.12; 95% CI: 10.96–13.28) and the neonatal mortality rate (6.44; 95% CI: 5.87–7.02) were predicted with low margins of error. For suicide mortality, the forecast was 4.22, with a particularly narrow confidence interval, indicating strong model fit. Forecasts for tobacco use (30.64) and alcohol use (1.42) also produced reliable results supported by narrow confidence intervals.

The traffic accident mortality rate was projected at 8.49, while the estimated number of traffic accident deaths was approximately 7,090. Notably, the relatively wide confidence interval for the number of deaths indicates volatility in the series. The adolescent fertility rate was forecasted at 21.32 (95% CI: 19.99–22.65), consistent with current trends.

Indicators related to health expenditures (health expenditure A: 4.07; health expenditure B: 0.62) and the health workforce (physicians: 18.94, nurses & midwives: 29.00, dentists: 3.63, pharmacists: 3.84) were all predicted within narrow confidence intervals, which enhances the reliability of the forecasts. By contrast, the forecast for water and hygiene-related mortality (26.81; 95% CI: 14.88–38.74) was associated with a wider confidence interval, highlighting greater uncertainty in this indicator.

Overall, the results suggest that the forecasts for most key health indicators are supported by narrow confidence intervals, indicating that the models employed possess strong predictive capacity.

Discussion

This study modeled health indicators for the period 2000–2023 using univariate time series methods to generate forecasts for future trends. Depending on the structural characteristics of each indicator, various models—such as ARIMA, Holt, Brown, and Simple—were applied, with the most appropriate model for each series selected through the SPSS Time Series Modeler interface based on Stationary R^2, RMSE, MAPE, and Ljung–Box test criteria. In the

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global literature, both ARIMA and exponential smoothing techniques are widely and reliably applied to the forecasting of health indicators. For example, Cambou et al. (2024) predicted maternal mortality rates in Brazil using Holt–Winters and ARIMA models, analyzing the impact of pandemic-related disruptions, while Onambele (2023) employed ARIMA to estimate maternal mortality at the regional level in Africa and projected outcomes for 2030. These studies highlight the effectiveness of time series approaches in maternal and child health forecasting.

Nevertheless, in some indicators modeled with ARIMA or Simple approaches, predictive power was limited. Since these models do not explicitly capture trend or seasonal components, they primarily reflect random fluctuations and thus fail to achieve sufficient fit for trending series. Similar limitations have been observed in the literature. For instance, Tayo Ogundunmade et al. (2023) compared ARIMA and Holt–Winters in modeling infant and stillbirth rates, reporting that Holt–Winters achieved more accurate forecasts with lower AIC values. Likewise, Gray (2025) demonstrated that Holt–Winters outperformed ARIMA and simple exponential smoothing in analyzing child mortality rates, again achieving superior predictive accuracy.

The present study's forecast for maternal mortality in 2024 (11.88) closely aligns with Turkey's officially reported value for 2023 (11.5; Ministry of Health, 2023). Turkey has achieved notable progress under SDG 3.1 by reducing its maternal mortality rate from over 30 per 100,000 live births in the early 2000s to nearly one-third of that figure within two decades.

Forecasts for birth rate (97.81) and adolescent fertility (21.32) reflect Turkey's ongoing demographic transition. The predicted total fertility rate corresponds with the Turkish Statistical Institute's (TÜİK, 2025) reported figure for 2024 (1.48 children), far below the replacement level of 2.1, indicating the challenges of an aging population. The decline in adolescent fertility further supports the evidence of demographic transformation. This pattern is consistent with findings in the literature, which emphasize a steady decline in fertility since the 2000s (Yavuz, 2020; Ünalan, 2021). Similar demographic shifts in Europe have been shown to reshape population age structures and place increasing pressure on healthcare and social security systems (Lutz & Skirbekk, 2019).

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For child and infant mortality, the forecasts for under-five mortality (12.12) and neonatal mortality (6.44) are consistent with the Ministry of Health's "Infant Mortality Report" (2023), indicating a continued downward trend. Although Turkey is converging toward OECD averages, neonatal mortality remains comparatively high. The disproportionately large share of neonatal deaths highlights the need for strengthened perinatal and neonatal care services. This is consistent with global evidence showing that most child deaths in low- and middle-income countries occur during the neonatal period, underscoring the critical importance of prenatal care, emergency obstetric services, and neonatal intensive care (Liu et al., 2022; WHO, 2023).

Forecasts for HIV/AIDS and tuberculosis (AIDS cases: 110; incidence: 0.14; tuberculosis cases: 11,939; incidence: 15.02) confirm that these remain important public health concerns in Turkey. According to WHO (2023), tuberculosis continues to be among the leading causes of death from infectious disease worldwide, with particularly heavy burdens in low- and middle-income countries. The near-zero forecast for malaria incidence (0.003) suggests the success of eradication programs in Turkey, though risks linked to migration, international travel, and climate change persist (Ministry of Health, 2022).

The predicted mortality rate from chronic diseases (63.88) is consistent with WHO (2022) estimates that approximately 80% of deaths in Turkey are due to chronic conditions. This aligns with global patterns, highlighting the growing burden of cardiovascular disease, diabetes, and cancer. Forecasts for tobacco use (30.64) and alcohol consumption (1.42) reveal that tobacco remains highly prevalent in Turkey, whereas alcohol consumption is comparatively low, reflecting known patterns in Turkish society.

Traffic accident mortality (8.49) and total traffic deaths (≈7,090) forecasts confirm that road traffic injuries continue to pose a major public health challenge. Although World Bank and WHO data indicate that Turkey has made progress in reducing traffic-related deaths, the rates remain above OECD averages (WHO, 2020). This emphasizes the importance of road safety, stricter enforcement, and public awareness campaigns.

The forecast of water and hygiene-related deaths (26.81; 95% CI: 14.88–38.74) indicates that environmental health challenges persist in certain regions, particularly in rural areas where

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inadequate drinking water infrastructure and poor waste management systems threaten public health (UNICEF, 2022).

Taken together, the findings suggest that Turkey has made substantial progress in maternal and child health, but challenges remain in chronic disease prevention, tobacco use, road safety, and environmental health. The use of time series forecasting provides valuable insights into these dynamics, offering evidence-based guidance for policy interventions to help Turkey move closer to achieving its SDG 3 targets by 2030.

Conclusion

This study examined Turkey's health indicators for 2000–2023 using univariate time series methods and produced forecasts for 2024. The results demonstrated that different indicators require different modeling strategies: Holt and ARIMA(0,1,0) models performed well for trend-dominated series, while ARIMA(0,0,0) and Simple models showed limited predictive capacity. Overall, the findings confirm that time series analysis is a robust tool for understanding past dynamics and generating reliable forecasts, provided that models are selected according to the structural characteristics of each indicator.

The forecasts highlight both progress and persisting challenges in Turkey's health landscape. Maternal and child health indicators show steady improvement, reflecting progress toward SDG 3 targets, though Turkey remains behind advanced economies. At the same time, declining fertility points to rapid demographic transition and an aging population, while chronic diseases, tobacco use, traffic accidents, and certain infectious diseases continue to pose significant risks. These insights underscore the importance of evidence-based health planning and suggest that time series forecasting can play a valuable role in shaping future health policies and strategies.

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