

**MEDICAL NEWS**

**TIP HABERİ**

**ACUTE STROKE AGENDA IN TURKEY: 2023**

**TÜRKİYE'DE AKUT İNME GÜNDEMİ: 2023**

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**There is no reduction in mortality due to stroke**

Following the publication of 2020 and 2021 mortality statistics by the Turkish Statistical Institute (TurkStat) on February 23, 2023, the need to provide an update on the incidence of acute stroke in our country and its critical effects arose. Since 2009, TurkStat has been publishing statistics on deaths and causes of death by combining data from the Central Population Administration System (MERNIS) and the death notification system of the Ministry of Health (MoH). The causes of death are coded according to the International Classification of Diseases (ICD-10) in the MoH death notification system. Death and population statistics from 2009 to the present, obtained from the TurkStat website, are given in Figure 1. The course of vascular causes of death by gender groups between 2009 and 2021 is also summarized in Figure 2.

In 2020, the number of deaths in Turkey was reported as 507.938. As of the last day of 2020, the population of Turkey was 83,6 million. 56% of the deaths were male, and the crude death rate was 6,1 per thousand. Cardiovascular diseases were the cause of 183.109 deaths (36%). There were 95.442 men and 88.667 women who died from cardiovascular diseases. In 2020, the number of death records from stroke was 35.880, corresponding to 7,2% of all deaths and 19,6% of deaths from cardiovascular diseases (1).

According to this data, one Turkish person died from a stroke every fifteen minutes in 2020. In 2021, the number of deaths in Turkey was announced as 565.594. This corresponded to an increase of 11,4% compared to the previous year. Males accounted for 54,6% of deaths. The crude mortality rate was realized as 6,7 per thousand. This increase should undoubtedly be related to deaths due to COVID-19. COVID-19 ranked fourth among causes of death in 2021 with 11,5%. In 2021, circulatory system diseases ranked first among the causes of death, as in previous years. One-third of all deaths (33,4%) were due to cardiovascular causes. Neurovascular diseases were responsible for 6,3% of all deaths and 18,9% of cardiovascular deaths (2). From 2009 to 2021, the number of deaths due to cardiovascular causes has been steadily increasing, albeit with some variability (Figure 2A). Although the stroke had a stable course, it was determined that it could not be reduced (Figure 2B).

**Stroke incidence continues to increase**

The occurrence of vascular diseases is rising in tandem with the aging of the Turkish population. Based on the global burden of disease study data, the number of acute strokes in Turkey in 2019 was estimated to be 125.345 (65% acute ischaemic stroke, 24% intracerebral hemorrhage, and 11% subarachnoid hemorrhage) (3). The prevalence of stroke was calculated as

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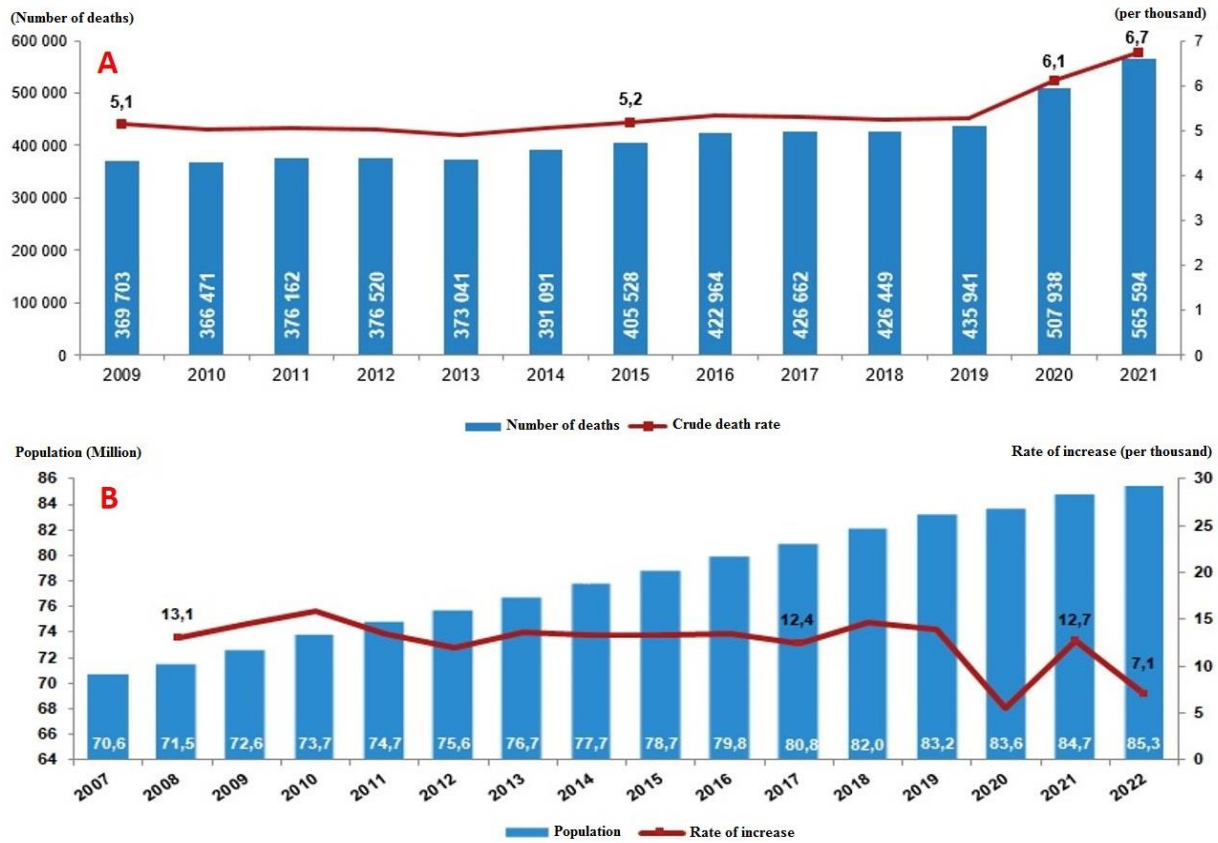
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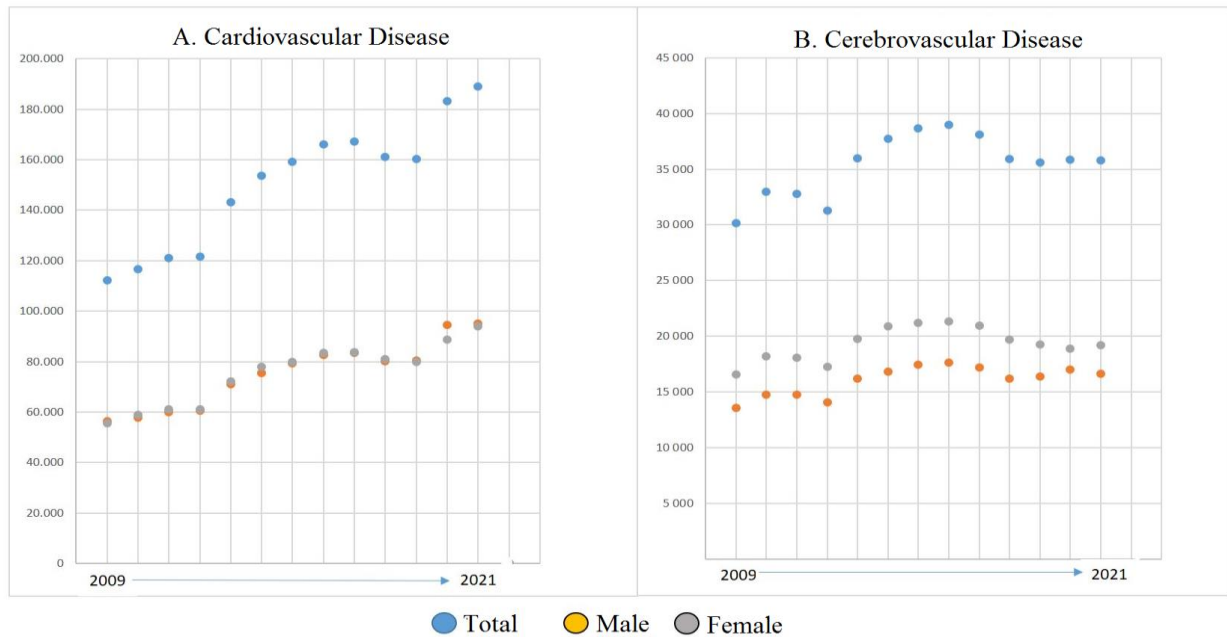
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**Figure 1.** (A) Number of deaths and crude death rate in 2009-2021; (B) Turkey's population growth and population by years. (Footnote: Taken from TurkStat website. (1,2)).



**Figure 2.** Annual change in cardiovascular (A) and cerebrovascular (B) deaths between 2009-2021. (Footnote: Y axis shows the number of people).

1.080.380 (1,3%) and death due to stroke as 48.947 (3). The estimated incidence of stroke was 126.711 in 2020 and 127.404 in 2021 based on population growth rates, and the stroke prevalence was calculated as 1.092.157 (1,3%) in 2020 and 1.098.126 (1,3%) in 2021. The global burden of disease estimates is higher than TurkStat data. Based on global disease data, stroke mortality was calculated to be 49.481 in 2020 and 49.751 in 2021.

### **Efforts to reduce the prevalence of vascular diseases in Turkey**

It is known that the conversion of risk to symptomatic disease in vascular diseases is directly related to the number, severity, or degree of uncontrolled risk factors as well as the duration of exposure. In other words, the expected increase in vascular disease as a natural result of population aging can be offset by early detection and management of risk factors. In this context, lifestyle changes such as tobacco use, alcohol use, physical inactivity, and an unhealthy diet, environmental risks such as air pollution, and consequent diseases such as hypertension, diabetes, dyslipidemia, and obesity are key steps in preventing the clinical consequences of vascular diseases, including death. The Ministry of Health in Turkey has conducted effective studies and campaigns to improve vascular health. These include the "Turkish Cardiovascular Diseases Prevention and Control Program (2021-2026)" (4), "The Turkish Diabetes Program (2015-2020)" (5), "Turkish Healthy Ageing Action Plan and Implementation Program (2021-2026)" (6), "National Tobacco Control Program-Action Plan (2018-2023)" (7), "Turkish Healthy Nutrition and Active Life Program Adult and Childhood Obesity Prevention and Physical Activity Action Plan (2019-2023)" (8), and "Turkish Reduction of Excess Salt Consumption Program (2017-2021)" (9). However, it is reasonable to anticipate that it will be unable to provide sufficient positive results in the near future due to the interruption of campaign processes during the pandemic and the lack of prioritization as a result of the disasters experienced afterward. Since the effect of campaigns cannot be efficient for a long time, it is necessary to continue actively by keeping them constantly on the agenda.

### **Acute Stroke Guideline: Transformation of the acute stroke system in Turkey**

The critical factor in acute stroke management is that treatment is time-dependent. This holds true for both intravenous thrombolytic therapy and neuro-interventional procedures. It requires the organization of not only neurologists to administer treatments but also hospital systems on a 24/7 basis and geographical distribution. As a result, a system of administration and management that will be applicable throughout the country is imposed. In this context, the "Directive on Health Services to be Provided to Patients with Acute Stroke" was published by the Ministry of Health on July 18, 2019 (10). Due to the pandemic, it was only possible to implement it one year later, in March 2021. Within the first year, the readiness potential was realized, with more than sixty stroke centers and fifty stroke units certified. The directive and its annexes set standards ranging from the qualifications of specialists capable of performing neuro-interventional procedures to the architecture of neurological intensive care units. In addition, "Clinical Stroke Protocol" and "Acute Stroke Diagnosis and Treatment Guide" were published by the Ministry (11,12). Directives and protocols based on regional dynamics have begun to be implemented through provincial health directorates. For example, the stroke watch system has been successfully implemented in Ankara for more than five years (13).

### **What to do in 2023?**

In order to achieve positive results in the short and medium terms within the scope of acute stroke management in our country, regional planning in accordance with the directive is the first step. This can only be accomplished through the coordination of all regional centers. The management of provincial health directorates and the academic leadership of stroke centers are essential. In Turkey, stroke centers and units have reached a number that can cover approximately 90% of the resident population; however, we do not have data in terms of service realization, adequacy, and quality metrics (14,15).

Regardless of the current situation, regional systems must be established throughout the

country, beginning with Istanbul and Izmir, to eliminate problems and carry out the necessary work to improve the existing systems and continue uninterrupted.

Studies to identify and monitor the performance of acute stroke systems within the framework of patient-based quality metrics should be implemented as soon as possible. This should be done by independent academic centers and associations in addition to the service provider ministry. The Turkish Cerebrovascular Diseases Society must quickly update the metrics published on the subject (16).

Continuous advances in acute stroke science make it necessary to update the "Stroke Clinical Protocol" and "Acute Stroke Treatment Guidelines" almost every year. This is also accurate for the Turkish Cerebrovascular Diseases Society and the Turkish Neurological Society guidelines (17,18).

The success of acute stroke systems is possible with awareness campaigns as well as system presentations. However, we observe that the activities of the Turkish Cerebrovascular Diseases Society in this direction, which have not ceased even during the pandemic, have not been as effective as desired (19,20). Many activities have been carried out along the way under the slogan "Early intervention is the cure for stroke," and large numbers of people have been reached, but the response of these activities in terms of system improvement has not yet reached a discernible level (14,21). This is, of course, an effort that has the potential to be reflected in the years to come, but it also points to the necessity of establishing and expanding cooperation with service providers, including at the organizational level. Designing awareness-raising activities in a regional context, on the other hand, is critical for success. As a result, it is critical that each stroke center take the initiative in its own region. Stroke awareness, especially targeting local populations with high risk and potential for poor outcomes, needs to be examined by these centers. In addition to the main line that the cure for stroke is early intervention, local education programs should be carried out with a broad perspective, including stroke warning signs, risk factors, primary and secondary prevention, chances of recovery, what to do in the post-hospital period in acute stroke, rehabilitation, and return to a productive life.

These programs will only be effective if they are repeated and made continuous.

Finally, the aim is to demonstrate the validity and quality of the system that has been or will be established in 2023 for the immediate transfer of acute stroke patients to stroke units or stroke centers where acute treatment can be applied via 112. In this case, a good place to start would be for 112 to gather the necessary data. As a measure of treatment success, stroke centers must track data on the rate of administration of acute treatments, temporal metrics, and functional status at discharge. However, nowadays, when neuro-interventional treatment is on the agenda in acute patients with large infarcts, it would be the best approach to realize these inspections, which are the most critical stage of systemic recovery, with the cooperation of 112 and academic associations. Otherwise, we have no idea beyond the subjective assessments of stroke centers and treatment providers. One solution in this context is the certification of stroke centers accredited by the Ministry within the framework of objective on-site examinations by independent bodies such as the Turkish Cerebrovascular Diseases Society. Center certification should not be a one-time event; it should be done on a regular basis, highlighting quality metrics and making it appealing with various incentives.

In summary, in order to reduce stroke-related deaths similar to those in Western countries, it would be rational to start this year with (i) the implementation of regional stroke referral and management systems as soon as possible and neurologists taking the initiative in this respect; (ii) updating diagnostic and treatment guidelines and manuals to include new developments; (iii) designing campaigns to increase public awareness of stroke at the regional level on the basis of need and risk, but they should definitely be designed locally; and (iv) certification of accredited stroke centers on the basis of scientific principles.

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#### Ethics

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