

# Estimated burden of selected eye diseases in Albania during the period 1990-2021

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## Abstract

The purpose of our analysis was to examine the trends of specific eye diseases in Albania during the period 1990-2021. This analysis was based on the estimates available from the Global Burden of Disease (GBD) studies, reported by the Institute for Health Metrics and Evaluation (IHME). For Albania, IHME uses data that are primarily available from the National Institute of Statistics. The age-standardized mortality rate from eye cancer in the Albanian population exhibited a decrease from 0.46 deaths per 100,000 population in 1990 to 0.31 deaths per 100,000 population in 2021. Similarly, the age-standardized burden of disease from eye cancer in the Albanian population decreased from 1990 to 2021. However, compared with the neighbouring Western Balkan countries, Germany and France, the mortality rate and the burden of eye cancer in Albania were the highest in both 1990 and 2021. Our analysis highlights a declining trend in the mortality rate and burden of eye cancer in Albania from 1990 to 2021. However,

these indicators remain higher compared to neighbouring and Western European countries.

## Introduction

According to the Global Burden of Disease (GBD) study, in 2020, there were about 596 million people with distance vision impairment at a global scale.<sup>1</sup> Of these, 43 million were blind.<sup>1</sup> Further 510 million people had uncorrected near vision impairment, merely due to the absence of reading glasses.<sup>1</sup> Notably, a significant majority of those affected (90%) reside in Low- and Middle-Income Countries (LMICs).<sup>1</sup> Vision loss can impact individuals of all ages – yet, the majority of those with vision impairment and blindness are over 50 years old.<sup>2</sup>

More recent data from the World Health Organization (WHO) indicate that, currently, at least 2.2 billion people have a near or distance vision impairment.<sup>2</sup> Of these, in at least one billion cases, vision impairment could have been prevented or remains unaddressed.<sup>2</sup> According to WHO, refractive errors and cataracts are the primary causes of vision impairment and blindness worldwide.<sup>2</sup> Additionally, only 36% of individuals worldwide with distance vision impairment caused by refractive errors and just 17% of those with vision impairment due to cataracts have prompt access to suitable interventions.<sup>2</sup>

The primary conditions leading to distance vision impairment or blindness consist of cataract followed by refractive error, age-related macular degeneration, glaucoma, and diabetic retinopathy.<sup>2,3</sup> On the other hand, the leading cause of near vision impairment is presbyopia.<sup>4</sup>

It should be noted that vision impairment does not only bear individual and family costs, but it also imposes a significant financial burden for all societies worldwide, with an annual global cost of productivity estimated at around US\$ 411 billion.<sup>2</sup>

Nonetheless, the information about Albania and other countries of the Western Balkans regarding eye health is rather limited. After the collapse of the communist regime in 1990, Albania has embarked on a difficult transition toward a market-oriented economy, which is characterized, among other aspects, by substantial changes in the health status of the general population,<sup>5</sup> including changes in the patterns of eye diseases due to the continuous population aging.<sup>6</sup> In 2021, the crude mortality rate from non-communicable diseases (NCDs) in Albania was estimated at about 820 deaths per 100,000 population, showing a considerable increase compared with the fall of the communist regime in the early 1990s (around 380 deaths per 100,000 population).<sup>7</sup> The proportional mortality from NCDs in the Albanian population in 2021 was estimated at about 73%, indicating a significant decrease from around 93% in 2019 (*i.e.*, before COVID-19 pandemic).<sup>7</sup> However, the overall mortality rate from NCDs has increased in Albania from

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798 deaths in 2019 to 820 deaths in 2021 (per 100,000 population), indicating an increase in the death rates from both infectious diseases (COVID-19) and NCDs.<sup>7</sup> Cardiovascular diseases constitute the leading cause of death in the Albanian population, with an estimated (crude) mortality rate of about 530 deaths per 100,000 population, accounting for 47% of the proportional mortality.<sup>7</sup> Within cardiovascular diseases, ischemic heart disease is the main cause of death, with an estimated mortality rate of 241 deaths per 100,000 population, representing more than one-fifth (21%) of the overall mortality in the general population of Albania.<sup>7</sup>

Considering this background, the aim of our analysis was to examine the trends of specific eye diseases in Albania during the period 1990-2021.

## Materials and Methods

Our analysis was based on the Albanian estimates provided by the Global Burden of Disease 1990 and 2021 studies, which are reported by the Institute for Health Metrics and Evaluation.<sup>7</sup>

For all countries, IHME estimates mortality using a combination of methods, including statistical modeling, disease-specific models, and cause-of-death modeling.<sup>7,8</sup> The statistical modeling used by IHME is based on available data from vital registration systems, surveys, and other available sources. These models take into consideration the variations in data quality and completeness, as well as the differences in mortality rates among various age groups and regions worldwide.<sup>7,8</sup> Additionally, IHME employs disease-specific models to estimate mortality for specific diseases or conditions.<sup>7,8</sup> Also, cause-of-death modeling is used to estimate mortality by cause of death, which is crucial for identifying the leading causes of death across various populations, including Albania. These models integrate data from medical certifications, verbal autopsy, and other sources to estimate cause-specific mortality rates.<sup>7,8</sup> Furthermore, IHME uses “ensemble modeling,” which is a method that combines multiple models to produce more accurate estimates of mortality. This approach evaluates the strengths and weaknesses of different modeling methods and includes uncertainty in the estimates provided.<sup>7,8</sup>

In the case of Albania, IHME uses data that are primarily available from the National Institute of Statistics.<sup>7</sup>

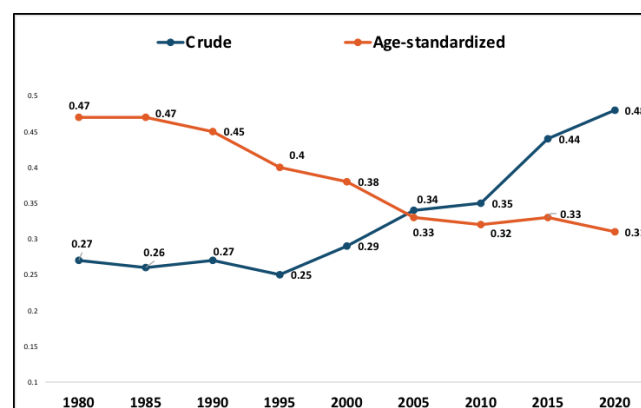
## Results

Table 1 presents selected indicators of eye diseases in Albania

in 1990 and in 2021. Overall, the crude mortality rate from eye cancer in the Albanian population in 1990 was 0.26 deaths per 100,000 population, whereas in 2021, it was almost double (0.48 per 100,000 population) [upper panel]. However, this is logical considering the rapid aging of the Albanian population in the past three decades.<sup>5,6</sup> As a matter of fact, the age-standardized mortality rate from eye cancer in the Albanian population exhibited a decrease from 0.46 deaths per 100,000 population in 1990 to 0.31 deaths per 100,000 population in 2021.

Figure 1 presents both the crude and the age-standardized mortality rates from eye cancer in the Albanian population for the period 1980-2021, based on the estimates provided by IHME.<sup>7</sup> From 1980 to the mid-1990s, there was evidence of a stable crude mortality rate, which afterward increased continuously until 2021, in line with the continuous increase of older people shares in Albania. Conversely, the age-standardized estimates of mortality rate from eye cancer in the Albanian population indicated a gradual decrease, pointing to prompt and more effective treatment and management of these diseases.

Regarding the burden of disease (Table 1, lower panel), in 1990, there were about 7.7 crude Disability-Adjusted Life Years (DALYs) per 100,000 from eye cancer in the Albanian population, whereas in 2021, this figure increased to 10.8 DALYs per 100,000 population. Similar to mortality rate estimates, the increase in the crude burden of disease level (mortality and morbidity combined) from 1990 to 2021 was mainly due to population aging. Indeed, the



**Figure 1.** Crude and age-standardized mortality rate (deaths per 100,000 population) from eye cancer in Albania during the period 1980-2021 (source: <https://vizhub.healthdata.org/gbd-results/>)

**Table 1.** Selected eye disease indicators in Albania in 1990 and in 2021 (source: IHME - <https://vizhub.healthdata.org/gbd-results/>).

| Upper panel: mortality indicators                                       |       |       |                  |      |
|-------------------------------------------------------------------------|-------|-------|------------------|------|
| Indicator                                                               | Crude |       | Age-standardized |      |
|                                                                         | 1990  | 2021  | 1990             | 2021 |
| Eye cancer (deaths per 100,000 population)                              | 0.26  | 0.48  | 0.46             | 0.31 |
| Lower panel: burden of disease [Disability-Adjusted Life Years (DALYs)] |       |       |                  |      |
| Indicator                                                               | Crude |       | Age-standardized |      |
|                                                                         | 1990  | 2021  | 1990             | 2021 |
| Eye cancer (DALYs per 100,000)                                          | 7.68  | 10.82 | 11.10            | 7.20 |
| Retinoblastoma (DALYs per 100,000)                                      | 0.02  | 0.01  | 0.01             | 0.02 |
| Other eye cancers (DALYs per 100,000)                                   | 7.66  | 10.81 | 11.08            | 7.18 |
| Foreign body in eyes (DALYs per 100,000)                                | 1.23  | 1.25  | 1.28             | 1.17 |

age-standardized burden of disease from eye cancer in the Albanian population in 1990 was estimated at around 11.1 DALYs per 100,000, whereas in 2021, it decreased to 7.2 DALYs per 100,000. Almost the entire toll of eye cancer in the Albanian population concerns different types of tumors other than retinoblastoma, which constitutes a negligible share (comprising only 0.01 DALYs per 100,000 population in 2021 at a crude level). Furthermore, at a crude level, the burden of foreign body in eyes was slightly lower in 1990 compared to 2021 (1.23 vs. 1.15 DALYs per 100,000, respectively), whereas upon age-standardization there was evidence of an opposite finding (1.28 vs. 1.17 DALYs per 100,000, respectively).

Table 2 presents age-standardized eye disease indicators for selected European countries, including Albania, for the years 1990 and 2021. The mortality rate from eye cancer in Albania was the highest among all countries in both 1990 (0.46 deaths per 100,000 population) and 2021 (0.31 deaths per 100,000 population). On the other hand, Montenegro exhibited the lowest mortality rate from eye cancer in both 1990 and 2021 (0.06 deaths per 100,000 population in both 1990 and 2021). In line with the mortality pattern, the burden of eye cancer was the highest among all countries in Albania in both 1990 (11.1 DALYs per 100,000) and in 2021 (7.2 DALYs per 100,000), and the lowest in Montenegro (1.64 and 1.54 DALYs per 100,000, respectively). As observed earlier, almost the entire share of eye cancer in Albania was explained by different types of tumours other than retinoblastoma, a finding that was more pronounced in Albania compared with the other six countries. Conversely, the burden of foreign body in eyes in Albania (about 1.3 and 1.2 DALYs per 100,000 in 1990 and in 2021, respectively) was somehow similar to the other countries of the Western Balkans, except Croatia, which displayed a higher burden in both 1990 and 2021. Notably, the burden of foreign body in the eyes was much higher in Germany and France in both 1990 and 2021 compared with Albania and the Western Balkan countries.

## Discussion and Conclusions

This analysis offers valuable insights into the mortality rate and burden of selected eye diseases within the Albanian population over the past few decades. The findings indicate that both the age-standardized mortality rate and the burden of eye cancer in this population have decreased from 1990 to 2021. Nonetheless, compared with the neighbouring Western Balkan countries, Germany and France, the mortality rate and the burden of eye cancer in Albania were the highest in both 1990 and 2021.

The Lancet Global Health Commission on Global Eye Health has emphasized that vision needs to be recognized as a critical

development priority, considering eye health as a crucial aspect for achieving Sustainable Development Goals (SDGs).<sup>3</sup> From this perspective, the Commission argues that there is considerable evidence indicating that enhancing eye health, directly and indirectly, supports achieving numerous SDGs, such as alleviating poverty, boosting work productivity, improving overall and mental health, and advancing education and equity.<sup>3</sup>

However, in countries with limited resources, including Albania, financial barriers may hinder prompt and effective eye care for many individuals in the general population. For this very reason, the Commission recommends that eye health be included in national health financing to pool the risk.<sup>3</sup>

From another aspect, there are positive messages on a global scale. Hence, the age-standardized global prevalence of blindness has fallen by almost 29% during the period 1990-2020, in line with the significant decrease in the prevalence of major infectious causes of blindness, including onchocerciasis and trachoma.<sup>3</sup> Yet, the aging of the populations worldwide has been associated with an increase in the crude prevalence of age-related causes of blindness, thereby increasing the overall number of individuals with blindness in some regions of the world.<sup>3</sup>

Among other health aspects, vision impairment is associated with poor mental health.<sup>9-11</sup> A meta-analysis has revealed that one-quarter of individuals with eye diseases have also advanced depressive symptoms,<sup>9</sup> which, in turn, increase with the advancement of eye diseases.<sup>9-11</sup> In addition, vision impairment is linked to dementia.<sup>3</sup>

Our analysis is limited by its reliance on secondary data from the Global Burden of Disease studies, which may not fully capture local variations or recent trends in Albania. GBD estimates are often modeled, and any gaps, inaccuracies, or methodological differences in data collection and reporting could affect the validity of the findings. Additionally, our analysis does not incorporate primary data sources such as hospital records, cancer registries, or ophthalmologic screenings, which could provide a more detailed and clinically validated picture of eye cancer trends. Without direct epidemiological or clinical validation, the analysis may not account for factors such as diagnostic improvements, changes in healthcare access, or variations in disease classification over time. Another limitation of this analysis is its main focus on eye cancer, which excludes other prevalent eye diseases such as cataracts, glaucoma, and macular degeneration, potentially overlooking broader trends and determinants of eye health in Albania. Additionally, potential inaccuracies in national data sources and underreporting of eye diseases could impact the precision of the estimates, as acknowledged by IHME.<sup>7,8</sup>

Regardless of these limitations, this study provides valuable insights into the long-term trends of eye cancer in Albania, offering a basis for public health planning and resource allocation. It high-

**Table 2.** Eye disease indicators in selected European countries in 1990 and in 2021 (source: IHME - <https://vizhub.healthdata.org/gbd-results/>).

| Indicator*                                 | Albania |      | Montenegro |      | North Macedonia |      | Croatia |      | Slovenia |      | Germany |      | France |      |
|--------------------------------------------|---------|------|------------|------|-----------------|------|---------|------|----------|------|---------|------|--------|------|
|                                            | 1990    | 2021 | 1990       | 2021 | 1990            | 2021 | 1990    | 2021 | 1990     | 2021 | 1990    | 2021 | 1990   | 2021 |
| Eye cancer (deaths per 100,000 population) | 0.46    | 0.31 | 0.06       | 0.06 | 0.18            | 0.16 | 0.23    | 0.14 | 0.13     | 0.07 | 0.13    | 0.15 | 0.18   | 0.14 |
| Eye cancer (DALYs per 100,000)             | 11.10   | 7.20 | 1.64       | 1.54 | 4.51            | 3.61 | 5.86    | 3.40 | 3.89     | 1.98 | 4.22    | 4.51 | 5.71   | 4.43 |
| Retinoblastoma (DALYs per 100,000)         | 0.01    | 0.02 | 0.06       | 0.02 | 0.01            | 0.01 | 0.07    | 0.03 | 0.30     | 0.27 | 0.46    | 0.40 | 0.72   | 0.19 |
| Other eye cancers (DALYs per 100,000)      | 11.08   | 7.18 | 1.58       | 1.52 | 4.50            | 3.60 | 5.79    | 3.36 | 3.59     | 1.71 | 3.76    | 4.33 | 4.99   | 4.03 |
| Foreign body in eyes (DALYs per 100,000)   | 1.28    | 1.17 | 1.19       | 1.15 | 1.26            | 1.17 | 2.69    | 2.57 | 1.18     | 1.15 | 8.32    | 8.40 | 8.31   | 8.28 |

\*All indicators in the table

lights the need for targeted interventions and international comparisons to address persisting disparities. Additionally, the findings can guide future research to expand the scope of eye health studies and develop comprehensive strategies for prevention and treatment. The findings of this study have significant policy implications for eye health and cancer prevention in Albania. Despite a declining trend in eye cancer mortality and disease burden, Albania continues to have higher rates compared to neighboring and Western European countries, highlighting the need for targeted public health interventions. Policymakers should prioritize strengthening early detection programs, improving access to specialized ophthalmologic and oncologic care, and increasing public awareness about risk factors associated with eye cancer. Furthermore, investing in a national cancer registry and enhancing data collection mechanisms would enable more accurate tracking of disease trends and facilitate evidence-based decision-making. Aligning national policies with best practices from countries with lower eye cancer burdens could help reduce disparities and improve overall eye health outcomes in Albania.

In conclusion, our analysis highlights a declining trend in the mortality rate and burden of eye cancer in Albania from 1990 to 2021. However, these indicators remain higher compared to neighboring and Western European countries.

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