



Severe Asthma Index Companion Report

May 2023



SEVERE ASTHMA INDEX

COPENHAGEN
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Contents

Executive summary	3
Next steps	5
Introduction	6
Methodology and delimitation	8
Index findings	15
Overall scores	16
Policy Context	17
Access and Care Coverage	18
Health System Characteristics	19
Disease Burden	20
Environmental Factors	21
Discussion	22
Conclusion	23
Disclosures	26
Acknowledgements	26
References	27
Appendix I: Country overviews	28
Australia	29
Austria	31
Belgium	33
Canada	35
Czechia	37
Denmark	39
Estonia	41
Finland	43
France	45
Germany	47
Greece	49
Hungary	51
Ireland	53
Italy	55
Japan	57
Latvia	59
Lithuania	61
The Netherlands	63
New Zealand	65
Norway	67
Poland	69
Portugal	71
Slovakia	73
Slovenia	75
South Korea (Republic of Korea)	77
Spain	79
Sweden	81
Switzerland	83
United Kingdom	85
Appendix II: Indicator list	87

Executive summary

Asthma is a chronic disease estimated to affect approximately 334 million people globally, which results in significant impacts on individuals' quality of life and health outcomes, as well as marked pressures on social, financial, and healthcare systems [1]. Severe asthma, while only estimated to make up approximately five percent of the overall asthma burden worldwide, accounts for over half of the resource expenditure on asthma [2]. Given the disproportionate impact and systemic burden of severe asthma, as well as the steady increase in the prevalence of asthma in most parts of the world, there is a growing imperative for policymakers, clinicians, and patient and civil society organisations to develop a more comprehensive and robust understanding of how health systems manage the disease and to identify best practices that may prevent disease progression and improve asthma control [3].

In responding to this imperative, the Copenhagen Institute for Futures Studies (CIFS), Weber Shandwick, and Flipside Health, with financial support provided by Sanofi and Regeneron, have developed the Severe Asthma Index, a first-of-its-kind tool for assessing countries' health system approaches to managing severe asthma as well as other related factors that may impact asthma severity and control. The Severe Asthma Index currently evaluates 29 OECD countries' approaches to severe asthma across a range of parameters linked to health policy, access to and quality of care, clinical indicators, population health indicators, and environmental factors. The Index marks the first attempt to bring together various sources of data to support a comprehensive, multinational analysis of approaches to severe asthma care and prevention. By providing such an overview, it aims to motivate the creation and implementation of more robust policies and strategies related to asthma and severe asthma, support improved access to and quality of care, and assist health system stakeholders in identifying best practices.

Crucially, the first edition of the Severe Asthma Index provides the following key observations:

There is a need for a “whole system” approach

Severe asthma is not just a clinical phenomenon. Patient outcomes and experiences both impact and are impacted by a multitude of systemic, policy, and environmental factors. There is a need for a “whole system” approach, that takes all these factors into account, to effectively manage severe asthma among country populations. The Health in All Policies (HiAP) approach, championed by the World Health Organisation (WHO), may provide a basis for future work in this area.

Severe asthma has high societal costs, so addressing its burden stands to have positive knock-on effects

The estimated societal cost of severe asthma is significant in many countries. Addressing the burden of asthma and, in particular, severe asthma may have marked impacts on healthcare resource usage, productivity loss, and health outcomes even over the medium term (five to 10 years). Solutions in this area also stand to have other positive public health knock-on effects. Crucially, improved country-level monitoring and more consistent analyses of the economic and societal impacts of severe asthma are needed to drive these efforts.

There is a need for standardised and consistent reporting of severe asthma data

There are vastly different standards in the reporting of asthma data. Differing clinical definitions of and health system approaches to severe asthma lead to inconsistent reporting around health outcomes and patient experience. This makes it difficult to ascertain the full impact of severe asthma on patients as well as health systems and society at large. A standardised definition of severe asthma, greater alignment with internationally recognised best practices, standards, and guidelines, and a higher level of disaggregation in datasets could improve the insight of policymakers and healthcare professionals and support more robust and fit-for-purpose approaches to asthma and severe asthma care.

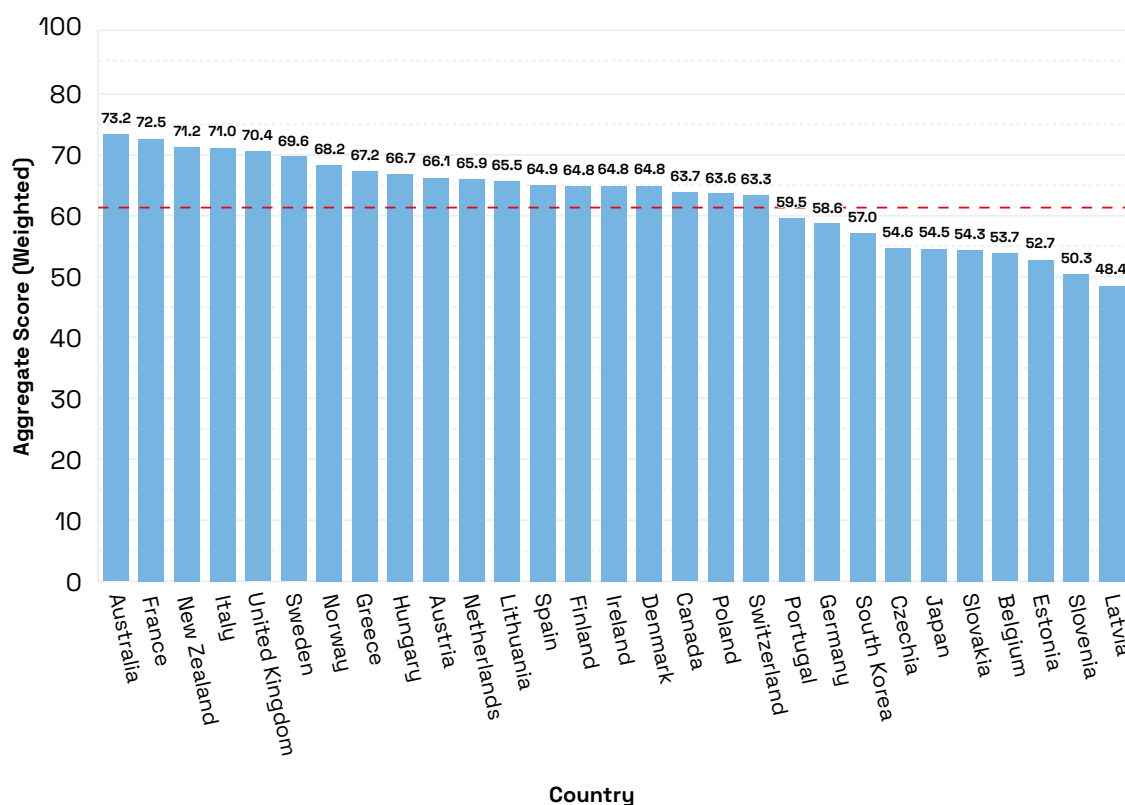
There is potential to improve resource allocation efficiency in healthcare systems

Access to quality care varies significantly, even in a group of comparatively wealthy and developed countries. Care pathways and reimbursement policies – rather than lack of resources – in many cases make the difference in experience and outcomes in severe asthma care.

Focus is needed on individualisation and health behaviour in asthma care

A focus on individualised asthma care and behavioural change, e.g., through social prescribing and focus on appropriate physical activity, stands to significantly benefit both individuals and health systems.

Severe Asthma Index Scores (Weighted)



1- Overview of overall country scores in the Severe Asthma Index

Next steps

In addition to providing policymakers and other stakeholders with a tool for building insights and driving policy work in the asthma space, the Severe Asthma Index aims to strengthen the commitment of both public and private sector decision-makers to take both long- and short-term actions to improve health outcomes and quality of life for asthma patients and ensure the sustainability of health systems. Future editions of the Index will explore how country approaches have changed over time, the impact those changes have on health outcomes and health system performance, and analyse severe asthma-specific indicators as well as additional non-clinical factors that may have a significant effect on the improvement of asthma and severe asthma care.

Introduction

Background

Asthma is a chronic disease estimated to affect approximately 334 million people globally, which results in significant impacts on individuals' quality of life and health outcomes, as well as marked pressures on social, financial, and healthcare systems [1]. Severe asthma, while only estimated to make up approximately five percent of the overall asthma burden worldwide, accounts for over half of the resource expenditure on asthma [2]. Given the disproportionate impact and systemic burden of severe asthma as well as the steady increase in the prevalence of asthma in most parts of the world, there is a growing imperative for policymakers, clinicians, and patient and civil society organisations to develop a more comprehensive and robust understanding of how health systems manage the disease and to identify best practices that may prevent disease progression and improve asthma control [3].

In responding to this imperative, the Copenhagen Institute for Futures Studies (CIFS), Weber Shandwick, and Flipside Health, with financial support provided by Sanofi and Regeneron, have developed the Severe Asthma Index, a first-of-its-kind tool for assessing both countries' health system approaches to managing severe asthma as well as other related factors that may impact asthma severity and control. The Severe Asthma Index currently evaluates 29 OECD countries' approaches to severe asthma across a range of parameters linked to health policy, access to and quality of care, clinical indicators, population health indicators, and environmental factors. The Index marks the first attempt to bring together various sources of data to support a comprehensive, multinational analysis of approaches to severe asthma care and prevention. By providing such an overview, it aims to motivate the creation and implementation of more robust policies and strategies related to asthma and severe asthma, support improved access to and quality of care, and assist health system stakeholders in identifying best practices.

Work on the project began in August 2022. The Index model was developed between September 2022 and January 2023 with the support and input of six global asthma and health policy experts. The first edition of the Index was finalised in April 2023. Overall, data from this first edition of the Severe Asthma Index suggest that severe asthma remains an inconsistently defined and inadequately prioritised condition in many countries. While it has long been widely recognised that severe asthma constitutes a significant economic and social burden [4] with a high level of unmet healthcare need reported among severe asthma patients [5], the lack of comprehensive, coherent, and well-implemented national strategies for asthma – and the even greater lack of focus on severe asthma – illustrate a large gap that policymakers and other relevant health system stakeholders should be called upon to fill to the best of their ability.

Crucially, the overall Index findings also suggest and support existing claims that countries and their relevant health system stakeholders could also make progress in severe asthma control and prevention by undertaking actions that are external to often slow and rigid policy processes, e.g., implementation and strengthening of care guidelines [6], expanding access to more patient-oriented (and increasingly digital) services [7], and addressing behavioural and lifestyle factors [8],[9]. In addition, individual country-level observations, which are provided at the end of this report, give indications

of potential best practices and specified areas for improvement that can be addressed on both the national and local levels.

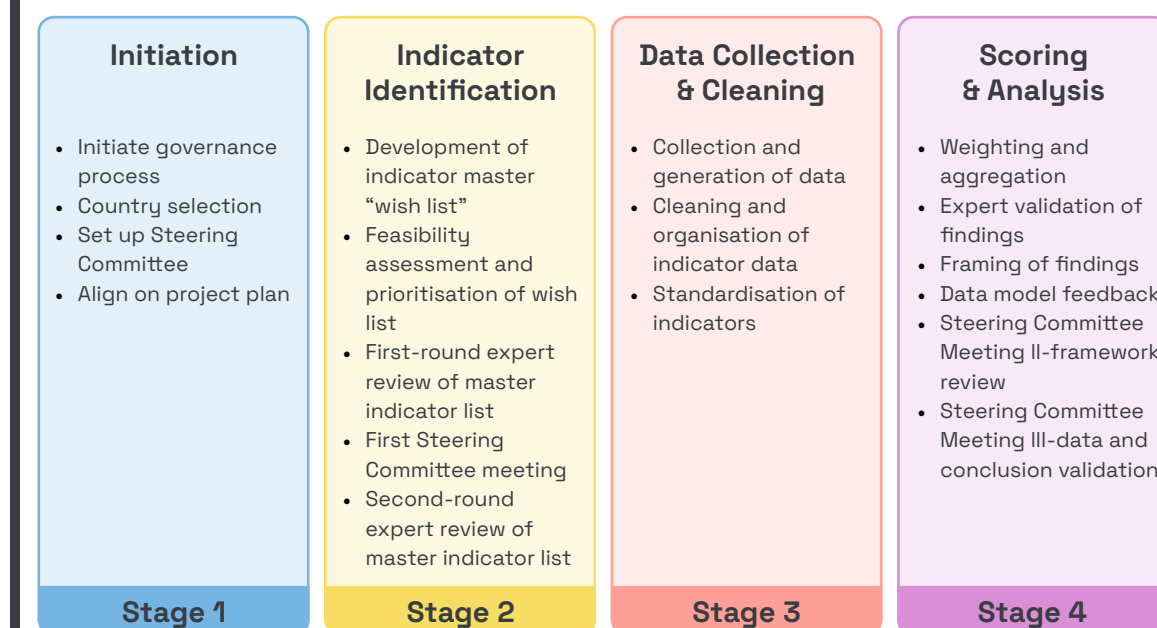
Ultimately, the Index findings emphasise the need for a comprehensive, “whole system” approach to severe asthma. By encouraging all stakeholders – not only healthcare professionals – to address and prioritise severe asthma, like the complex and burdensome chronic condition it is, the Severe Asthma Index aspires to support the creation of innovative, collaborative, cross-border, and comprehensive solutions to a crucial but currently overlooked global health issue.

Methodology and delimitation

The Severe Asthma Index has been realised through the contributions and support of several partners: the Copenhagen Institute for Futures Studies (CIFS), Weber Shandwick, Flipside Health, Sanofi, and Regeneron. CIFS had the primary responsibility for the design of the Severe Asthma Index data model as well as the collection, generation, and analysis of the data that inform the model. Weber Shandwick and Flipside were responsible for communications activities related to the Index and the website and web tool design, respectively. Sanofi and Regeneron provided financial support for creating and disseminating the Index. Building the Index data model was a collaborative effort between CIFS and a Steering Committee, wherein CIFS designed the methodology and carried out the practical activities concerning the construction of the model and a Steering Committee of six independent experts validated CIFS' actions and decisions.

The following process was undertaken to produce the Severe Asthma Index.

Severe Asthma Index Process Overview



Country selection

Within the various approaches widely used for country selection, a combination of a **most similar systems design** (where countries are selected based on a set of shared characteristics such as income level and governance and economic models) and geography-based country selection was followed to reduce potential confounding

variables while providing opportunities for identification and sharing of best practices over the short- to medium-term. Examples of Health System Characteristics used for this purpose include the existence of de facto universal health coverage and similar approaches to service delivery.

Data availability also determined the inclusion of countries to ensure as complete a dataset as possible. Specifically, we selected countries that regularly publicly report data that has been validated by recognised international or supranational institutions. The number of countries included ensured that the size of the dataset was neither too small (which may not be sufficient to identify trends) nor too large (which may present challenges such as heterogenous availability of data and increased complexity of analysis/results).

Finally, to maximise the impact of the Index, we identified countries with comparatively strong public institutions and the capacity to enact policy change so that they may build on the Index's findings to inform policy and improve severe asthma management and care.

Following this approach, 29 OECD countries were selected for inclusion in the Severe Asthma Index:

■ Australia	■ Greece	■ Poland
■ Austria	■ Hungary	■ Portugal
■ Belgium	■ Ireland	■ Slovakia
■ Canada	■ Italy	■ Slovenia
■ Czechia	■ Japan	■ South Korea
■ Denmark	■ Latvia	(Republic of Korea)
■ Estonia	■ Lithuania	■ Spain
■ Finland	■ The Netherlands	■ Sweden
■ France	■ New Zealand	■ Switzerland
■ Germany	■ Norway	■ United Kingdom

Limitations to the country selection methodology include:

1. Similar systems design limits the ability to analyse performance across country parameters such as health access and governance (existence of de facto UHC, etc.) and to extrapolate the model beyond its geographical scope.
2. Deciding on the inclusion of countries based on data availability creates the possibility for availability bias and confounding based on commonalities between Index performance and data availability.

Empanelling of Steering Committee

To validate the data and lead decision-making regarding the content of the Severe Asthma Index, a Steering Committee of six global asthma and health policy experts was established. The members were selected through seeking a balance of clinical knowledge in severe asthma, patient organisation leadership, and expertise in health policy development and implementation.

Definition of severe asthma in the Severe Asthma Index

Researchers and organisations define severe asthma in various ways [10],[11]. For the purposes of building the Severe Asthma Index, the Global Initiative for Asthma (GINA) definition of severe asthma was followed. GINA defines severe asthma as “asthma that persists with poor symptom control and frequent exacerbations despite treatment with high-dose inhaled corticosteroids (ICS) and additional controllers [12].” It is noted, however, that since severe asthma is a retrospective label, it exists within a broader context of “asthma” as an “umbrella term” [13], which GINA defines as “a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness, and cough, that vary over time and in intensity, together with variable expiratory flow limitation [12].”

Preliminary desktop research

We conducted a preliminary review of the literature regarding asthma and severe asthma to:

- Gain an understanding of the condition, including definitions, incidence and prevalence, risk factors, comorbidities, and overall impact on individuals and society as a whole
- Identify usual clinical practice, including diagnosis, standard of care, and stratification
- Determine access and reimbursement of asthma management and care
- Identify health policies addressing asthma and associated risk factors

These insights then informed the identification of the most relevant and viable indicators to be included in the Index as well as potential sources of data.

Indicator proposal

Insights from the literature review supported the identification of indicators, i.e., qualitative and quantitative variables both directly and indirectly linked to or impacting the ability of country health systems to manage and prevent severe asthma among country populations. We identified over 70 potential indicators that were broadly grouped into five categories:

- Policy Context
- Access and Care Coverage
- Health System Characteristics
- Disease Burden
- Environmental Factors

The indicator categories were structured to facilitate a multifaceted analysis of health system performance concerning severe asthma. As a result, severe asthma was examined not only as a clinical issue but also involving factors such as public policy, health system design, other health conditions, and the environment and climate.

Indicator validation

The draft indicators were prioritised and validated by the Severe Asthma Index Steering Committee through two rounds of review, resulting in a final list of 28 indicators across the five indicator categories (see [Appendix II](#) for the list of indicators and category assignments). Exclusion and addition of indicators were based on assessment of conceptual goodness of fit, data availability, and convertibility, i.e., whether the raw indicator data could be feasibly and meaningfully quantified in the index data model.

Data Collection

Data collection commenced upon receiving validation of the prioritised list of indicators. Data collection took place between October 2022 and March 2023 and was conducted in several ways:

Desktop research

The research team identified and collected relevant data points from publicly available sources such as the OECD, WHO, World Bank, and Eurostat databases as well as from peer-reviewed articles and reports and other official documents authored or approved by relevant public authorities in each country included in the index.

Expert questionnaire

To supplement desktop research, the research team designed a questionnaire for the collection of a wide range of severe asthma-specific information. The questionnaire was validated by the Severe Asthma Index Steering Committee before being submitted to respondents (see the [questionnaire template](#)).

The questionnaire was distributed online to over 70 different medical experts and civil servants working within or affiliated with public health institutions or relevant research institutions (e.g., universities and severe asthma care units) in the 29 chosen countries. The response period ran from December 2022 to March 2023.

Respondents were selected based on the following occupational/professional criteria with the intent of maximising the accuracy of responses:

- Civil servant with a role in a national public health institution or equivalent body
- Medical respiratory specialist, preferably with an affiliation or assignment with a national health institution or research institution

Due to a limited number of responses, medical experts working with affiliate offices of the project sponsors also provided supplementary responses to the questionnaire.

Data scoring and normalisation

Raw data from desktop research and the questionnaire were matched with each of the validated indicators and then organised into the approved indicator categories. To maximise conceptual fit with some indicators, several data points were also combined to create compound variables. Qualitative data points were quantified through the application of scorecards designed by the research team. The scorecards associated different point values to a set of standardised qualitative characteristics, for example, whether a country has a set of national guidelines for severe asthma care. Indicators based on qualitative data have scorecards with different maximum values; these values

depend on the characteristics being examined in the Severe Asthma Index.

Several qualitative indicators are dichotomised in the Index, i.e., 1 point may be assigned if a given condition is fulfilled, while a score of 0 is assigned if the condition is not fulfilled.

Following the scoring of the qualitative data, all data points in the Index were normalised on a 0 to 10 scale using a min-max normalisation method. This approach allows for uniform analysis of many different types of data that have originally been recorded on different scales. On the normalised scale, a score of 10 indicates a high level of fulfilment of the Index model's criteria for a given indicator, while a score of 0 indicates a low level of fulfilment.

Following normalisation, country scores for each indicator category were averaged and then multiplied by 10 to give a score out of 100 points. The purpose of the conversion to a 100-point scale on the category level is to reflect smaller differences in country scores that would otherwise be expressed as decimals.

To produce an overall Index score, country scores in each of the indicator categories were averaged and weighted. Once they received validation from the Steering Committee, the following weights were applied to each indicator category when calculating the overall Index score for each country:

- Policy Context – 30%
- Access and Care Coverage – 25%
- Health System Characteristics – 20%
- Disease Burden – 15%
- Environmental Factors – 10%

The weighting approach emphasises elements of the Index that can be directly addressed by decision-makers and key stakeholder groups. The Policy Context and Access and Care Coverage categories are therefore more heavily weighted in the Index because they include indicators that directly reflect factors over which country decision-makers and stakeholders have control. The remaining categories in the Index are less heavily weighted because they are either linked to longer-term health outcomes and health system performance and/or indirect factors impacting severe asthma management and outcomes. The assigned weights aim to reflect the Index's primary ambition to motivate policy actions and adoption of best practices that should improve health outcomes and health system performance and, ultimately, address factors affecting the prevalence and severity of asthma among populations. However, all indicator categories are fundamental to supporting a multifaceted analysis of countries' management and prevention of severe asthma. Future additions of the Index may entail a revision of this weighting approach once a longitudinal analysis of country scores becomes possible. It should also be noted that users of the Severe Asthma Index can download the Index data tool and assign a custom set of weights to the indicator categories.

Analysis of results

The results yielded by the Index data model were compared using descriptive statistics on both the aggregate and individual country levels. Correlation between several indicators was also investigated to determine whether significant relationships exist between any variables.

Important note on scoring in the Severe Asthma Index data model

The Severe Asthma Index is constructed as an ideal and abstract model for severe asthma care and management. In this way, no country is expected to receive a perfect score in the Index. Crucially, the scoring system should not be understood as an expression of how objectively “good” or “bad” a country’s health system is at managing and preventing severe asthma. Rather, the overall Index score and category scores should be understood as indications of how well the country health system approaches and performance concerning severe asthma fit the ideal model that the Severe Asthma Index proposes. Scores also indicate where there may be best practices that country health systems could learn from and adapt to their local needs as well as highlight potential areas for improvement.

Limitations

The Severe Asthma Index is a powerful tool for identifying best practices in severe asthma care and analysing a country’s health system performance against an ideal model for severe asthma care, but it is still bounded by several important limitations that must be kept in mind when exploring the Index insights and the data on which they are built.

Data availability and accuracy

There are significant limitations on the availability, accessibility, and accuracy of severe asthma-related data. In many cases, there is a lack of disaggregation in health data indicating asthma severity. Data fragmentation and a lack of harmonised rules for data reporting and access across the Index countries also create barriers to severe asthma-specific information. In addition, several sources of information may be used to build the dataset for a single indicator. For these reasons, several severe asthma-specific indicators, such as specified hospitalisation data, prescription information, condition prevalence, severe asthma-specific healthcare resource utilisation, and patient treatment adherence, had to be removed from the Severe Asthma Index framework. Moreover, it is crucial to note that country-reported data may in some cases reflect a tendency to underreport or misreport some data or outcomes.

Time lag and time series

The inclusion of various kinds of data in the Index has necessitated the use of data that has been collected at different time points. The Index makes use of the latest data wherever possible, but there is still variance in the time series within and across indicators. Differences in time series in the dataset are always indicated in the Index.

Missing data and imputation

Data points for some countries are not reported or are non-existent. In such instances, data has been imputed by calculating the average value for the given indicator using the reporting countries’ data. Imputed values are indicated in the Index.

Proxy indicators and conceptual accuracy

Several proxy indicators have been developed, in part based on input from the Steering Committee, to approximate data that are not currently directly reported. These proxy indicators may, in some cases, be based on a composite of several sources of data. Proxy indicators and their method of calculation are always listed in the Index.

Generalisation

The whole-country approach of the Severe Asthma Index may risk generalising intra-country differences such as urban/rural divides and differences in regional approaches to care, especially in federalised countries and countries with highly devolved healthcare systems. In addition, nuances related to how countries’ policies

and care access conditions function and are experienced in practice may not be fully expressed, as the Index framework takes a country-wide approach that assesses reported system characteristics rather than the day-to-day operational environment.

COVID-19

Several data points may be influenced by the impact of the COVID-19 pandemic on health system capacity, performance, planning, and access.



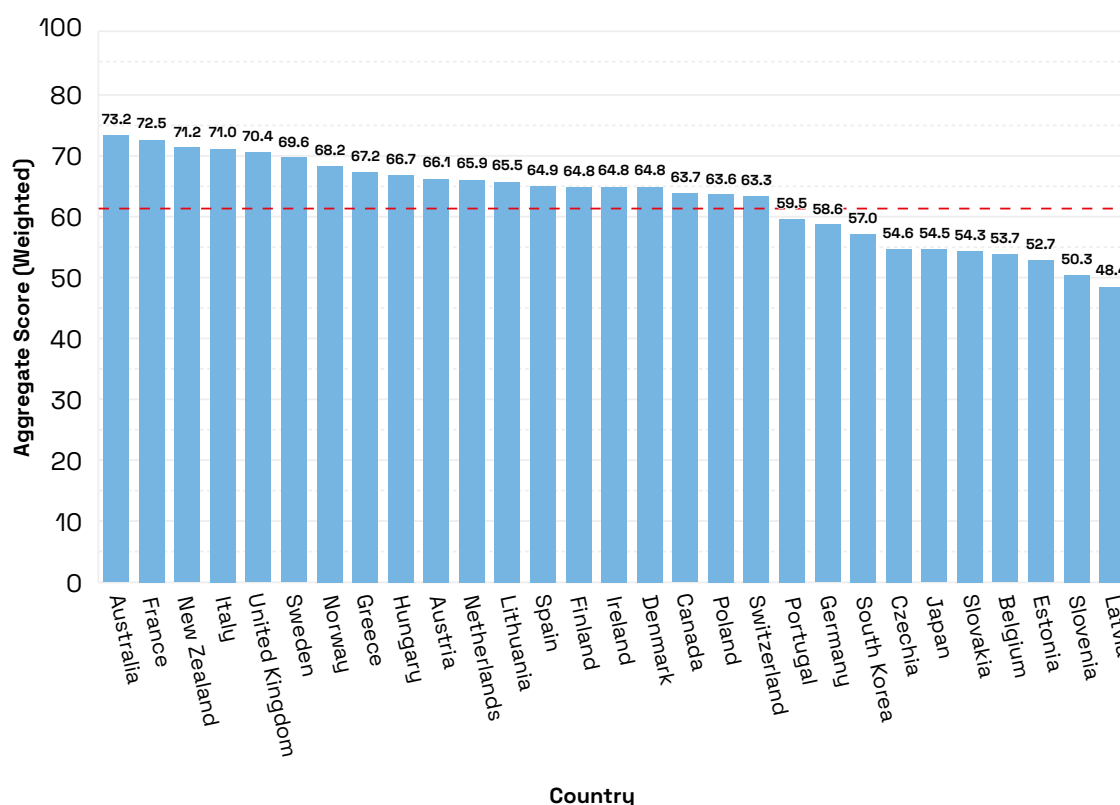
Index Findings

Overall scores

The Severe Asthma Index evaluates countries' health system approaches to the management and prevention of severe asthma across five diverse categories of indicators. The overall average score for all countries is 62.8/100, and the range between country scores is modest at nearly 25 points. However, there are still clear differences in the Index, with Australia scoring the highest (73.2/100) followed closely by France, New Zealand, Italy, and the UK. Conversely, Latvia scored the lowest (48.4/100), followed by Slovenia, Estonia, Belgium, and Slovakia. Importantly, the scores within each indicator category also vary significantly among all countries. Therefore, even the top performers show areas for improvement, and there is no consistently high or low scorer across all Index categories.

Overall, all countries demonstrate some major strengths as well as significant areas for improvement. Notably, a high Policy Context score was the strongest predictor of a high overall score. This is not unexpected, as the Policy Context category has the greatest weight in the Severe Asthma Index, accounting for approximately 30% of the overall score. However, a strong Policy Context score – and, by extension, a more favourable policy environment – is not a guarantor of high scores in the other indicator categories. In addition, it is important to note that the overall scores and category scores provide only a general indication of countries' goodness of fit with the Severe Asthma Index model. Country-level observations in Appendix I provide a more detailed overview of individual indicator scores and thereby insights into additional strengths and areas for improvement among the countries.

Severe Asthma Index Overall Score (Weighted)



Note: This graph provides an overview of aggregate scores, which may generalise some countries' performance. See [Appendix I](#) for more detailed information about country scores within each indicator, as well as notes on where underreporting and misreporting of data may impact results.

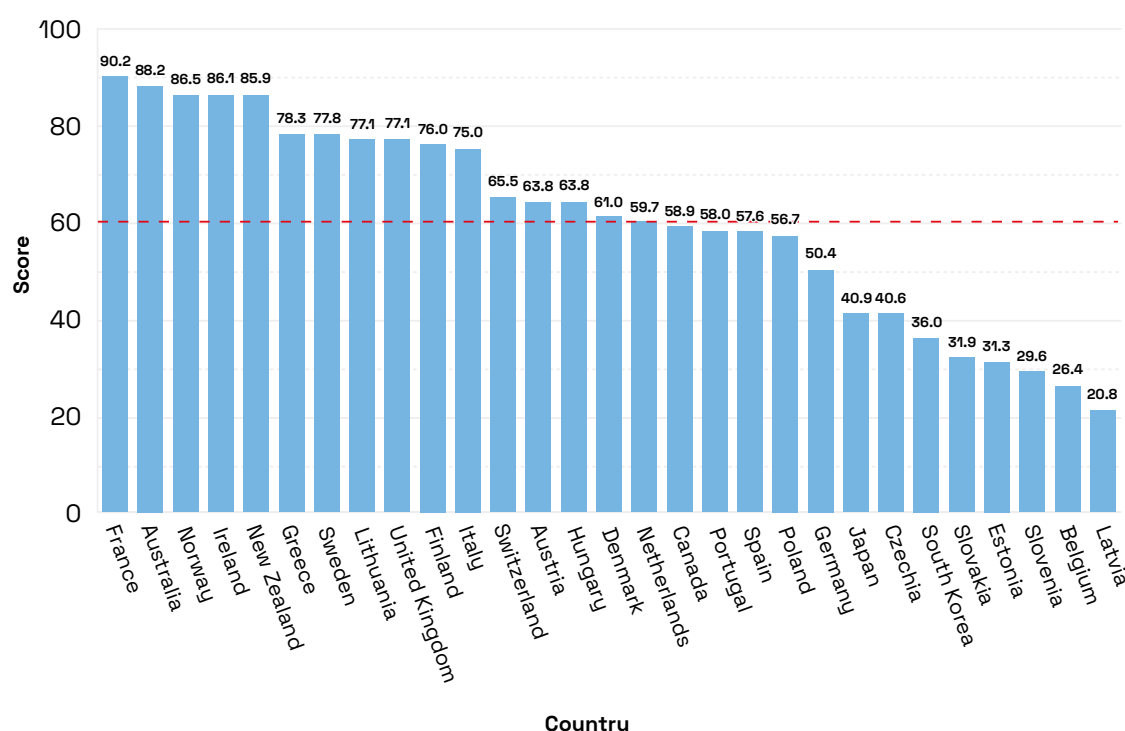
Policy Context

The Policy Context category in the Severe Asthma Index has been found to have the second-lowest average score of 60 points and the greatest range at 69 points. France, Australia, Norway, Ireland, and New Zealand were the top scorers in this category, while Latvia, Belgium, Slovenia, Estonia, and Slovakia were the lowest scorers. Although most countries have some form of guidelines for severe asthma, less than half have a national strategy for asthma control, prevention, and/or management. However, it should be kept in mind that not all country health systems apply a uniform definition of severe asthma, and different practices concerning clinical data collection and coding concerning severe asthma abound. Crucially, of the countries that do have a strategy for asthma, the scope, comprehensiveness, and year of implementation of the strategies vary considerably.

Furthermore, the countries' level of alignment with internationally recognised best practices, which is proxied by GINA's strategy for difficult-to-treat and severe asthma, is, on average, low, i.e., less than five out of 10 possible points. While most countries are reporting data to the International Severe Asthma Registry (ISAR), the quality, scope, and accessibility of data reported to ISAR vary greatly between countries.

In general, the implementation of stronger tobacco control laws could significantly improve country performance in the Policy Context category. This indicates that there is ample room for improvement and increased implementation of best practices in this category, even among the top scorers.

Policy Context



Note: This graph provides an overview of indicator category scores, which may generalise some countries' performance. See [Appendix I](#) for more detailed information about country scores within each indicator, as well as notes on where underreporting and misreporting of data may impact results.

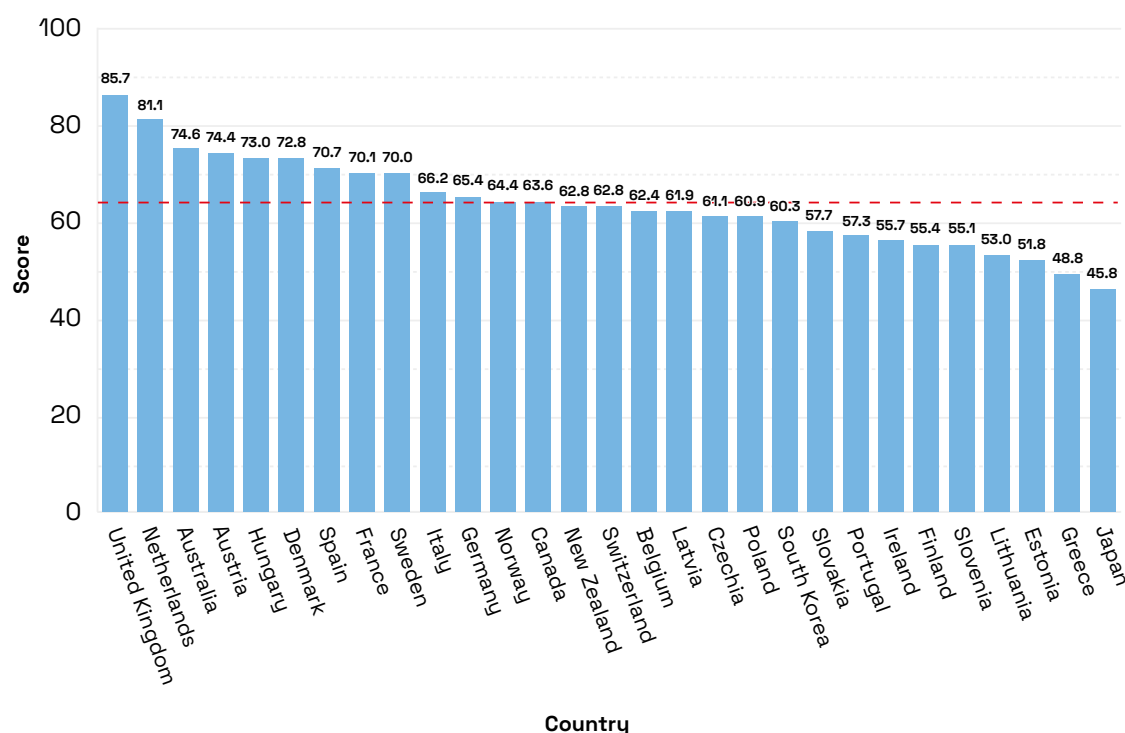
Access and Care Coverage

The Access and Care Coverage category in the Severe Asthma Index has the second largest range between scores at 40 points, with the UK, Netherlands, Australia, Austria, and Hungary emerging as the top scorers, while Japan, Greece, Estonia, Lithuania, and Slovenia scored the lowest. Countries generally demonstrate that health systems offer access to and coverage for a wide range of drugs as well as diagnostic and treatment services for asthma and severe asthma, except for biologics, where reported levels of access and coverage vary substantially among the countries.

Importantly, none of these factors display a strong correlation with the levels of unmet need that populations in each of the countries report, suggesting that ensuring greater equity in concern of severe asthma care and outcomes may require greater attention to both other structural elements of healthcare systems as well as other systemic inequalities.

Findings regarding digital health services were more varied: while COVID-19 increased access to and reimbursement for telehealth services, and all countries in the Index, at a minimum, offer some form of remote care, it remains to be seen whether this will hold over the coming years. Access to digital therapeutics is also limited among the countries in the Index, indicating an area where countries could make gains by improving access to digitally enabled and patient-centric tools and services.

Access and Care Coverage



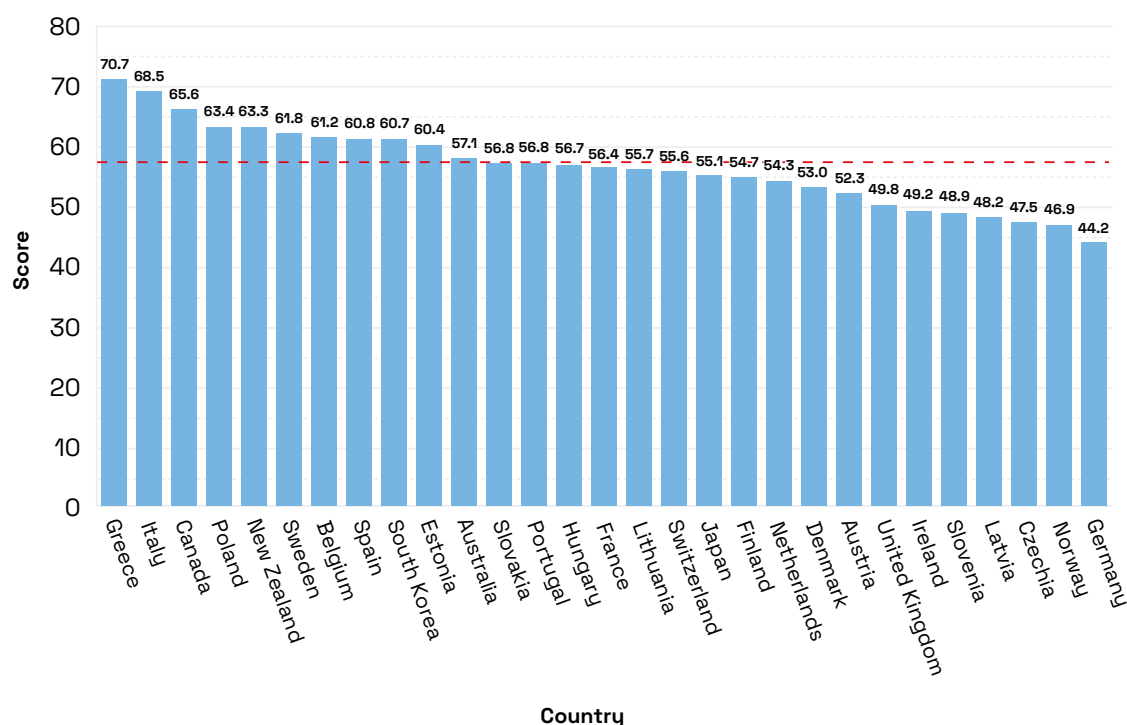
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Health System Characteristics

The Health System Characteristics category displayed the lowest average score and the second smallest range between scores. Greece, Italy, Canada, Slovakia, Poland, and New Zealand were the top performers, while Germany, Norway, Czechia, Latvia, and Slovenia scored the lowest. Asthma-related hospitalisations per 100,000 population vary widely between countries, with a range of over 90 hospitalisations per 100,000 people between the top and bottom scorers. However, neither this indicator nor the number of respiratory specialists per 100,000 population is a strong predictor of the average number of days spent in hospital per asthma-related hospitalisation.

Importantly, most countries report that data related to severe asthma-related hospitalisations and health outcomes for severe asthma patients are disaggregated by age and sex, but few disaggregate by income, ethnicity, and geographic location, which limits more targeted research and insight-building. This highlights an opportunity for country health systems to improve data collection and coding.

Health System Characteristics



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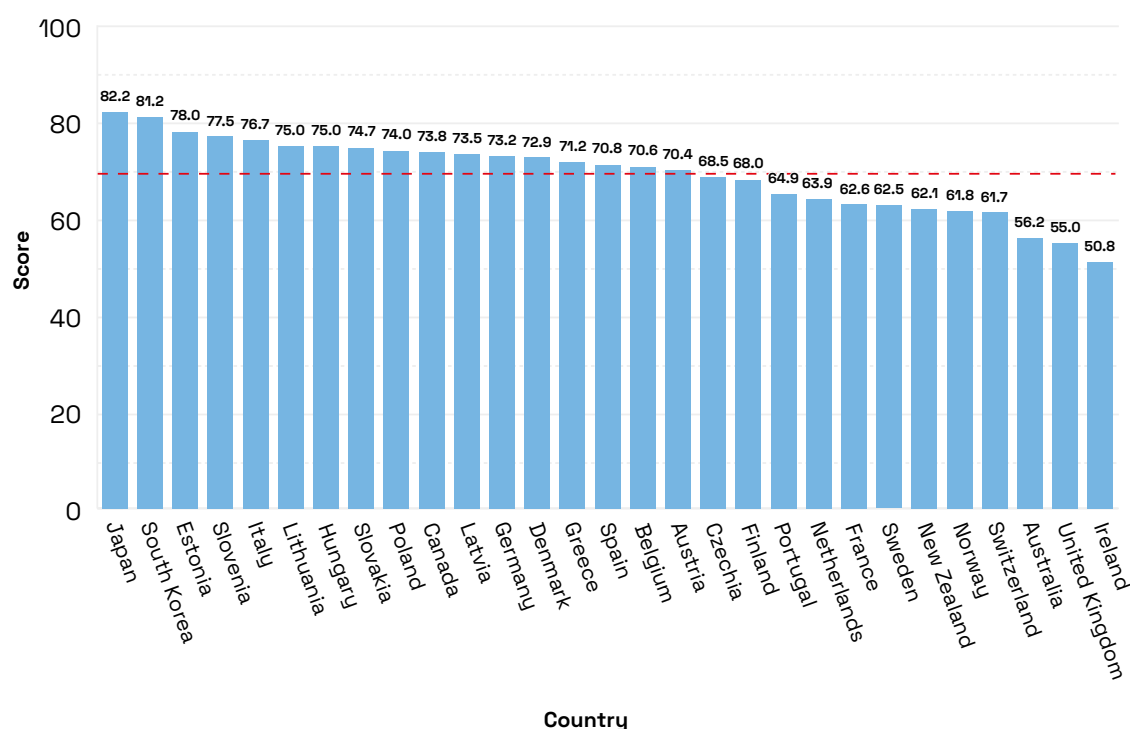
Disease Burden

The Disease Burden category has a relatively high average score of 69/100 points. Japan, South Korea (the Republic of Korea), Estonia, Slovenia, and Italy have the highest scores in this category, while Ireland, the UK, Australia, Switzerland, and Norway scored the least. The estimated societal cost of severe asthma per 100,000 people among the 29 countries, calculated using a modified version of the International Respiratory Coalition's Monetised disability-adjusted life years (DALYs) approach, is relatively high and can go up to over 31 million 2021 international dollars, highlighting not only the burden but need for action in addressing both the immediate and knock-on effects of severe asthma.

The rate of DALYs accountable to asthma varies greatly among the countries. The UK has the highest rate with almost 1.5% of all recorded DALYs, while Lithuania has the lowest at under 0.35% of DALYs. Estimated severe asthma deaths also range considerably among the countries, with New Zealand having sixteen times the rate of estimated severe asthma deaths compared to the highest-scoring country, Lithuania.

The Index also highlights significant room for improvement among almost all countries in terms of lifestyle and behavioural factors that have an impact on asthma severity. Between one in every five and one in every four people are obese in most countries, and in some countries, more than one in every three adults are regular tobacco users. These factors can contribute to a higher disease burden for asthma patients. Addressing these factors could help reduce the disease burden associated with asthma in many countries.

Disease Burden

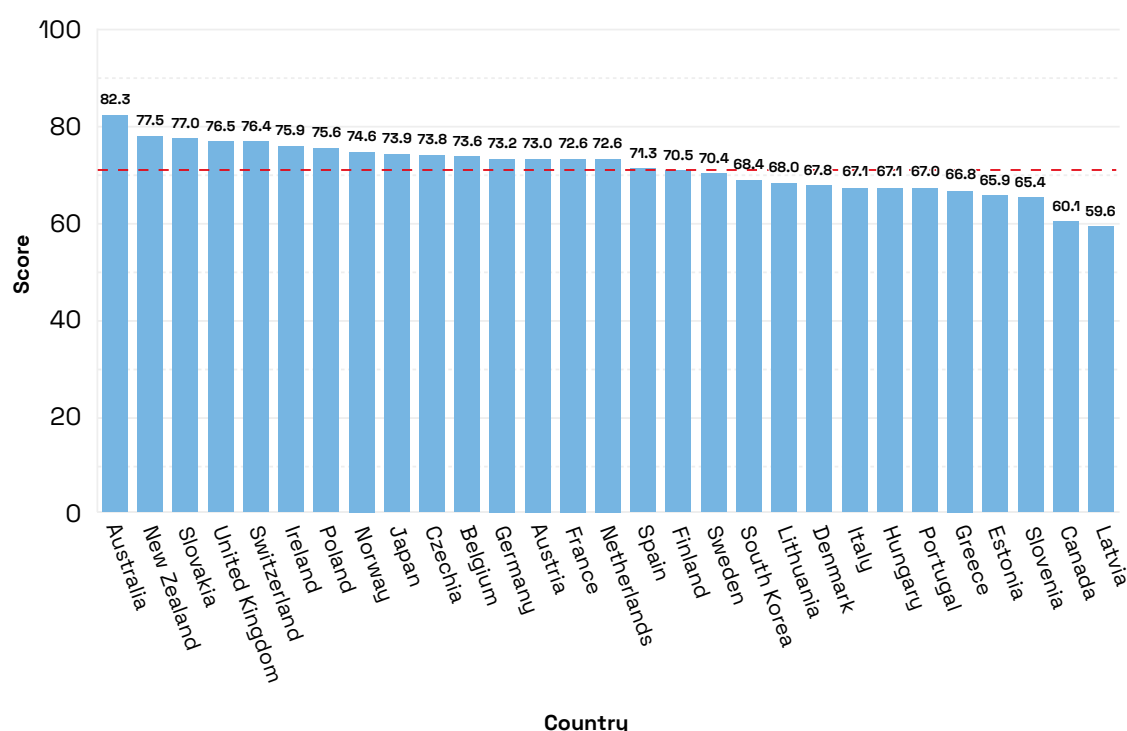


Note: This graph provides an overview of indicator category scores, which may generalise some countries' performance. See [Appendix I](#) for more detailed information about country scores within each indicator, as well as notes on where underreporting and misreporting of data may impact results.

Environmental Factors

The Environmental Factors category has the highest average score and the narrowest range between country scores. Australia, New Zealand, Slovakia, the UK, and Switzerland have the highest scores in this category, while Latvia, Canada, Slovenia, Estonia, and Greece report the lowest scores. There are areas where countries can make considerable improvements to their scores, particularly in indoor air quality and population exposure to particulate matter: one-fifth to one-quarter of some countries' populations report housing conditions linked to poor indoor air quality and exposure to poor outdoor air quality. While surface temperature increase anomaly has a significant impact on country Environmental Factors scores, it is a variable that is subject to marked changes from year to year, which should be kept in mind when evaluating outcomes in this category.

Environmental Factors



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Discussion

Overall, data from this first edition of the Severe Asthma Index suggest that severe asthma remains an inconsistently defined and inadequately prioritised condition in many countries. While it has long been widely recognised that severe asthma constitutes a significant economic and social burden [4], and that there is a high level of unmet healthcare needs reported among severe asthma patients [5], the lack of comprehensive, coherent, and well-implemented national strategies for asthma (and the even greater lack of focus on severe asthma) illustrates a large gap that policymakers and other relevant health system stakeholders should be called upon to fill to the best of their ability.

Crucially, the Index findings also suggest and support existing claims that countries and their relevant health system stakeholders could also make progress in severe asthma control and prevention by undertaking actions that are external to often slow and rigid policy processes, e.g., implementation and strengthening of care guidelines [6], expanding access to more patient-oriented (and increasingly digital) services [7], and addressing behavioural and lifestyle factors [8],[9].

Ultimately, the Index findings emphasise the need for a comprehensive, “whole system” approach to severe asthma. By encouraging all stakeholders – not only healthcare professionals – to address and prioritise severe asthma as the complex and burdensome chronic condition it is, the Severe Asthma Index aspires to support the creation of innovative, collaborative, cross-border, and comprehensive solutions to a crucial but currently overlooked global health issue.

Finally, it is crucial to note that the Index and its findings are both informed and limited by the highly variable level of data availability between countries as well as considerable inconsistencies in how countries report data pertaining to severe asthma both in clinical and non-clinical settings. In future editions of the Index, there is an ambition to examine additional clinical indicators that are more severe asthma-specific, track how country approaches have changed over time, identify the impacts those changes have on health outcomes and health system performance, and pinpoint additional non-clinical factors that may have a significant relationship to the improvement of asthma and severe asthma care. Several recommendations and calls to action that aim to address the limitations that currently prevent this are proposed in the final section of this report.

Conclusion

The Severe Asthma Index illustrates a need for increased focus on and prioritisation of severe asthma among most of the country health systems examined, as well as identifies country health system strengths and areas for improvement in terms of management and prevention of severe asthma. The following observations can be made in summary:

There is a need for a “whole system” approach

Severe asthma is not just a clinical phenomenon. Patient outcomes and experiences both impact and are impacted by a multitude of systemic, policy, and environmental factors. There is a need for a “whole system” approach to effectively manage severe asthma among country populations. The Health in All Policies (HiAP) approach, championed by WHO, may provide a basis for future work in this area.

Severe asthma has high societal costs, so addressing its burden stands to have positive knock-on effects

The estimated societal cost of severe asthma is significant in many countries. Addressing the burden of asthma and, in particular, severe asthma may have marked impacts on healthcare resource usage, productivity loss, and health outcomes even over the medium term (five to 10 years). Solutions in this area also stand to have other positive public health knock-on effects. Crucially, improved country-level monitoring and more consistent analyses of the economic and societal impacts of severe asthma are needed to drive these efforts.

There is a need for standardised and consistent reporting of asthma data

There are vastly different standards in the reporting of asthma data. Differing clinical definitions of and health system approaches to severe asthma lead to inconsistent reporting around health outcomes and patient experience. This makes it difficult to ascertain the full impact of severe asthma on patients as well as health systems and society at large. A standardised definition of severe asthma, greater alignment with internationally recognised best practices, standards, and guidelines, and a higher level of disaggregation in datasets could improve the insight of policymakers and healthcare professionals and support more robust and fit-for-purpose approaches to asthma and severe asthma care.

There is potential to improve resource allocation efficiency in healthcare systems

Access to quality care varies significantly, even in a group of comparatively wealthy and developed countries. Care pathways and reimbursement policies – rather than lack of resources – in many cases make the difference in experience and outcomes in severe asthma care.

Focus is needed on individualisation and health behaviour in asthma care

A focus on individualised asthma care and behavioural change, e.g., through social prescribing and focus on appropriate physical activity, stands to significantly benefit both individuals and health systems.

In addition to providing policymakers and other stakeholders with a tool for building insights and driving policy work in the asthma space, the Severe Asthma Index aims to strengthen the commitment of both public and private sector decision-makers to take both long- and short-term actions to improve health outcomes and quality of life for asthma patients and ensure the sustainability of health systems.

Finally, we propose several recommendations and calls to action that are intended to: (1) facilitate action and collaboration among relevant stakeholders in addressing the burden of severe asthma (2) support the development of a more robust and comprehensive future edition of the Severe Asthma Index, and – most importantly – (3) enable more comprehensive intra- and cross-country studies in all aspects of severe asthma research.

All relevant stakeholders are called upon to:

Ensure the implementation of coherent, long-term strategies and guidelines for severe asthma

Despite the marked economic, social, and human impacts of severe asthma, it remains an under-prioritised disease area in many countries. Policymakers and civil society representatives should collaborate to develop robust, comprehensive strategies for managing and preventing severe asthma that emphasise sustainability, and long-term improvement, as well as mechanisms for continuous learning, evaluation, and building the capacity to adapt to changing circumstances and patient needs. In addition, key national stakeholders should work to not only implement national guidelines that are built on international best practices (such as those defined in the GINA Strategy) but also ensure that the guidelines are used in practice. Aligning on a uniform definition of severe asthma and prioritising cross-country, interdisciplinary, and public-private collaborations should also underpin these efforts.

Emphasise the role of prevention and early intervention in severe asthma care

The complexity and burden of severe asthma demand an approach that addresses the disease from several angles, even prior to diagnosis. Policymakers and other stakeholders should undertake efforts to prevent severe asthma by improving access to diagnostics and specialist care through the elimination of financial and geographic boundaries with the help of more equitable funding models and the use of digital solutions. In addition, stakeholders should support the development and implementation of policies that may impact asthma control and outcomes such as those related to the improvement of air quality, tobacco control, and other social and non-clinical determinants of health.

Implement standardised reporting protocols and improve access to severe asthma-related data

The large potential for improvement of severe asthma outcomes, new research and development of data-driven severe asthma policies is limited by insufficient reporting of and access to severe asthma-specific data. Health policymakers and health system stakeholders should ensure to the greatest possible extent that data are consistently and correctly reported, and that data – without compromising patient rights or privacy – are made publicly accessible to support more efficient academic research, bolster health policy making, and facilitate improved allocation of health system resources. This could include but is not limited to, severe asthma-specific hospitalisation data, prescription dispensing data, and patient-reported outcome and experience data.

Empower patients and educate the public about the impact of severe asthma

The inherently human dimension of asthma and severe asthma needs greater recognition and must be acted upon. Patients should receive the support, education, and resources that enable their empowerment. This can be driven through policy initiatives that increase financial and institutional support for patient organisations, implement patient-centric care models, provide additional opportunities for self-management, and improve monitoring and reporting on care quality, health outcomes, and patient experience.

Disclosures

Sanofi and Regeneron commissioned the creation of the Severe Asthma Index. However, the Copenhagen Institute for Futures Studies independently researched and subsequently developed all the insights and recommendations contained within the Index. Financial support was provided by Sanofi and Regeneron.

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Appendix I: Country Overviews

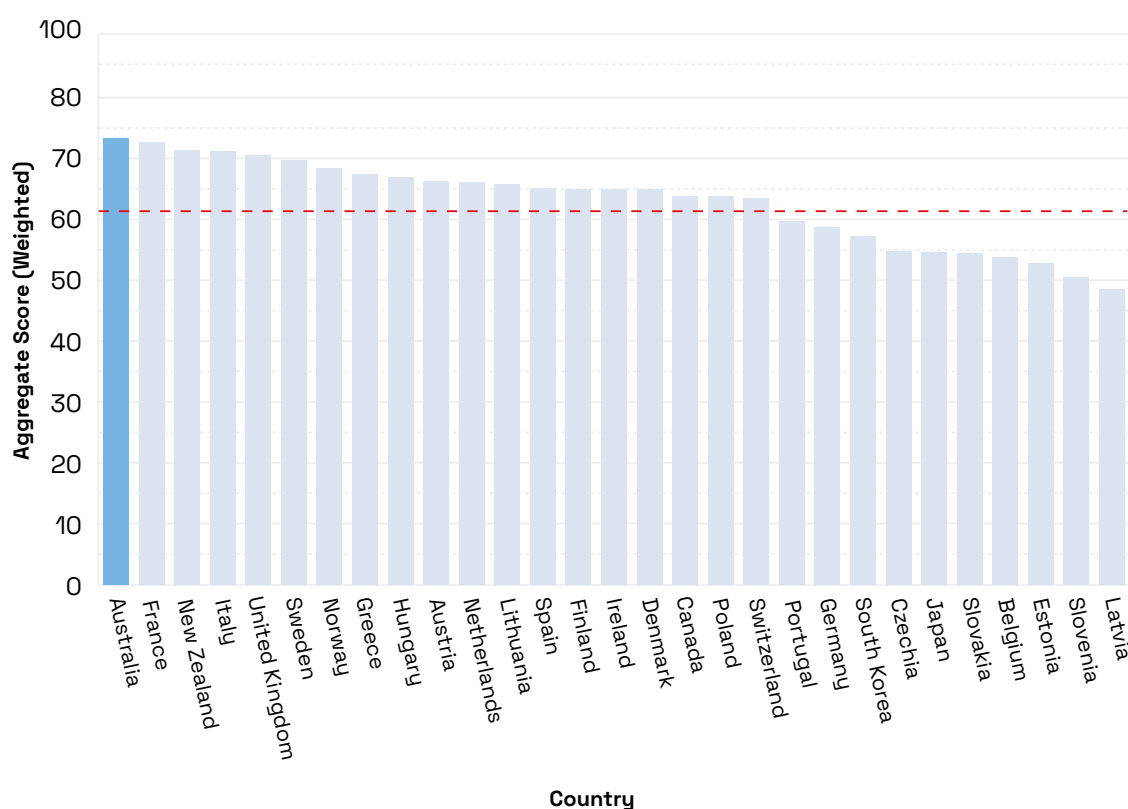


Australia

Australia scores highest on overall performance in the Severe Asthma Index. In particular, Australia scores highly in Access and Care Coverage due to extensive access to treatments, diagnostics, and specialist care. However, its score could be further improved by addressing its comparatively low level of access to biologics and some types of diagnostics. The country is one of the top scorers in the Policy Context category, with a strong level of implementation of asthma strategies and tobacco control policies, although it reports limited alignment with best practices in care. Australia displays one of the lowest scores in Disease Burden, with the highest rate of asthma-associated DALYs, the second highest rate of deaths, and a high obesity rate.

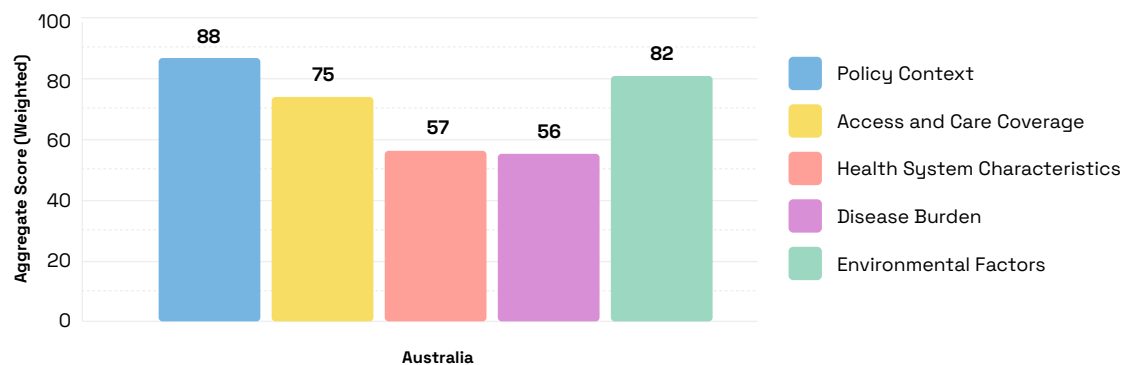
- Highest overall score in the Severe Asthma Index
- Ranks highly in Access and Care Coverage
- Highest rate of DALYs attributable to asthma

Country data



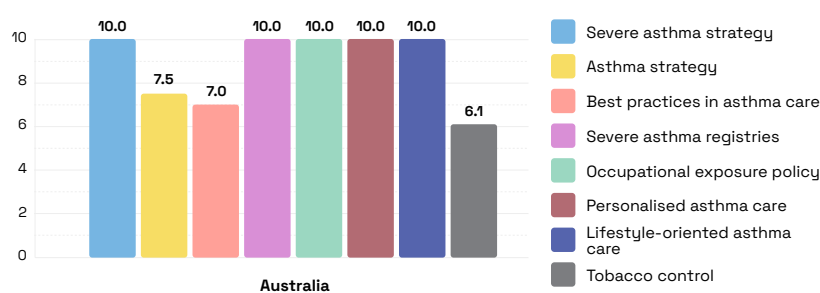
Overall Score
73.2

Rank
1



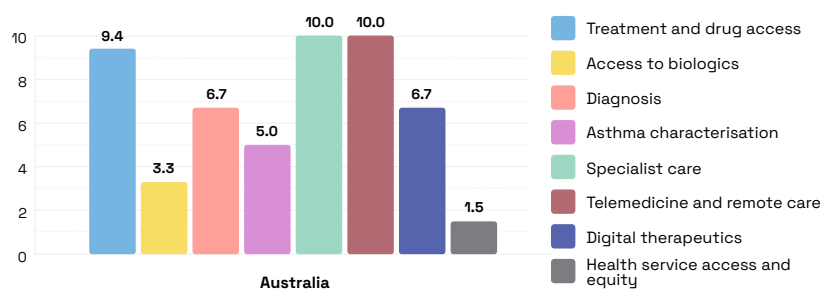
Policy Context

Score **88.0**



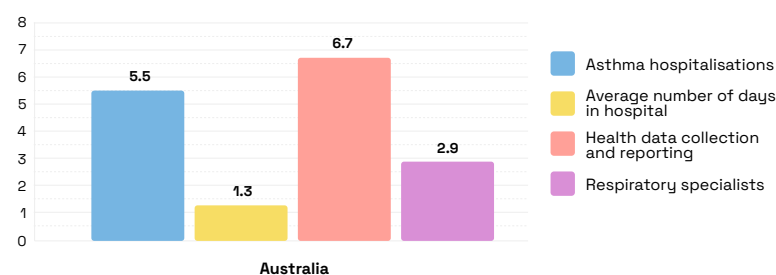
Access and Care Coverage

Score **75.0**



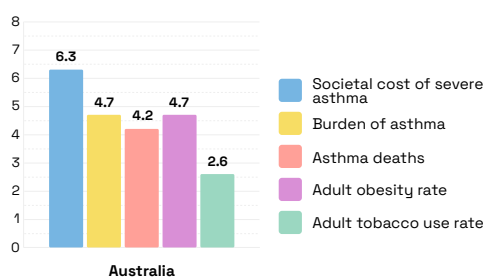
Health System Characteristics

Score **57.0**



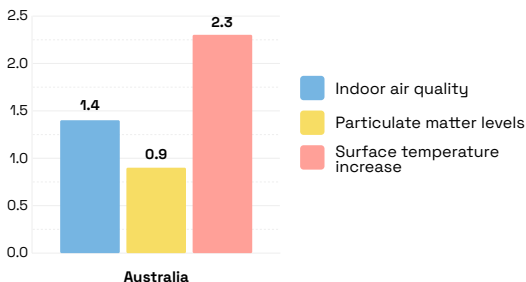
Disease Burden

Score **56.0**



Environmental Factors

Score **82.0**



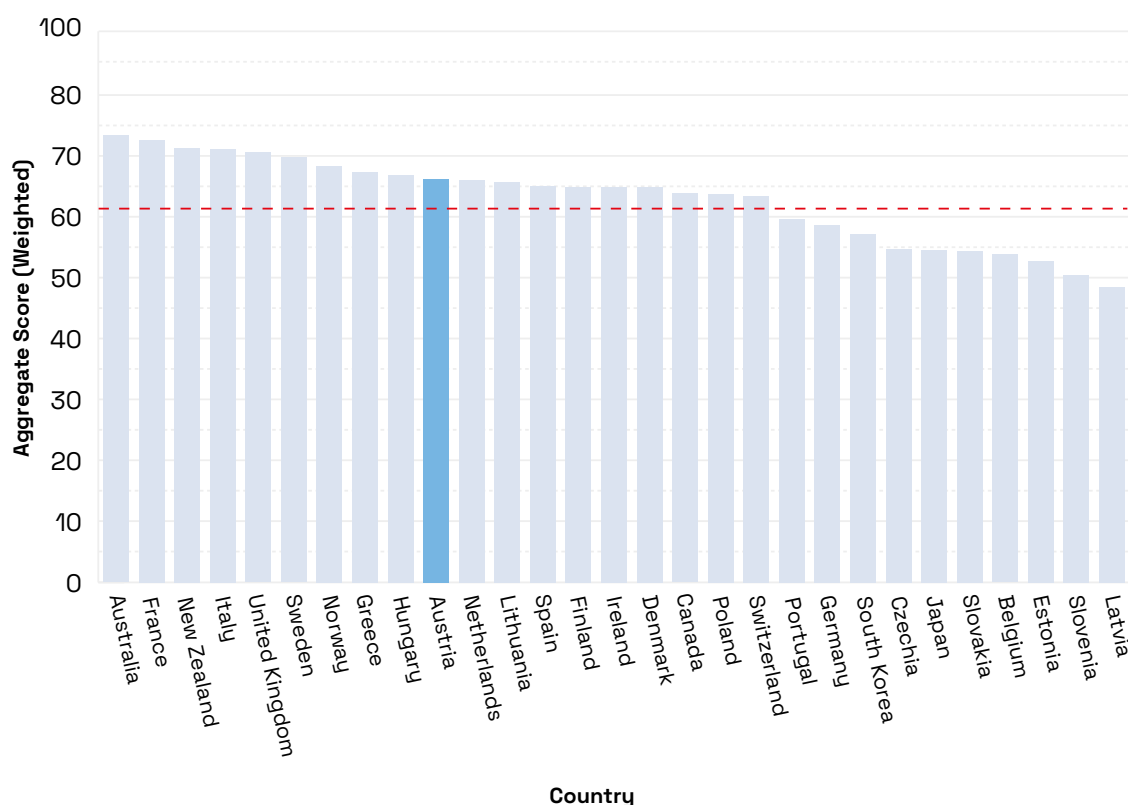


Austria

Austria is among the top scorers in Access and Care Coverage, with relatively high access to treatment (though limited access to biologics) and diagnostics as well as to digital therapeutics and telemedicine and the population reports that healthcare service needs are well met. On the other hand, Austria ranks lower in Policy Context, though higher than the average, with a relatively high implementation of strategies for severe asthma. This score is limited by the lack of a national asthma strategy and limited alignment of guidelines with best practices and tobacco control policies. In terms of Health System Characteristics, Austria has significant room for improvement with a high number of asthma-related hospitalisations and average number of days spent in hospital.

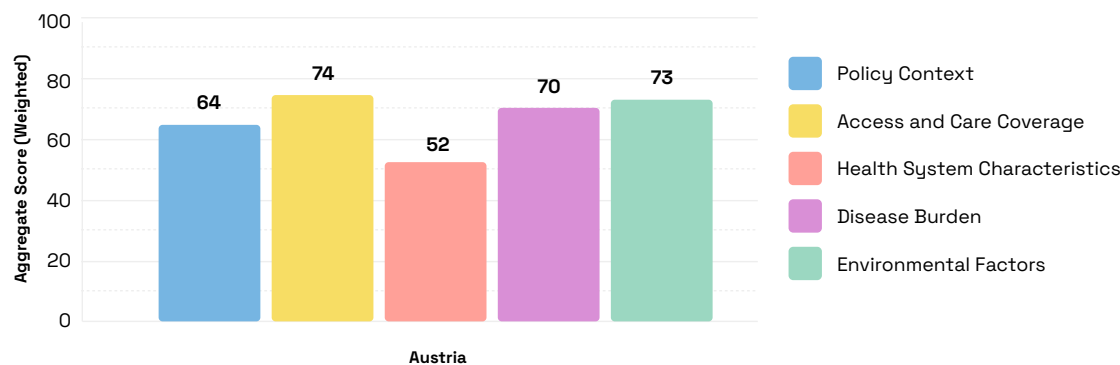
- Relatively high Access and Care Coverage score
- Population reports that healthcare service needs are largely met
- High number of hospitalisations and average number of days spent in the hospital

Country data



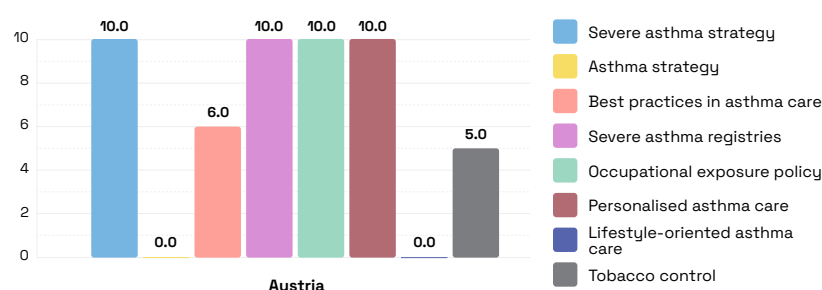
Overall Score
66.1

Rank
10



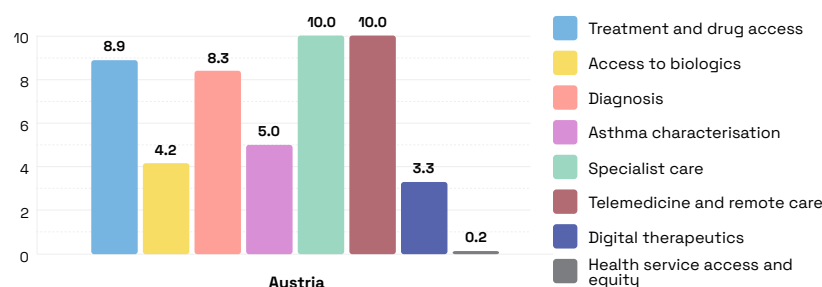
Policy Context

Score **64.0**



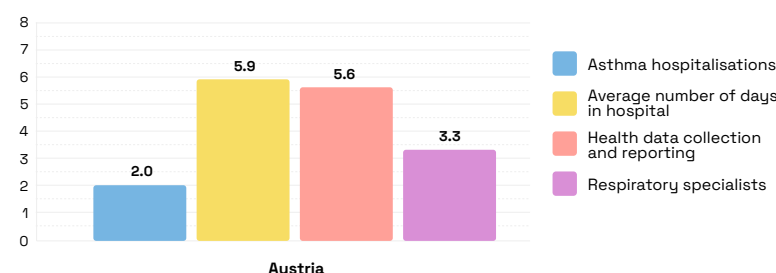
Access and Care Coverage

Score **74.0**



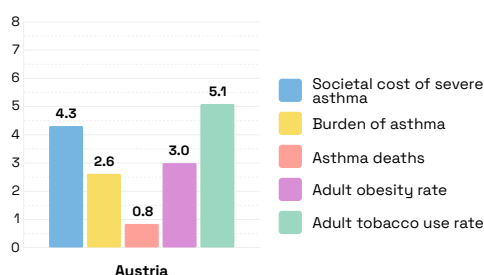
Health System Characteristics

Score **52.0**



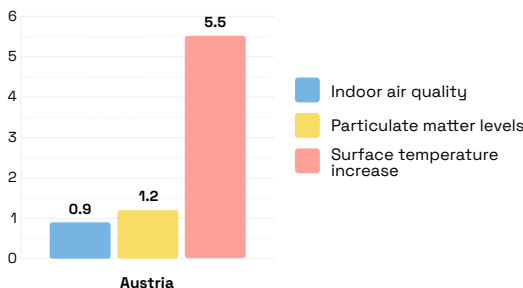
Disease Burden

Score **70.0**



Environmental Factors

Score **73.0**



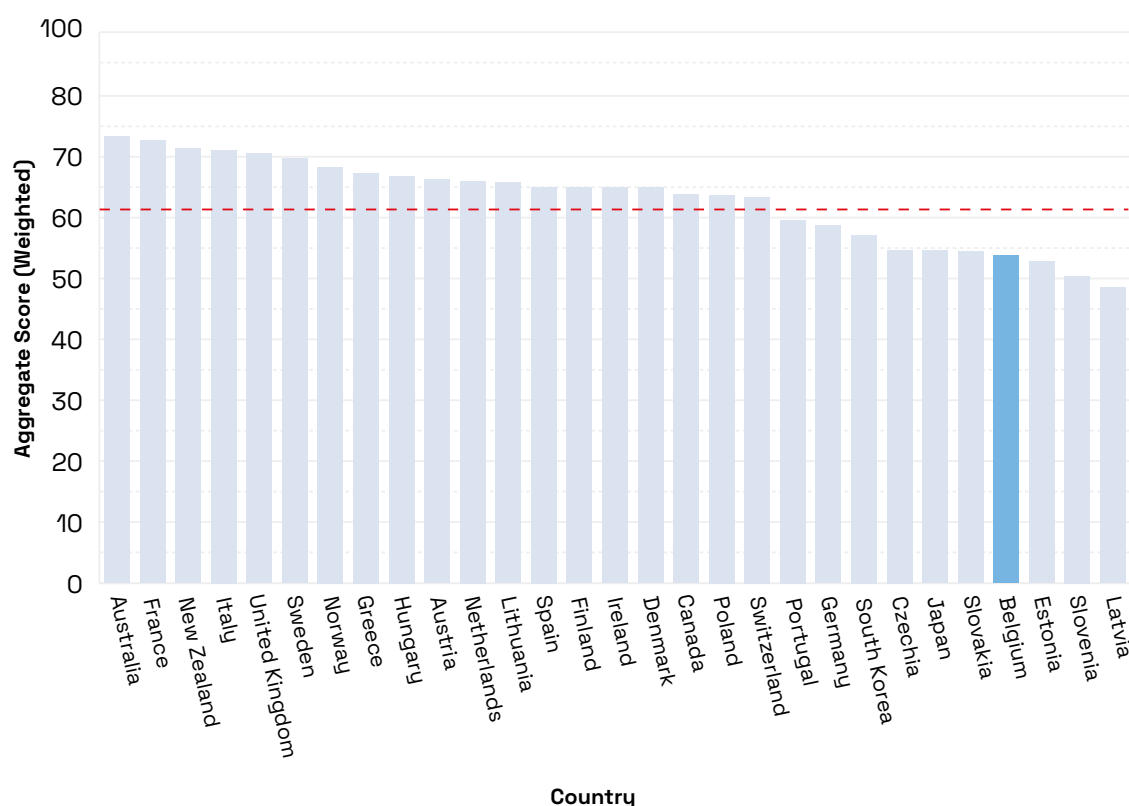


Belgium

Belgium has a relatively high score within the Health System Characteristics category, especially in relation to the number of respiratory specialists, the number of hospitalisations due to asthma, and the average number of days spent in the hospital. However, Belgium scores low in the Policy Context category due to a lack of an asthma strategy and severe asthma guidelines. In terms of Access and Care Coverage, Belgium scores slightly below the average, with low access to treatments and specialist care, which is balanced by below-average levels of unmet needs reported and adequate access to diagnostics.

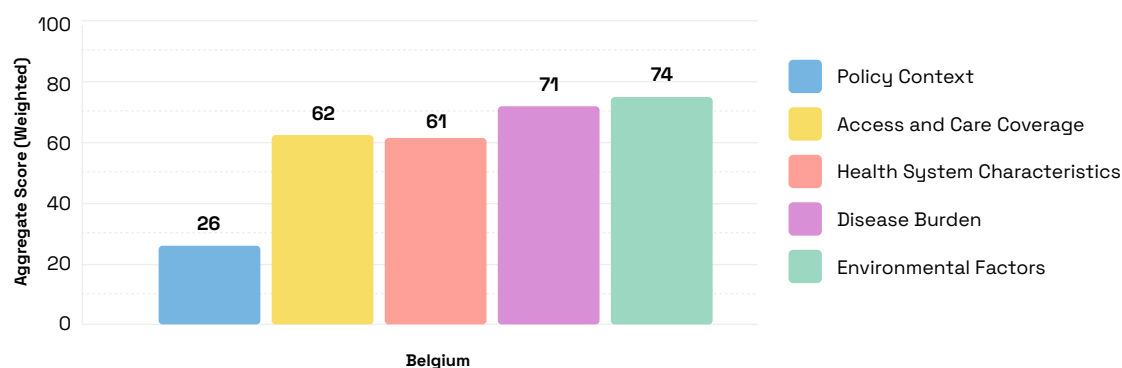
- Relatively low numbers of hospitalisations
- Adequate amount of respiratory specialists
- A national asthma strategy and better alignment with international best practices for severe asthma care could improve Belgium's score

Country data



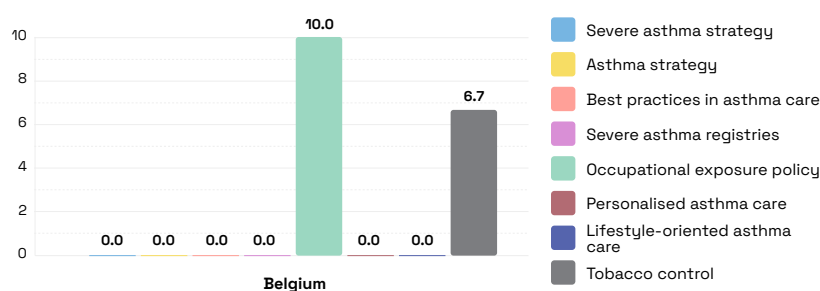
Overall Score
53.7

Rank
26



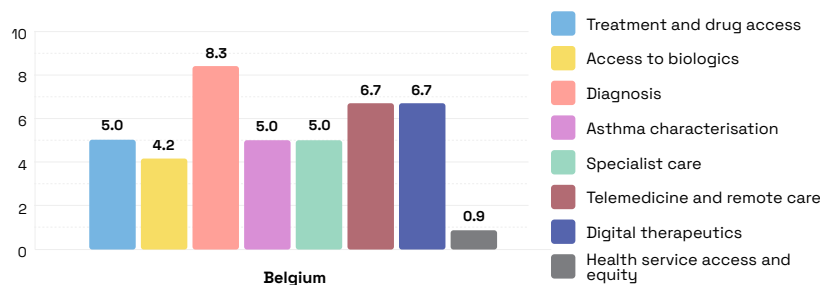
Policy Context

Score **26.0**



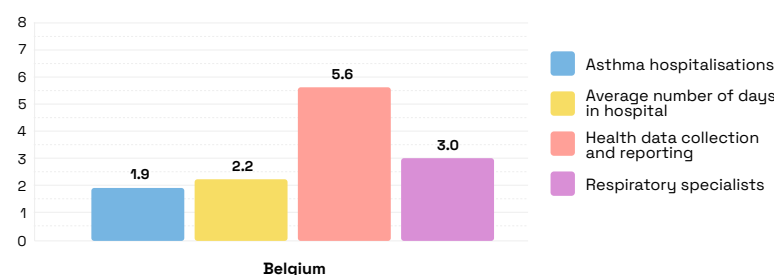
Access and Care Coverage

Score **62.0**



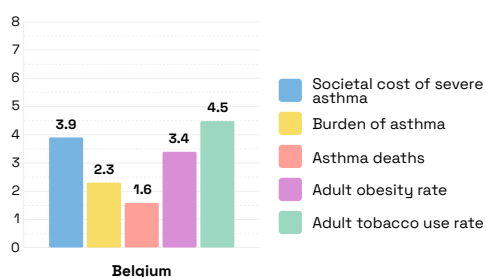
Health System Characteristics

Score **61.0**



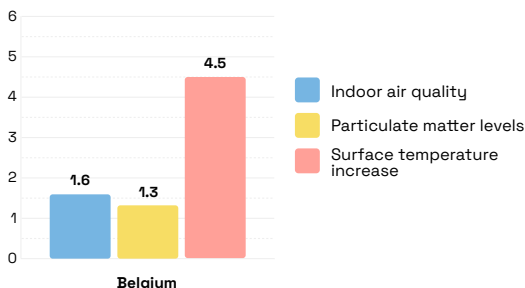
Disease Burden

Score **71.0**



Environmental Factors

Score **74.0**

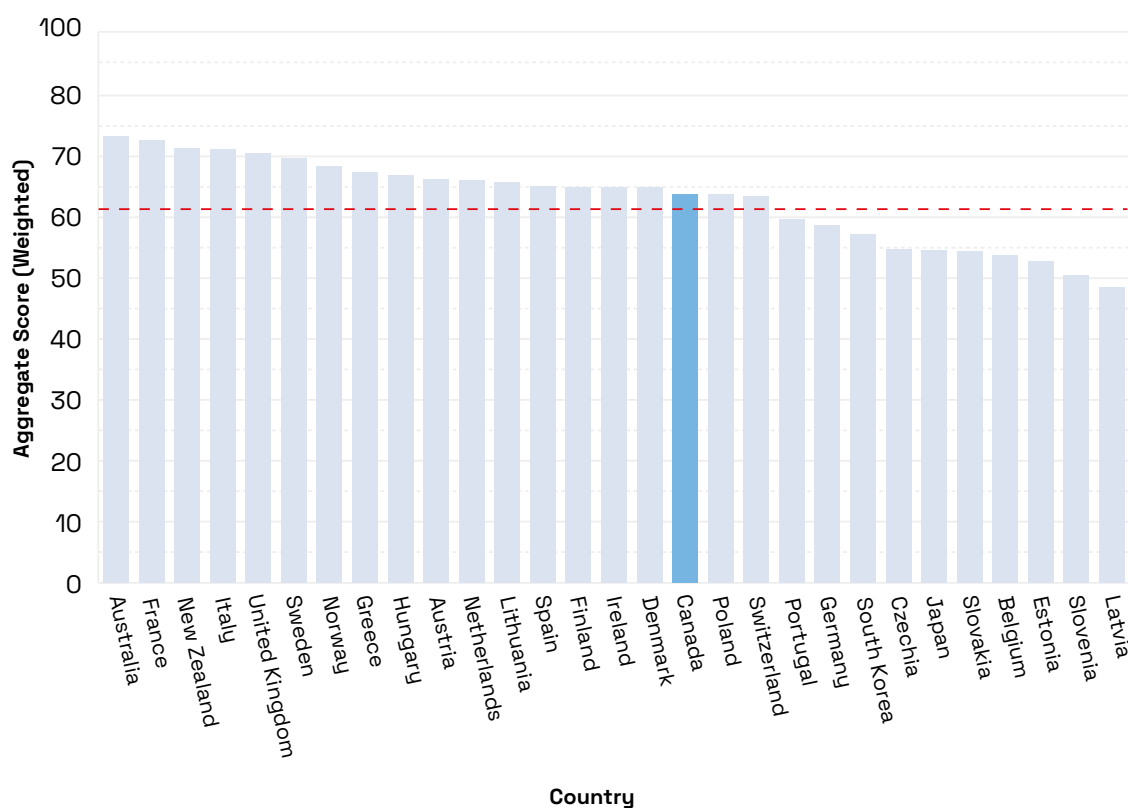


Canada

Canada scores just below the average in terms of Policy Context, despite having implemented a relatively comprehensive asthma strategy, severe asthma care guidelines, and tobacco control laws. Canada also scores highly in Health System Characteristics mainly due to a low number of asthma-related hospitalisations and an average number of days spent in the hospital. On the other hand, Canada's score in Access and Care Coverage is only slightly above average, with high access to treatment and inflammatory phenotyping-based diagnostics being tempered by limited access to FeNO and specialist care, as well as having one of the highest unmet needs.

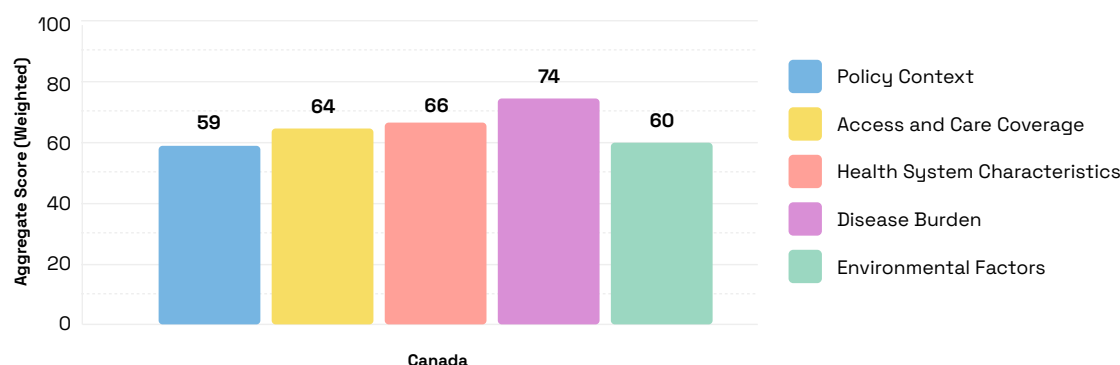
- Canada has a comparatively comprehensive asthma strategy and good alignment with international best practices for severe asthma care
- Low number of asthma-related hospitalisations and days spent in hospital
- High level of unmet needs reported

Country data



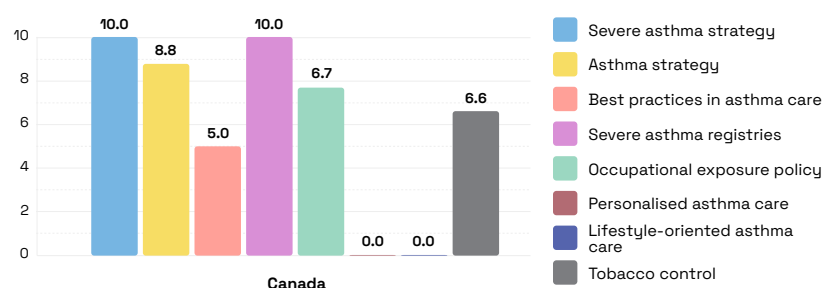
Overall Score
63.7

Rank
17



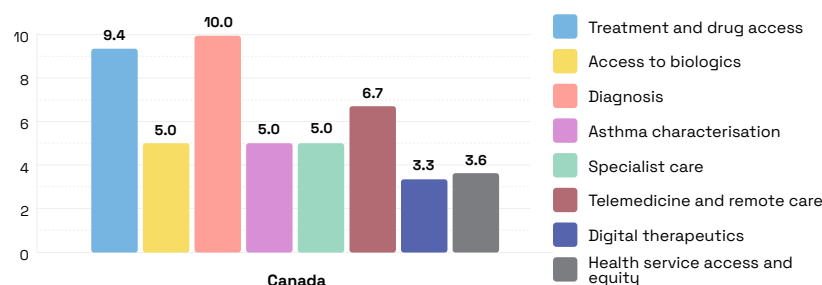
Policy Context

Score **59.0**



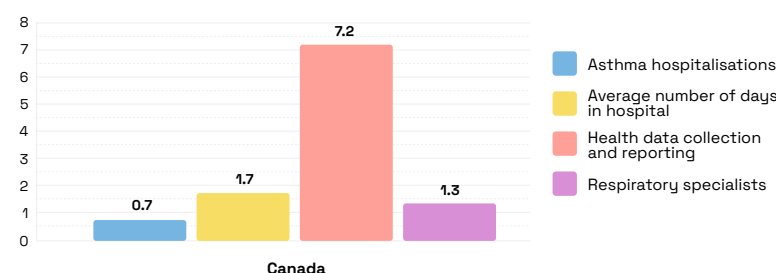
Access and Care Coverage

Score **64.0**



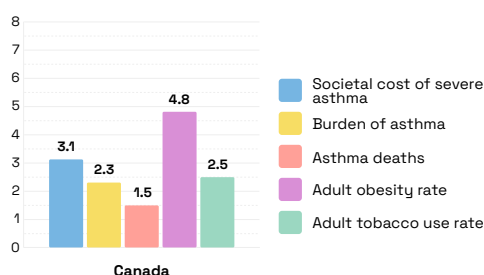
Health System Characteristics

Score **66.0**



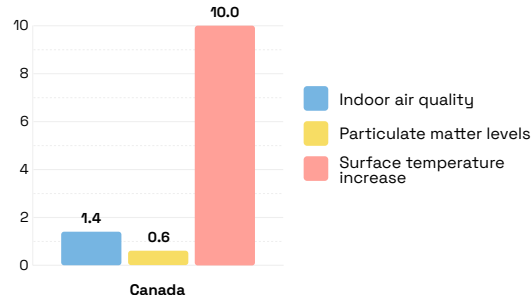
Disease Burden

Score **74.0**



Environmental Factors

Score **60.0**



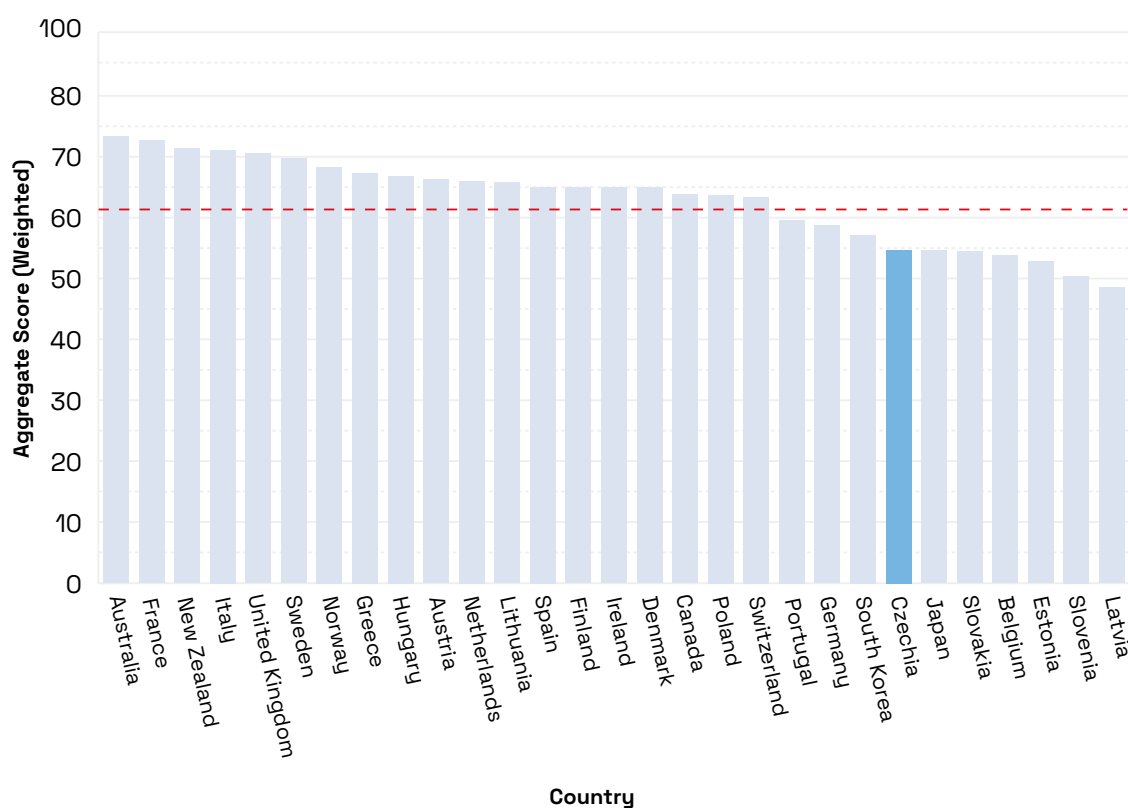


Czechia

Czechia is among the lowest scorers in terms of Policy Context due to a lack of national strategy for asthma, a moderate level of alignment with best practices for severe asthma care, a lack of reporting to asthma registries, and moderate tobacco control. This is compounded by a low score in Health System Characteristics, which is attributable to a high average number of days spent in hospital despite a moderate number of hospitalisations, though Czechia reports a relatively high number of respiratory specialists. Czechia's score is slightly below the average within Environmental Factors though it shows one of the highest levels of indoor air quality.

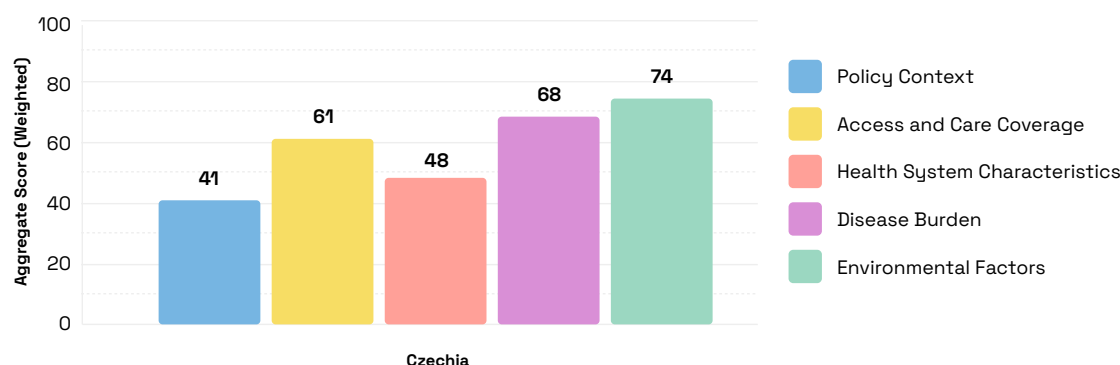
- High average number of days spent in hospital
- Lack of implementation of a national strategy for asthma and alignment with best practices.
- Relatively high indoor air quality

Country data



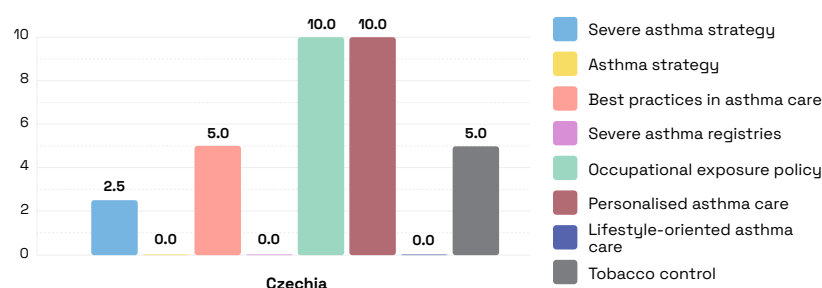
Overall Score
54.6

Rank
26



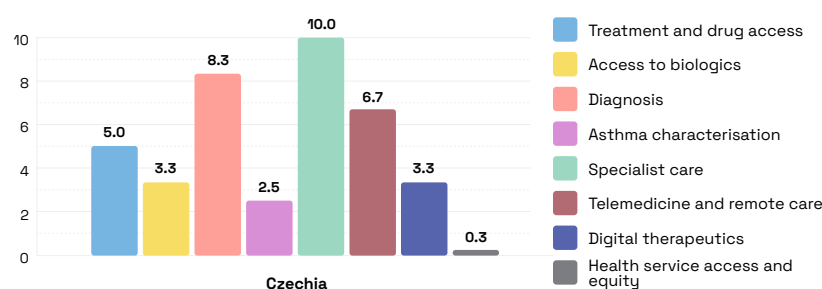
Policy Context

Score **41.0**



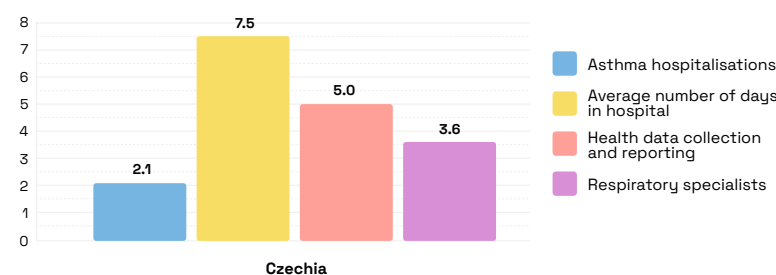
Access and Care Coverage

Score **61.0**



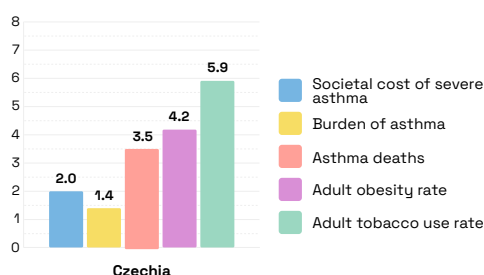
Health System Characteristics

Score **48.0**



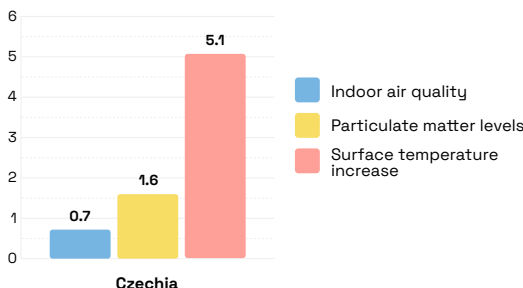
Disease Burden

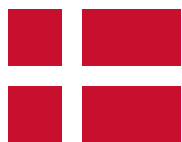
Score **68.0**



Environmental Factors

Score **74.0**



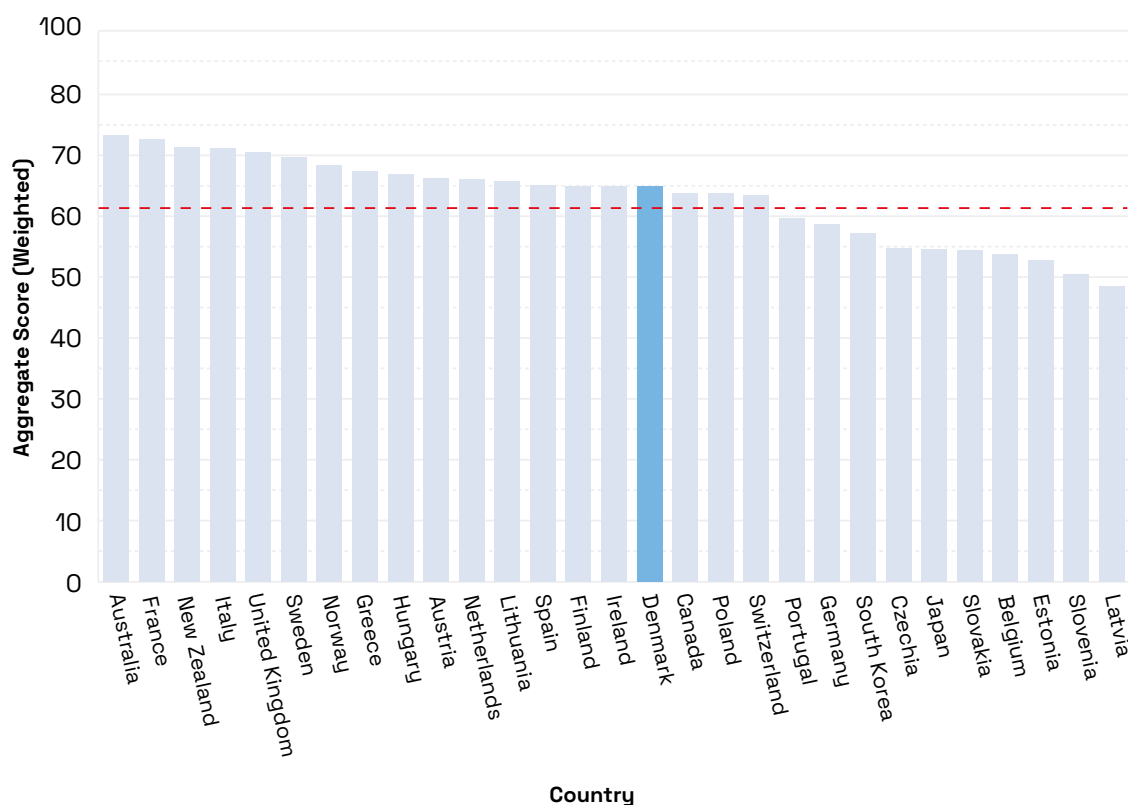


Denmark

Denmark scores slightly above average in the Policy Context category due to comparatively comprehensive guidelines for severe asthma care. However, this is balanced by the lack of a national asthma strategy as well as limited alignment of asthma care with international best practices and average tobacco control laws. Denmark is one of the top scorers in Access and Care Coverage, which includes high access to treatment, diagnosis, specialist care, and telemedicine. On the other hand, while Denmark reports one of the lowest average number of days spent in hospital, it also reports one of the highest numbers of asthma-related hospitalisations. Denmark's Disease Burden score is also slightly above average, due to a comparatively high estimated societal cost of severe asthma, slightly below average asthma DALYs, and one of the highest percentages of deaths attributable to asthma.

- Denmark could benefit from the development and implementation of a national asthma strategy
- One of the lowest average number of days spent in hospital
- High proportion of deaths due to asthma

Country data

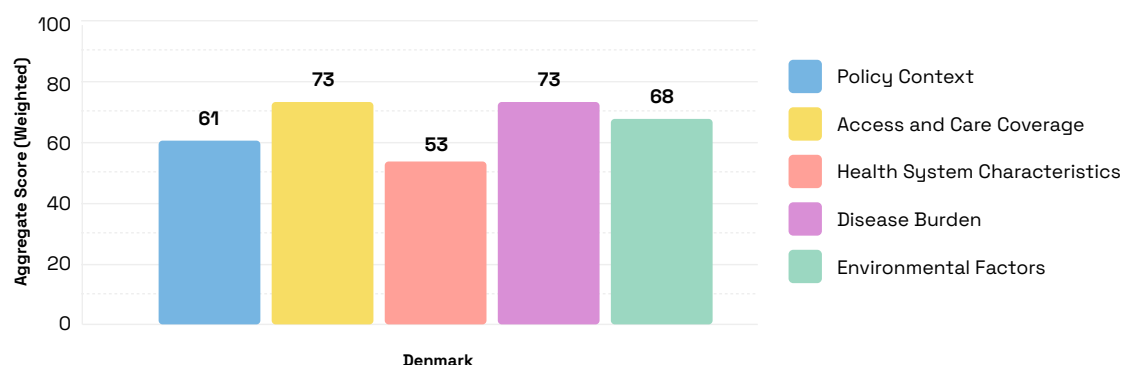


Overall Score

64.8

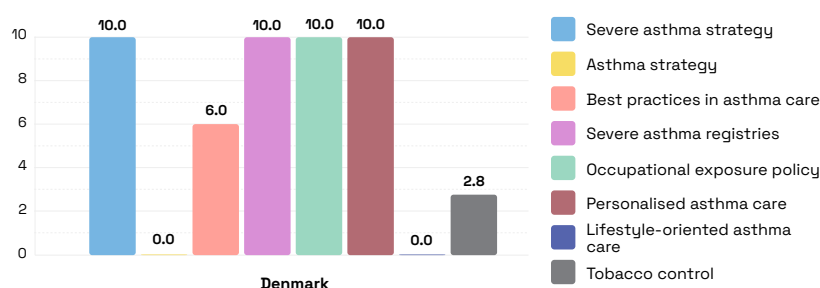
Rank

16



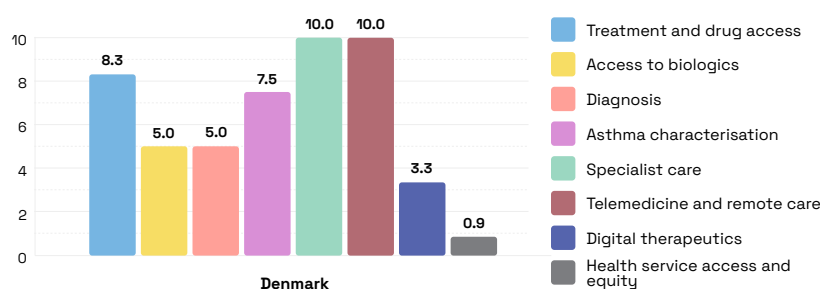
Policy Context

Score **61.0**



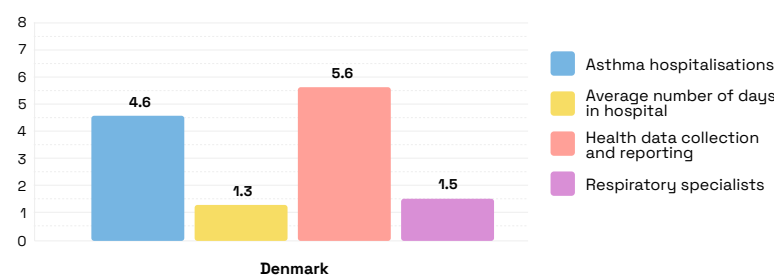
Access and Care Coverage

Score **73.0**



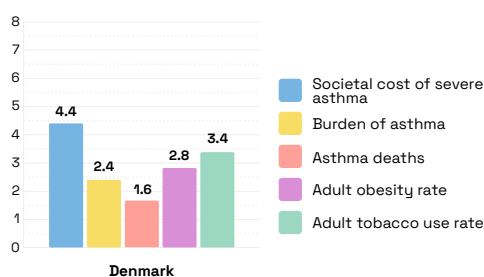
Health System Characteristics

Score **53.0**



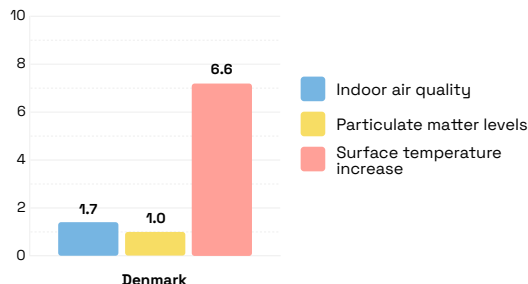
Disease Burden

Score **73.0**



Environmental Factors

Score **68.0**



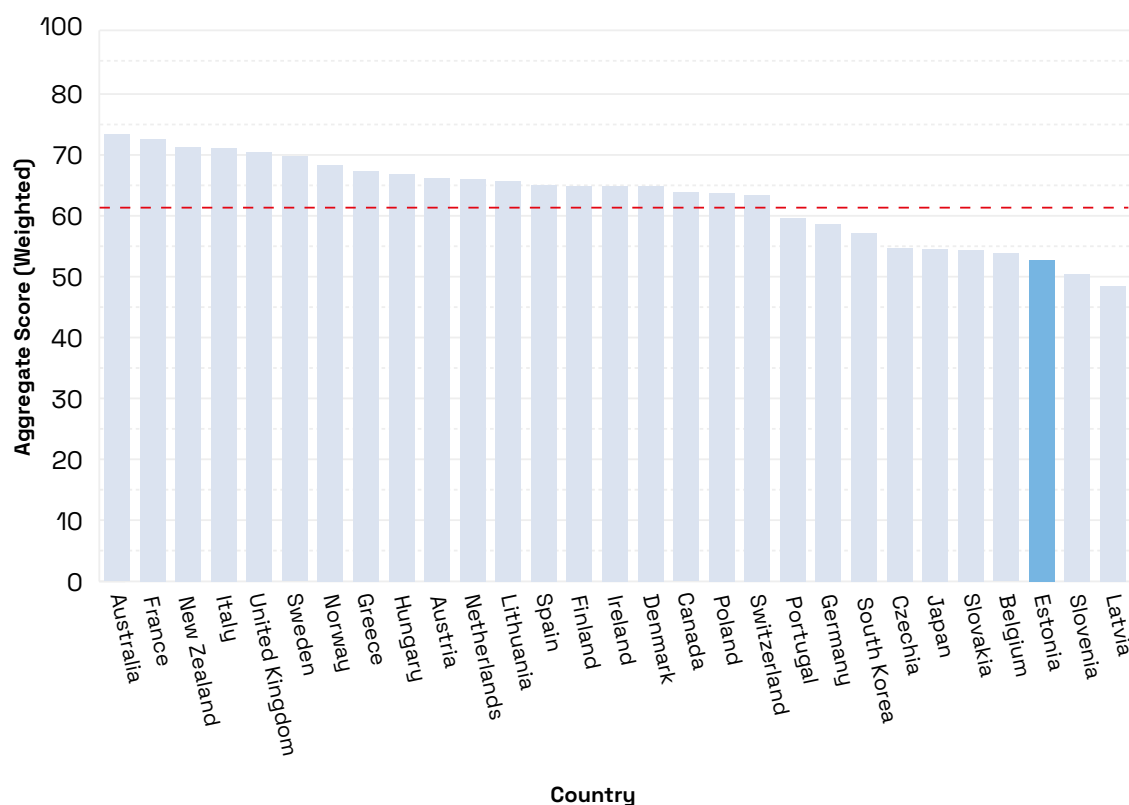


Estonia

Estonia displays one of the lowest scores in Access and Care Coverage mainly due to the highest reported percentage of unmet healthcare service needs as well as limited access to treatment, although Estonia displays one of the highest levels of access to biologics and adequate access to specialists and diagnostics. Estonia is one of the top scorers in terms of the Disease Burden category, with among the lowest levels of societal cost of asthma, asthma DALYs, and asthma deaths, despite a relatively high rate of adult tobacco use. Finally, Estonia displays the lowest Policy Context score with no asthma strategy or guidelines for severe asthma, low alignment of care with best practices, lack of severe asthma registry reporting, and limited tobacco control laws.

- Severe asthma guidelines and a national strategy for asthma would greatly improve Estonia's Policy Context score
- Estonians report the highest level of unmet healthcare service needs
- Adequate access to respiratory specialists, diagnostics, and medicines

Country data

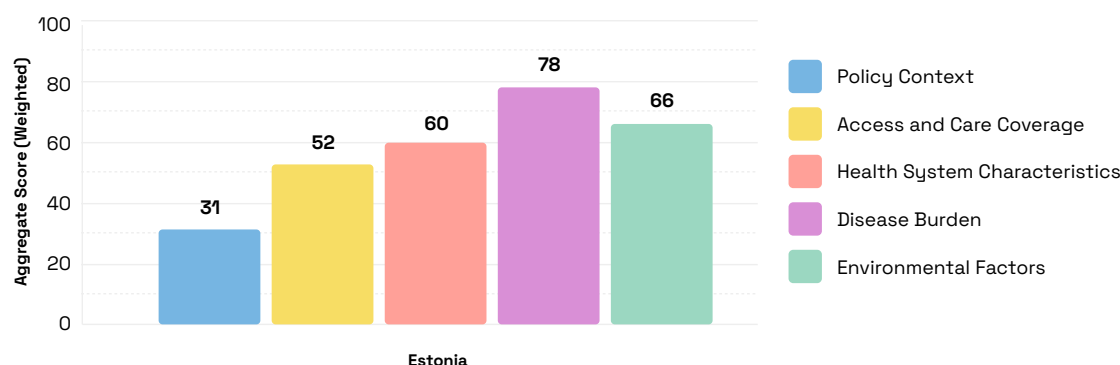


Overall Score

52.7

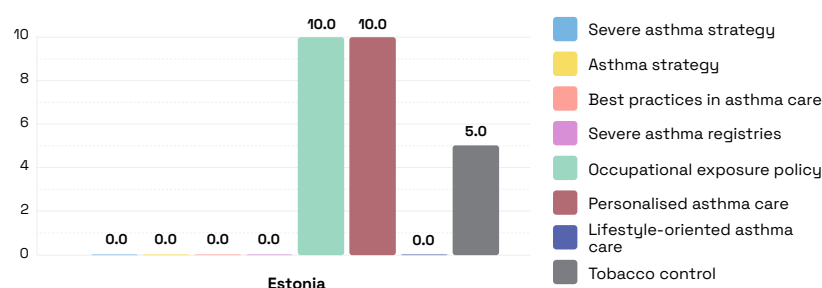
Rank

27



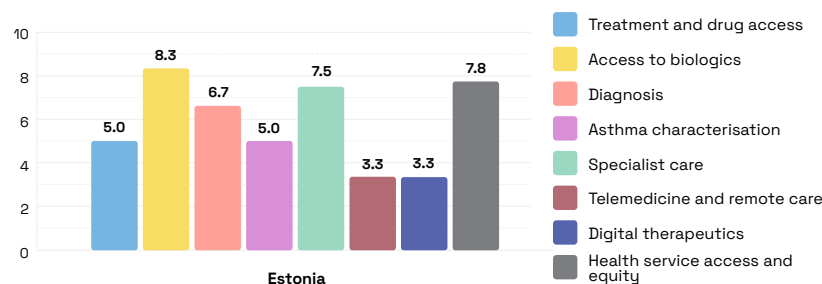
Policy Context

Score **31.0**



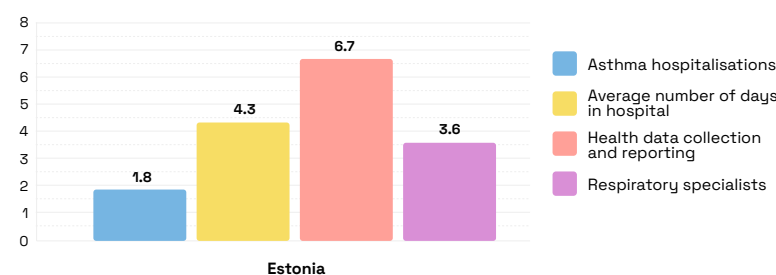
Access and Care Coverage

Score **52.0**



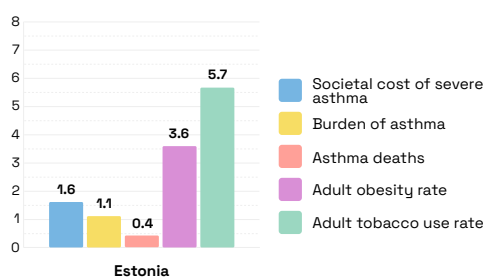
Health System Characteristics

Score **60.0**



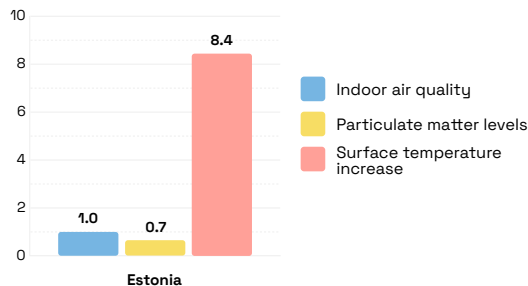
Disease Burden

Score **78.0**



Environmental Factors

Score **66.0**



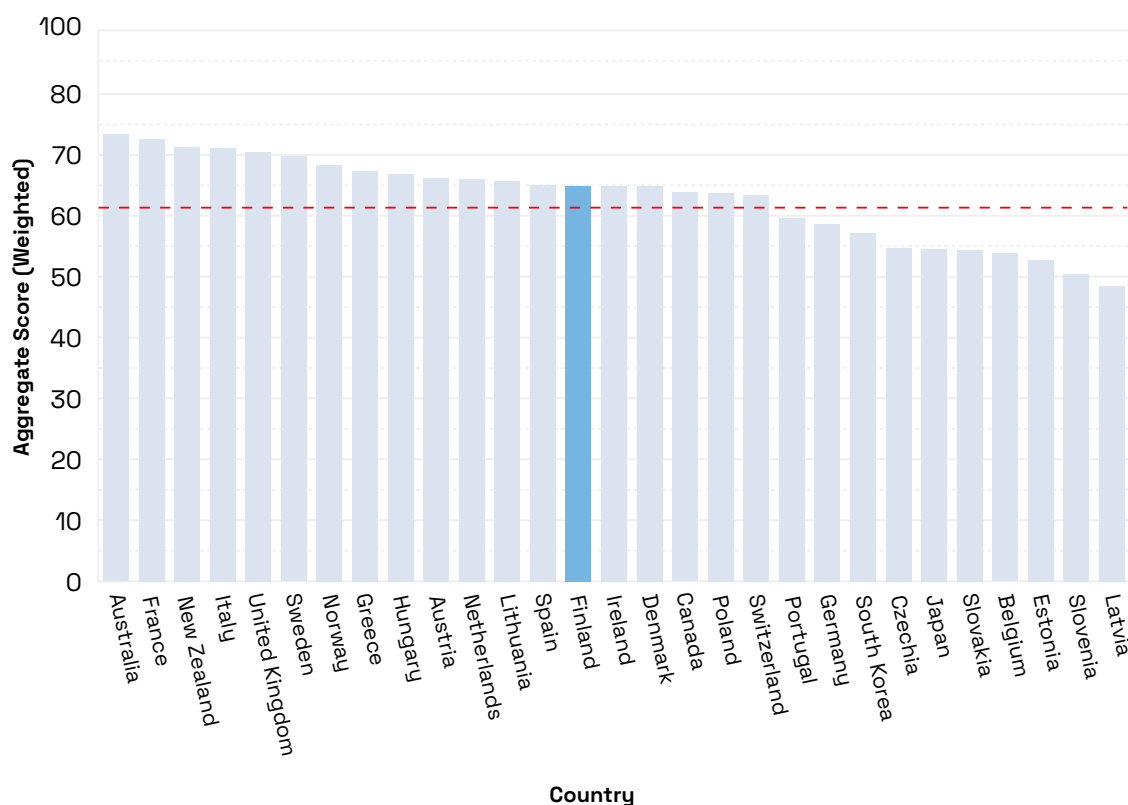


Finland

Finland scores well above average in the Policy Context category with a moderate implementation of a national strategy for asthma, limited alignment of care guidelines with international best practices, and moderate tobacco regulations. In terms of Environmental Factors, Finland has the best indoor air quality and the lowest level of particulate matter. Moreover, Finland ranks among the lowest in terms of Access and Care Coverage, with comparatively limited coverage of treatments (including biologics) and limited access to specialist care.

- Finland could improve its score with a more comprehensive asthma strategy and guidelines for severe asthma care
- Best indoor air quality and the lowest level of particulate matter
- One of the lowest levels of access to treatment but adequate access to diagnostics

Country data

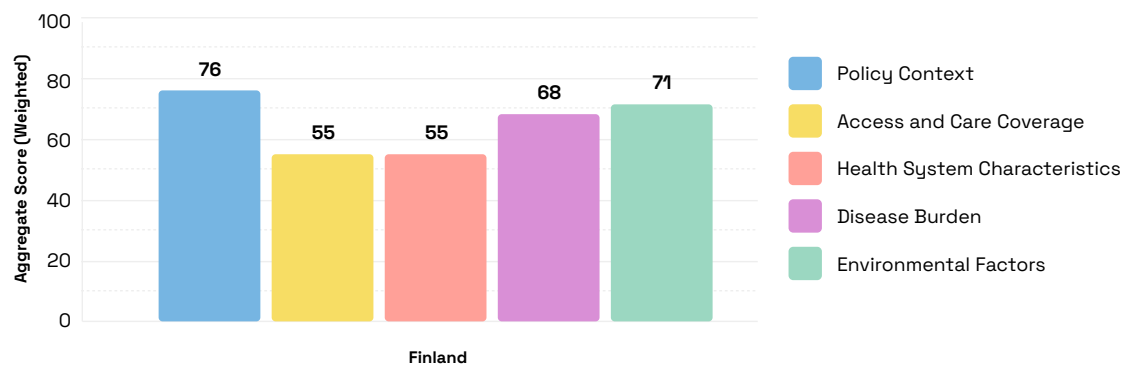


Overall Score

64.8

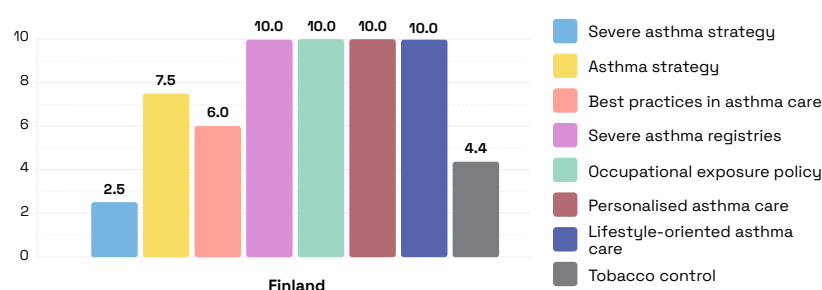
Rank

14



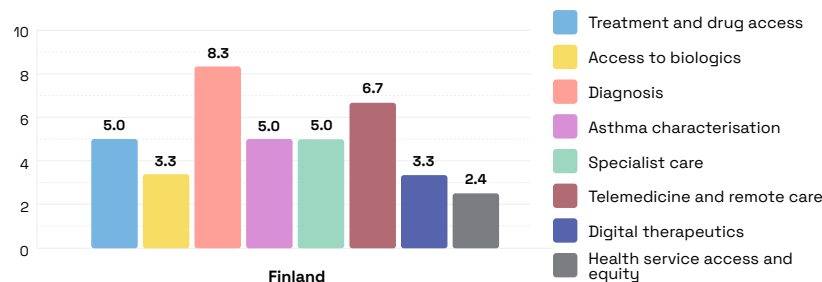
Policy Context

Score **76.0**



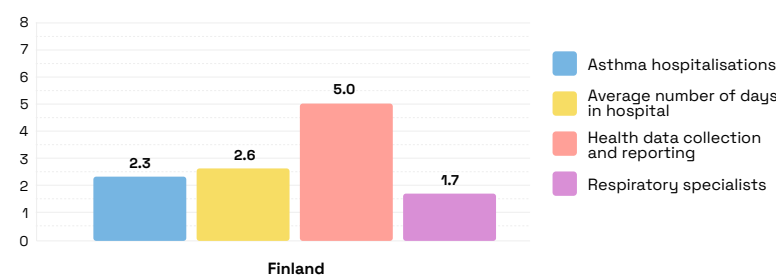
Access and Care Coverage

Score **55.0**



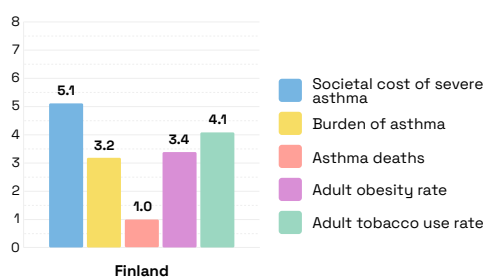
Health System Characteristics

Score **55.0**



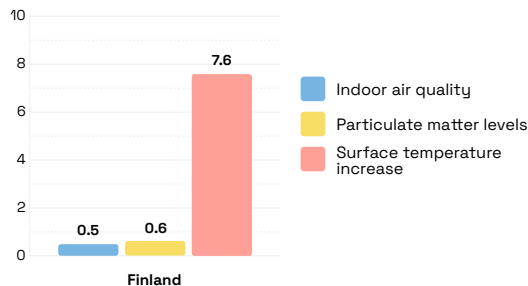
Disease Burden

Score **68.0**



Environmental Factors

Score **71.0**

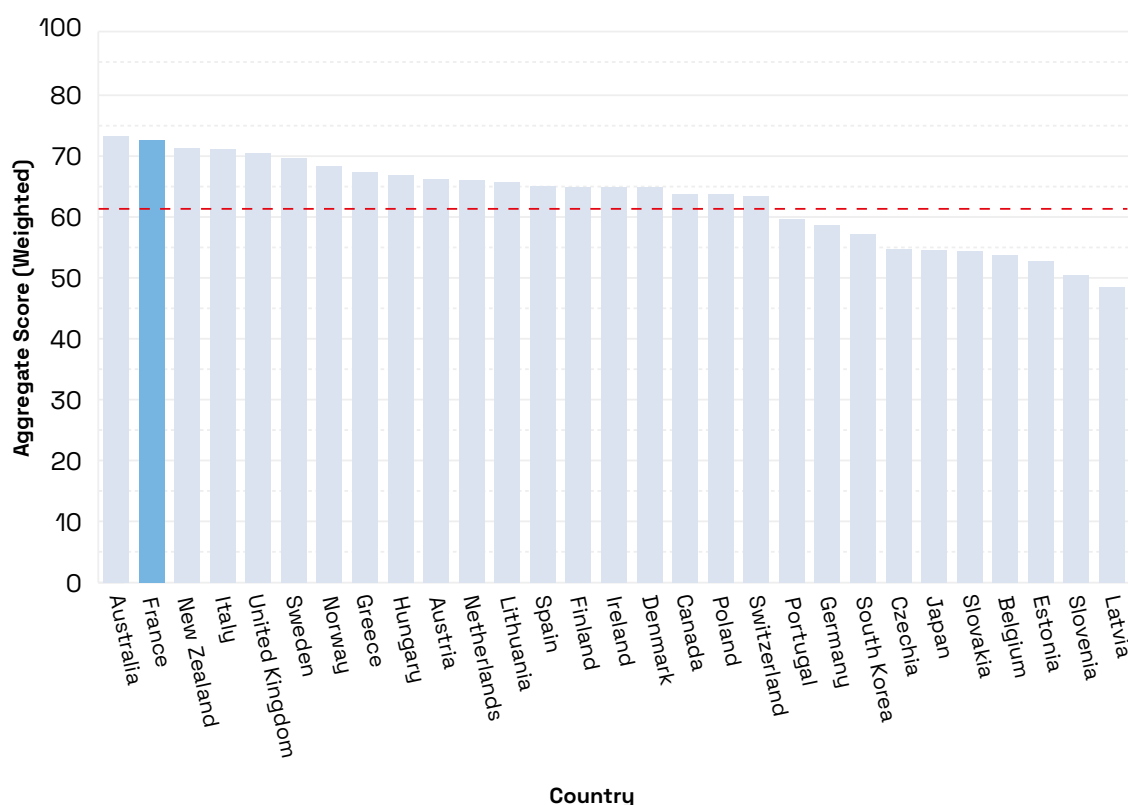


France

France has the highest score in the Policy Context category due to its comprehensive policies, strategies, and guidelines for severe asthma care. On the other hand, France displays an average Disease Burden score, with a relatively high estimated societal cost of severe asthma and DALYs attributable to asthma. France also reports one of the highest rates of adult tobacco use. France's Environmental Factors score is limited by a relatively high level of particulate matter and low indoor air quality.

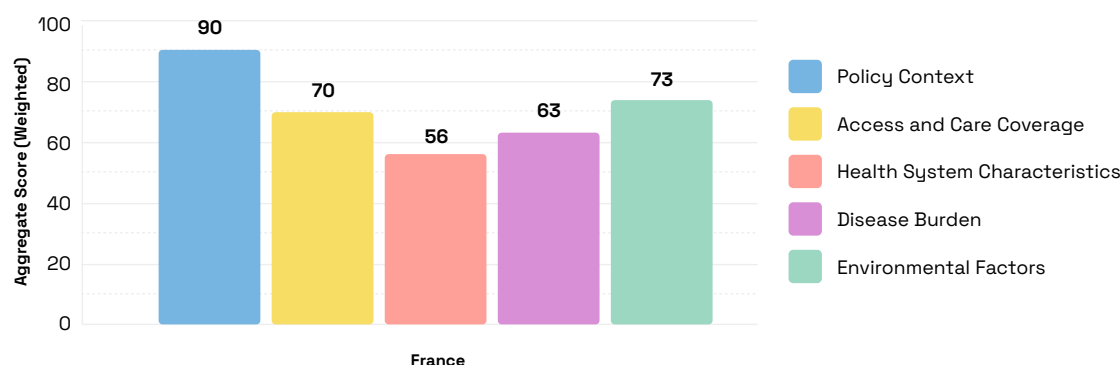
- Strong asthma policies and strategies and a high level of alignment with guidelines
- One of the highest rates of adult tobacco use
- Relatively high level of particulate matter and low indoor air quality

Country data



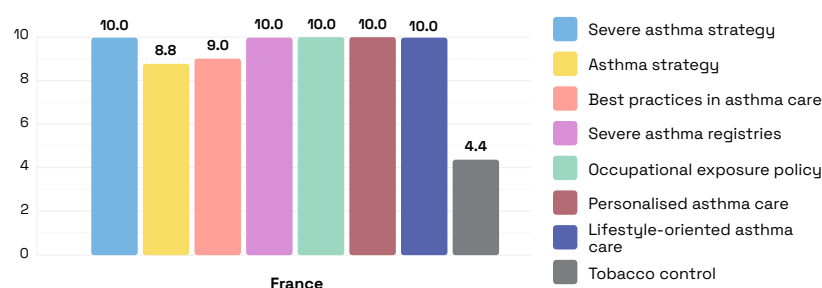
Overall Score
72.5

Rank
2



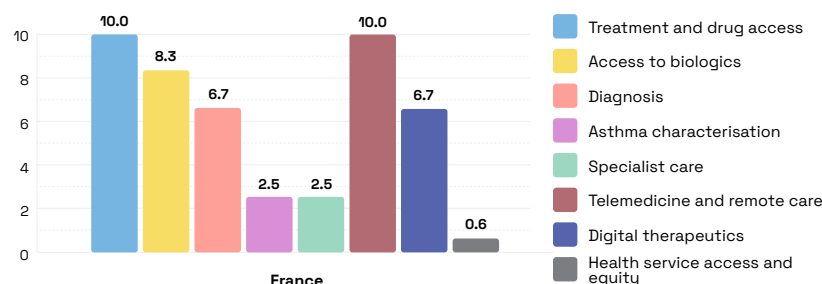
Policy Context

Score **90.0**



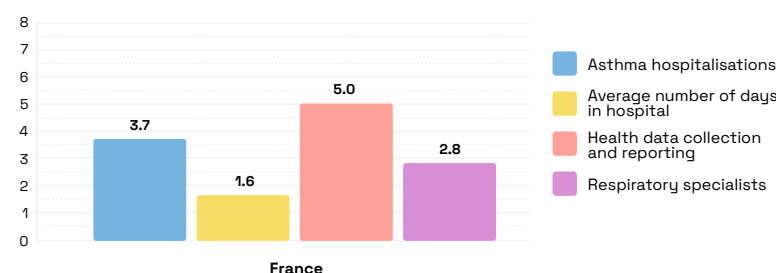
Access and Care Coverage

Score **70.0**



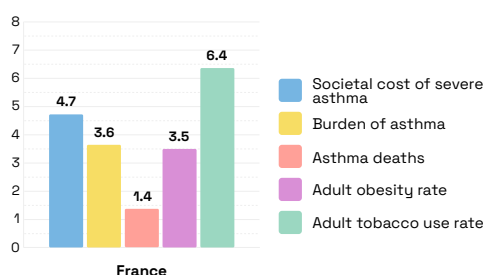
Health System Characteristics

Score **56.0**



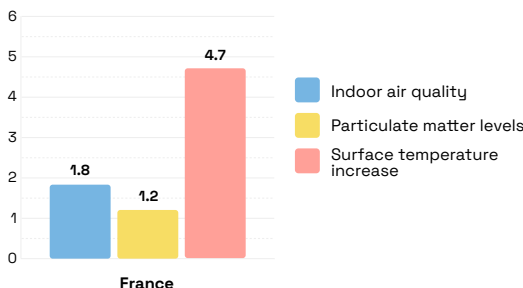
Disease Burden

Score **63.0**



Environmental Factors

Score **73.0**



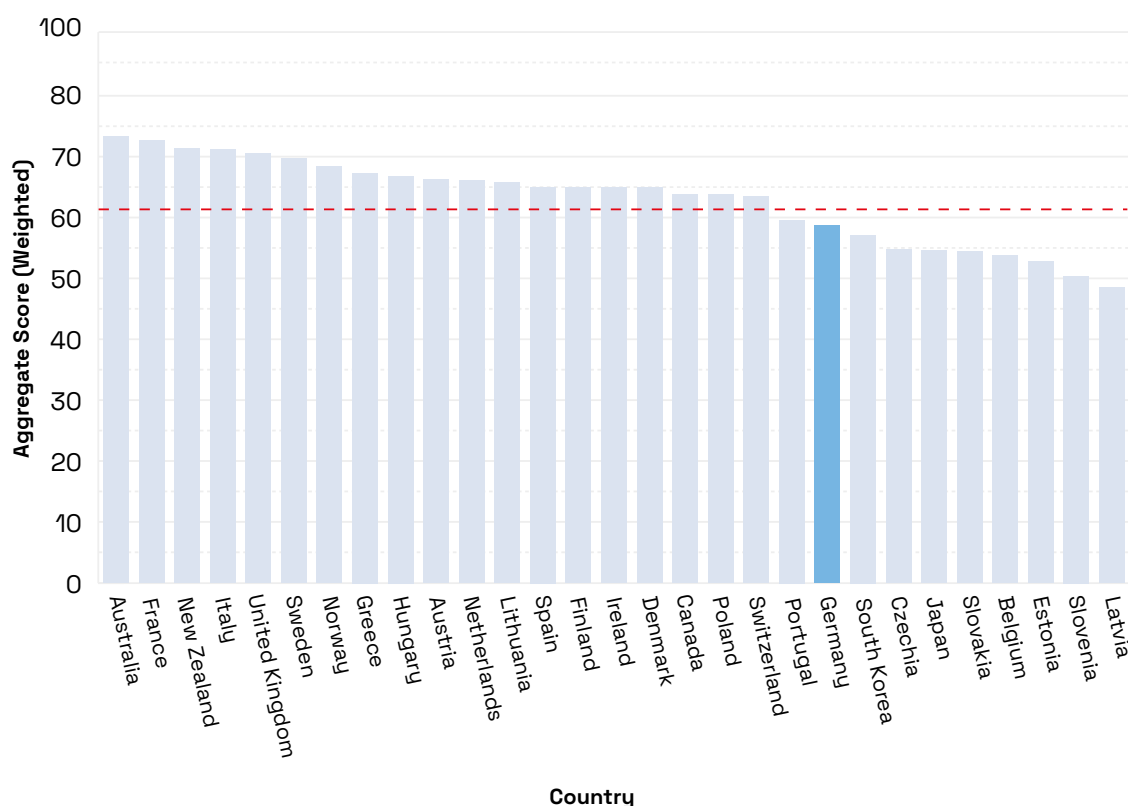


Germany

Germany scores slightly above average in terms of Access and Care Coverage, with high access to treatment, including biologics and digital therapeutics. Access to diagnostics, including an average access to FeNO, is adequate. In terms of Policy Context, Germany demonstrates a relatively high level of implementation of severe asthma guidelines and has guidelines in alignment with international best practices. Germany has the lowest score on Health System Characteristics due to a high average number of days spent in the hospital along with a relatively low number of respiratory specialists.

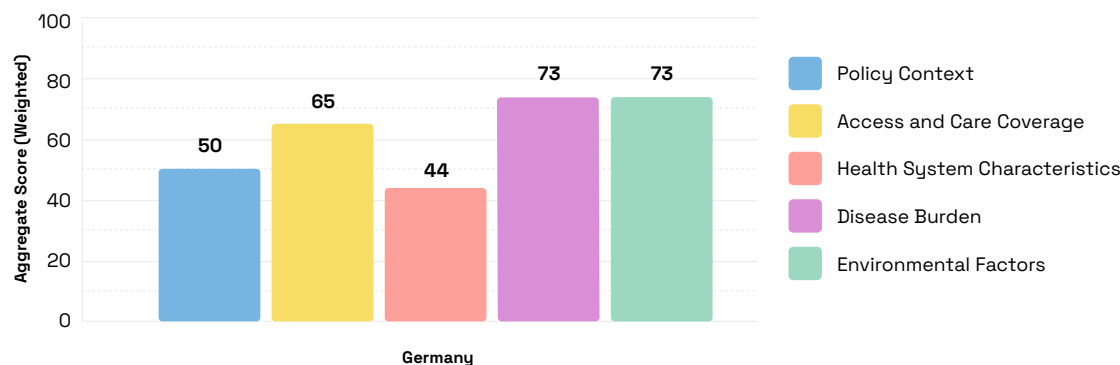
- Good access to and coverage of treatment including biologics and digital therapeutics, as well as diagnostics
- High average number of days spent in hospital
- Low number of respiratory specialists

Country data



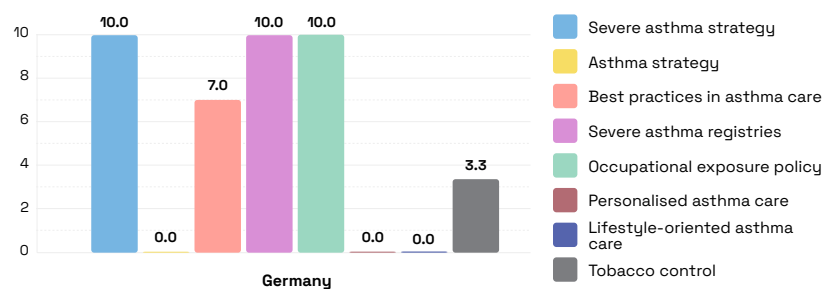
Overall Score
58.6

Rank
21



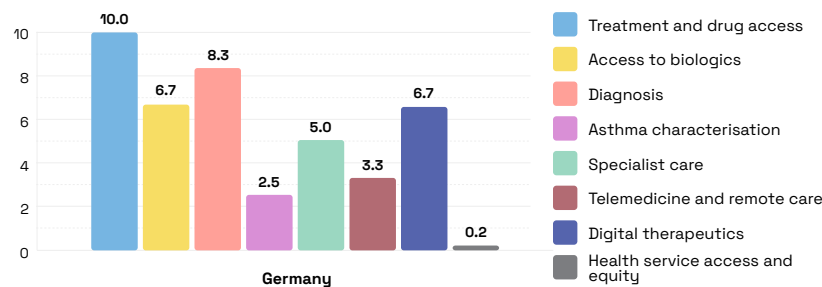
Policy Context

Score **50.0**



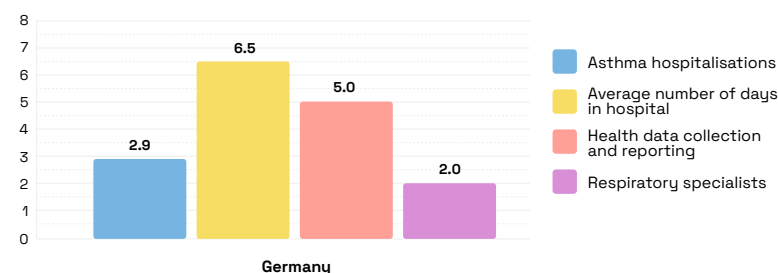
Access and Care Coverage

Score **65.0**



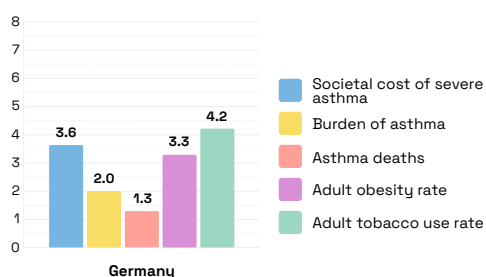
Health System Characteristics

Score **44.0**



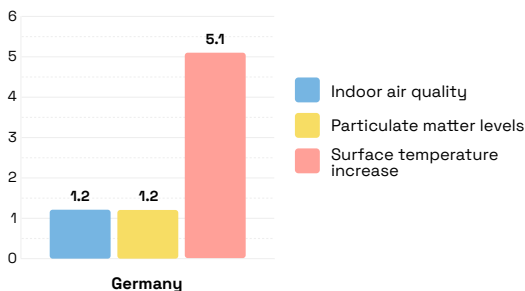
Disease Burden

Score **73.0**



Environmental Factors

Score **73.0**



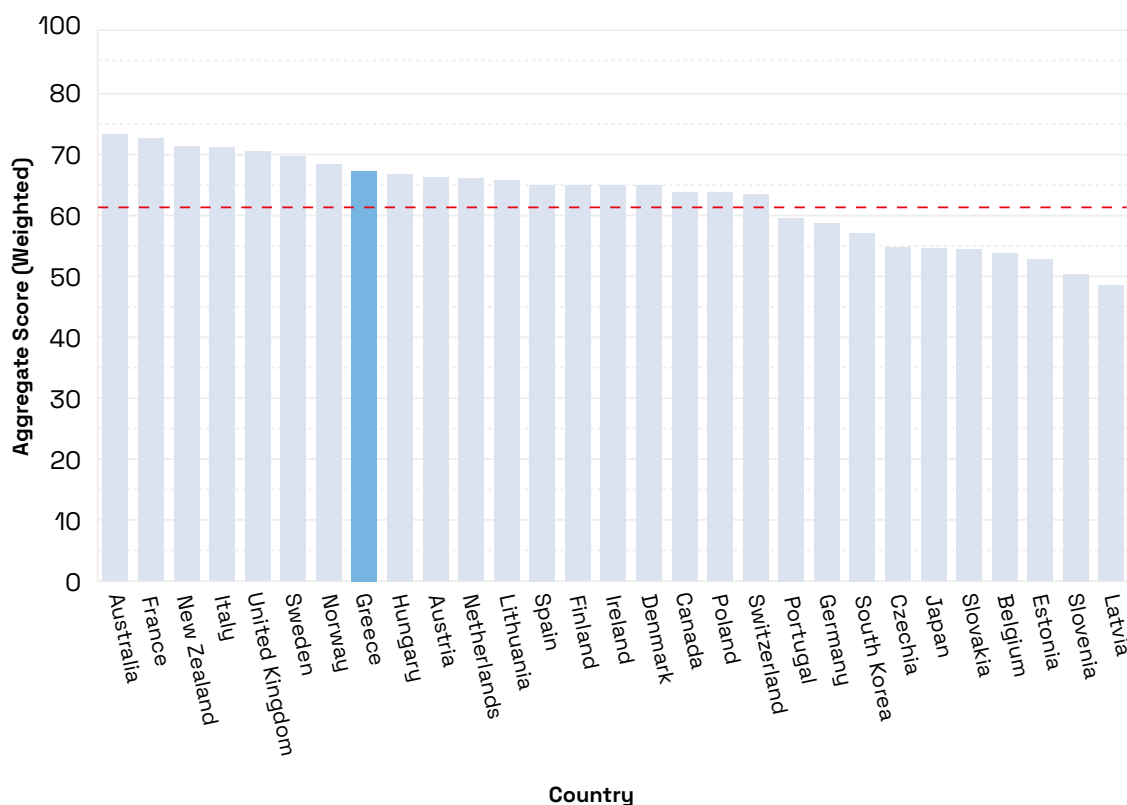


Greece

Greece ranks highly in the Policy Context category, with its score based on strong tobacco control laws (the second highest after Sweden) and the existence of comprehensive severe asthma guidelines. However, Greece is among the lowest scorers in terms of Access and Care Coverage. This is mainly due to a low uptake of telemedicine and digital therapeutics, as well as minimal access to FeNO. Greece also scores highly in Health Systems Characteristics due, in part, to a low number of asthma-related hospitalisations and average number of days spent in hospital. Greece's Disease Burden score is only slightly better than the average.

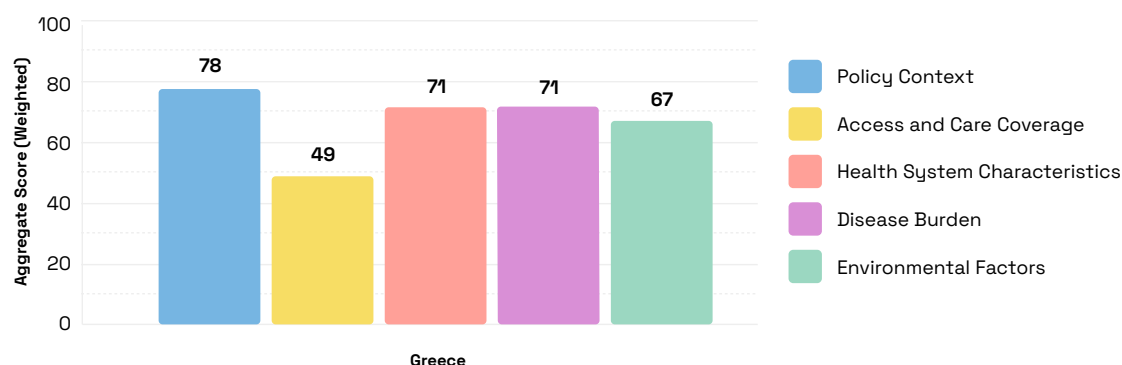
- Strong tobacco control laws and severe asthma guidelines
- Low uptake of telemedicine and digital therapeutics and limited access to some types of diagnostics
- Low number of hospitalisations related to asthma and average number of days spent in hospital

Country data



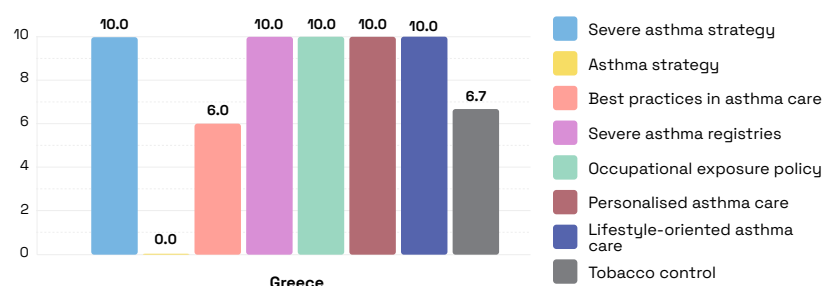
Overall Score
67.2

Rank
8



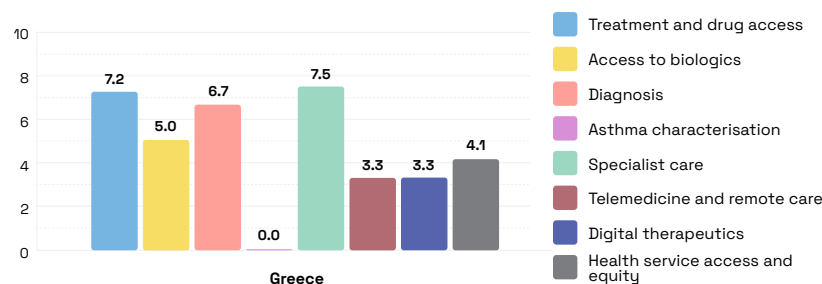
Policy Context

Score **78.0**



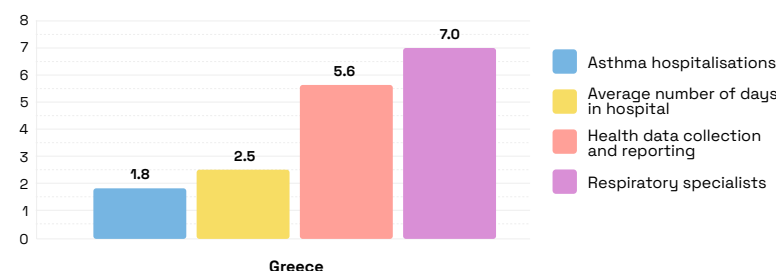
Access and Care Coverage

Score **49.0**



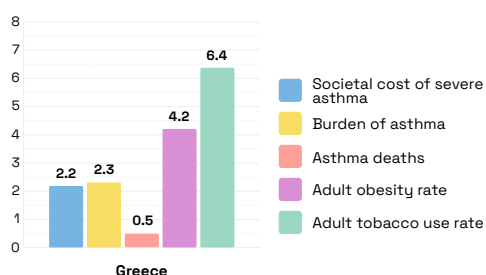
Health System Characteristics

Score **71.0**



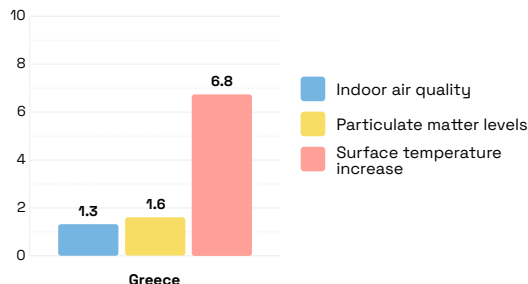
Disease Burden

Score **71.0**



Environmental Factors

Score **67.0**



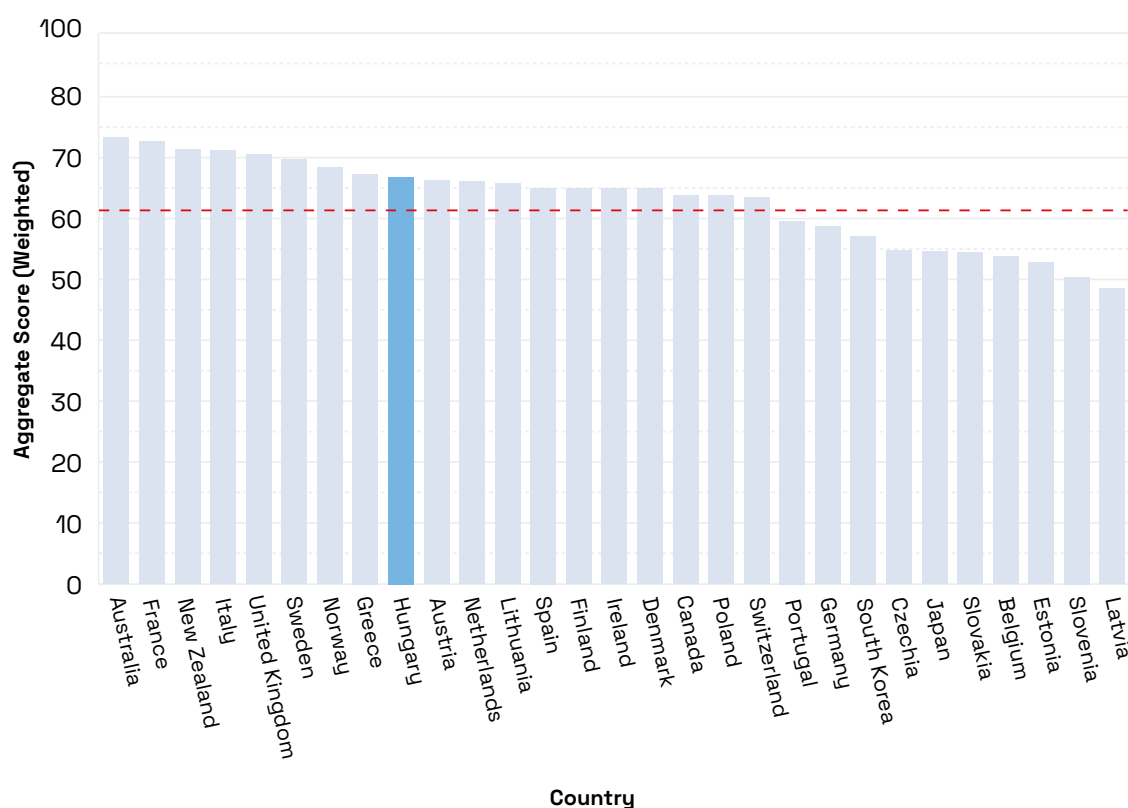


Hungary

Hungary's score in Policy Context is just above average, despite lacking specific severe asthma guidelines and a limited level of alignment of national care guidelines with international guidelines. In addition, Hungary scores among the highest in terms of Access and Care Coverage. This is mainly due to a relatively high level of access to diagnostics and specialist and remote care, though missing data on access to medicines limits this assessment. Hungary's score is among the highest in terms of Disease Burden. Hungary's Health System Characteristics score could be improved by focusing in part on the high average number of days spent in hospital due to asthma.

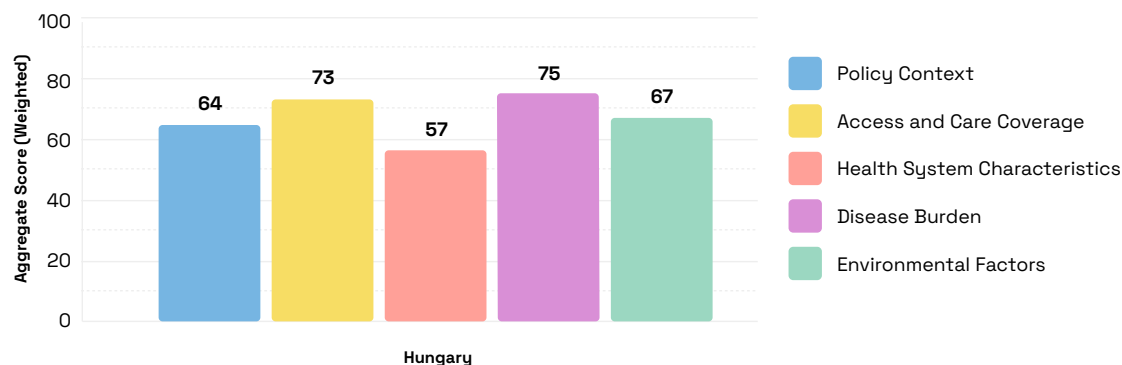
- Hungary could improve its score by implementing severe asthma guidelines and increasing alignment with international best practices
- High Access and Care Coverage score with high levels of access to diagnostics and specialist and remote care
- High average number of days spent in hospital due to asthma

Country data



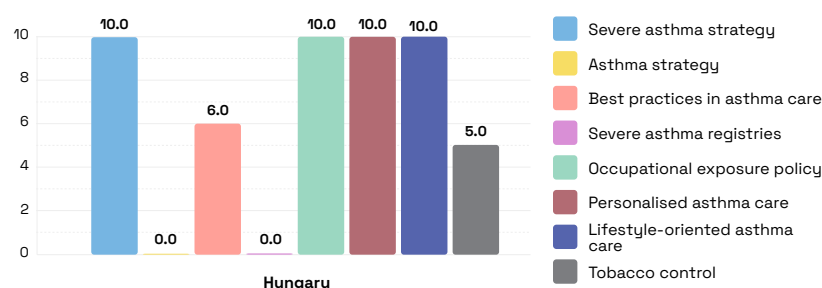
Overall Score
66.7

Rank
9



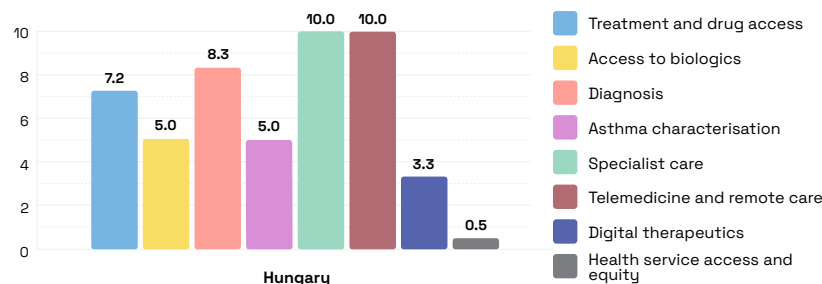
Policy Context

Score **64.0**



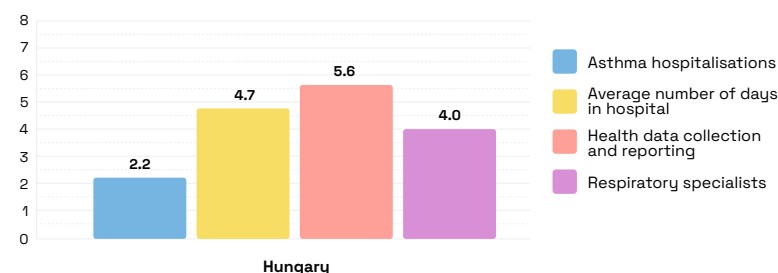
Access and Care Coverage

Score **73.0**



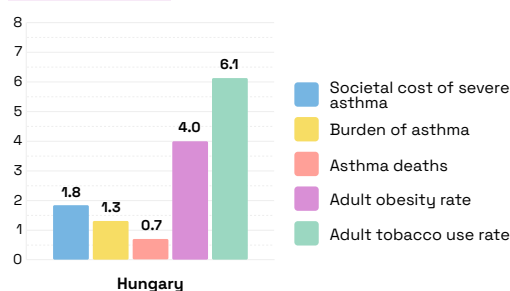
Health System Characteristics

Score **57.0**



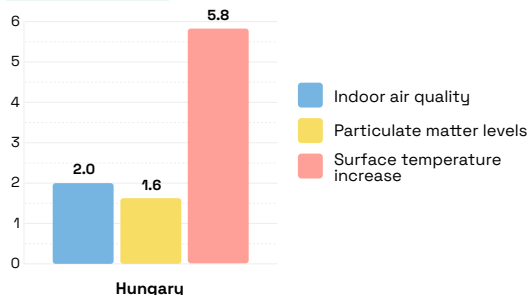
Disease Burden

Score **75.0**



Environmental Factors

Score **67.0**

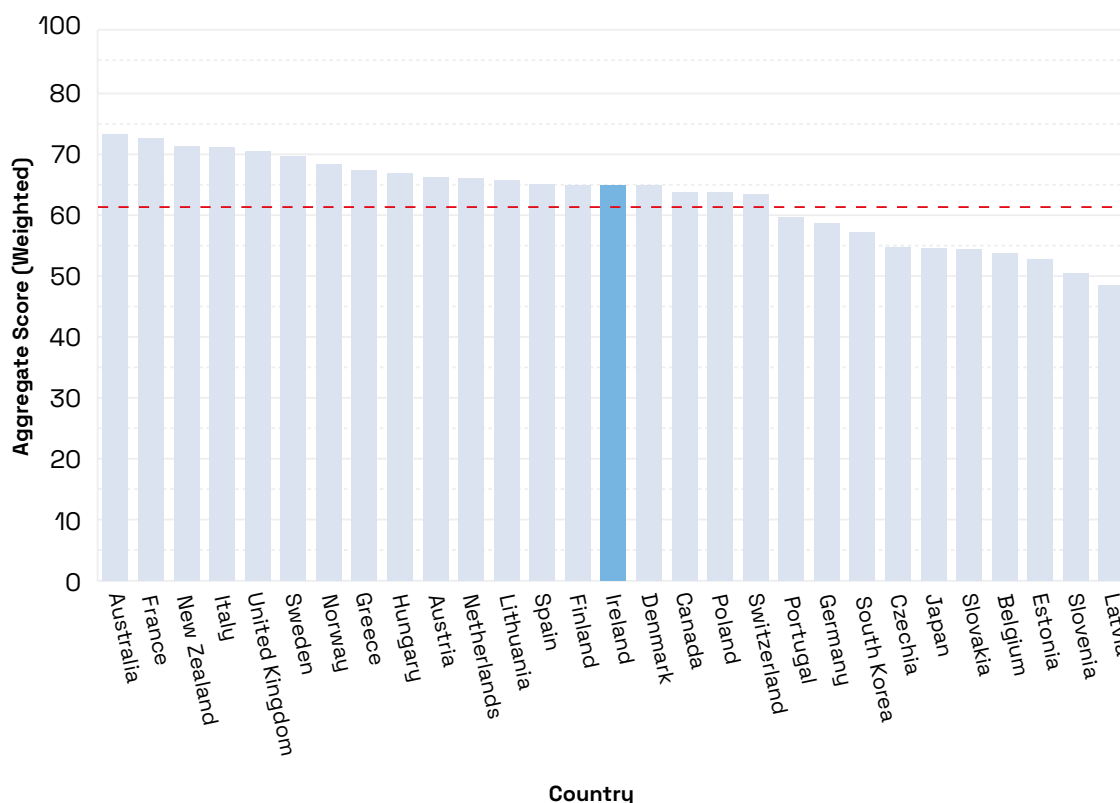


Ireland

Ireland is among the highest ranking in terms of Policy Context, due to having comprehensive severe asthma guidelines, a national asthma strategy and the existence of a severe asthma registry, as well as the second most comprehensive level of tobacco control laws. This has yet to translate into tangible improvements in Access and Care Coverage, where it ranks low due to limited diagnostics, including little to no use of FeNO for asthma characterisation, and specialist care. Ireland is also among the lowest ranking and shows significant room for improvement in terms of Health System Characteristics, owing to high levels of asthma-related hospitalisations, though patients spend on average fewer days in the hospital compared to most countries, and the lowest number of respiratory specialists per 100,000. Ireland scores highly in Environmental Factors and is slightly above the average due primarily to fairly low levels of population exposure to particulate matter.

- Limited access to diagnostics and specialist care
- High levels of asthma hospitalisations but lower than average time spent in hospital
- Low levels of particulate matter

Country data¹



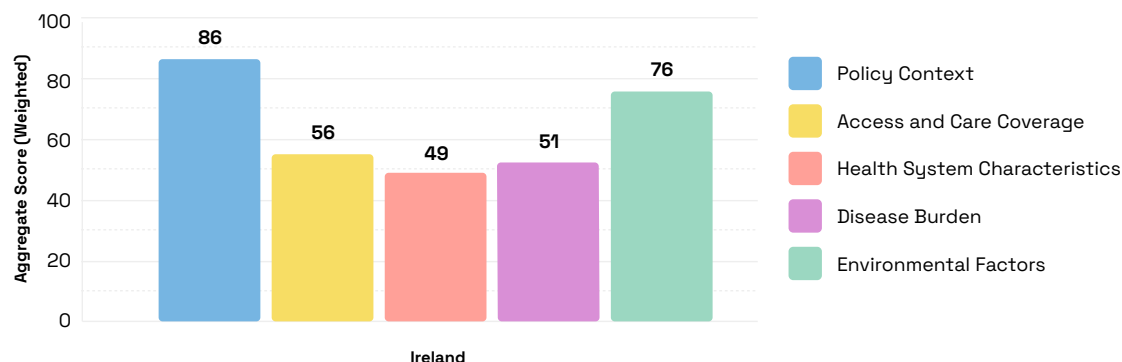
Overall Score

64.8

Rank

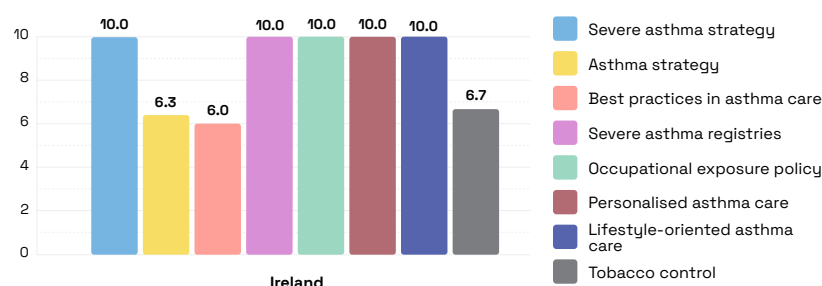
15

¹ We note the potential for low data reliability for Ireland's estimated societal cost of severe asthma because the indicator is linked to gross domestic product. Various aspects of the Irish economy significantly impact the accuracy of Ireland's GDP estimates and, thereby, its performance within this indicator. The estimated societal cost of severe asthma may be lower than reported here.



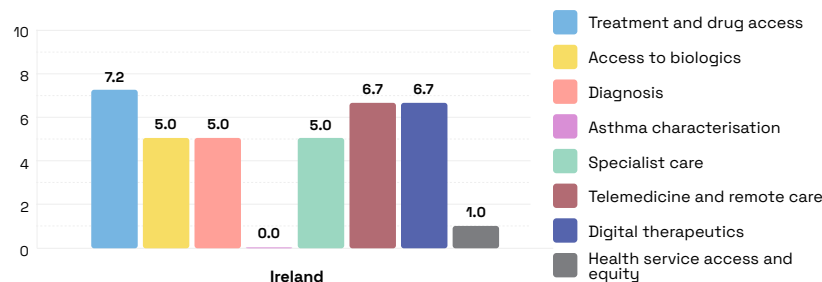
Policy Context

Score **86.0**



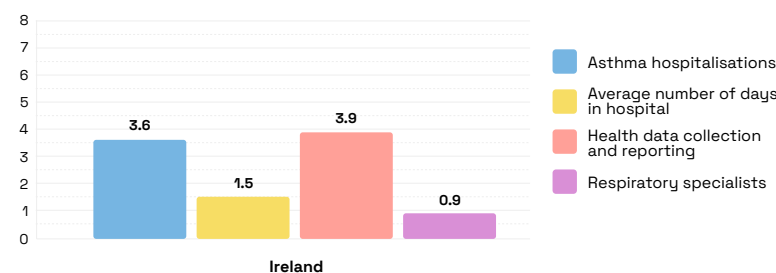
Access and Care Coverage

Score **56.0**



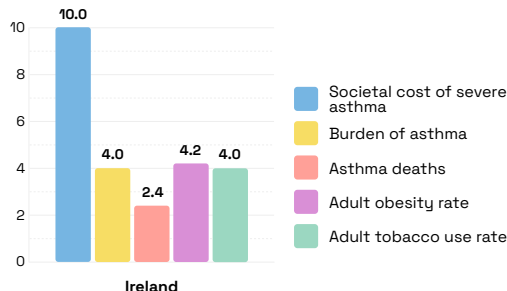
Health System Characteristics

Score **49.0**



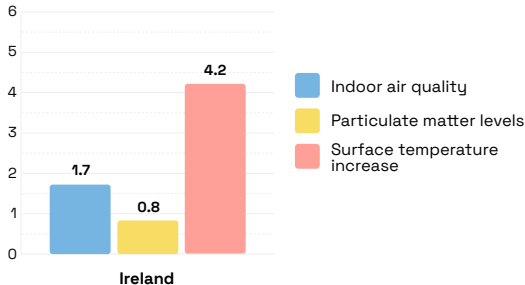
Disease Burden

Score **51.0**



Environmental Factors

Score **76.0**



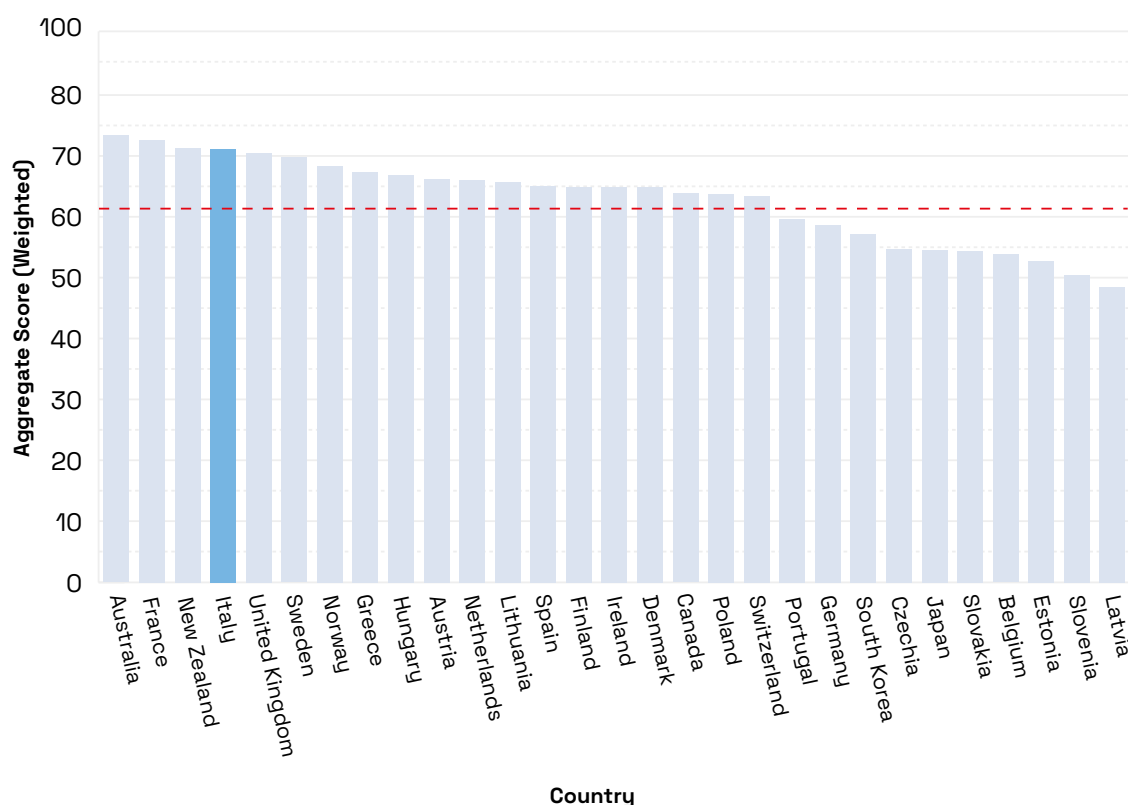


Italy

In Policy Context, Italy's score is well above the average, having the highest alignment of national care guidelines with international guidelines and the existence of a severe asthma registry being undermined by a limited asthma strategy, the lack of severe asthma guidelines, and limited tobacco control policies. Italy scores within the top third of countries in Access and Care Coverage with a higher-than-average score. This is due to an above-average level of access to treatments (including biologics), access to inflammatory phenotyping-based diagnostics, and high levels of access to telemedicine and remote care. Italy ranks highest in terms of Environmental Factors and is among the top scorers in terms of Disease Burden, with positive, though improvable, performance in the estimated societal cost of severe asthma, asthma DALYs, percentage of deaths attributable to asthma, and adult obesity rate.

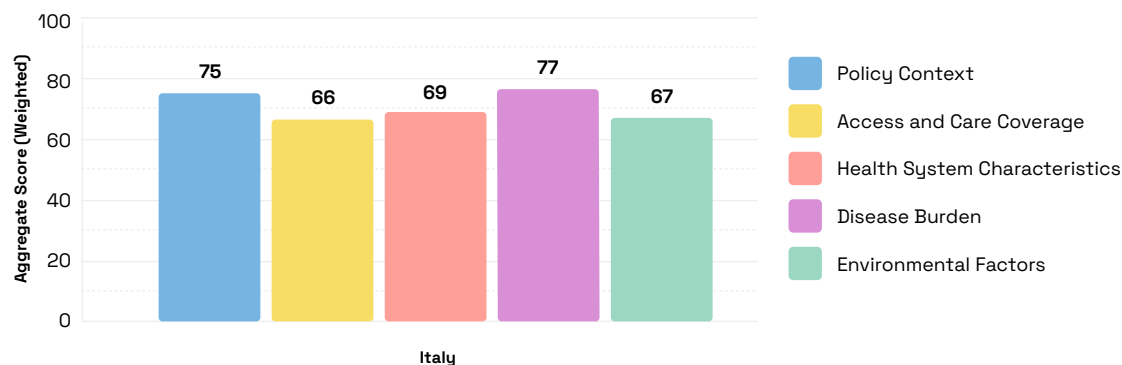
- Best alignment of national care guidelines with international guidelines
- One of the highest levels of access to inflammatory phenotyping-based diagnostics
- One of the lowest levels of DALYs attributable to asthma

Country data



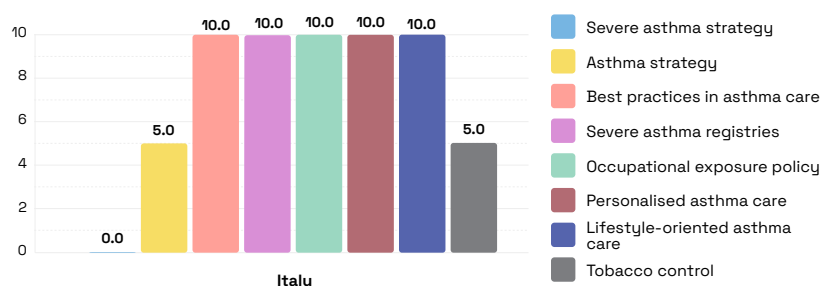
Overall Score
71.0

Rank
4



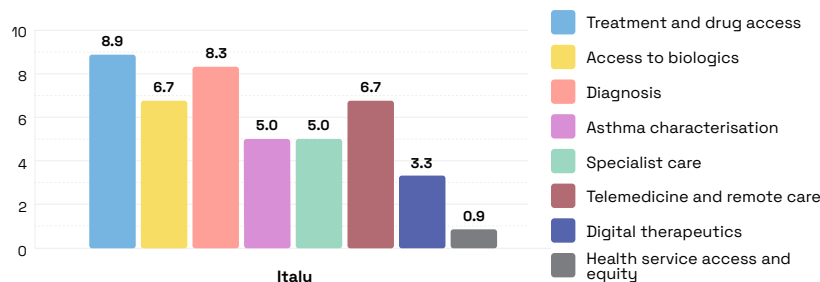
Policy Context

Score **75.0**



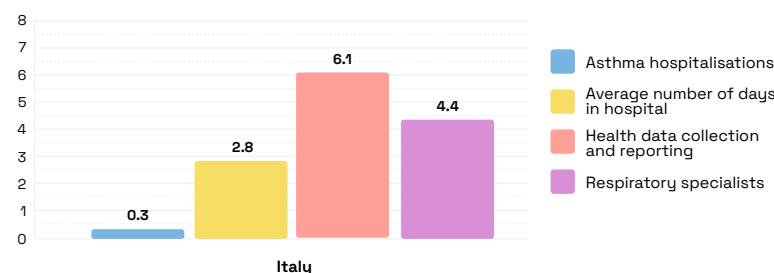
Access and Care Coverage

Score **66.0**



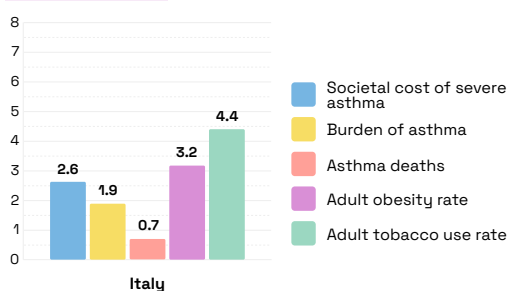
Health System Characteristics

Score **69.0**



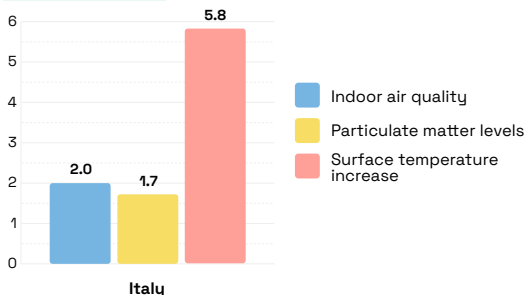
Disease Burden

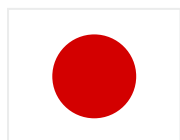
Score **77.0**



Environmental Factors

Score **67.0**



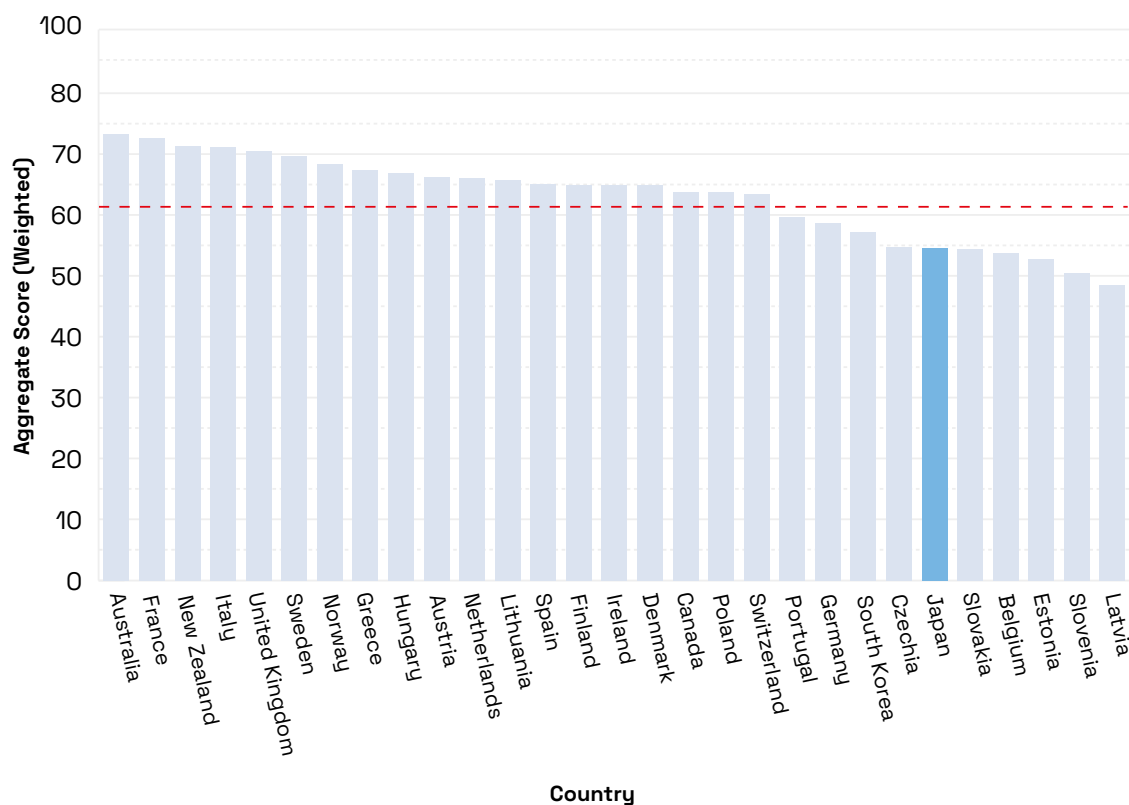


Japan

Despite the existence of comprehensive severe asthma guidelines and a severe asthma registry, Japan's score in Policy Context is well below the average due to the lack of a national asthma strategy and limited alignment of national care guidelines with international guidelines. Importantly, Japan ranks last in terms of Access and Care Coverage. This can be attributed to limited access to treatment and medicines (including biologics), diagnostics, and digital therapeutics. In spite of this, Japan has the highest score in Disease Burden, with relatively low scores across most indicators except the percentage of deaths attributable to asthma, where Japan ranks slightly below average and is driven primarily by the lowest rate of adult obesity among the selected countries.

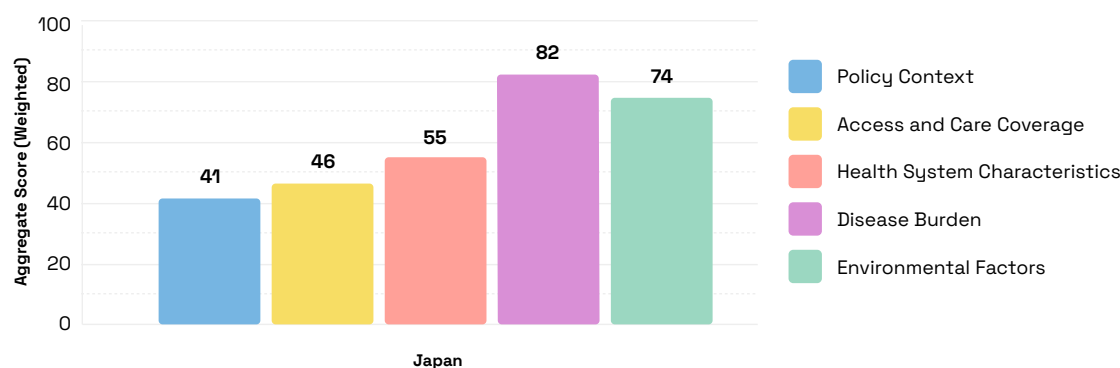
- Strong severe asthma guidelines and existence of severe asthma registries
- Lowest Access and Care Coverage score
- Highest Disease Burden score and lowest rate of adult obesity

Country data



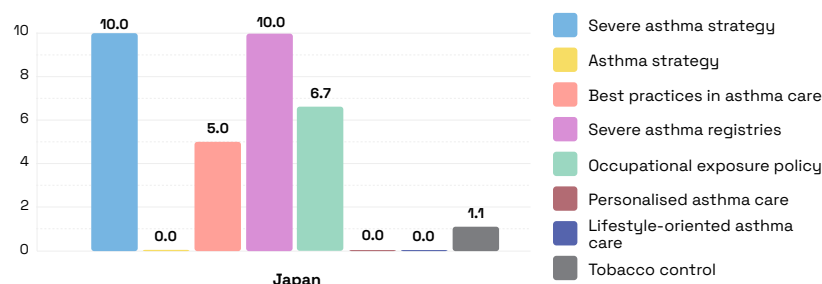
Overall Score
54.5

Rank
24



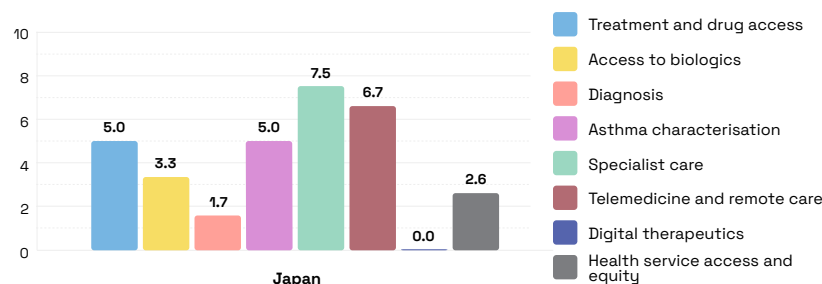
Policy Context

Score **41.0**



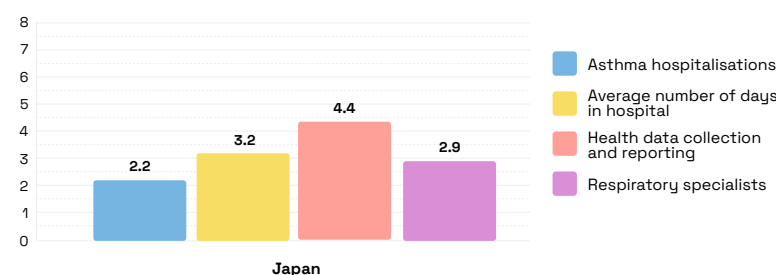
Access and Care Coverage

Score **46.0**



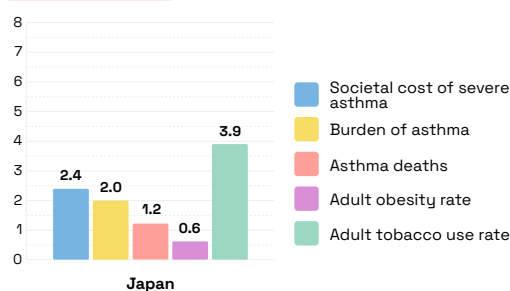
Health System Characteristics

Score **55.0**



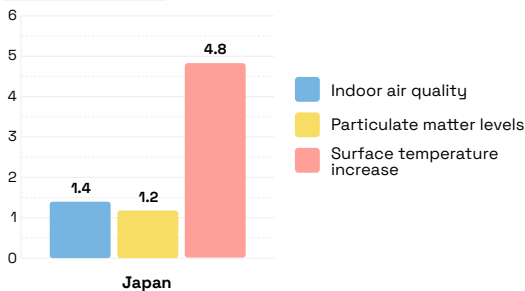
Disease Burden

Score **82.0**



Environmental Factors

Score **74.0**

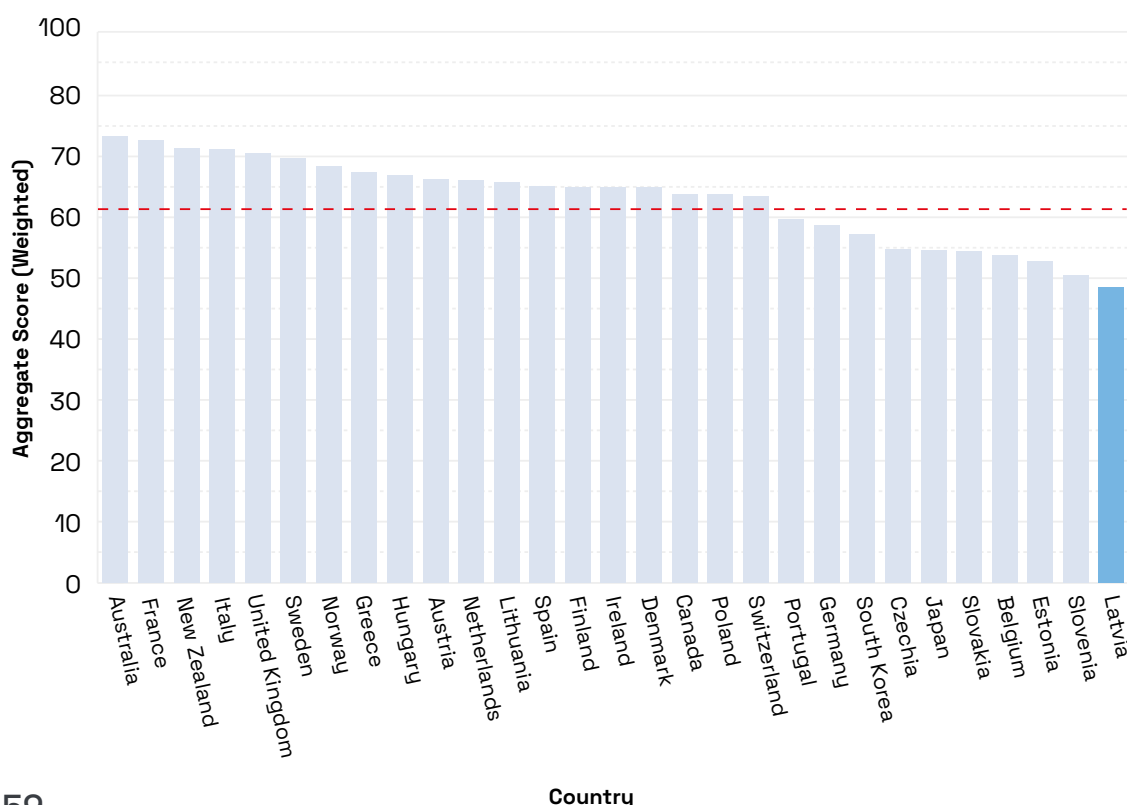


Latvia

Latvia is the lowest scoring in terms of Policy Context, having no severe asthma guidelines, no general asthma strategy, a lack of alignment of national care guidelines with international guidelines, and a lack of reporting to severe asthma registries. However, Latvia shows the second highest level of tobacco control laws. Latvia has one of the lowest scores in terms of Health System Characteristics, which is attributable to having the highest average number of days spent in hospital due to asthma and a relatively high level of annual asthma-related hospitalisations. In spite of these results, Latvia's score in Disease Burden is slightly above the average, with the third lowest societal cost attributable to severe asthma, the fourth lowest number of DALYs attributable to asthma, and the second lowest percentage of deaths attributable to asthma. The highest rate of tobacco use, and a relatively high adult obesity rate limit Latvia from scoring higher in this category.

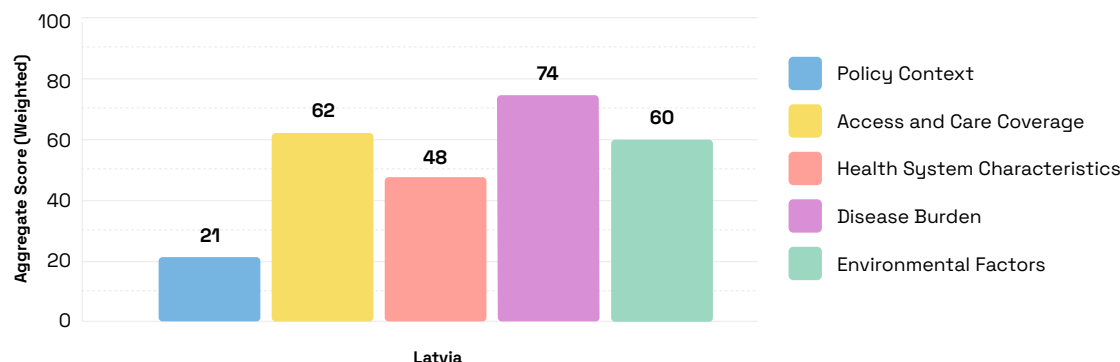
- The lowest ranking in terms of Policy Context with no asthma strategy or severe asthma guidelines
- Second highest in terms of tobacco control laws to address highest level of tobacco use
- Highest average number of days spent in hospital due to asthma, though low societal cost and deaths attributable to asthma despite high rates of obesity and tobacco use

Country data



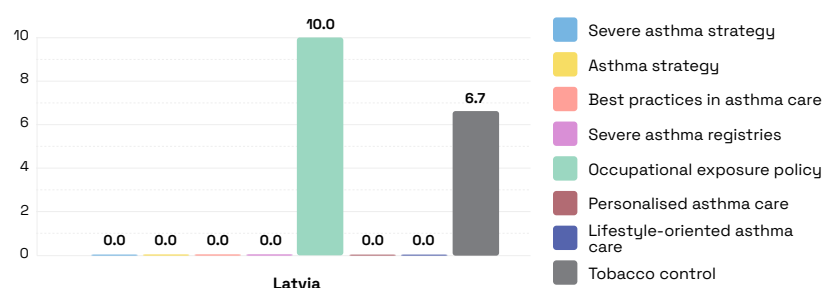
Overall Score
48.4

Rank
29



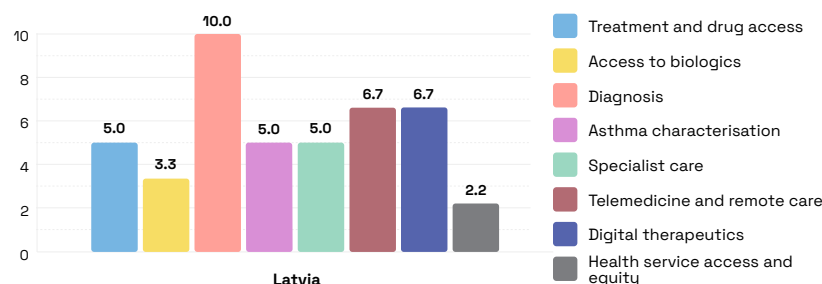
Policy Context

Score **21.0**



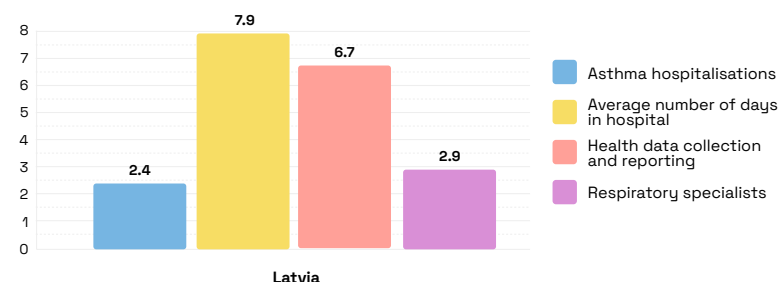
Access and Care Coverage

Score **62.0**



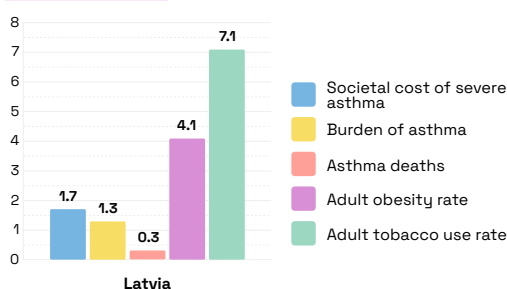
Health System Characteristics

Score **48.0**



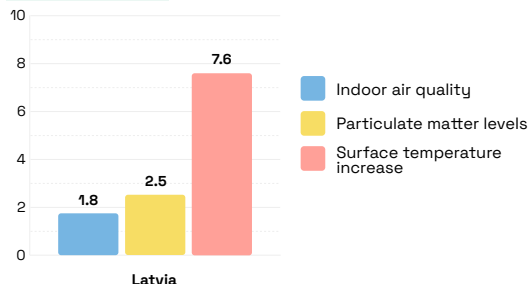
Disease Burden

Score **74.0**



Environmental Factors

Score **60.0**



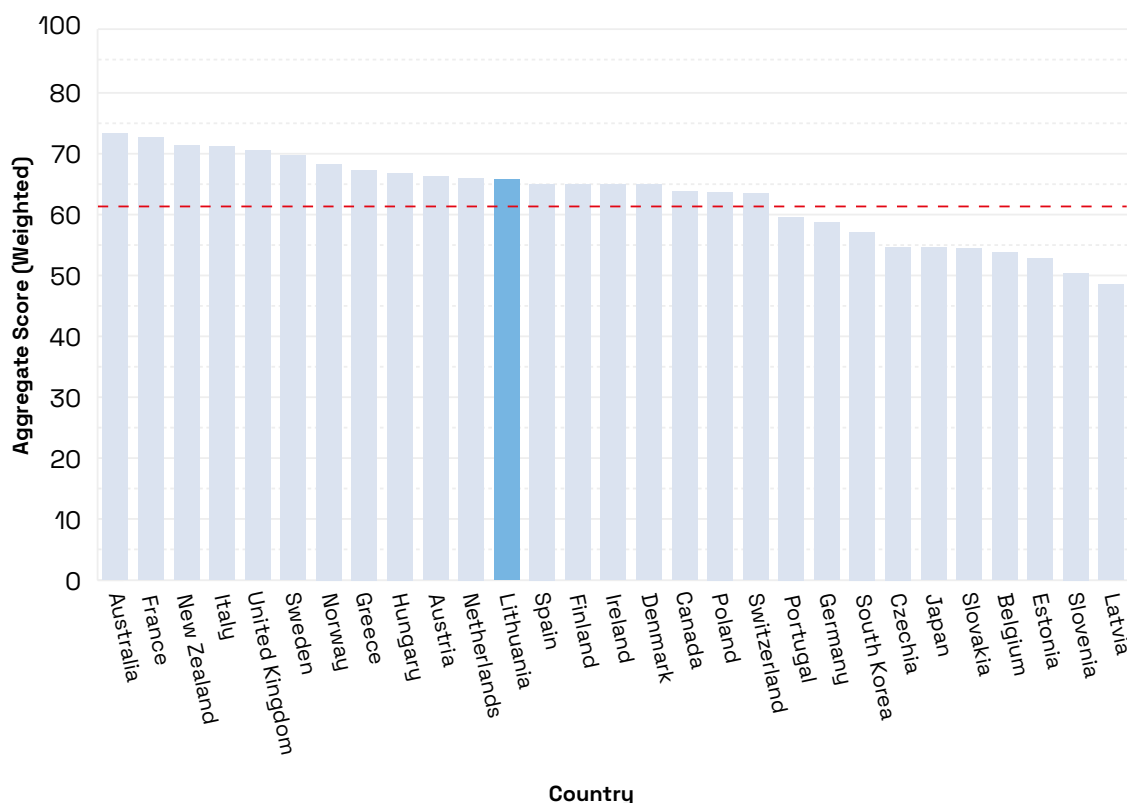


Lithuania

Lithuania is among the highest scoring in terms of Policy Context. This is attributable to having a comparatively comprehensive asthma strategy, having severe asthma guidelines, and having an above-average score in tobacco control laws. Lithuania could improve its Policy Context score by reporting data to a severe asthma registry and addressing the limited alignment of its national care guidelines with international best practices. In terms of Access and Care Coverage, Lithuania is among the lowest scoring, based primarily on low levels of access to treatment (including biologics) and digital therapeutics. Despite these measures, Lithuania scores highly in terms of Disease Burden score, with among the lowest estimated societal cost of severe asthma and percentage of DALYs attributable to asthma, as well as the lowest percentage of deaths attributable to asthma. Having among the highest adult obesity and tobacco use rates prevents Lithuania from scoring higher in this category.

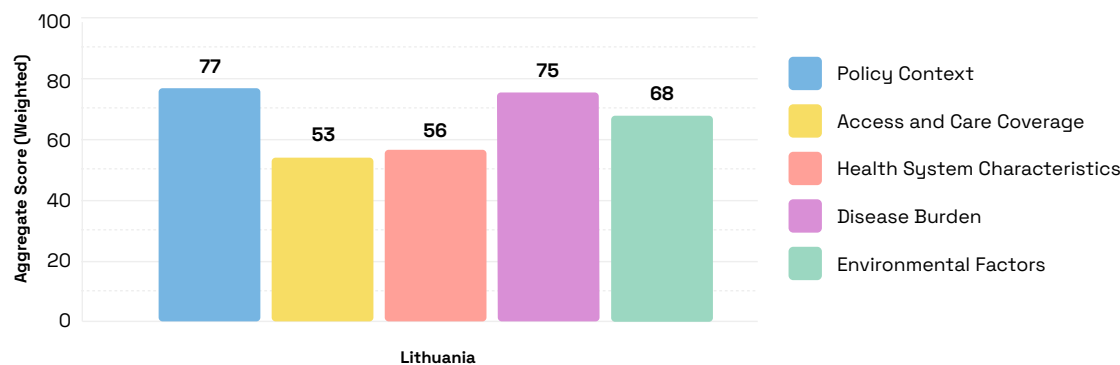
- Strong national asthma strategy and severe asthma guidelines, though there is a lack of severe asthma registries
- Low levels of access to treatment and digital therapeutics
- Lowest percentage of deaths attributable to asthma

Country data



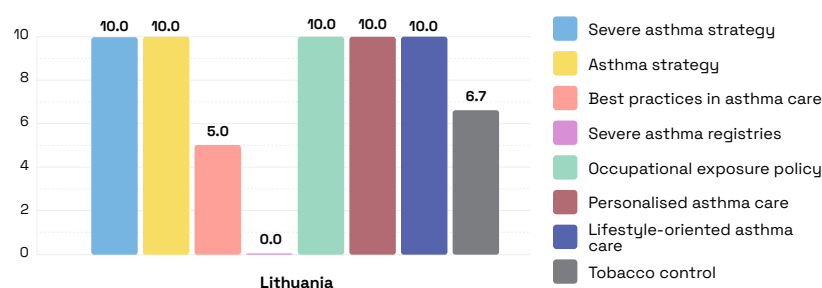
Overall Score
65.6

Rank
12



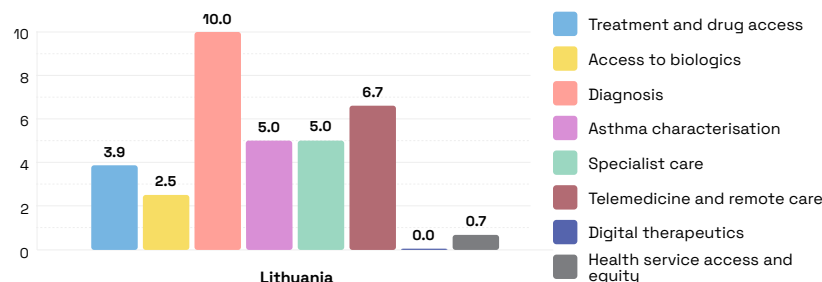
Policy Context

Score **77.0**



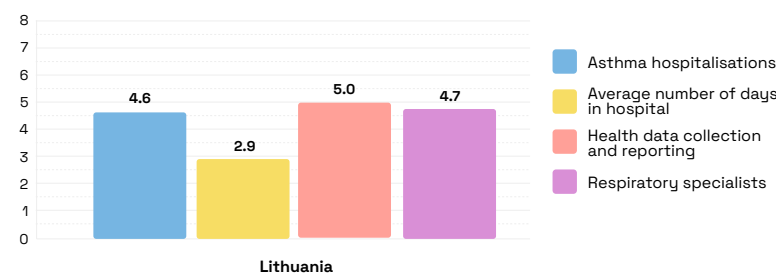
Access and Care Coverage

Score **53.0**



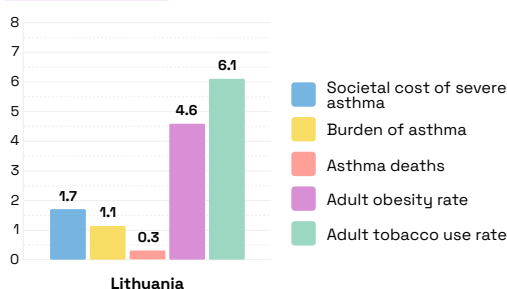
Health System Characteristics

Score **56.0**



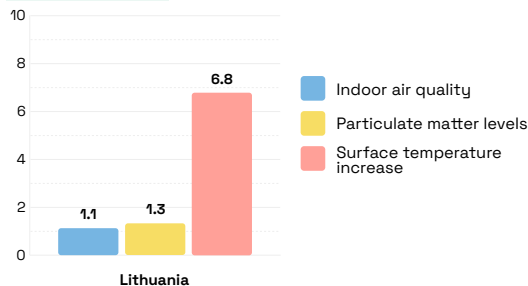
Disease Burden

Score **75.0**



Environmental Factors

Score **68.0**



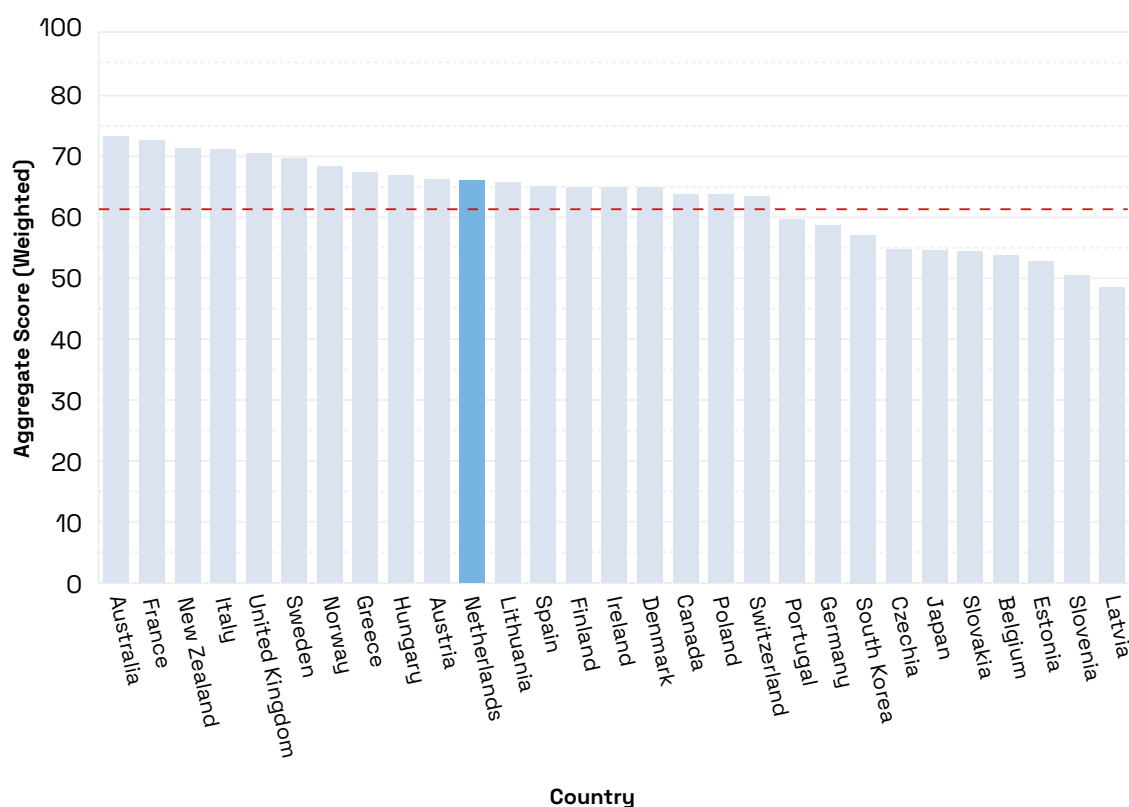


The Netherlands

The Netherlands reports an average score in the Policy Context category, in part due to the existence of a national asthma strategy and severe asthma guidelines. However, limited alignment of national guidelines with international best practices and tobacco control laws lowers the Netherlands' score. In terms of Access and Care Coverage, the Netherlands scores second compared to all other countries. This is due to excellent access to treatment (including biologics), diagnostics, and telemedicine – though the Netherlands could improve access to specialist care and digital therapeutics. Notably, the Netherlands ranks among the lowest in terms of Disease Burden score. This is attributable to a high estimated societal cost of severe asthma and DALYs attributable to asthma, as well as adult tobacco use and obesity rates slightly higher than the average.

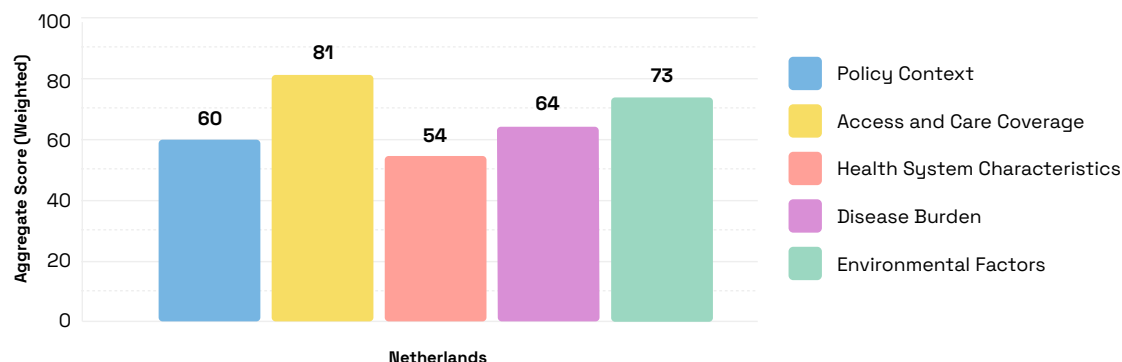
- Strong asthma strategy and severe asthma guidelines as well as a severe asthma registry
- Second highest score in Access and Care Coverage, though limited access to specialist care
- Low score in Disease Burden with high societal cost and DALYs attributable to asthma

Country data



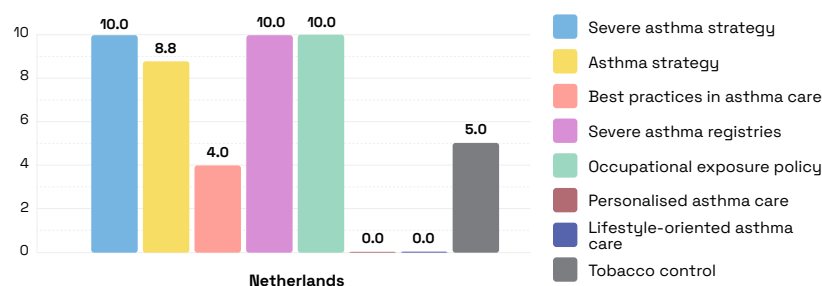
Overall Score
65.9

Rank
11



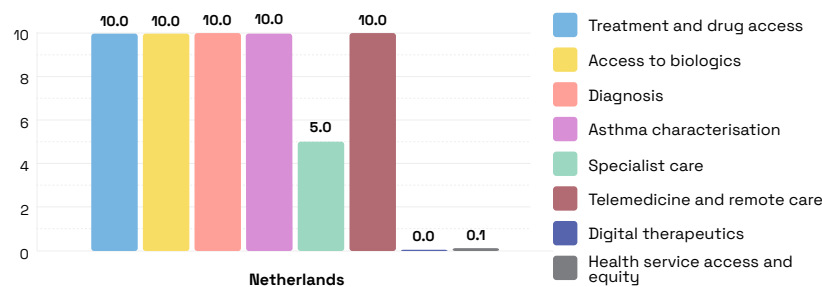
Policy Context

Score **60.0**



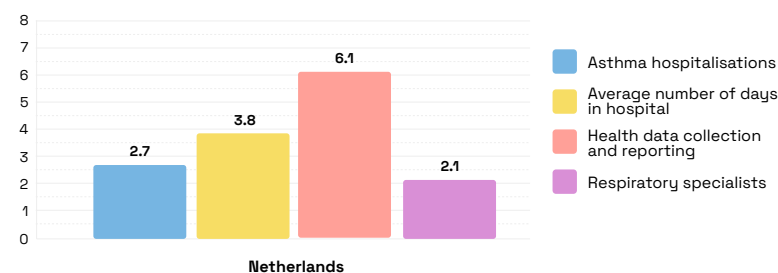
Access and Care Coverage

Score **81.0**



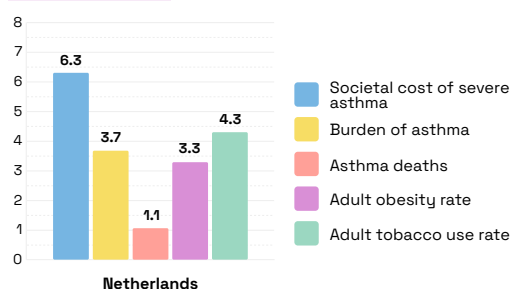
Health System Characteristics

Score **54.0**



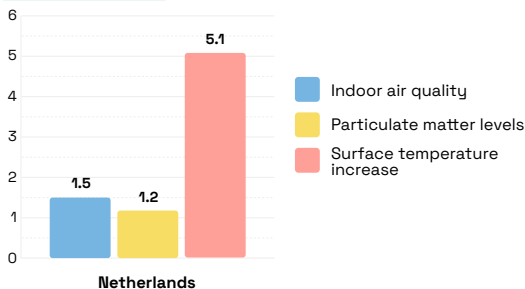
Disease Burden

Score **64.0**



Environmental Factors

Score **73.0**



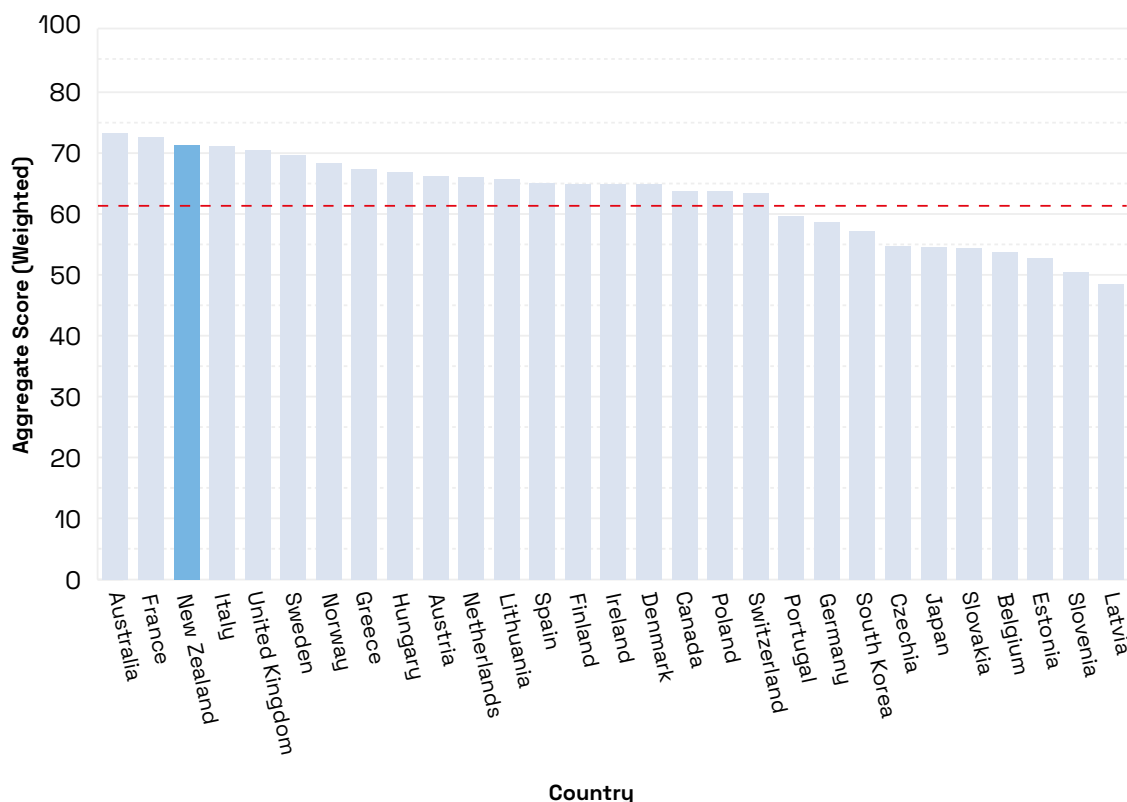


New Zealand

New Zealand is among the highest scoring in the Policy Context category due to a strong national asthma strategy and severe asthma guidelines, and the country's reporting to severe asthma registries. New Zealand's score could be improved by addressing its limited alignment of national care guidelines with international best practices and comparatively modest tobacco control laws. New Zealand's score in terms of Access and Care Coverage is average. The country has high levels of access to treatment and some diagnostics (inflammatory phenotyping), though limited access to biologics, FeNO-based diagnostics (for asthma characterisation), and specialised care.

- Strong asthma strategy and existence of severe asthma guidelines
- Limited alignment of national care guidelines with international best practices
- Limited access to biologics, FeNO-based diagnostics, and specialised care

Country data

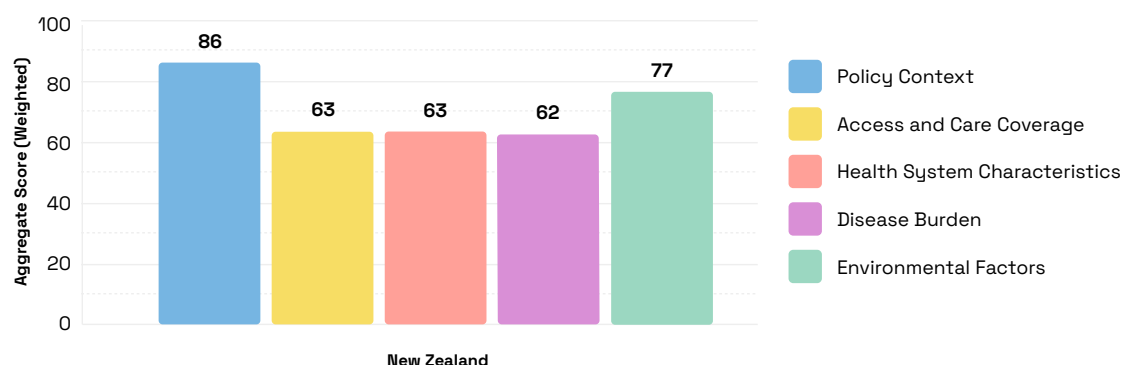


Overall Score

71.2

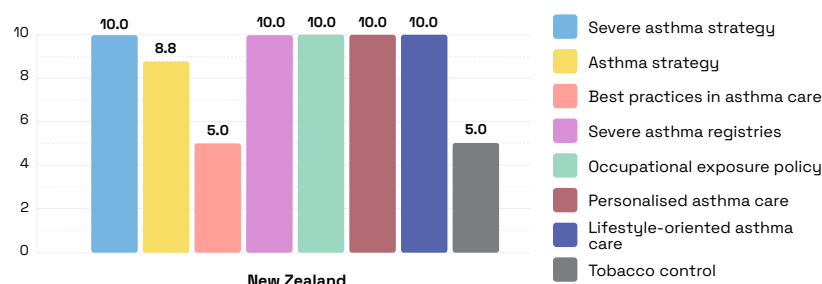
Rank

3



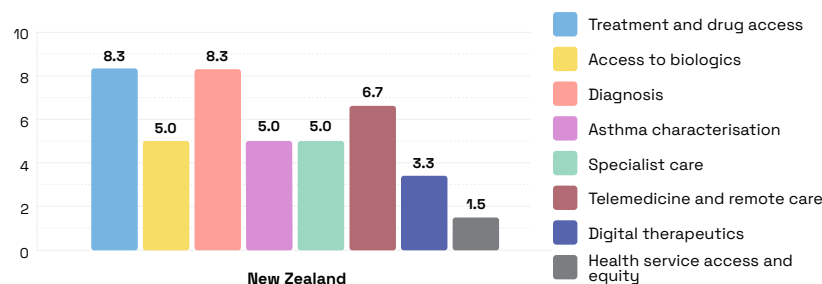
Policy Context

Score **86.0**



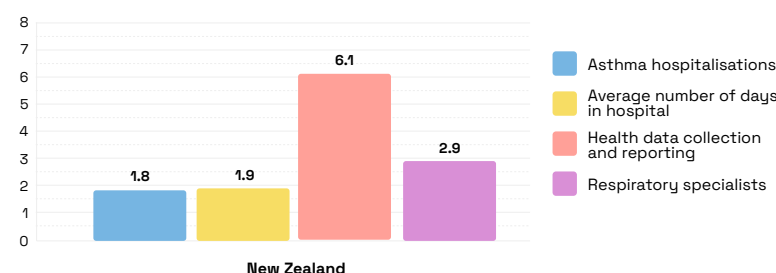
Access and Care Coverage

Score **63.0**



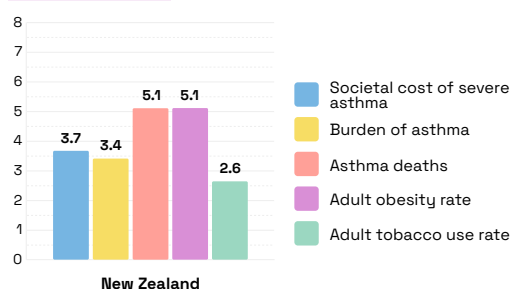
Health System Characteristics

Score **63.0**



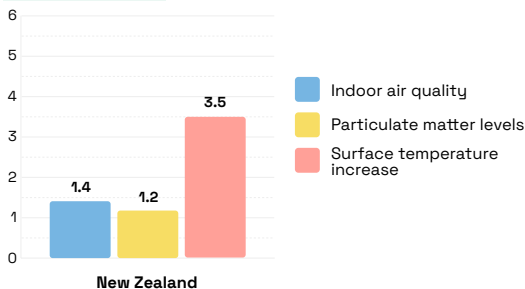
Disease Burden

Score **62.0**



Environmental Factors

Score **77.0**



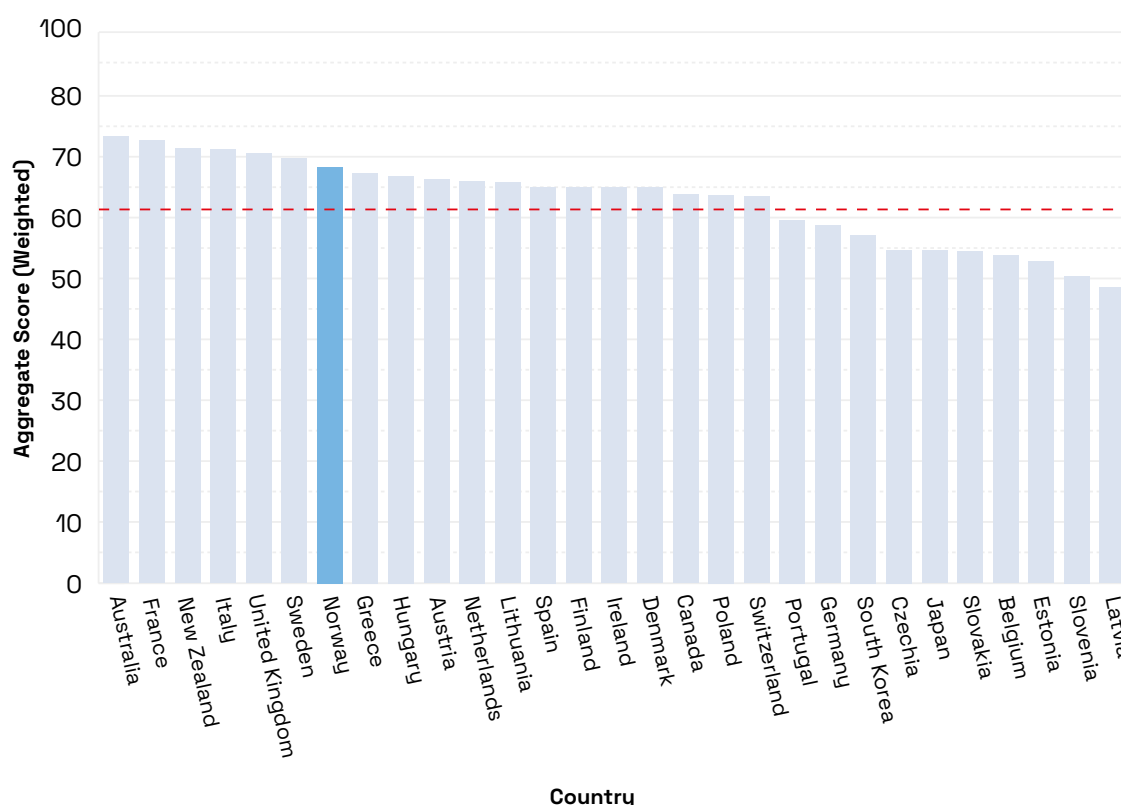


Norway

Norway is among the highest scoring in terms of Policy Context. This is due to a comprehensive asthma strategy, severe asthma guidelines, and Norway's reporting to severe asthma registries. Limited alignment of national guidelines with international best practices and comparatively modest tobacco control laws limit Norway's ability to score higher in this category. In terms of Access and Care Coverage, Norway ranks close to the average. While Norway shows relatively low unmet needs and high levels of access to biologics-based treatment, specialist care, and diagnostics such as inflammatory phenotyping, improvement could be made in access to other treatments, digital therapeutics, and FeNO-based diagnosis. Norway has among the lowest Disease Burden scores, which is attributable to one of the highest estimated societal costs of asthma and the number of DALYs attributable to asthma. Having some of the lowest rates of adult tobacco use improves Norway's score in this category.

- Strong asthma strategy, severe asthma guidelines, and severe asthma registries boost Norway's score
- High levels of access to biologics-based treatment, specialist care, and inflammatory phenotyping-based diagnostics
- High estimated societal cost and number of DALYs attributable to asthma

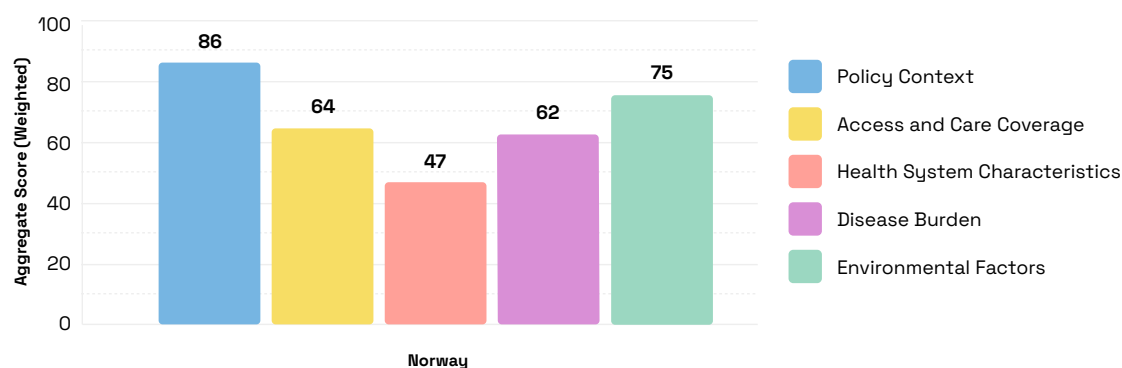
Country data²



Overall Score
68.2

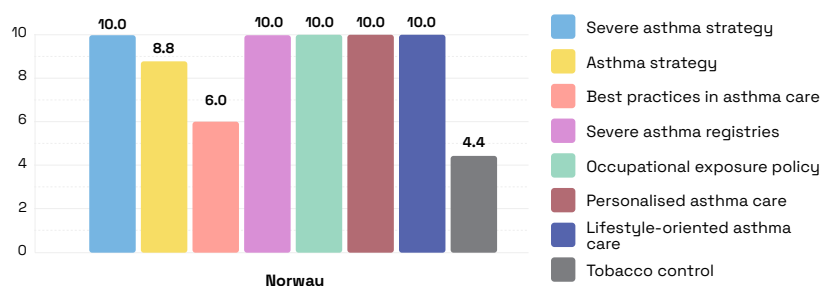
Rank
7

² We note the potential for low data reliability for Norway's estimated societal cost of severe asthma because the indicator is linked to gross domestic product. Various aspects of the Norwegian economy significantly impact the accuracy of Norway's GDP estimates and, thereby, its performance within this indicator. The estimated societal cost of severe asthma may be lower than reported here.



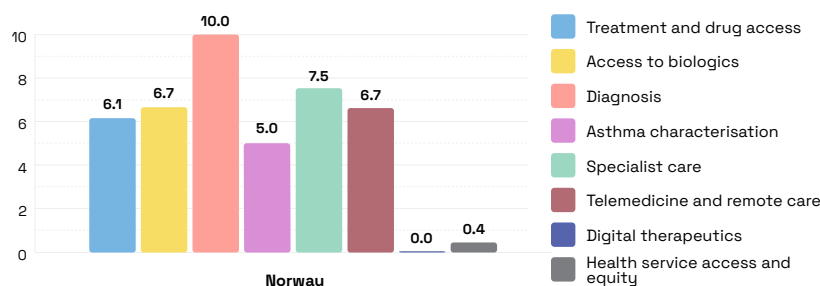
Policy Context

Score **86.0**



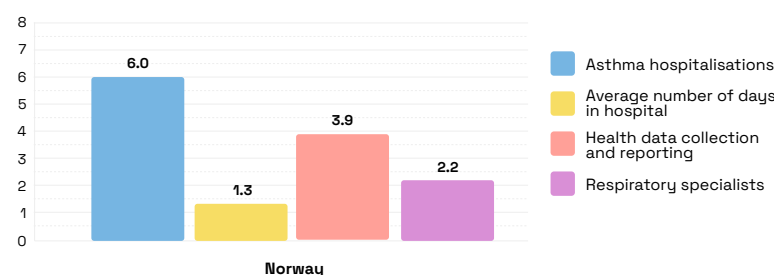
Access and Care Coverage

Score **64.0**



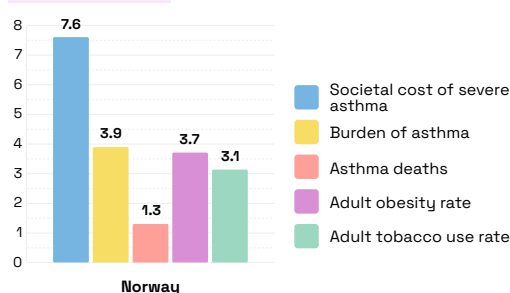
Health System Characteristics

Score **47.0**



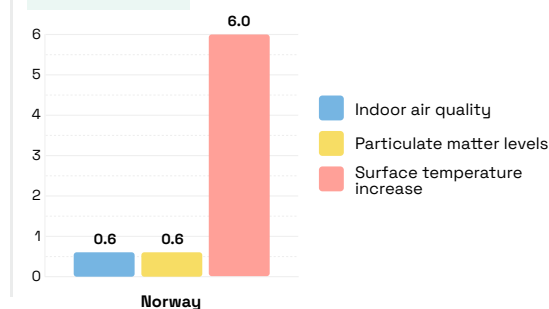
Disease Burden

Score **62.0**



Environmental Factors

Score **75.0**



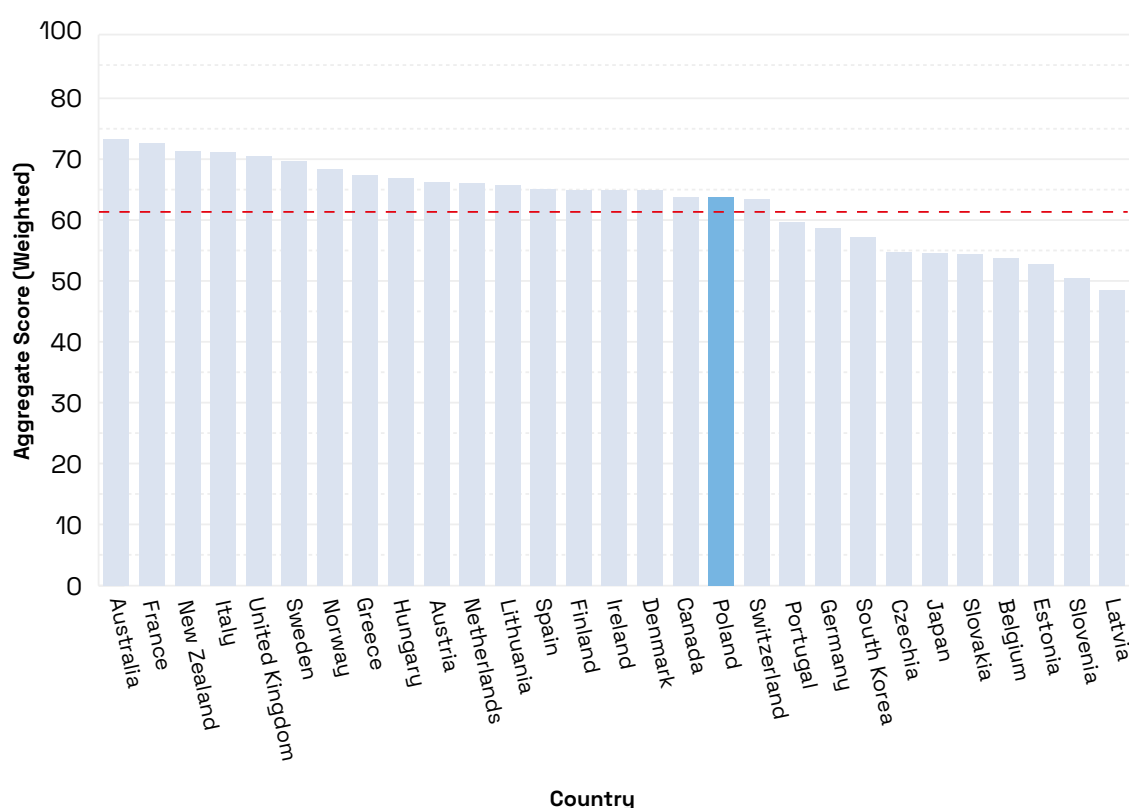


Poland

Poland's Policy Context score is slightly below the average. On the positive side, Poland reports a relatively solid asthma strategy and the existence of severe asthma registries. However, Poland's score is undercut by the absence of severe asthma guidelines, relatively poor alignment of national care guidelines with international guidelines, and limited tobacco control laws. In terms of Access and Care Coverage, Poland also scores below average. Limited access to treatment, including biologics, and diagnostics based on FeNO as well as relatively high unmet needs lower Poland's score in this category. This is somewhat counterbalanced by high levels of access to diagnostics based on inflammatory phenotyping as well as to specialist care. However, Poland is among the highest scoring in Health System Characteristics, resulting from a lower-than-average number of annual asthma hospitalisations and average number of days in hospital due to asthma and one of the highest numbers of respiratory specialists per 100,000 population.

- Limited access to treatment and diagnostics based on FeNO and high unmet needs
- High levels of access to diagnostics based on inflammatory phenotyping and specialist care
- One of the greatest numbers of respiratory specialists per 100,000 population

Country data

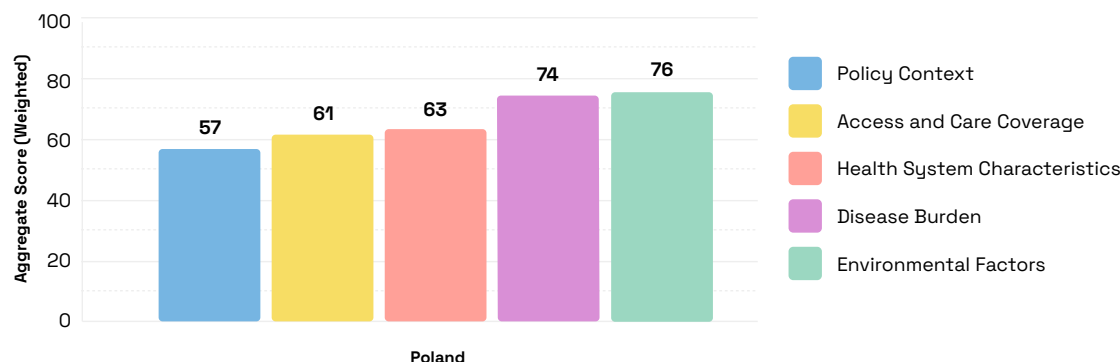


Overall Score

63.6

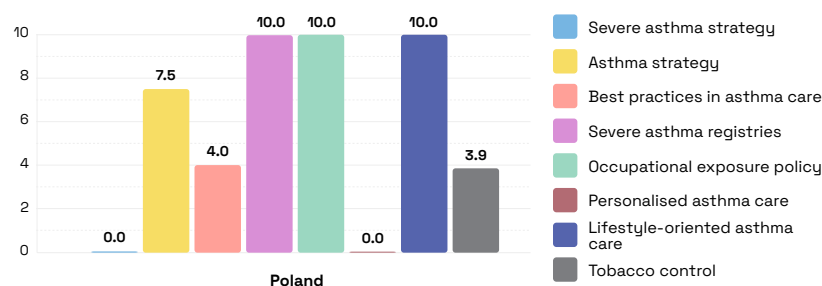
Rank

18



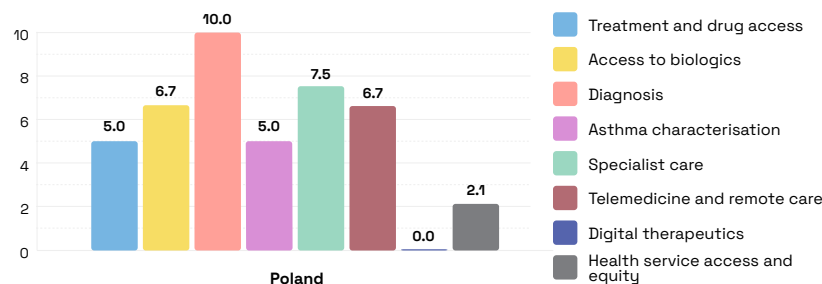
Policy Context

Score **57.0**



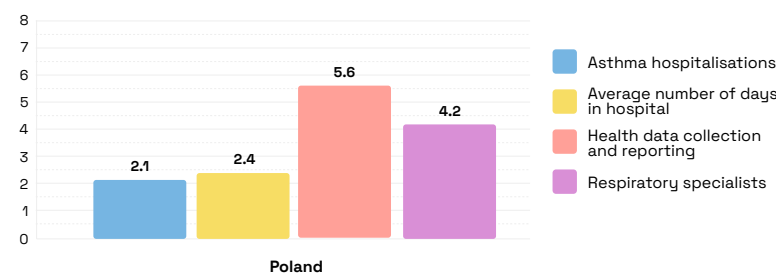
Access and Care Coverage

Score **61.0**



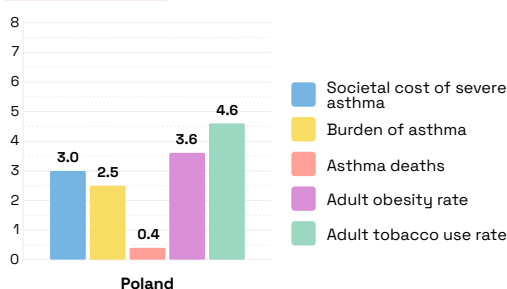
Health System Characteristics

Score **63.0**



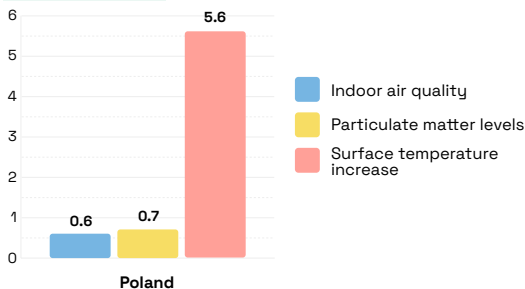
Disease Burden

Score **74.0**



Environmental Factors

Score **76.0**



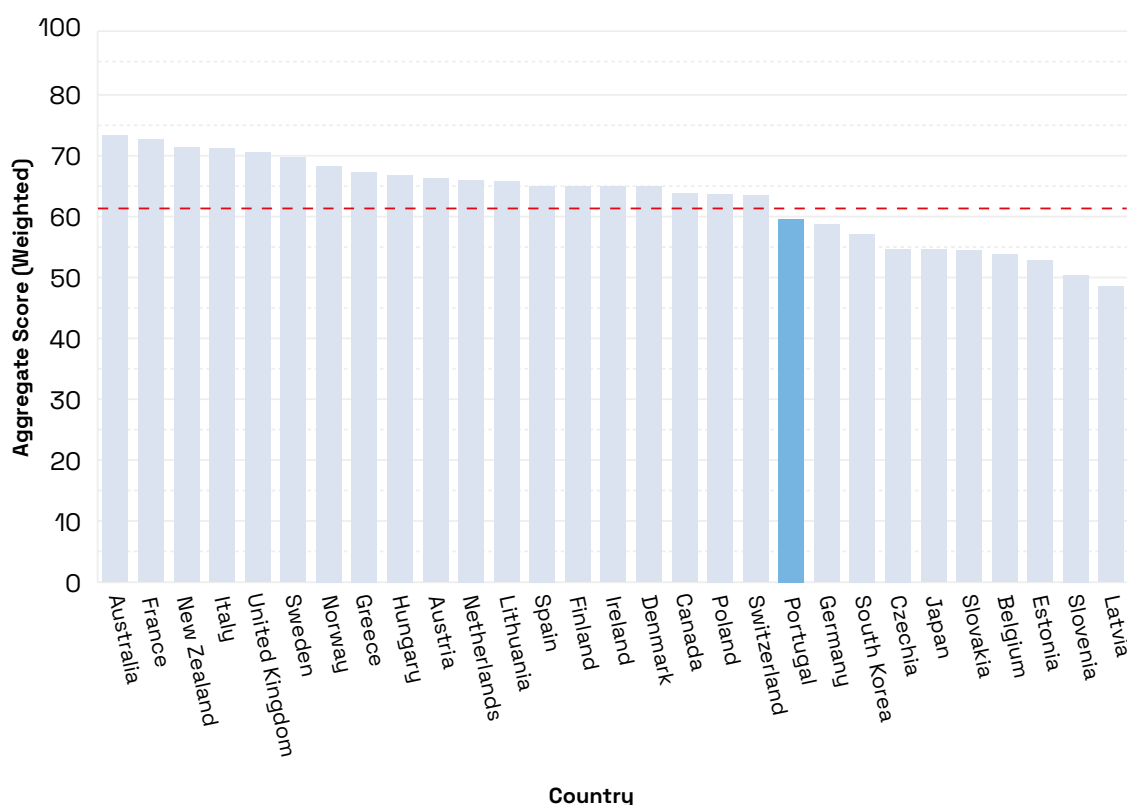


Portugal

Portugal's score in Policy Context is close to the average. This is a result of Portugal having a relatively strong asthma strategy as well as having severe asthma guidelines, while weak tobacco control laws bring Portugal's score down. Portugal is amongst the lowest scoring in terms of Access and Care Coverage, attributable to limited access to some treatments, especially biologics, FeNO-based diagnostics and digital therapeutics, though high levels of access to inflammatory phenotyping-based diagnostics and specialist care, as well as unmet needs below the average, bring Portugal's score up. Portugal scores within the bottom third of countries in the Disease Burden category, with one of the highest estimated societal costs of asthma and percentage of DALYs attributable to asthma. However, Portugal displays a rate of deaths associated with asthma that is below the average.

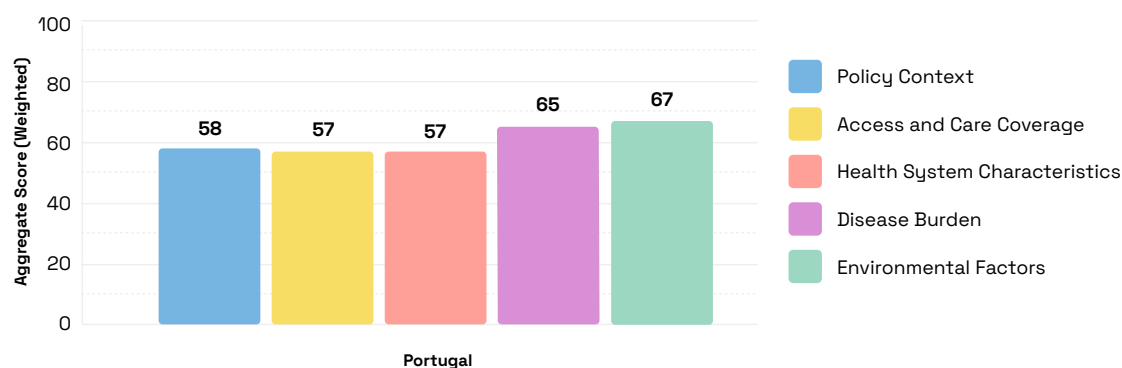
- Limited severe asthma guidelines and tobacco control laws
- Low Access and Care Coverage and among the highest levels of DALYs attributable to asthma
- High levels of access to inflammatory phenotyping-based diagnostics and specialist care

Country data



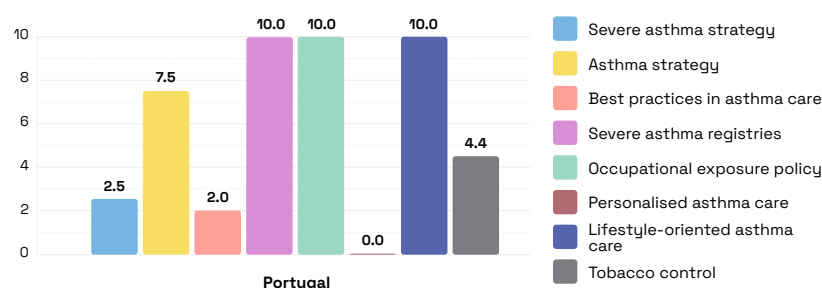
Overall Score
59.5

Rank
20



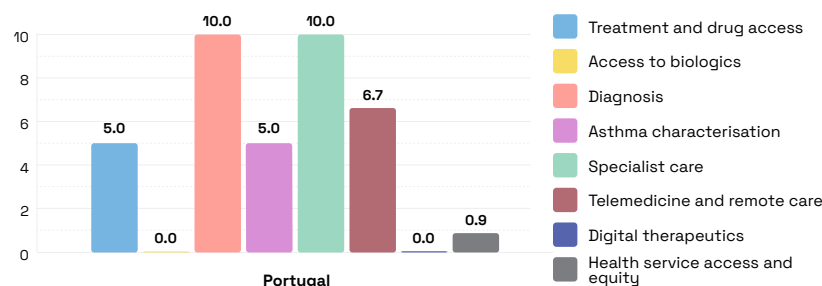
Policy Context

Score **58.0**



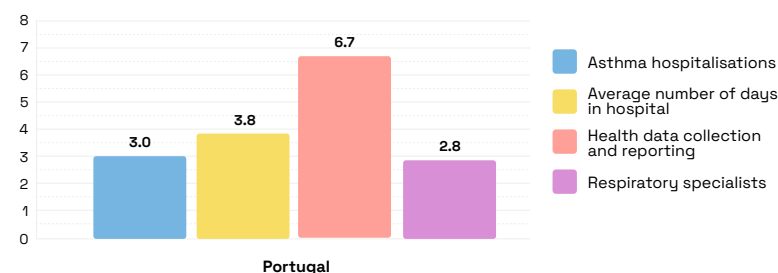
Access and Care Coverage

Score **57.0**



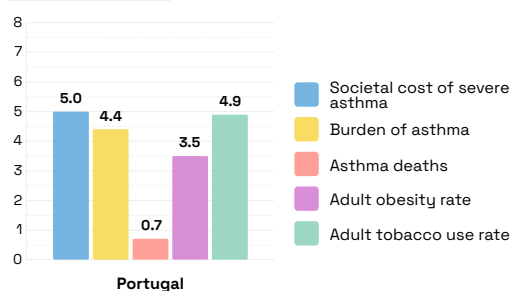
Health System Characteristics

Score **57.0**



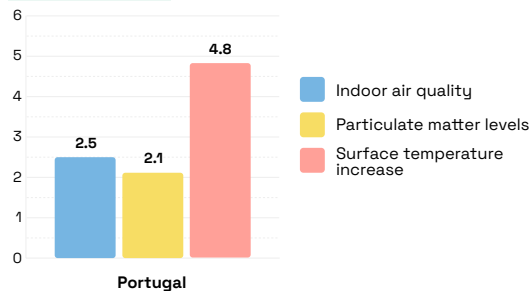
Disease Burden

Score **65.0**



Environmental Factors

Score **67.0**



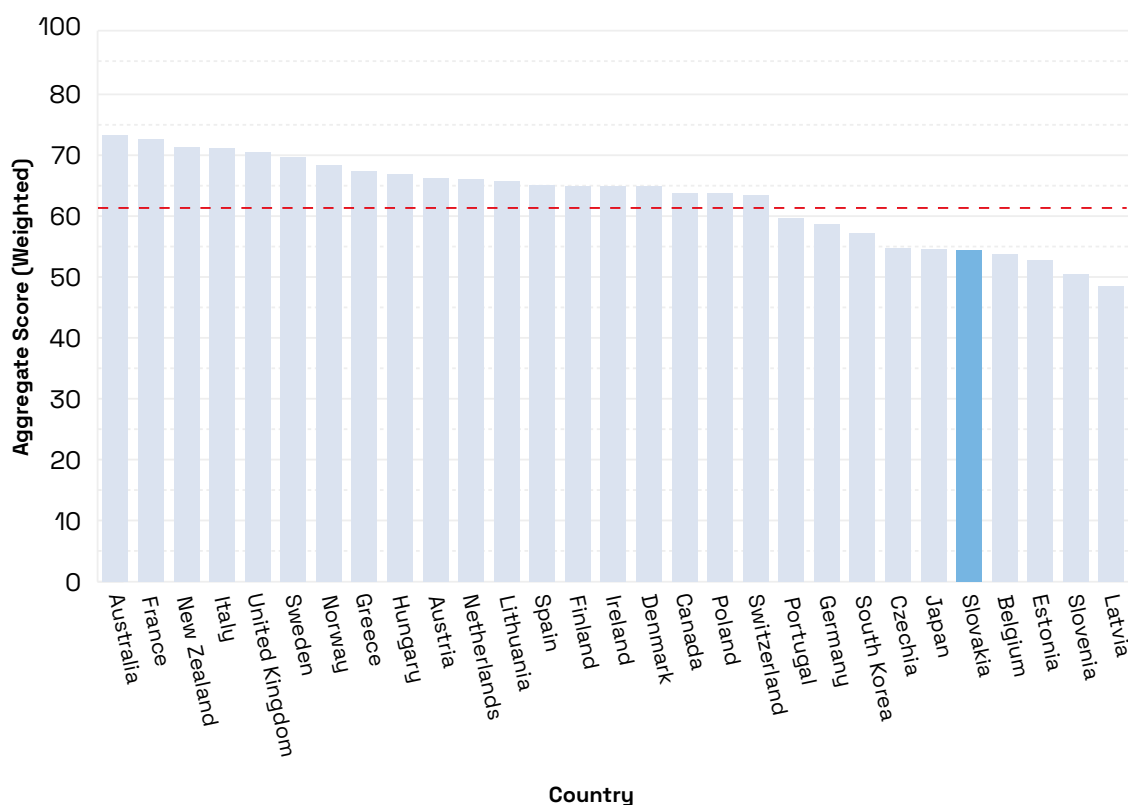


Slovakia

Slovakia is among the lowest scorers in terms of Policy Context, lacking both an asthma strategy and severe asthma guidelines, and having no alignment of national care guidelines with international guidelines, and no severe asthma registries. While higher than Slovakia's Policy Context score, the country also scores low in Access and Care Coverage. This is due to limited access to treatment, especially biologics, and digital therapeutics. Positively, Slovakia's tobacco control laws and access to specialist care are above average and its unmet need is below average. Despite scoring low in Policy Context and Access and Care Coverage, Slovakia scores above average in the Health System Characteristics category, with one of the lowest rates of annual asthma hospitalisations and one of the highest proportions of respiratory specialists.

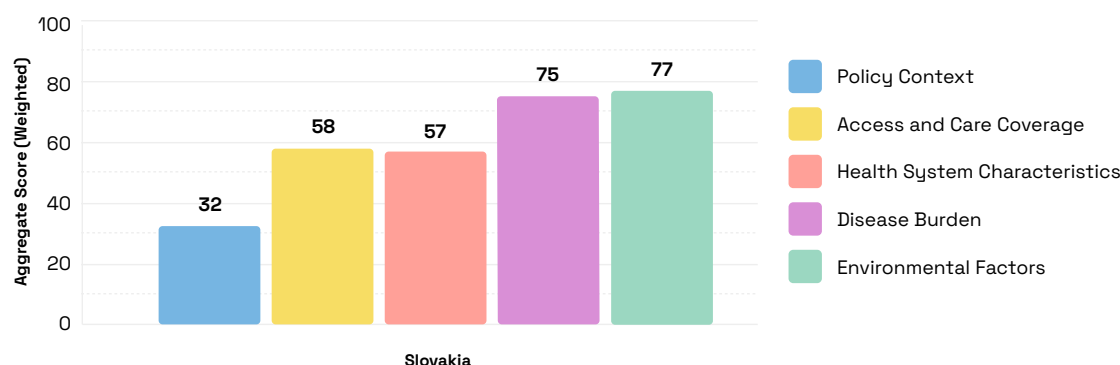
- No asthma strategy, alignment of national care guidelines with international guidelines, and no severe asthma registries
- Limited access to treatment (especially biologics) and digital therapeutics
- One of the lowest rates of annual asthma hospitalisations

Country data



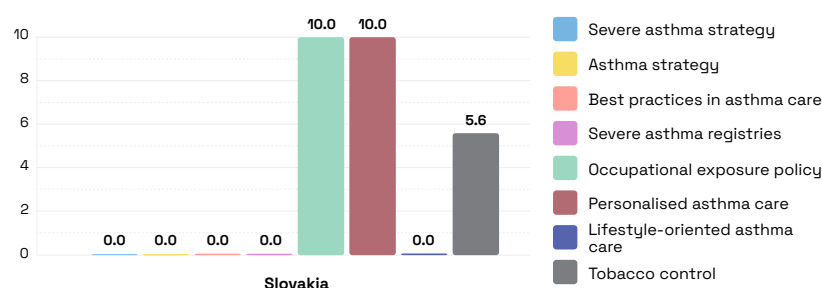
Overall Score
54.3

Rank
25



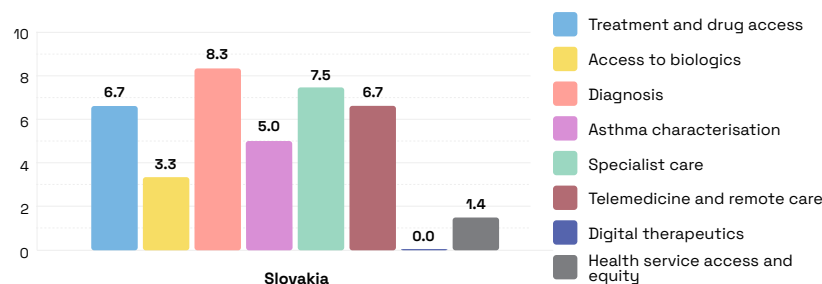
Policy Context

Score **32.0**



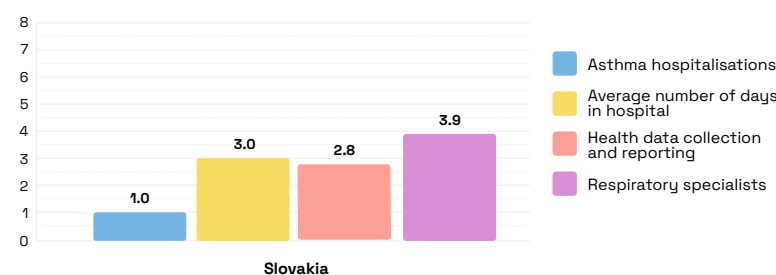
Access and Care Coverage

Score **58.0**



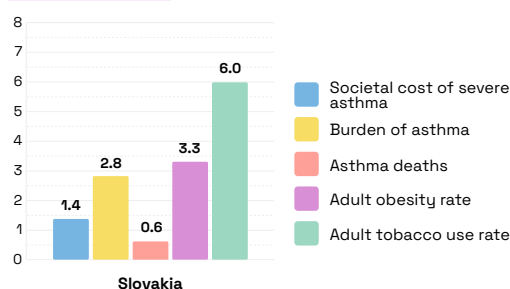
Health System Characteristics

Score **57.0**



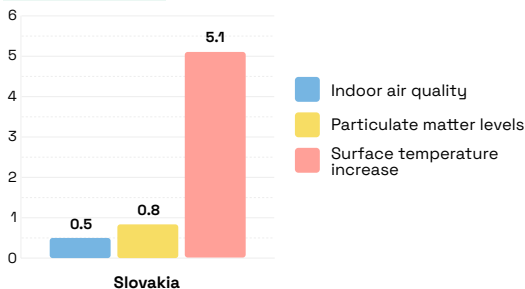
Disease Burden

Score **75.0**



Environmental Factors

Score **77.0**



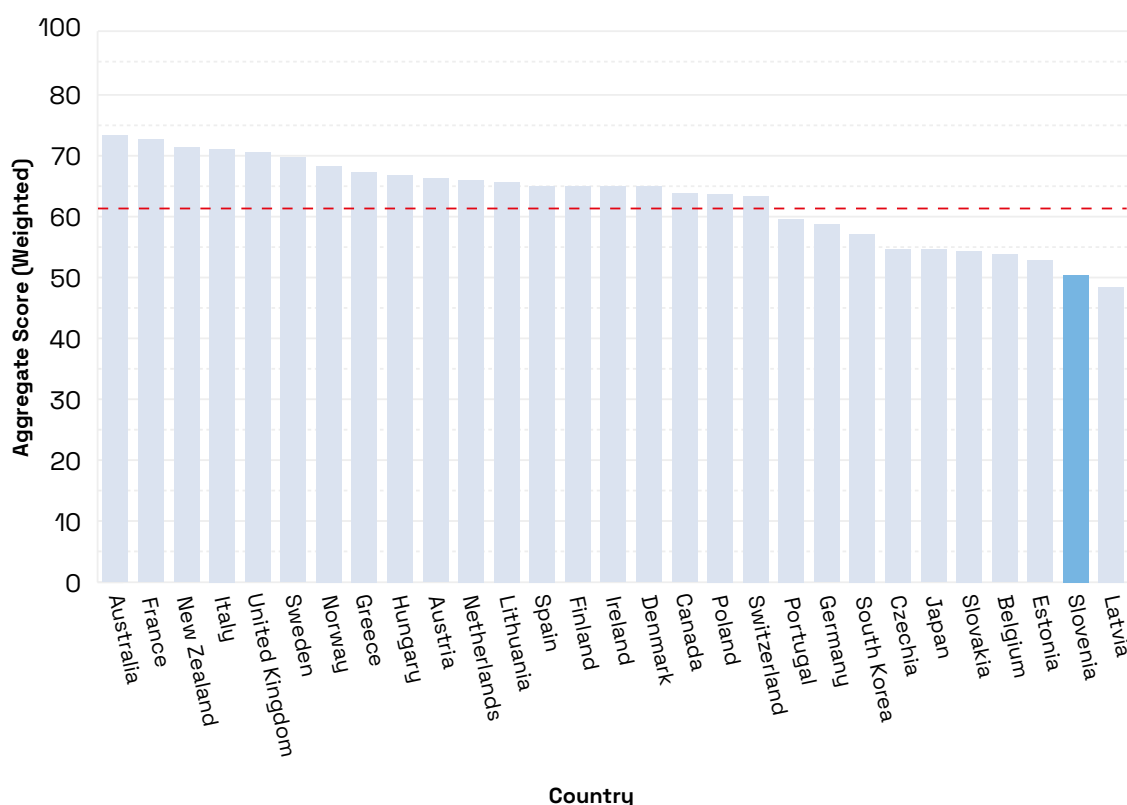


Slovenia

Slovenia shows room for improvement across most categories in the Severe Asthma Index but has a strong score in the Disease Burden category with a low reported rate of asthma deaths and asthma DALYs. Slovenia could help to improve its score by addressing its lack of a strategy for asthma and low level of alignment with international best practices. Access to diagnostics and specialist care is good, but access to digital therapeutics and telehealth could also be improved.

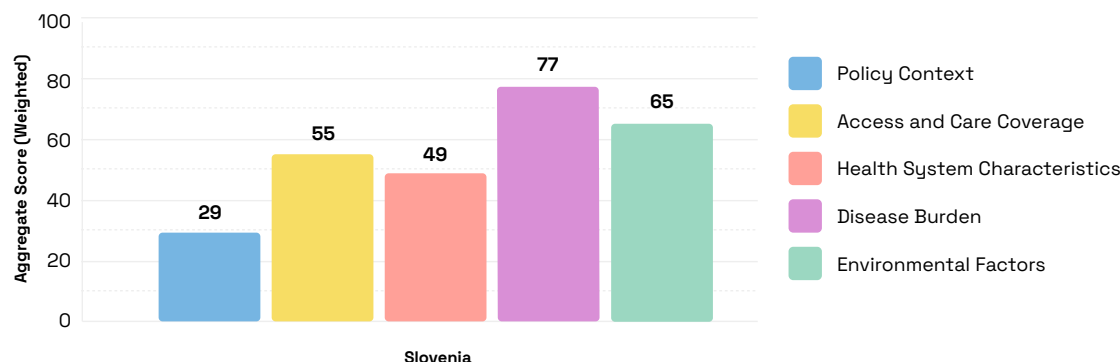
- Slovenia has good access to diagnostics and specialist care relative to other countries
- Slovenia displays one of the lowest rates of asthma deaths and asthma DALYs
- Improving alignment with international best practices and implementing an asthma strategy could improve Slovenia's score

Country data



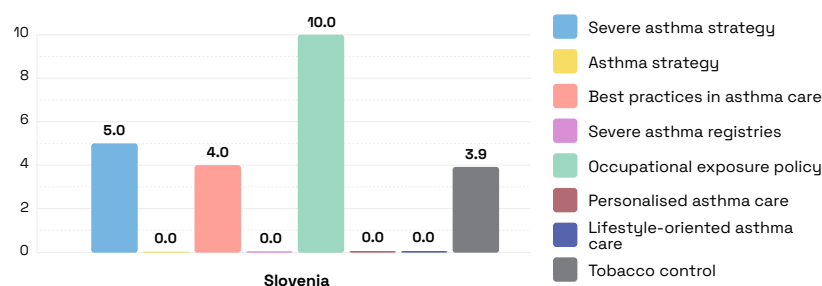
Overall Score
50.3

Rank
28



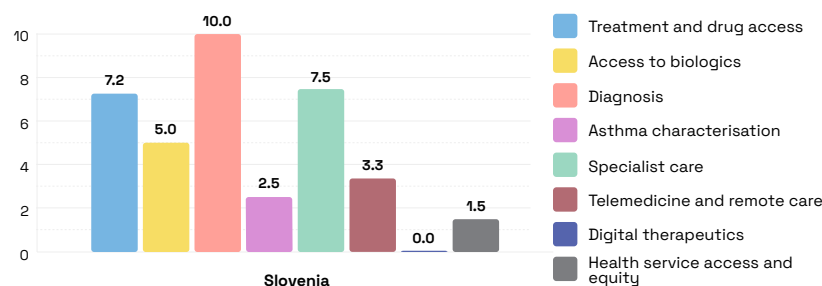
Policy Context

Score **29.0**



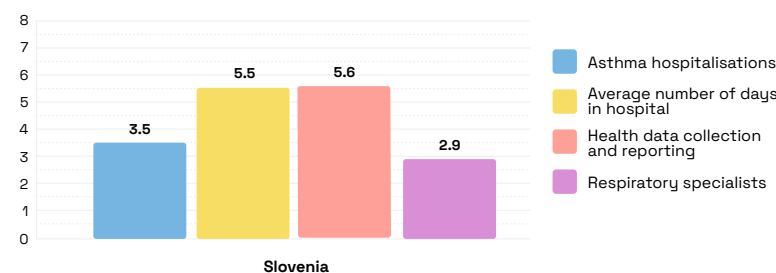
Access and Care Coverage

Score **55.0**



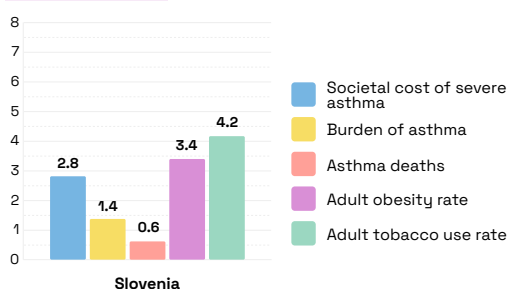
Health System Characteristics

Score **49.0**



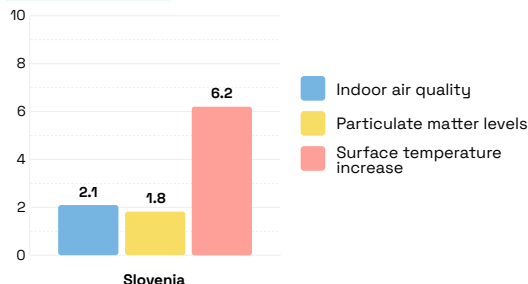
Disease Burden

Score **77.0**



Environmental Factors

Score **65.0**





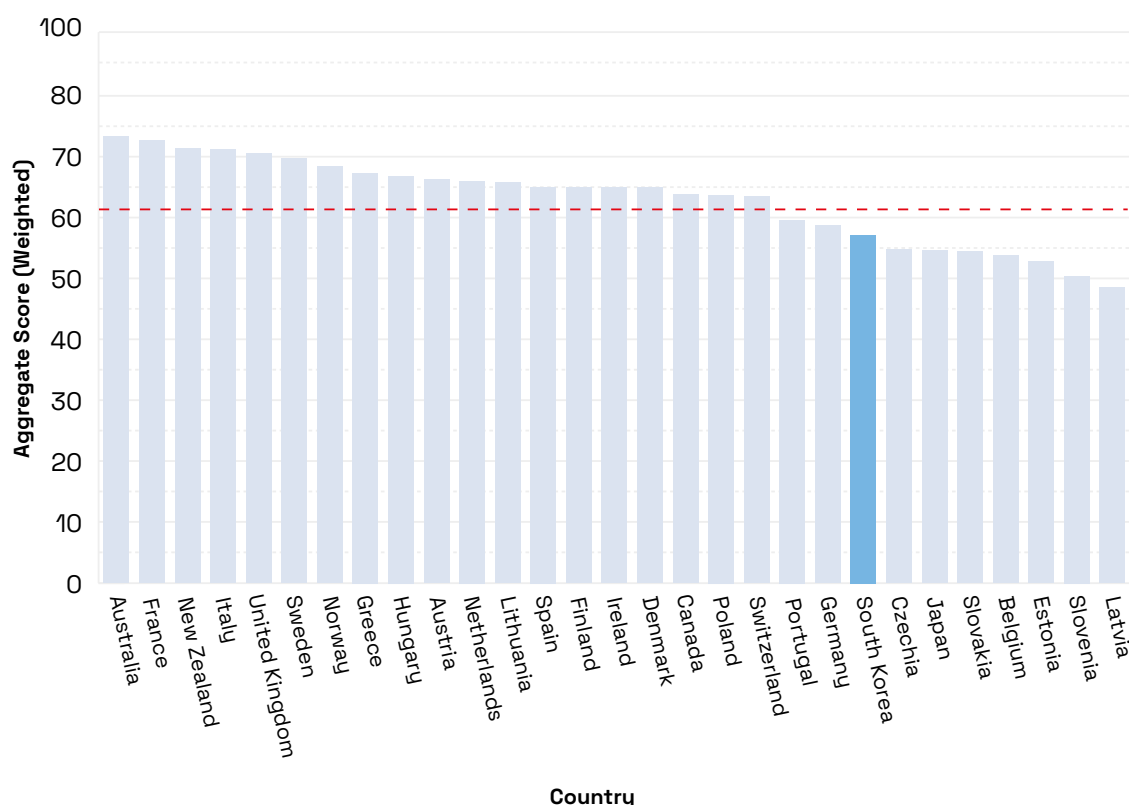
South Korea

(Republic of Korea)

South Korea presents moderate to low scores in the Severe Asthma Index, but also demonstrates several important strengths. In the Health System Characteristics category, South Korea comes out above the average score with among the lowest rates of asthma-related hospitalisations. South Korea has a very strong score in Disease Burden, ranked second in the category with a relatively low rate of asthma DALYs, asthma deaths, and the second lowest adult obesity rate.

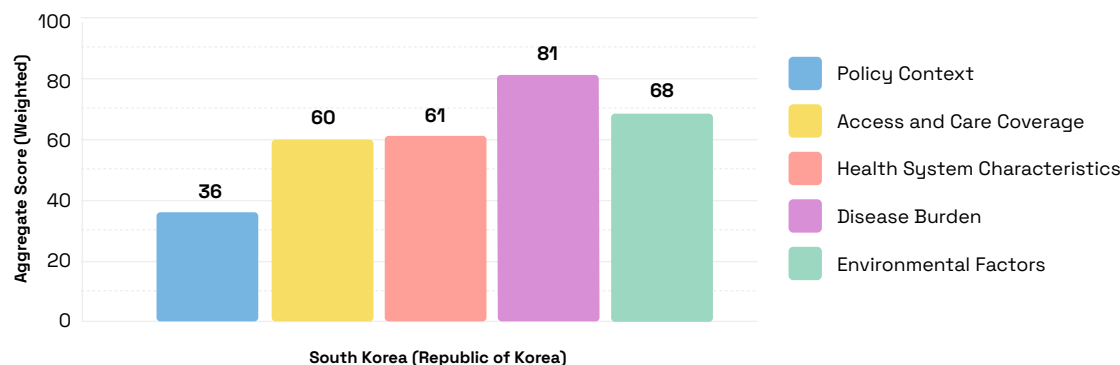
- South Korea reports a comparatively low rate of asthma-related deaths
- While the adult obesity rate is the second lowest in the Index, tobacco use and control could be addressed to improve the country's overall score
- South Korea presents one of the lowest rates of asthma-related hospitalisation

Country data



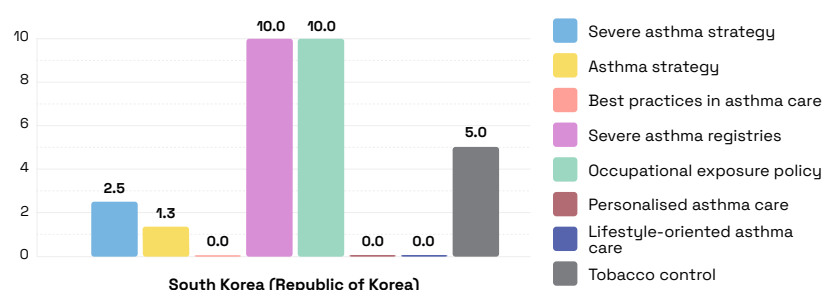
Overall Score
57.0

Rank
22



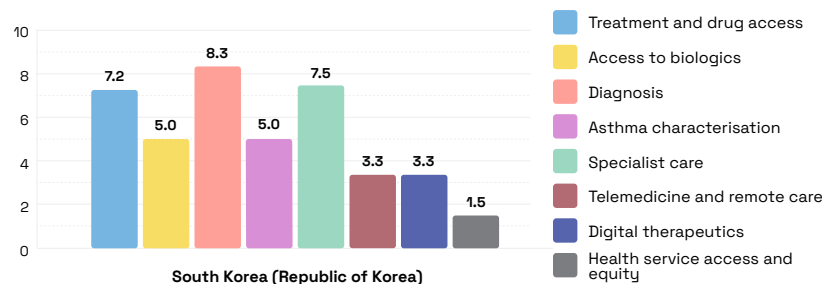
Policy Context

Score **36.0**



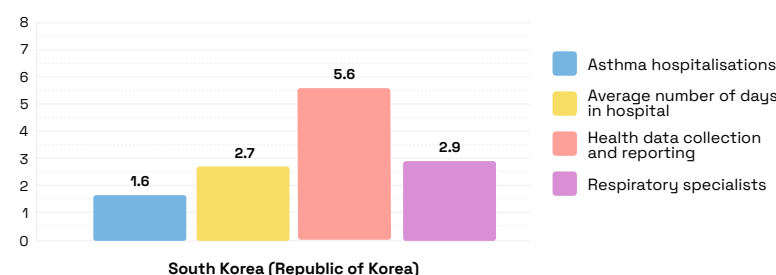
Access and Care Coverage

Score **60.0**



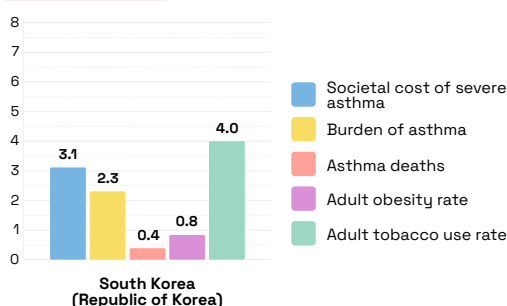
Health System Characteristics

Score **61.0**



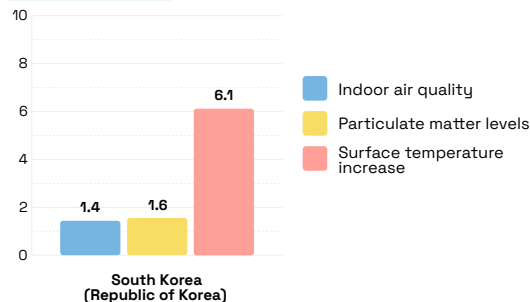
Disease Burden

Score **81.0**



Environmental Factors

Score **68.0**



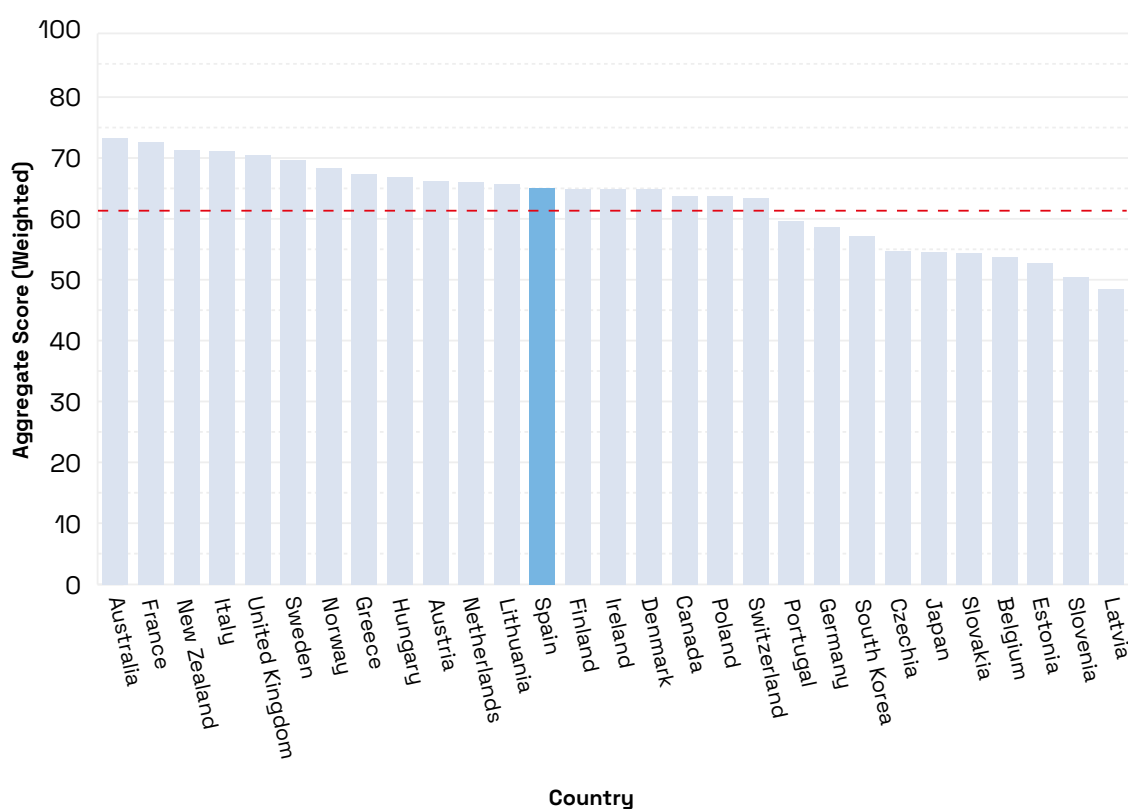


Spain

Spain ranks slightly above average in the Severe Asthma Index overall, with moderate to strong scores across most categories. Spain reports that its population healthcare service needs are very well met as well as having a high level of drug and treatment access. However, access to biologics in Spain could be improved. Spain has a comparatively low estimated societal cost of severe asthma, but the disease burden could be further addressed through tackling risk factors such as adult obesity and tobacco use.

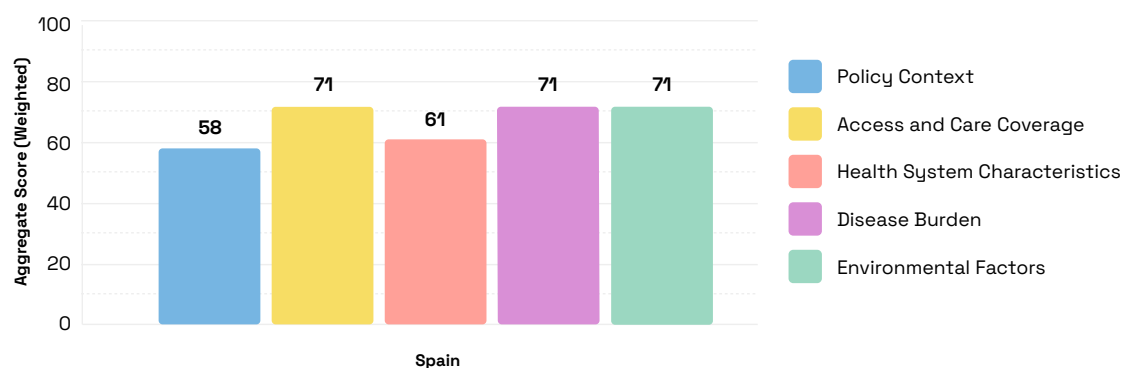
- Spain reports the lowest level of unmet healthcare needs in the Index
- Spain could further improve its score with a comprehensive asthma strategy
- Spain reports the fourth poorest indoor air quality in the Index

Country data



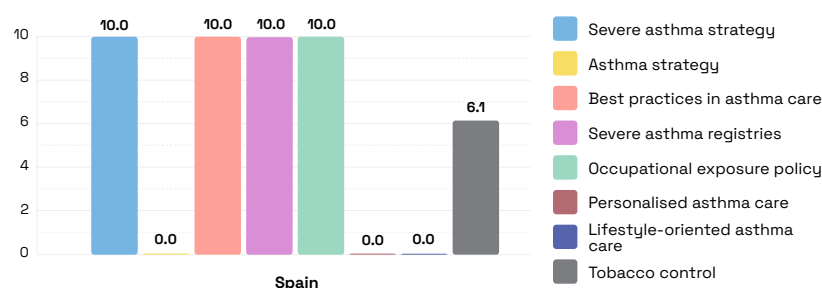
Overall Score
64.9

Rank
13



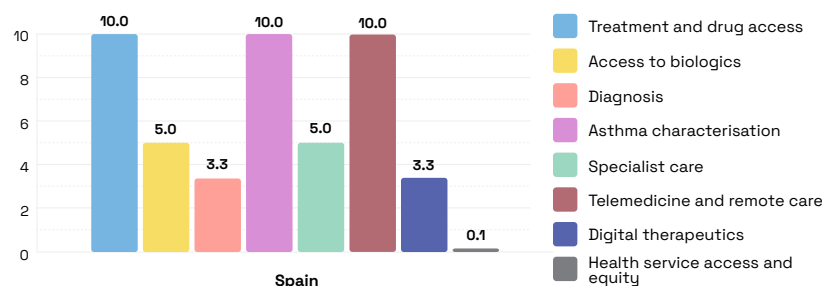
Policy Context

Score **58.0**



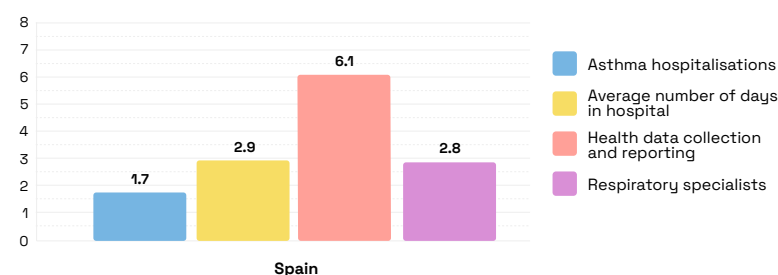
Access and Care Coverage

Score **71.0**



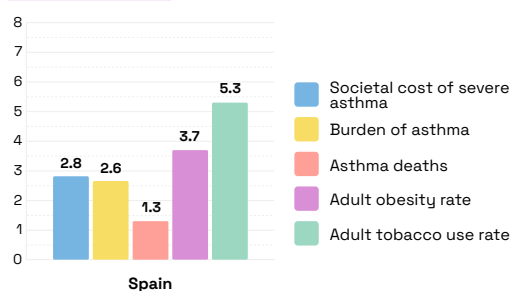
Health System Characteristics

Score **61.0**



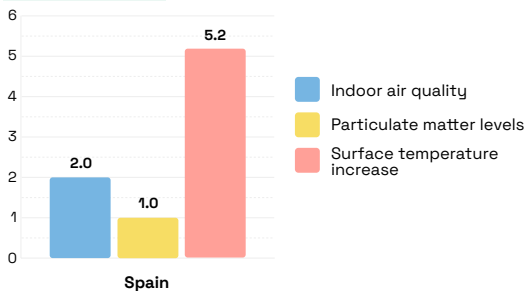
Disease Burden

Score **71.0**



Environmental Factors

Score **71.0**



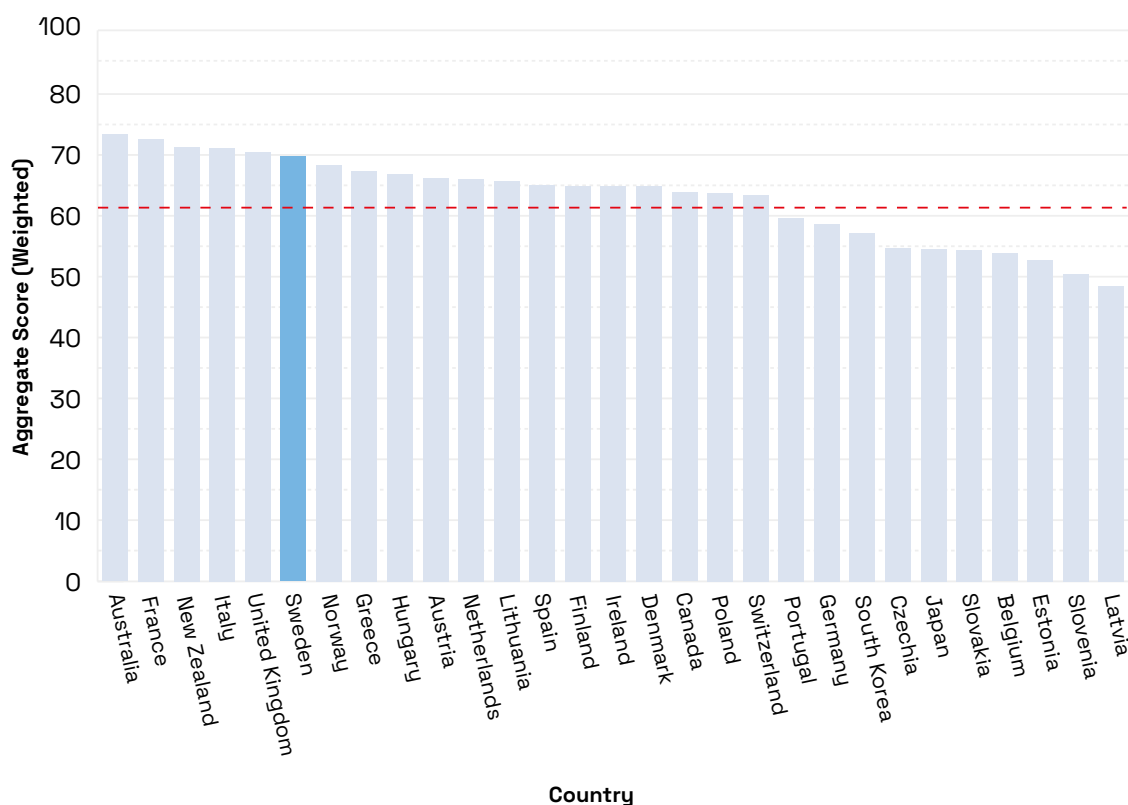


Sweden

Sweden has strong scores across most categories in the Severe Asthma Index. As one of the top performers in Policy Context, Sweden has the highest level of tobacco control but could have better alignment with international guidelines. Sweden also presents with excellent drug and treatment access and coverage compared to other countries in the Index. Access to biologics is good, with a comparatively low level of unmet need. Compared to other countries, Sweden has a low rate of asthma hospitalisations and the fewest average number of days spent in the hospital, but Sweden still presents one of the highest estimated societal costs of severe asthma.

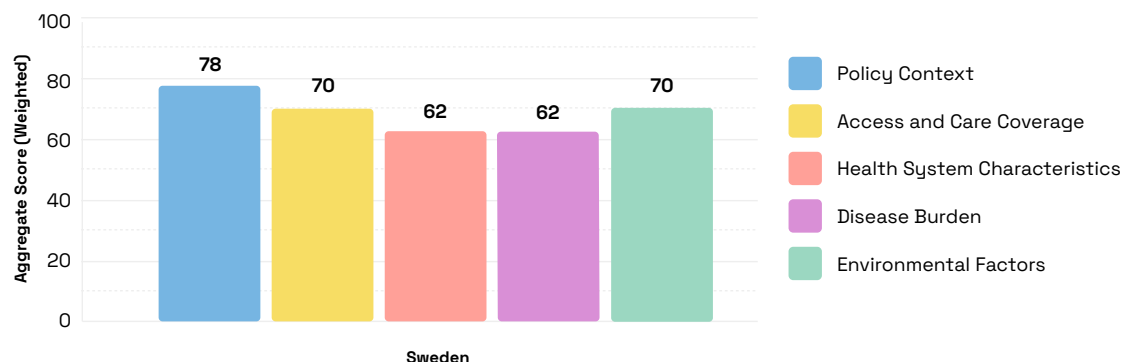
- Sweden has the fewest average number of days of asthma-related hospitalisation
- Better alignment of guidelines with international best practices would improve Sweden's overall score
- The estimated societal cost of severe asthma in Sweden is among the highest in the Index

Country data



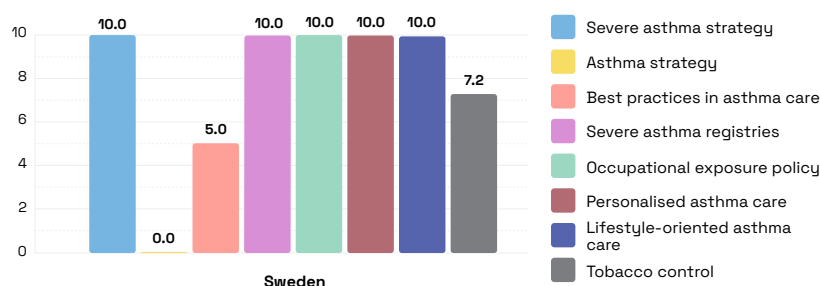
Overall Score
69.6

Rank
6



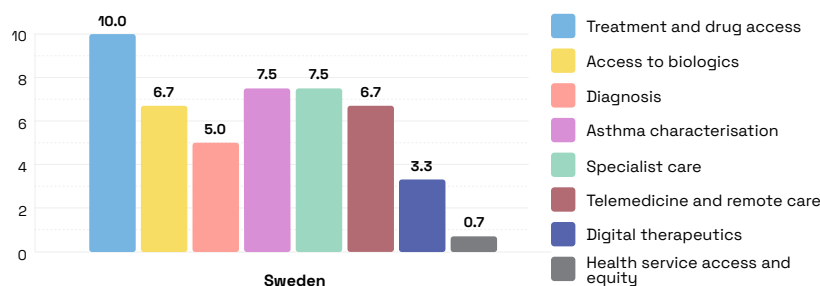
Policy Context

Score **78.0**



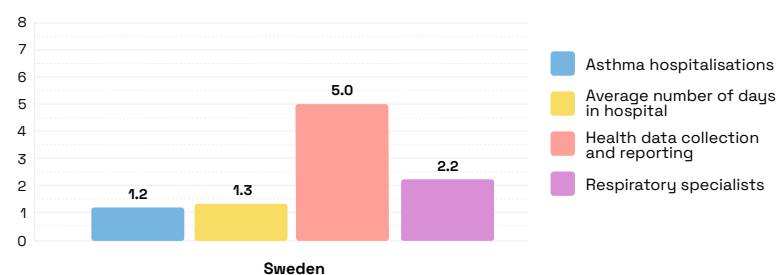
Access and Care Coverage

Score **70.0**



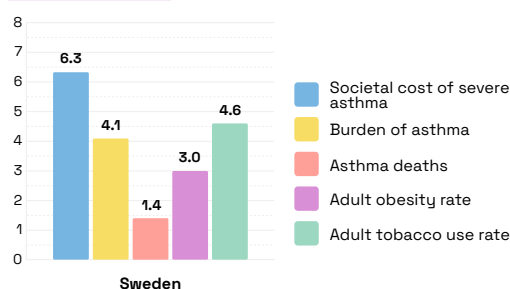
Health System Characteristics

Score **62.0**



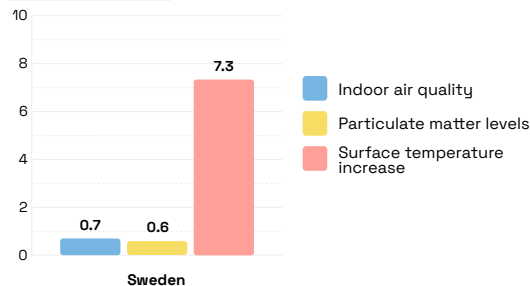
Disease Burden

Score **62.0**



Environmental Factors

Score **70.0**



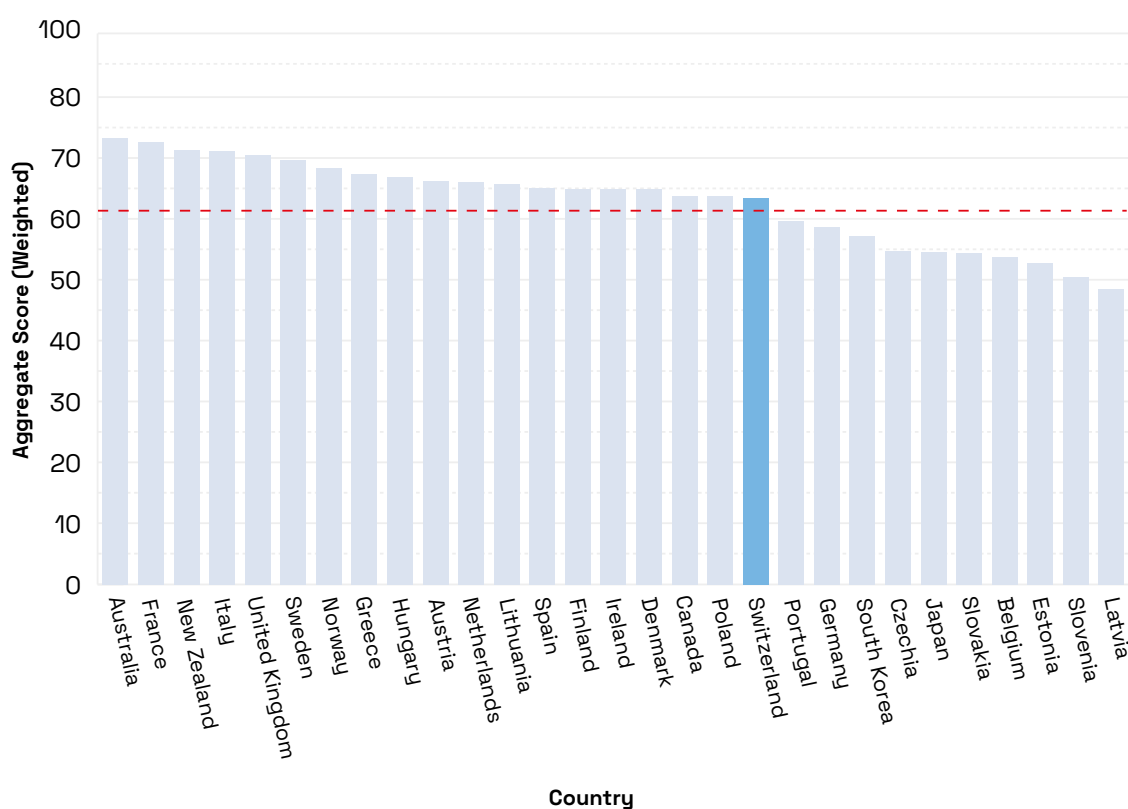


Switzerland

Switzerland presents several strengths as well as several areas for improvement in the Severe Asthma Index. While Switzerland reports a very low level of unmet healthcare needs and encouraging figures related to asthma risk factors such as obesity, it currently has no comprehensive strategy for asthma and a comparatively low level of tobacco control. Access to treatment and drugs is generally strong, but access to biologics could be improved.

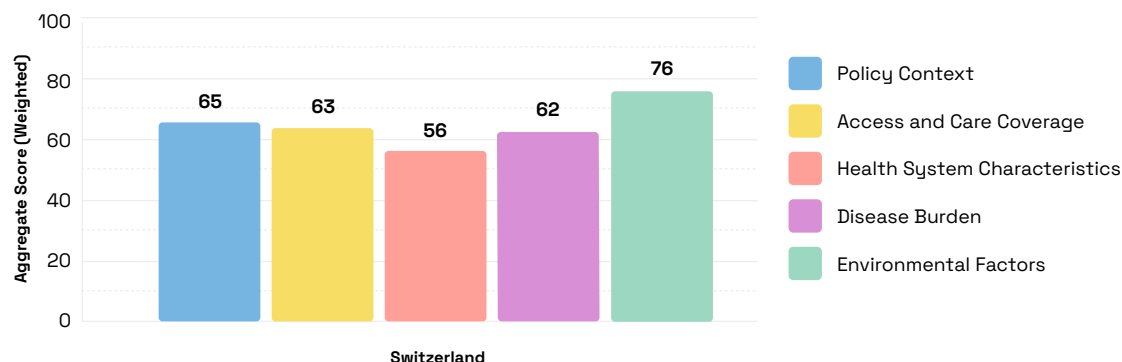
- Switzerland presents the lowest adult obesity rate of all European countries in the Index
- High scores in Environmental Factors support Switzerland's moderate overall score in the Index
- Switzerland reports a very low level of unmet healthcare needs

Country data



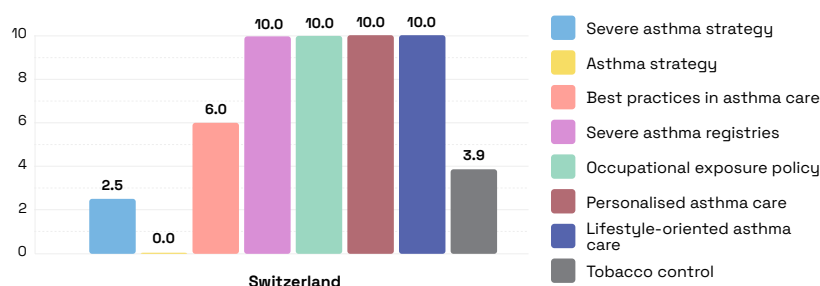
Overall Score
63.3

Rank
19



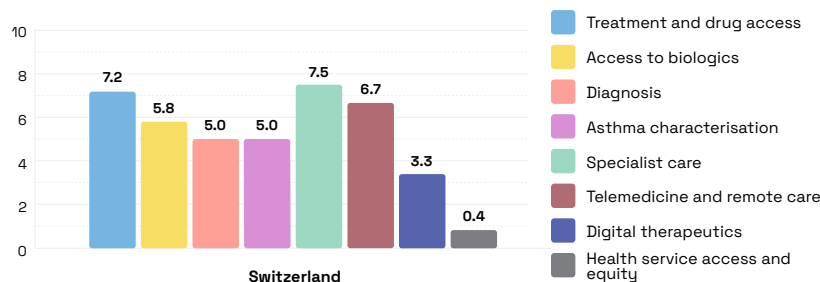
Policy Context

Score **65.0**



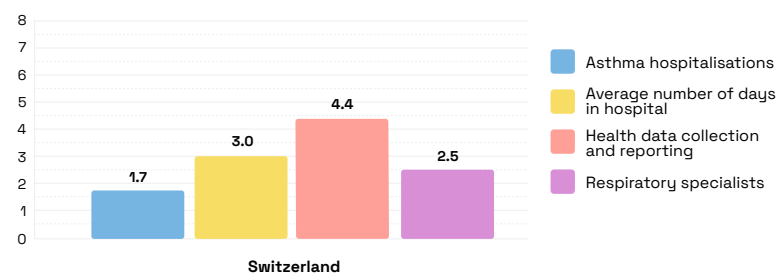
Access and Care Coverage

Score **63.0**



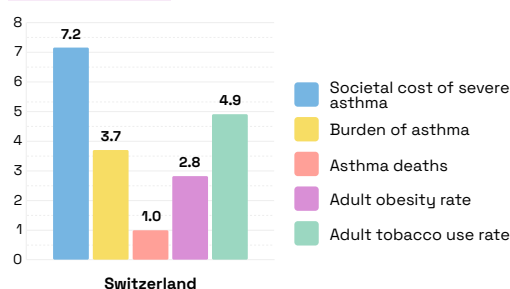
Health System Characteristics

Score **56.0**



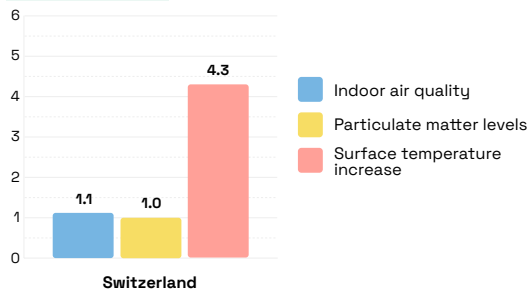
Disease Burden

Score **62.0**



Environmental Factors

Score **76.0**



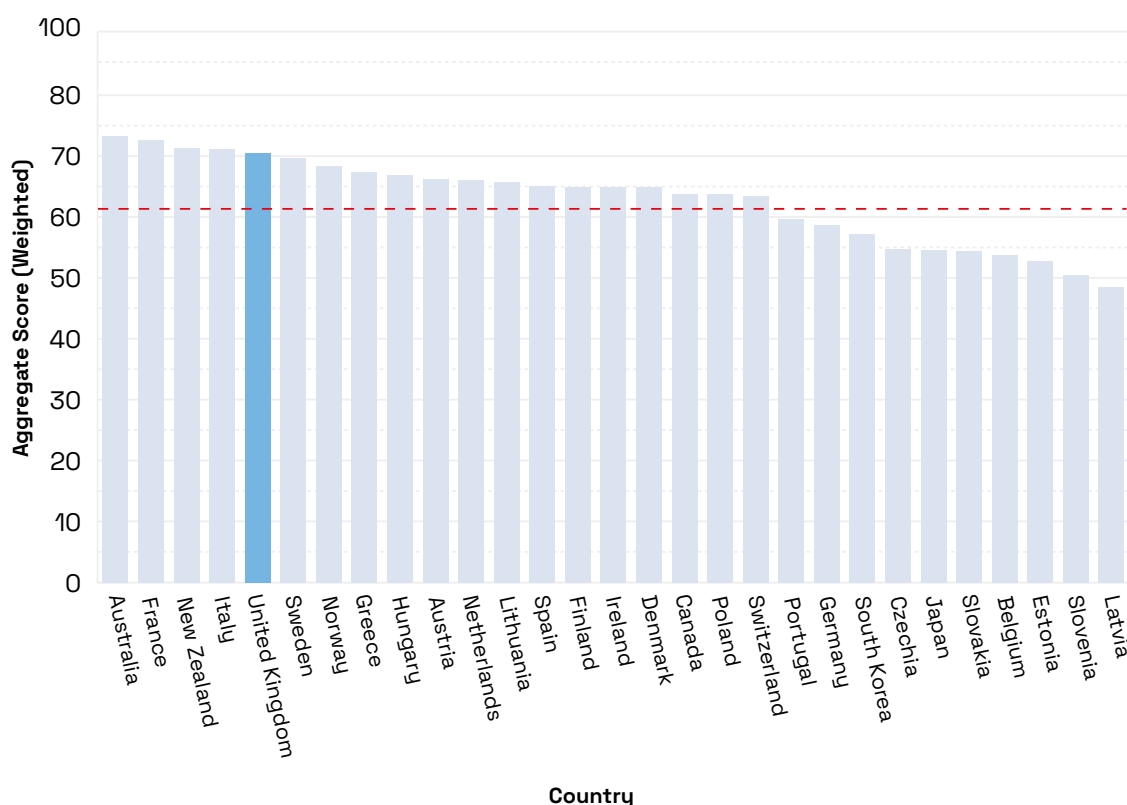


United Kingdom

The United Kingdom demonstrates high to moderate scores across indicators in the Index. The United Kingdom's comprehensive universal healthcare system may support its first-place rank in the Access and Care Coverage category, with strong asthma treatment and drug access, and good access to specialists. However, the United Kingdom also presents a comparatively high level of unmet healthcare needs, and the country ranks low in Health System Characteristics with the highest number of hospitalisations per 100,000 population and a comparatively low number of respiratory specialists.

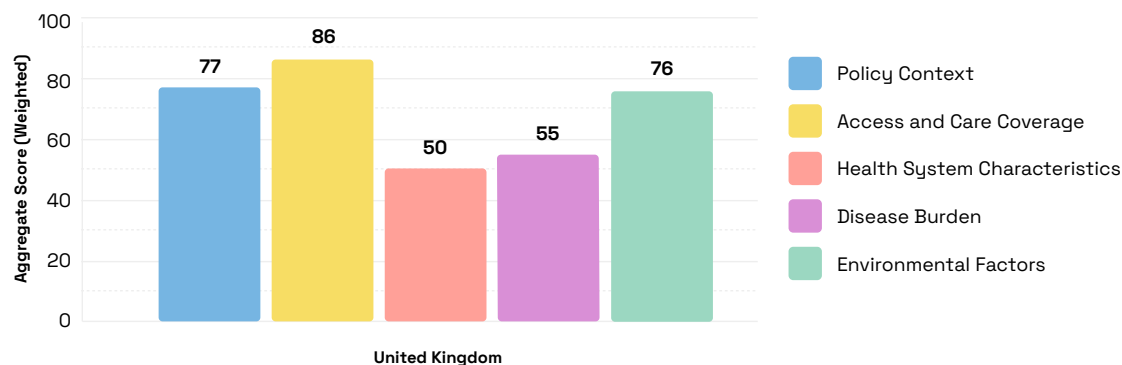
- Ranked first in Access and Care Coverage category, in part due to strong access to asthma treatment and drug coverage
- The United Kingdom has a high estimated societal cost of severe asthma compared to other countries
- Behavioural changes and better alignment with international best practices could improve the UK's score

Country data



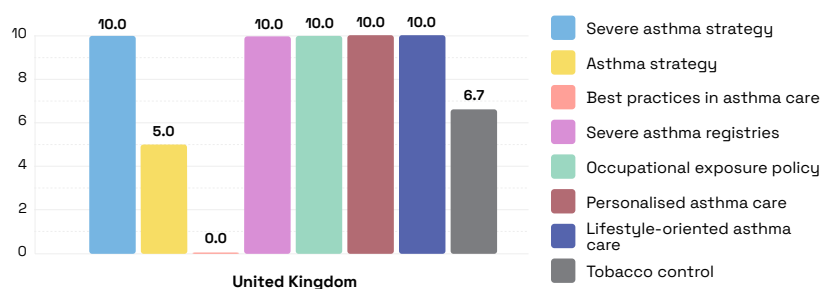
Overall Score
70.4

Rank
5



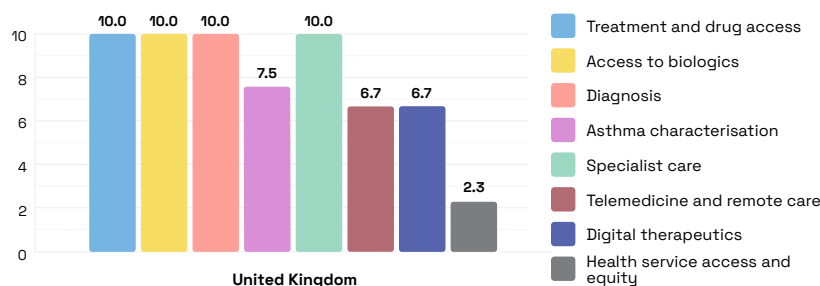
Policy Context

Score **77.0**



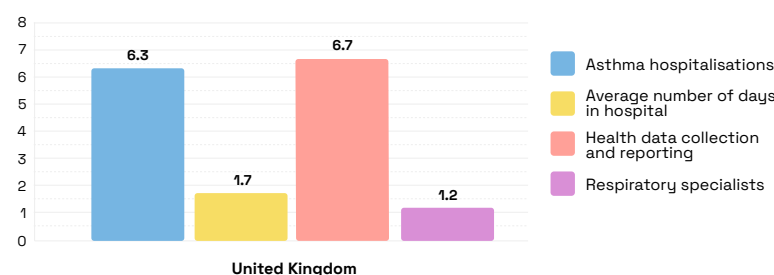
Access and Care Coverage

Score **86.0**



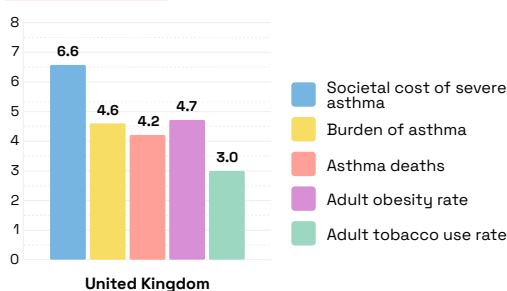
Health System Characteristics

Score **50.0**



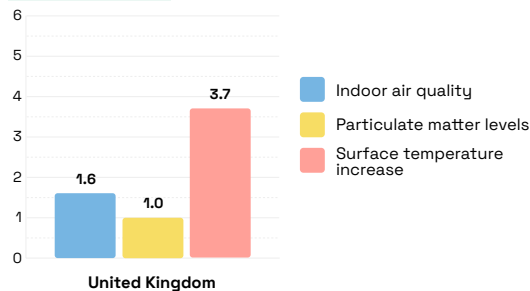
Disease Burden

Score **55.0**



Environmental Factors

Score **76.0**





Appendix II: Indicator list

Indicator Name	Indicator description	Indicator variable name and scoring scale
Policy Context	Severe asthma care guidelines	Provides insight into prioritisation of and engagement with severe asthma Existence and level of implementation of guidelines for severe asthma (Out of 4)
	Asthma strategy	Provides insight into national policy prioritisation of and engagement with asthma Existence of national strategy for asthma (not severe-specific) (Out of 8)
	Best practices in asthma care	Indicates care guidelines' alignment with internationally recognised best practices for severe asthma care National care guidelines' level of alignment with GINA strategy for "difficult-to-treat and severe asthma" (Out of 10)
	Severe asthma registries	Whether a country reports health data to the International Severe Asthma Registry Severe Asthma Registries (Out of 1)
	Occupational exposure policy	Indication of occupational exposures that may influence health outcomes for asthma patients Chemical Exposure Regulations (Out of 3)
	Personalised asthma care	Whether a country encourages the use of individualised treatment plans for severe asthma patients Use of individualised/stratified treatment regimens (Out of 1)
	Lifestyle-oriented asthma care	Whether weight reduction or physical activity is prescribed by default for high-BMI severe asthma patients in a country BMI Individualisation (Out of 1)
	Tobacco control	Strength and scope of tobacco consumption and sale regulations Tobacco Control Laws (Out of 18)
Access and Care Coverage	Treatment and drug access	Assessment of extent of public payor (insurance) coverage for a range of drugs for asthma treatment Treatment and Drug Access (Out of 18)
	Access to severe asthma-specific treatments	Assessment of extent of public payor (insurance) coverage for approved biologics for the treatment of severe asthma Access to Biologics (Out of 12)
	Diagnosis	Assessment of the application of selected diagnostic tools and methods for disease characterisation Diagnostics (Inflammatory Phenotyping) (Out of 6)
	Asthma characterisation	Assessment of the application of FeNO for diagnostic and disease management purposes as well as public payor (insurance) coverage for FeNO Diagnostics (FeNO Access) (Out of 4)

Access and Care Coverage	Specialist care	Assessment of specific specialist referral pathways for severe asthma patients, direct access to specialists, and extent of public payor (insurance) coverage for specialist care	Specialist Care (Out of 4)
	Telemedicine and remote care	Assessment of use of telemedicine and remote care in a country and extent of public payor (insurance) coverage for telemedicine and remote care consultations	Telemedicine/Remote Care (Out of 3)
	Digital therapeutics	Assessment of access to digital therapeutics (e.g., approved condition management apps/ monitoring tools) and extent of public payor (insurance) coverage for digital therapeutics	Digital Therapeutics (Out of 3)
	Health service access and equity	Percentage of the national population reporting unmet healthcare needs due to distance from points of care, financial barriers, and waiting lists	Equity (Unmet Need % population reporting unmet healthcare needs due to distance from care, financial barriers, and waiting lists) - NOTE: NEGATIVE DIRECTION INDICATOR
Health System Characteristics	Asthma hospitalisations	Number of asthma-related hospitalisations per 100,000 population	Annual Asthma Hospitalisations (per 100,000) (MIN: 0 / MAX: 150) - NOTE: NEGATIVE DIRECTION INDICATOR
	Average number of days in hospital	Average number of days in hospital per asthma patient	Average number of days in hospital per asthma patient (MIN: 0 / MAX: 20) - NOTE: NEGATIVE DIRECTION INDICATOR
	Health data collection and reporting	Assessment of level of granularity and disaggregation of asthma and asthma-relevant health and outcome data and to which kinds of registries these data are reported.	Health data recording/ reporting (Out of 18)
	Respiratory specialists	Number of respiratory specialists per 100,000 population	Number of respiratory specialists per 100,000 (MIN: 0 / MAX: 15)
Disease Burden	Societal cost of severe asthma	Asthma disability-adjusted life years per 100,000 among population aged 0 to 40 * GDP Per Capita (purchasing power parity 2021 International Dollars)	Societal Cost of Severe Asthma (Asthma DALYs per 100,000 among population aged 0 to 40 * GDP Per Capita (PPP 2021 International Dollars)

Disease Burden	Burden of asthma	Asthma disability-adjusted life years (DALYs) as a percentage of all country DALYs	Asthma DALYs as % of all Country DALYs (MIN: 0 / MAX: 3) - NOTE: NEGATIVE DIRECTION INDICATOR
	Estimated severe asthma deaths	Asthma deaths as a percentage of all recorded deaths among ages 0-40	Asthma Deaths % of all Deaths aged 0-40 (MIN: 0 / MAX: 2.83) - NOTE: NEGATIVE DIRECTION INDICATOR
	Adult obesity rate	Rate of obesity among the adult population	Adult obesity rate (% of adults) (MIN: 0 / MAX: 61) - NOTE: NEGATIVE DIRECTION INDICATOR
	Adult tobacco use rate	Rate of tobacco use among the adult population	Adult tobacco use rate (% of adults) (MIN: 0 / MAX: 52.1) - NOTE: NEGATIVE DIRECTION INDICATOR
Environmental Factors	Indoor air quality	Percentage of population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames of floor	Indoor Air Quality (MIN: 0 / MAX: 100) - NOTE: NEGATIVE DIRECTION INDICATOR
	Particulate matter levels	Average level of exposure of a nation's population to concentrations of suspended particles measuring less than 2.5 microns in aerodynamic diameter	Particulate matter levels (MIN: 0 / MAX: 100) - NOTE: NEGATIVE DIRECTION INDICATOR
	Surface temperature increase	Mean surface temperature change during the period 1961-2021, using temperatures between 1951 and 1980 as a baseline.	Surface temperature increase (increase anomaly relative to 1951-1980 global average) (MIN: -0.288 / MAX: 2.543) - NOTE: NEGATIVE DIRECTION INDICATOR



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