

BEYOND HEALTH EXPENDITURE: A COMPARATIVE INDICATOR-BASED ASSESSMENT OF HEALTH SYSTEM PERFORMANCE IN GERMANY, AUSTRIA AND CZECHIA

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Abstract: *This paper examines how selected OECD and Eurostat indicators can be used to compare specific dimensions of health-system performance in Germany, Austria and Czechia. Rather than constructing a ranking, the study applies a concise multidimensional framework that covers healthcare expenditure relative to GDP, life expectancy, ambulatory care-sensitive hospital admissions, satisfaction with the availability of quality healthcare, and self-reported unmet medical needs. The comparison identifies distinct and partly contrasting country profiles: Germany combines the highest expenditure intensity with comparatively high life expectancy and comparatively high admission rates for selected ambulatory care-sensitive conditions; Austria records comparatively high life expectancy, the most favourable satisfaction values and, for most of the observation period, low self-reported unmet medical needs; and Czechia combines lower expenditure and life expectancy with low self-reported unmet medical needs and a mixed profile across the selected hospital-admission indicators. These patterns are interpreted descriptively rather than causally. The contribution of the study lies in providing a transparent and parsimonious approach to selecting, operationalising and jointly interpreting routinely available cross-national indicators while making explicit the limits of broader performance conclusions drawn from such data.*

Keywords: *performance indicators, health system comparison, Germany, Austria, Czechia*

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1 Introduction

Comparative health system analysis has become increasingly important as European health systems face demographic ageing, rising expenditure, workforce pressures and growing expectations regarding accessible, equitable and high-quality care (OECD & European Commission, 2024c). Contemporary performance frameworks conceptualise health-system performance as a multidimensional construct encompassing population health outcomes, quality, access, responsiveness, equity and the organisation and use of health-system resources (Lee-Foon et al., 2023; Papanicolas et al., 2022).

Other Health System Performance Assessment (HSPA) approaches similarly emphasise the relationship between health system functions, intermediate objectives and final goals. In the HSPA Framework for Universal Health Coverage, Papanicolas et al. (2022) link governance, resource generation, financing and service delivery to broader objectives including health improvement, responsiveness, equity, financial protection and efficiency.

This multidimensional perspective creates a methodological challenge for cross-country comparison. International databases such as OECD Health Statistics and Eurostat provide standardised indicators that facilitate comparisons across countries and over time. Such indicators are widely used in comparative health-system and efficiency research because they offer a relatively consistent empirical basis for analysing differences between national systems (Gavurova et al., 2021; Mbau et al., 2023). At the same time, individual indicators capture only particular aspects of health-system performance and differ considerably in what they can reasonably be interpreted to represent. Healthcare expenditure relative to GDP, for example, describes the financial intensity of healthcare spending in relation to national economic output, but does not directly measure resource availability or efficiency. Life expectancy provides a broad population-health outcome, but is influenced by social, demographic and behavioural factors beyond healthcare provision. Indicators relating to potentially avoidable hospital admissions, satisfaction with the availability of quality healthcare and unmet medical needs likewise capture specific aspects of service delivery, responsiveness and access rather than health-system performance as a whole.

The methodological issue is therefore not only which indicators are available,

but also how they should be selected, combined and interpreted in comparative analysis. As Barbazza et al. (2021) emphasise, performance indicators need to be understood in relation to their intended purpose and context of use. A limited set of internationally comparable indicators may provide a useful basis for identifying differences between health systems, but the conclusions drawn from such comparisons depend on the conceptual meaning of the individual measures, their comparability across countries and observation periods, and the distinction between descriptive patterns and causal explanations. Indicator-based comparisons therefore require explicit analytical boundaries if they are not to imply a more comprehensive assessment of health-system effectiveness than the underlying data permit.

Germany, Austria and Czechia provide a useful setting in which to examine these issues. The three countries are geographically situated in Central Europe and have health systems shaped to varying degrees by social health insurance traditions, while differing in financing arrangements, governance structures, resource allocation and patterns of service organisation. Their combination therefore allows for comparison among systems that share important historical and institutional characteristics but nevertheless display meaningful differences in the organisation and financing of healthcare. The purpose of selecting these three cases is not to treat them as representative of European health systems as a whole, but to conduct a focused comparison within a relatively coherent regional and institutional context.

While existing comparative research has developed broad HSPA frameworks and cross-country efficiency assessments, less attention has been paid to the methodological implications of using a deliberately restricted set of routinely available indicators for focused regional health-system comparisons.

Against this background, the present study adopts a deliberately parsimonious indicator-based approach. It examines five internationally comparable measures representing distinct dimensions relevant to health-system performance: healthcare expenditure relative to GDP, life expectancy, selected ambulatory care-sensitive hospital admission indicators, satisfaction with the availability of quality healthcare, and self-reported unmet medical needs. The study does not seek to construct a composite performance score, rank the three health systems, or estimate causal effects. Instead, it investigates how a limited set of standardised OECD and Eurostat indicators can be used to

structure a systematic cross-country comparison, while making explicit the methodological and interpretative limitations of such an approach.

Accordingly, the study addresses the following research question:

How can a selected set of internationally comparable OECD and Eurostat indicators be used to compare specific dimensions of health-system performance in Germany, Austria and Czechia, and what methodological and interpretative limitations arise from such a parsimonious indicator-based approach?

The contribution of the study is therefore primarily methodological and comparative rather than causal. It provides a transparent framework for selecting, operationalising and jointly interpreting a limited set of internationally available indicators across three structurally related Central European health systems. In doing so, the analysis distinguishes between patterns that can be identified directly from the selected indicators and broader institutional or causal explanations that require additional evidence. The study thus aims not to determine which of the three health systems performs ‘best’, but to demonstrate how different indicator dimensions can generate distinct comparative profiles and why these profiles need to be interpreted within clearly defined methodological boundaries.

2 Conceptual Framework

Health-system performance is commonly understood as a multidimensional concept rather than as a single measurable outcome. Health System Performance Assessment frameworks therefore distinguish between different system functions, intermediate objectives and final goals, including financing, service delivery, access, quality, responsiveness, equity and population health (Arah et al., 2003; Papanicolas et al., 2022). From this perspective, no individual indicator can provide a comprehensive assessment of health-system performance.

The present study adopts this multidimensional understanding but applies it in a deliberately restricted form. Rather than attempting to operationalise the full range of HSPA dimensions, it focuses on a limited number of internationally comparable indicators representing distinct analytical domains. These

domains include relative expenditure intensity, population health, selected aspects of service performance, perceived responsiveness and access to care. The purpose is not to treat these dimensions as interchangeable components of a single performance score, but to examine how they produce different comparative perspectives on the three health systems.

This distinction is important because the selected indicators differ in both their conceptual meaning and their proximity to healthcare system activity. Some measures, such as healthcare expenditure relative to GDP, describe the financial context within which healthcare is provided. Others, such as life expectancy, capture broad population-level outcomes that are influenced by healthcare as well as by socioeconomic, demographic, behavioural and environmental factors. Indicators of ambulatory care-sensitive hospitalisation are more closely related to patterns of healthcare delivery, but remain affected by differences in clinical practice, admission thresholds, coding and service organisation. Similarly, satisfaction with the availability of quality healthcare and self-reported unmet medical needs provide information on perceived responsiveness and access, but are also shaped by expectations, subjective need and survey design.

Accordingly, the framework treats the selected measures as **indicators of specific dimensions relevant to health-system performance rather than direct measures of overall health-system effectiveness**. Their analytical value lies in enabling structured comparison across countries while preserving the distinction between observed indicator patterns and broader judgements about system performance. In line with Barbazza et al. (2021), the interpretation of each indicator therefore depends on its purpose, definition and context of use.

The framework also distinguishes between descriptive comparison and causal explanation. Differences between countries may be associated with institutional characteristics such as financing arrangements, governance, care organisation or provider incentives, but the indicators used in this study do not in themselves establish such causal relationships. Institutional factors are therefore considered in the interpretation of the findings only where they are supported by existing research, while the empirical analysis remains focused on cross-country differences in the selected indicator measures.

3 Methods

3.1. Comparative case selection

Germany, Austria and Czechia were selected purposively for a focused comparative analysis. The case selection was guided by four criteria. First, all three countries are located in Central Europe, which provides a relatively coherent regional context for comparison. Second, their healthcare systems have historically been shaped, to varying degrees, by social health insurance traditions. Third, despite these shared institutional features, the three countries differ in their financing arrangements, governance structures, patterns of service organisation and levels of healthcare expenditure. Fourth, internationally harmonised OECD and Eurostat data are available for all three countries across the selected performance dimensions.

The comparison therefore follows a purposive rather than representative case-selection strategy. Germany, Austria and Czechia are not treated as representative of European healthcare systems as a whole. Instead, they are used as three institutionally related but non-identical cases through which differences across selected health-system performance dimensions can be examined within a relatively comparable regional setting. This design allows similarities and differences in indicator patterns to be identified without assuming that observed differences can be attributed directly to particular institutional arrangements.

Other Central European countries with social health insurance traditions, most notably Slovakia, would also satisfy the regional and institutional criteria. Slovakia was not included because the design deliberately maximises variance in expenditure intensity within a most-similar institutional setting: Slovakia's health expenditure relative to GDP is close to that of Czechia, so its inclusion would have enlarged the case set without adding substantial variance on this dimension, while reducing the parsimony of the focused three-case comparison. Extending the framework to Slovakia and other Central and Eastern European social health insurance systems is a natural avenue for future research and is noted as such in the Conclusion.

3.2. Indicator selection and operationalisation

The indicator set was selected using a combination of conceptual and practical criteria. Indicators were included if they: (1) represented a distinct dimension relevant to health-system performance; (2) could be linked to established Health System Performance Assessment concepts; (3) were available in internationally harmonised form for Germany, Austria and Czechia; (4) allowed meaningful cross-country comparison; and (5) provided sufficient temporal coverage to identify recent patterns rather than isolated single-year observations.

Five indicator areas were retained on this basis. Healthcare expenditure relative to GDP was included as a measure of the relative financial intensity of healthcare spending. Life expectancy was selected as a broad population-health outcome. Age- and sex-standardised hospital admission rates for selected ambulatory care-sensitive conditions were used to capture a specific aspect of healthcare service performance, namely the extent to which conditions that can often be managed in primary or outpatient care result in hospitalisation. Satisfaction with the availability of quality healthcare was included as a perception-based indicator of healthcare responsiveness, while self-reported unmet medical needs were used to capture barriers to accessing needed care.

The indicators were deliberately selected to represent different analytical dimensions rather than to form a composite performance index. They are therefore not assumed to be equivalent or directly interchangeable. Nor are they interpreted as comprehensive measures of the dimensions to which they relate. For example, hospital admission rates for ambulatory care-sensitive conditions capture only one aspect of service performance and should not be interpreted as a general measure of healthcare quality. Similarly, self-reported unmet medical needs indicate barriers to access but do not by themselves constitute a direct measure of financial protection.

Table 1 summarises the analytical function of each indicator and the main interpretative caution that needs to be considered when using it for cross-country comparison.

Table 1: Analytical function and interpretative limits of the selected indicators

Indicator	Analytical dimension	Operationalisation	Data source	Observation period	Interpretative scope
Health expenditure	Financial input	Current health expenditure as % of GDP	OECD	2015–2024	Relative expenditure intensity; not absolute resource availability or efficiency
Life expectancy	Population health	Life expectancy at birth	OECD	2015–2023 (DE: 2022)	Broad outcome influenced by factors beyond healthcare
ACSC admissions	Service performance	Age- and sex-standardised admissions for CHF and hypertension	OECD Health Statistics	2015–2021	Specific proxy for outpatient/primary-care-related performance
Satisfaction with healthcare	Responsiveness	Satisfaction with availability of quality healthcare	OECD	2022	Population-based perception measure
Self-reported unmet medical needs	Access	Self-reported unmet need for medical examination or treatment due to financial reasons, waiting lists or distance to travel	Eurostat	2015–2025	Selected access barriers (financial reasons, waiting lists, distance); self-reported perception measure, not a comprehensive measure of accessibility or financial protection

Note: ACSC = ambulatory care-sensitive hospital, CHF = congestive heart failure, DE = Germany

Source: Own compilation based on OECD Health Statistics and Eurostat; specific sources and observation periods are reported for each indicator.

3.3. Data sources and observation periods

The empirical analysis is based exclusively on secondary data from

internationally harmonised sources. OECD Health Statistics constitute the principal data source and are supplemented by Eurostat where the required indicator is not available in an equivalent OECD series. These sources were selected because they provide standardised definitions and enable cross-country comparison across Germany, Austria and Czechia. Previous comparative health-system research has similarly relied on OECD data because of their harmonised structure and international comparability (Gavurova et al., 2021; Mbau et al., 2023).

The analysis covers the period from 2015 onwards, with the endpoint for each indicator determined by the latest comparable observation available for all three countries at the time of data extraction. Because OECD and Eurostat indicators are updated according to different reporting schedules, the available observation periods are not identical across all measures. The analysis therefore does not assume a uniform endpoint across indicators. Instead, the exact observation period and most recent available year are reported separately for each measure. For the expenditure indicator, 2024 is used as the final observation year because values for 2025 were still provisional at the time of data extraction.

Where longitudinal data are available, both the overall development across the observation period and the most recent comparable country values are examined. Differences in data availability, reporting periods or potential breaks in series are treated as methodological limitations rather than as substantive differences in health-system performance. These constraints are made explicit in the presentation and interpretation of the results.

3.4. Analytical strategy

The analysis follows a structured descriptive comparative approach. Rather than aggregating the indicators into a composite score, each indicator is analysed separately before patterns are compared across dimensions. This approach reflects the fact that the selected measures capture conceptually different aspects of health-system performance and cannot be meaningfully combined into a single numerical measure without additional weighting assumptions.

For each indicator, the analysis proceeds in three steps. First, country-level

values and temporal developments are compared to identify differences in levels and direction of change over the observation period. Second, the relative position of the three countries is examined within each indicator, with attention to whether country differences remain stable, narrow or widen over time. Third, the indicator-specific findings are compared across dimensions to identify whether countries display consistent or contrasting patterns across relative expenditure intensity, population health, service performance, perceived responsiveness and access.

The cross-indicator comparison is descriptive rather than evaluative. No external benchmark or threshold is used to classify a country as demonstrating ‘good’, ‘poor’ or ‘balanced’ overall performance. Similarly, the analysis does not infer that a country’s position on one indicator causes its position on another. Differences in expenditure, for example, are considered alongside differences in health outcomes and access indicators, but the analysis does not estimate an expenditure–outcome relationship or measure technical efficiency.

Institutional explanations identified in previous research are used only to contextualise observed indicator patterns. Where differences between countries may plausibly relate to healthcare organisation, financing arrangements or service-delivery structures, these explanations are presented as interpretations drawn from the existing literature rather than as causal findings of the present analysis.

4 Results

4.1. Healthcare expenditure as an input indicator

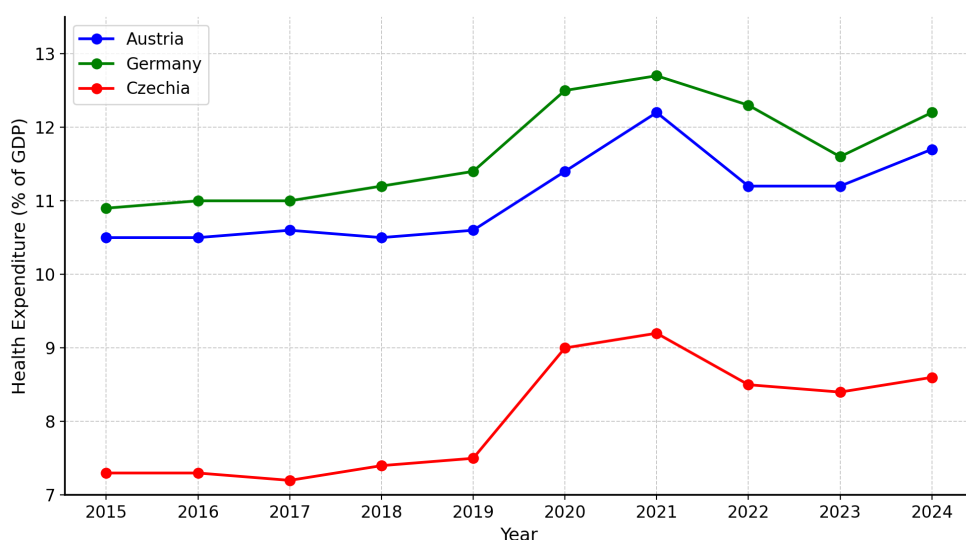
Health expenditure relative to gross domestic product (GDP) provides an indication of the financial intensity of healthcare spending in relation to the size of the national economy. Figure 1 presents health expenditure as a percentage of GDP in Germany, Austria and Czechia over the observation period.

Germany consistently recorded the highest share of GDP devoted to healthcare, followed by Austria, while Czechia remained at a lower level throughout the period. According to the most recent OECD data used in the analysis, health expenditure reached 12.2% of GDP in Germany, 11.7% in Austria and 8.6% in Czechia in 2024.

The time series shows a marked increase in health expenditure relative to GDP during the COVID-19 pandemic, particularly in 2020 and 2021, followed by a decline in 2022 and, in Germany and Czechia, in 2023 and a renewed increase in 2024 in all three countries. Despite these temporal changes, the relative ordering of the three countries remained broadly stable, with Germany recording the highest expenditure ratio and Czechia the lowest.

The indicator is interpreted as a measure of relative expenditure intensity rather than of resource availability, efficiency or overall performance (see Table 1).

Figure 1: Health Expenditure as a Percentage of GDP (2015-2024)



Source: Own compilation based on OECD, 2025.

4.2. Life expectancy as a population outcome indicator

Life expectancy at birth provides a broad population-level outcome measure. Figure 2 shows the development of life expectancy in Germany, Austria and Czechia between 2015 and 2022 for Germany and through 2023 for Czechia and Austria.

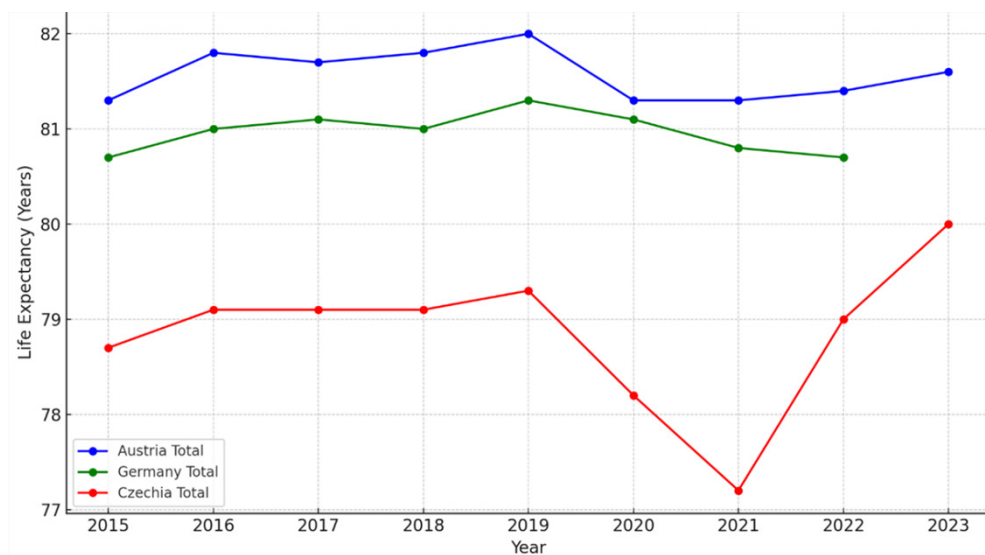
Austria and Germany recorded consistently higher life expectancy than Czechia over the observation period. The two countries followed broadly similar trajectories, while Czechia remained at a lower level. All three

countries experienced a decline around the COVID-19 pandemic. Austria and, more markedly, Czechia subsequently recovered, whereas the German series still shows no recovery by 2022.

The differences in life expectancy between the three countries were less pronounced than the differences observed in health expenditure relative to GDP. This descriptive contrast is considered across indicators in the subsequent cross-indicator analysis; it is not interpreted here as evidence of a direct relationship between healthcare expenditure and life expectancy.

Life expectancy is treated as a broad outcome measure shaped by factors beyond healthcare provision and is interpreted alongside the more delivery-related indicators discussed below (see Section 6).

Figure 2: Life expectancy in Germany, Austria and Czechia, 2015–2023



Note: Data availability differs across countries. The German series ends in 2022, while observations for Austria and Czechia are available through 2023. The figure therefore presents the latest available observation for each country within the 2015–2023 period.

Source: Own compilation based on OECD, 2024a.

4.3. Ambulatory care-sensitive hospital admissions

Age- and sex-standardised hospital admission rates for congestive heart failure and hypertension are used as indicators of ambulatory care-sensitive hospitalisation. Both conditions can often be managed through timely diagnosis, monitoring and treatment in primary or outpatient care. Hospital admission rates may therefore provide information on selected aspects of chronic disease management, continuity of care and access to effective ambulatory care (Martinho-Dias et al., 2026). They should not, however, be interpreted as comprehensive measures of healthcare quality.

Across the 2015–2021 observation period, admission rates declined for both selected conditions in all three countries. However, the relative position of the countries differed between the two indicators. For congestive heart failure, Czechia recorded the highest rate in 2015, while Germany recorded the highest rate in 2021; Austria recorded the lowest rate in both years. For hypertension, Germany recorded the highest rate in both years, while Czechia recorded the lowest. Table 2 therefore illustrates why the two conditions should be considered separately rather than combined into a single hospital-admission measure.

Table 2: Age- and sex-standardised hospital admission rates for selected ambulatory care-sensitive conditions, 2015 and 2021

Country	Congestive heart failure 2015	Congestive heart failure 2021	Hypertension 2015	Hypertension 2021
Austria	275.0	219.7	245.8	145.9
Czechia	443.3	357.2	143.9	59.3
Germany	416.1	362.9	293.8	203.0

Note: Values are age- and sex-standardised hospital admission rates per 100,000 population. Congestive heart failure and hypertension are presented separately as selected ambulatory care-sensitive conditions. Higher values indicate a greater number of hospital admissions for the respective condition per 100,000 population; lower values indicate fewer admissions. These indicators are used as proxies for selected aspects of chronic disease management and ambulatory care performance and should not be interpreted as comprehensive measures of healthcare quality. The table reports directly observed OECD values for 2015 and 2021; no interpolated observations are included. 2021 is the latest comparable observation available for all three countries in the selected OECD series. The hypertension admission indicator is no longer included in the current OECD Healthcare Quality and Outcomes (HCQO) data

collection (OECD, 2024e), and the OECD notes that differences in coding practices across countries may affect the comparability of avoidable-admission data (OECD & European Commission, 2024c). The hypertension values reported here therefore refer to the final years of harmonised international data collection and are interpreted with corresponding caution.

Source: Own compilation based on OECD (2024d).

The two indicators reveal different cross-country patterns. Germany recorded the highest hypertension admission rate in both reported years, while the highest congestive heart failure admission rate was recorded by Czechia in 2015 and by Germany in 2021. Austria recorded the lowest congestive heart failure admission rates, whereas Czechia recorded the lowest hypertension admission rates. All six country-specific series show lower values in 2021 than in 2015. These descriptive patterns do not establish a causal relationship between healthcare expenditure and hospital admissions, nor do they demonstrate that cross-country differences are attributable to specific institutional arrangements.

Hospital admission rates for ambulatory care-sensitive conditions are influenced by factors beyond healthcare provision alone. Cross-country differences may reflect variation in disease prevalence, referral behaviour, patient pathways, care coordination and patients' social and personal circumstances (Duminy et al., 2022). The indicators are therefore interpreted here as proxies for selected aspects of chronic disease management and ambulatory care performance rather than as direct measures of overall healthcare quality. Possible institutional explanations for the observed cross-country differences are considered further in the Discussion.

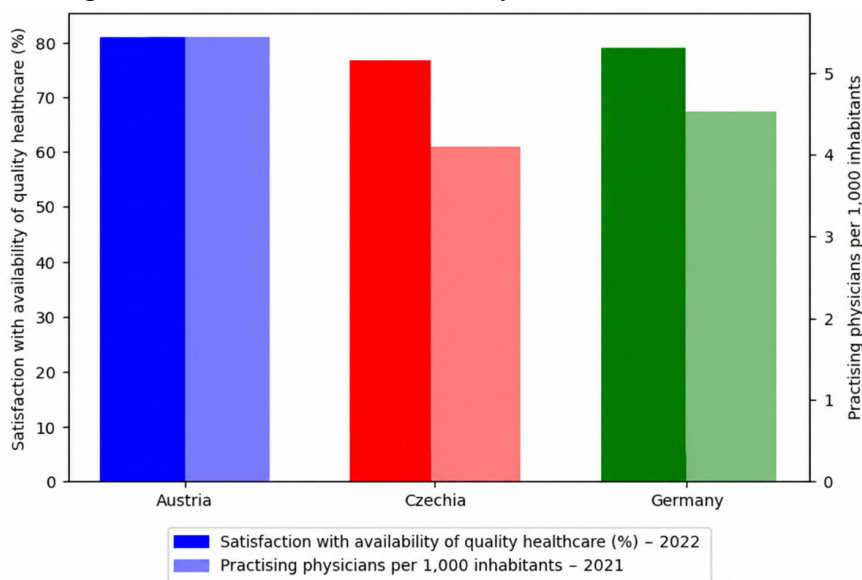
4.4. Satisfaction with the availability of quality healthcare

Satisfaction with the availability of quality healthcare provides a perception-based measure of how healthcare systems are assessed by the population. The indicator is based on the Gallup World Poll item reported by the OECD, which asks respondents whether they are satisfied or dissatisfied with the availability of quality healthcare in the city or area where they live (OECD, 2024b). 'Availability' therefore reflects respondents' overall perception of whether quality healthcare is accessible to them, rather than a specific geographical, temporal or financial dimension of access. Figure 3 presents this indicator for Germany, Austria and Czechia alongside the number of practising physicians per 1,000 inhabitants, as the availability of medical personnel may form part of the broader context in which accessibility and responsiveness are perceived.

The comparison shows differences in satisfaction levels across the three countries. Austria records the highest level of satisfaction, followed by Germany, while Czechia reports a lower value in the latest observation shown. These differences do not correspond to the countries' relative levels of healthcare expenditure. The ordering by physician density is the same as that by satisfaction, but this is considered descriptively only. The two measures are therefore considered descriptively rather than interpreted as evidence of a statistical or causal relationship.

Satisfaction with the availability of quality healthcare should be interpreted cautiously because it is a perception-based measure. Population assessments may be shaped by expectations, previous experiences, trust in institutions, perceived accessibility, waiting times, communication and survey context. Higher satisfaction consequently does not necessarily indicate superior clinical outcomes, while lower satisfaction does not automatically imply weaker healthcare provision.

Figure 3: Satisfaction with the availability of quality healthcare and practising physicians per 1,000 inhabitants in Germany, Austria and Czechia



Note: Satisfaction data refer to 2022 and practising physician density to 2021. Physician density is included as contextual information on healthcare capacity only; no causal or statistical association between the two measures is inferred. The satisfaction measure follows the Gallup/OECD item wording.

Source: Own compilation based on: OECD, 2024b.

Austria records the highest physician density among the three countries and also comparatively high satisfaction levels. Germany likewise has a relatively high physician-to-population ratio, while satisfaction is somewhat lower than in Austria. Czechia records the lowest physician density and the lowest satisfaction value among the three countries in the 2022 comparison. Taken together, physician density and satisfaction show the same ordering across the three countries, whereas expenditure does not. Given the small number of cases and the single observation year, this is noted as a descriptive pattern and not as evidence of an association.

4.5. Self-reported unmet medical needs as an access indicator

Self-reported unmet medical needs provide an access-related perspective on health-system performance. The Eurostat indicator measures the share of the population aged 16 years and over reporting unmet need for a medical examination or treatment because of financial reasons, waiting lists or being too far to travel. Dental care is excluded from the measure. The indicator therefore captures selected barriers to effective access rather than financial barriers alone (Eurostat, 2026).

Across 2015–2025, reported unmet medical needs remained comparatively low in Germany, Austria and Czechia, although the relative position of the three countries varied over time. In Germany, the reported share was 0.5% in 2015 and 1.0% in 2025. In Austria, it increased from 0.1% to 0.9% over the same period, while in Czechia it declined from 0.8% to 0.3%. In the most recent observation, Germany therefore recorded the highest value among the three countries (1.0%), followed by Austria (0.9%) and Czechia (0.3%). The time series does not indicate a uniform trend across the three countries: values remained very low throughout much of the observation period, while Germany and Austria recorded higher values in the most recent years. (Eurostat, 2026).

The indicator should nevertheless be interpreted cautiously. Self-reported unmet medical needs depend on individuals' perceived need for care and may be influenced by expectations, socioeconomic circumstances, national healthcare organisation and survey context. The Eurostat series also contains a break in the German time series in 2020, while the German value for 2023 is reported as an estimate. These qualifications should be taken into account when interpreting temporal changes. The measure is therefore treated here as a

perception-based indicator of selected barriers to healthcare access rather than as a comprehensive measure of accessibility or financial protection.

4.6. Cross-indicator comparison

The five indicators reveal distinct and partly contrasting patterns across Germany, Austria and Czechia. The comparison shows that the relative position of the three countries varies across indicators. Germany records the highest level of healthcare expenditure and comparatively high life expectancy, while showing the highest hypertension admission rates and comparatively high congestive heart failure admission rates. Austria combines comparatively high life expectancy and healthcare expenditure with relatively favourable values for satisfaction and, over most of the observation period, low self-reported unmet medical needs, although the most recent values have increased. Czechia records substantially lower healthcare expenditure and lower life expectancy, while showing comparatively low levels of self-reported unmet medical need, the lowest hypertension admission rates, and the highest congestive heart failure admission rate in 2015, though no longer in 2021. These cross-indicator patterns demonstrate that country differences cannot be represented adequately by a single measure. The relative position of each country depends on the dimension being examined, and a favourable value on one indicator does not necessarily coincide with favourable values on others. The analysis therefore identifies distinct indicator profiles rather than an overall ranking of the three health systems.

The comparison also highlights the importance of distinguishing between descriptive patterns and explanations for those patterns. Differences across expenditure, population health, service performance, responsiveness and access can be identified directly from the selected indicators, whereas the institutional, socioeconomic and organisational mechanisms underlying these differences cannot be established through the present analysis. These issues are considered in the Discussion in relation to existing health-system research.

5 Discussion

The findings show that Germany, Austria and Czechia display different profiles across the selected dimensions of health-system performance. The

comparison does not identify a single country that performs uniformly more favourably across all indicators. Instead, the relative position of each country varies according to the dimension examined. This supports the use of a multidimensional approach to health-system comparison and reinforces the methodological caution that individual indicators should not be treated as comprehensive measures of overall system performance.

A first notable finding concerns the relationship between healthcare expenditure and the other selected indicators. Germany records the highest level of health expenditure relative to GDP, but this does not coincide with uniformly more favourable values across life expectancy, ambulatory care-sensitive hospital admissions, satisfaction or unmet medical needs. Austria also records relatively high expenditure, while Czechia operates at a substantially lower expenditure level. These patterns should not be interpreted as evidence of a causal relationship between spending and outcomes. Rather, they illustrate that relative expenditure intensity and other dimensions of performance vary independently and that expenditure alone cannot be used to infer the overall effectiveness of a health system.

The differences in ambulatory care-sensitive hospital admissions are particularly relevant in this context. Germany records the highest hypertension admission rates among the three countries in both reported years, while the picture for congestive heart failure varies: Czechia recorded the highest rate in 2015, whereas Germany recorded the highest rate in 2021, with both countries at broadly similar levels in the latter year and Austria consistently recording the lowest rates. Existing research and country-system analyses point to several possible contextual explanations, including primary-care organisation, continuity of care, referral pathways and the relationship between outpatient and inpatient sectors (Blümel et al., 2020). In the German context, the institutional separation between ambulatory and hospital care and activity-based hospital financing have been discussed as potential contributors to relatively high inpatient utilisation; the German Government Commission has specifically highlighted volume-related incentives under hospital remuneration and the limited use of ambulatory alternatives where these are feasible (Government Commission for a Modern and Needs-Based Hospital Care System, 2022). These incentive structures are currently being addressed by the German hospital reform adopted in 2024, which partially replaces activity-based payment with capacity-based allocations (Milstein

& Schreyögg, 2024; KHVVG, 2024). These mechanisms, however, are not directly examined in the present study and should therefore be interpreted as contextual explanations derived from existing research rather than as causal findings of the indicator analysis.

The satisfaction results illustrate the limits of interpreting structural capacity as a direct determinant of perceived health-system performance. Austria combines the highest physician density with the highest satisfaction, Czechia the lowest physician density with the lowest satisfaction, and Germany occupies an intermediate position on both measures. The ordering of the three countries is therefore identical on the two indicators. With only three countries and a single observation year per measure, however, this correspondence cannot be interpreted as an association. It also does not extend to expenditure: Germany records the highest expenditure intensity but lower satisfaction than Austria. The differences in satisfaction between the countries are, moreover, small relative to the differences in physician density. These descriptive patterns suggest that population assessments of the availability and quality of healthcare are shaped by factors beyond physician supply alone. Previous research indicates that expectations, trust, communication, accessibility and prior experiences influence patient-centred assessments of care (Coulter & Ellins, 2007; Epstein & Street, 2011). Physician density should therefore be understood as part of the structural context in which perceptions are formed rather than as a direct explanation of those perceptions.

The results on self-reported unmet medical needs further highlight the distinction between formal coverage and experienced access. All three countries provide broad population coverage, yet the share of the population reporting unmet need for medical examination or treatment because of financial reasons, waiting lists or distance to travel differs across countries and over time. Reported levels remained low throughout much of the observation period, but the relative position of the three countries varied: in the most recent observation, Czechia records the lowest value, while Germany and Austria report higher values than in earlier years. These changes should be interpreted cautiously, given the perception-based character of the indicator and the reported break in the German time series. Country-specific research also shows that these access patterns emerge within different institutional settings: Germany combines near-universal coverage with a complex pluralistic insurance system (Blümel et al., 2020), while Czechia provides universal

statutory coverage through a multi-fund social health insurance model (Bryndová et al., 2023). Low aggregate unmet need should nevertheless not be equated with comprehensive accessibility or complete financial protection, because the indicator captures only selected barriers, and burdens may remain concentrated among particular population groups (World Health Organization Regional Office for Europe, 2025).

The country-specific literature reinforces the need for contextual interpretation. Germany's health-system review emphasises the institutional complexity of a system shaped by self-governance and multiple payer and provider interfaces (Blümel et al., 2020), while the Czech health-system review documents a universal social health insurance system with distinct governance and financing arrangements (Bryndová et al., 2023), and ongoing policy debates concern the business-cycle sensitivity of its predominantly wage-based revenue structure (Landovská, 2024). In Austria, the health-system review documents a system characterised by dual financing between social insurance and the federal states, which successive reforms since 2013 have sought to address through joint federal–regional target-based governance (Zielsteuerung-Gesundheit) (Bachner et al., 2019; OECD & European Observatory on Health Systems and Policies, 2025a). Recent work additionally highlights continuing expenditure pressures associated with demographic change and the exceptional spending effects of the COVID-19 period (Lackner et al., 2023). The most recent State of Health in the EU country profiles provide updated post-pandemic assessments for all three systems (OECD & European Observatory on Health Systems and Policies, 2025a, 2025b, 2025c). These contextual differences provide plausible background for the observed indicator profiles but are not tested as explanatory variables in the present analysis.

Taken together, the findings illustrate the analytical value of combining indicators from different performance dimensions. The five measures are not interchangeable, and their comparative patterns do not always point in the same direction. This is precisely why indicator-based comparisons should be interpreted as multidimensional profiles rather than as rankings.

The analysis also demonstrates the limits of what can be inferred from such profiles. OECD and Eurostat indicators allow systematic comparison across countries, but they do not explain the institutional mechanisms underlying observed differences. They therefore provide a basis for identifying patterns that require further investigation rather than for establishing why those

patterns occur. Future comparative research could address this limitation by combining harmonised quantitative indicators with institutional analysis, policy documents or qualitative evidence from healthcare professionals, policymakers and patients.

6 Methodological limitations

This study has several methodological limitations. First, the analysis relies on aggregate national-level indicators from OECD and Eurostat. While these data provide a harmonised basis for cross-country comparison, national averages cannot capture regional variation, urban–rural differences, socioeconomic inequalities or differences between population groups. The findings should therefore be interpreted as macro-level patterns rather than as evidence of uniform conditions within each country. This is particularly relevant because health-system performance includes dimensions such as equity, access and responsiveness that may vary substantially within national populations (Arah et al., 2003; Braithwaite et al., 2017; Papanicolas et al., 2022).

Second, the selected indicators represent only specific dimensions relevant to health-system performance. Health expenditure relative to GDP reflects relative expenditure intensity but does not measure efficiency or absolute resource availability (Smith, 2002; Hollingsworth, 2008). Life expectancy is influenced by factors beyond healthcare provision, including demographic, socioeconomic and behavioural conditions; recent longitudinal evidence across OECD countries confirms the importance of such broader determinants (Roffia et al., 2023). Ambulatory care-sensitive hospital admissions provide information on selected aspects of service performance but may also be affected by differences in disease prevalence, referral pathways, care coordination and other contextual factors (Duminy et al., 2022; Martinho-Dias et al., 2026). Satisfaction with the availability of quality healthcare and self-reported unmet medical needs are perception-based measures and may vary according to expectations, previous experiences, survey context and reporting behaviour. In addition, the observation periods of the selected indicators end in different years, reflecting differences in data availability across sources: ambulatory care-sensitive admissions are available through 2021, satisfaction through 2022, life expectancy through 2022 for Germany and 2023 for Austria and Czechia, health expenditure through 2024 and self-reported unmet medical needs through 2025. Cross-indicator comparisons therefore refer to the latest

available observation for each indicator rather than to a single common reference year.

Third, the analysis is descriptive and comparative rather than causal. It identifies differences and temporal patterns across Germany, Austria and Czechia, but it does not estimate the effects of financing arrangements, governance structures or service organisation on the selected indicators. Institutional explanations discussed in relation to the findings are therefore based on existing research and should not be interpreted as causal results of the present study. This distinction is consistent with the broader methodological principle that performance indicators need to be interpreted in relation to their purpose and context of use rather than treated as direct evidence of causal mechanisms (Barbazzà et al., 2021).

Fourth, the indicator set is deliberately limited. The five selected measures do not cover the full range of health-system performance. Important dimensions such as waiting times, workforce shortages, prevention, digital health, long-term care, continuity of care and pharmaceutical policy are not included. Their omission reflects the study's focus on a parsimonious set of internationally comparable indicators rather than an attempt to provide a comprehensive performance assessment. This limitation is consistent with the multidimensional understanding of health-system performance in existing assessment frameworks (Arah et al., 2003; Papanicolas et al., 2022).

Finally, differences in reporting schedules and data availability mean that not all indicators are observed over identical periods. The analysis therefore uses the latest comparable observations available for each measure and reports differences in observation periods transparently. For the ambulatory care-sensitive hospitalisation comparison, the reported endpoint values are restricted to observed OECD data for 2015 and 2021; interpolated values are not used in the comparative table. Potential breaks in series or changes in indicator definitions should nevertheless be considered when interpreting longitudinal patterns. In addition, the discontinuation of the hypertension-admission series in the current HCQO data collection restricts the extent to which this indicator can be updated or extended in future comparisons.

Overall, the study provides a structured macro-level comparison of selected performance dimensions, but its findings should not be interpreted as a comprehensive ranking or causal assessment of the three health systems.

7 Conclusion

This study compared selected dimensions of health-system performance in Germany, Austria and Czechia using a parsimonious set of internationally comparable OECD and Eurostat indicators. The analysis shows that the three countries display different profiles across the five performance dimensions examined. No single indicator provides a sufficient basis for judging overall health-system performance, and the relative position of each country varies according to the dimension examined.

The findings also demonstrate the importance of distinguishing between descriptive comparison and causal explanation. Differences in expenditure, life expectancy, hospital admission rates, satisfaction and self-reported unmet medical needs can be identified systematically across countries, but the institutional and organisational mechanisms underlying these patterns cannot be inferred from the indicator data alone. Indicator-based comparison is therefore most informative when measures are interpreted within clearly defined conceptual and methodological boundaries.

The contribution of the study lies in providing a transparent framework for selecting, operationalising and jointly interpreting a limited set of internationally comparable indicators across three structurally related health systems. Rather than producing an overall ranking, the approach highlights how different dimensions can generate contrasting comparative profiles and why these differences require careful contextual interpretation.

Future research could extend this approach by incorporating additional dimensions such as waiting times, workforce capacity, prevention, digital health and long-term care, and by combining harmonised quantitative indicators with institutional or qualitative evidence, as well as by extending the comparison to further Central and Eastern European social health insurance systems such as Slovakia. Such extensions would allow observed cross-country patterns to be linked more directly to the organisational and policy mechanisms that may help explain them.

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