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# Who cares? The informal childcare gender gap in Poland – spatiotemporal perspective

**Abstract:** The main objective of the study was to quantify the gender gap in childcare-related medical leave from work in Poland and to examine its spatial and temporal variations. The analysis was based on statistical data from the Social Insurance Institution (ZUS) for the years 2019 and 2024 at the county (powiat) level, employing GIS methods, exploratory spatial data analysis, and statistical tests, including Pearson's correlation coefficient, the paired-samples one-tailed t-test, and the non-parametric pairwise Dunn's test. The results indicate substantial and widening disparities between women and men, with women bearing a disproportionately greater burden. This phenomenon is particularly pronounced in the northern and eastern regions of the country.

**Keywords:** informal childcare gender gap, childcare absenteeism, health economics, labour market, space-time analysis, GIS

## Introduction

Work absenteeism due to medical reasons is a vital metric for understanding disease burden and its economic costs. Yet, the financial and occupational consequences of informal caregiving – unpaid support provided by family, friends, or neighbours – are often undervalued (National Research Council 2010, Australian Institute of Health and Welfare 2023). Informal carers, who are not formally compensated, assume a wide range of essential tasks and are a crucial part of the overall health care system.

The socio-economic burden generated by informal care is substantial. Economic ramifications include reduced income and work capacity for carers, leading to decreased tax revenue and increased welfare demand (Schofield et al. 2022, Thomas Hebdon et al. 2022). For example, informal care costs accounted for

approximately 18% of the total economic burden for certain conditions in Spain (Oliva-Moreno et al. 2009). Carers also face adverse health consequences, such as elevated stress and burnout (Gates et al. 2020). Employers incur indirect costs, such as reduced productivity and administrative burdens (Thomas Hebdon et al. 2022).

The burden of caregiving disproportionately affects women due to societal norms, with 72% of primary carers in Australia being female, though the overall sex division is relatively equal (Australian Institute of Health and Welfare 2023). Women are more likely to experience adverse occupational outcomes, including slower career progression and reduced working hours, contributing to the gender pay gap (Gates et al. 2020, Washington, Feinberg 2020). A lack of paid family leave policies exacerbates these disparities (Stephenson 2020). However, findings on the gender gap in caregiving and associated economic consequences are inconsistent; for example, parental leave was associated with more substantial wage penalties for men in Sweden (Boye 2019), and paid sick leave increased leave-taking among US men while women showed no significant change (Byker et al. 2023). Addressing the need for detailed research in the existing literature, this study focuses on short-term medical leave for informal childcare in Poland. The primary objective is to quantify and evaluate the gender gap in both childcare absenteeism (total days) and leave instances (number of occurrences) at the county (powiat) level for 2019 and 2024. Additionally, the study analyses the dynamics of these leaves and the average length of individual leave periods, disaggregated by sex.

The paper is structured as follows: Section 2 discusses the data and research methods; Section 3 presents the study's results; and the final section offers conclusions and recommendations.

## **Materials and Methods**

### **Data**

This analysis utilises data from the Polish Social Insurance Institution (ZUS) regarding the total days (childcare absenteeism) and instances (childcare leave) of medical leave taken for childcare, disaggregated by sex and county (powiat; Local Administrative Units level 1 – LAU 1) for 2019 and 2024. The year 2024 represents the most recent available data, while 2019 was selected to enable a temporal comparison that bypasses the COVID-19 pandemic period (2020–2022). This approach avoids potential distortions in childcare-related sickness leave patterns caused by pandemic-specific factors, such as nationwide mandatory school closures and transitions to remote learning, compulsory quarantines, and the shift toward remote work. These factors significantly altered traditional caregiving and labour-market behaviours, making the pandemic years unrepresentative of long-term trends. Furthermore, comparing pre-pandemic and post-pandemic years allows for an investigation into whether the crisis has permanently altered patterns

in the sex gap of informal childcare. ZUS only reports data for categories with at least four days/leaves to preserve statistical confidentiality. The study uses sex-disaggregated data to examine the gender gap, recognising the influence of societal gender norms on caregiving behaviours. Although this study conceptually focuses on informal childcare, the empirical analysis relies on administrative records of formal sickness absences. These absences are treated as an observable labour-market footprint of informal care within households, reflecting when parents temporarily leave work to provide care. This framing allows for the examination of spatial and temporal patterns of childcare-related labour interruptions while acknowledging that the measure captures the formal manifestation of underlying informal care responsibilities.

In Poland, medical leave for caregiving is strictly regulated. Parents are entitled to a maximum of 60 paid days (regardless of the number of children) per year for a healthy child under 14 or a disabled child under 18, and 14 days for children over 14 in specific circumstances. These entitlements apply separately to each insured individual (Social Insurance Institution 2018, Dz.U. z 2025 r. poz. 501).

Between 2019 and 2024, overall childcare absenteeism days increased by 12% to almost 11 million days, accounting for 4.3% of all sick absences in 2024. The total number of childcare leaves increased by 28% to approximately 2.9 million, comprising 11.3% of all sick leaves. Women accounted for the vast majority of both (78.7% of absenteeism days and 79% of leaves in 2024), though the percentages slightly declined since 2019. Notably, between 2019 and 2024, absenteeism days increased by 16% for men versus 11% for women, and leaves increased by 31% for men versus 28% for women. Statistical analysis at the county

Table 1. Statistical Analysis of Childcare Absenteeism and Instances in Poland: 2019 & 2024 (by County)

Metric	2019	2019	2024	2024	2019	2019	2024	2024
	Male [Days]	Female [Days]	Male [Days]	Female [Days]	Male [Leaves]	Female [Leaves]	Male [Leaves]	Female [Leaves]
Total (Sum)	2,061,862	7,973,434	2,401,619	8,882,962	471,567	1,832,076	621,608	2,347,936
Mean	5,425	20,982	6,320	23,376	1,240	4,821	1,635	6,178
Median	3,304	13,412	4,068	15,168	683	2,85	958	3,833
Min	213	1,624	280	2,307	62	374	77	627
Max	150,502	572,055	138,743	509,603	42,058	145,359	42,754	147,63
Mean share (%)	20%	80%	21%	79%	20%	80%	20%	80%
Median Share (%)	20%	80%	21%	79%	20%	80%	20%	80%
Min Share (%)	12%	69%	11%	70%	13%	72%	11%	72%
Max Share (%)	31%	88%	30%	89%	28%	87%	28%	89%

Source: own elaboration based on ZUS data.

level reveals significant geographical disparities, with total absenteeism days per county ranging from as few as 280 to over 500,000, reflecting the high concentration of leave-taking in major urban centres. Despite the overall growth, the gender disparity remains stark. While the median share of childcare responsibilities for men sits at 21%, some counties report male participation as low as 11%. This regional inequality across 380 counties underscores that while paternal involvement is rising nationally, childcare duties remain heavily gendered and localised (Table 1).

The primary analysis focuses on the childcare absenteeism rate and childcare leave rate (days/instances per 1,000 employed individuals, disaggregated by sex). The gender gap is quantified using the childcare absenteeism gender gap ratio and childcare leave gender gap ratio (female-to-male rate ratio minus one), where a positive value indicates a female surplus. Finally, the average childcare absence span (total days/instances) is calculated to assess differences in duration.

## Research methods

This study applied Geographic Information System (GIS) methods to develop a spatial database and support data visualisation. In addition, exploratory spatial data analysis (ESDA) techniques – specifically, global and local Moran’s I statistics – were used to examine spatial dependencies in the data. These tools refer to spatial autocorrelation, understood as the degree of similarity between observations in nearby locations (Tobler 1970). Positive spatial autocorrelation indicates clustering of similar values, whereas negative spatial autocorrelation suggests spatial dispersion. In this study, a first-order Queen contiguity spatial weights matrix was used to define spatial relationships between adjacent units, namely, counties (for more information, see Anselin 1995, Le Gallo, Ertur 2003).

For general statistical analysis, Pearson’s correlation coefficient ( $r$ ) quantifies the linear association between continuous variables (Field 2018). To compare the means of two related groups (e.g., male vs. female rates within the same county), a paired-samples one-tailed t-test (two-mean test) is used (Field 2018). Lastly, to assess differences in the distribution of scores across related groups (e.g., rate changes across counties), the non-parametric pairwise Dunn’s test is applied, which compares rank sums for associated samples (Field 2018). Spatial analyses were conducted in ArcMap and GeoDa, and statistical analyses were conducted in SPSS (detailed test results are presented in the Appendix).

In line with the ESDA framework, Moran’s I statistics are employed to identify and characterise spatial autocorrelation. Conventional statistical tests are used solely for complementary, non-causal comparisons. Accordingly, their results are interpreted descriptively rather than as fully independent inferential evidence when spatial dependence is present.

## Results

### Spatio-temporal patterns of childcare absenteeism and leave rates by sex

In 2019, childcare absenteeism among women in Poland followed a clear geographical pattern, with the highest rates in the northern and western voivodeships (NUTS 2 regions), including Opolskie, Śląskie, Dolnośląskie, Zachodniopomorskie, Pomorskie, and Warmińsko-Mazurskie. The extreme values highlighted striking regional disparities: Elbląski County had the highest rate (6,075 days per 1,000 employed women), while Janowski County had the lowest (276 days), a difference of nearly 5,800 days. Mazowieckie was the most internally diverse voivodeship. Among men, the highest values also appeared in the northern and western regions, as well as in Mazowieckie. The highest rate was observed in Grudziądzki County (1,113 days per 1,000 employed men), and the lowest in Sejeński County (66 days), a gap of over 1,000 days. By 2024, the spatial distribution remained broadly consistent, though the previously pronounced east-west divide was less evident. For women, the highest rate was recorded in Grudziądzki County (4,450 days), and the lowest in the city of Kalisz (495 days). The resulting gap of 3,955 days represents a notable decrease compared to 2019, suggesting narrowing disparities. For men, Grudziądzki County again recorded the highest absenteeism (998 days), and Sejeński County the lowest (67 days), replicating the 2019 pattern. The 931-day difference reflects a modest decline in spatial inequalities. In both cases, Mazowieckie remained the most internally diverse voivodeship (Fig. 1).

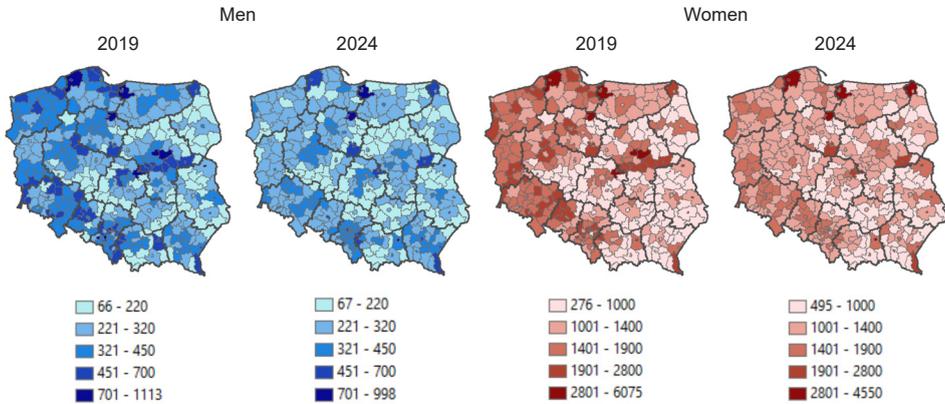


Fig. 1. Childcare absenteeism rate among men and women in 2019 and 2024  
 Source: own elaboration based on ZUS data in ArcMap.

In 2019, the Moran’s I statistic for childcare absenteeism in Poland indicated moderate, positive spatial autocorrelation for both men (0.40) and women (0.42), suggesting that neighbouring districts shared similar rates. By 2024,

these values had fallen to 0.34 and 0.31, respectively, showing a decline in the strength of this spatial clustering over time. Spatial clusters of counties with comparable rates were observed across the country, though they became less pronounced by 2024. For men, low absenteeism clustered mainly in the eastern (e.g., Podlaskie, Warmińsko-Mazurskie, and Mazowieckie) and central regions (e.g., from Wielkopolskie through Łódzkie and Świętokrzyskie to Lubelskie), while higher rates were limited to northern Poland and Śląskie. Among women, low absenteeism was concentrated in the south-east (e.g., Podkarpackie, Lubelskie, Małopolskie, and Świętokrzyskie), and higher rates were primarily found in the north, with additional smaller clusters noted in the south-west and Mazowieckie in 2019 (Fig. 2).

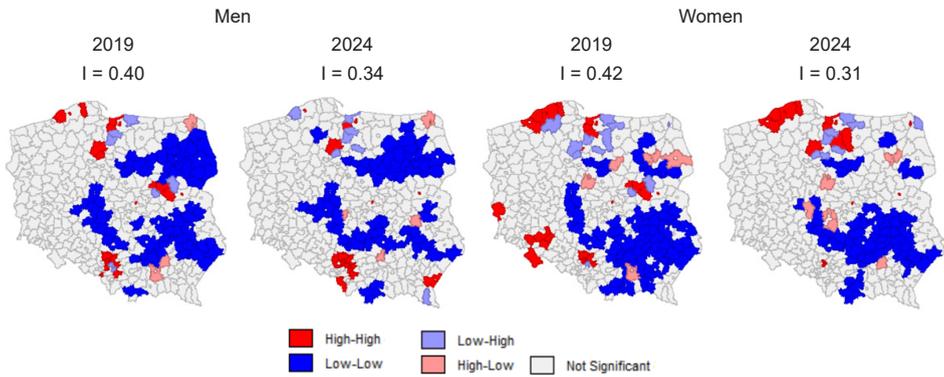


Fig. 2. Global and local Moran’s I statistics for childcare absenteeism rate among men and women in 2019 and 2024

\*All results are statistically significant.  
 Source: own elaboration in GeoDa.

Although the childcare absenteeism rates for men and women were highly correlated ( $r = 0.9$ ) in both 2019 and 2024, significant gender disparity was evident. Women consistently had a significantly higher mean absenteeism rate than men ( $p < 0.01$ ). While the average number of leave days decreased for both sexes, only men showed a significant shift in distribution ( $p < 0.001$ ), with women’s distribution remaining unchanged. The spatial distribution of childcare leave rates mirrored this disparity. The range between the lowest and highest rates across counties showed considerably greater spatial disparity for women than for men in both years. In 2019, the range was 199 for men but a staggering 1,239 for women. By 2024, this disparity decreased but remained high: 217 for men versus 1,027 for women, confirming that spatial differences in leave rates are markedly larger for female employees. The highest leave rates consistently clustered in the western and northern regions of Poland, but the overall east-west divide became less pronounced over time (Fig. 3).

The spatial patterns of the childcare leave rate closely resembled those of childcare absenteeism, as reflected in similar Moran’s I statistics. In 2019, the

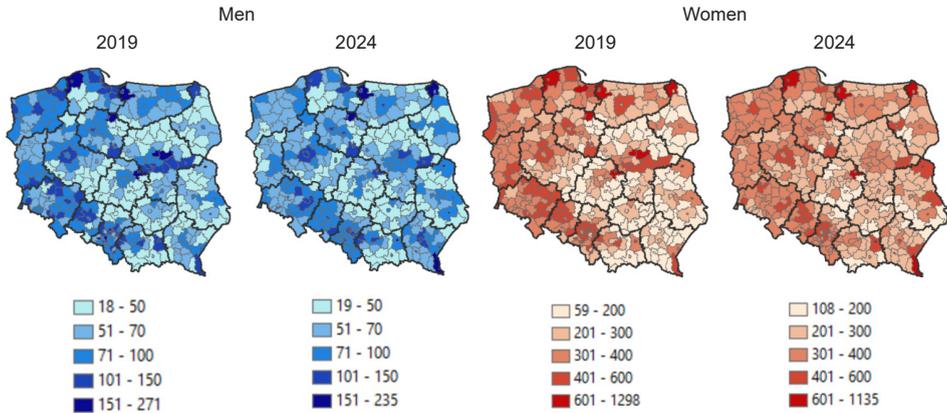


Fig. 3. Childcare leave rates among men and women in 2019 and 2024  
Source: own elaboration based on ZUS data in ArcMap.

Moran's  $I$  value for the leave rate was 0.43 for both men and women, indicating moderate, positive spatial autocorrelation. By 2024, this value declined to 0.34 for men and 0.32 for women, signalling a weakening of spatial dependence over time. The geographic clustering of high and low leave rates was nearly identical to that of absenteeism rates, with the only minor distinction being a slightly larger number of territorial units forming clusters of low leave rates.

The correlation between the childcare leave rate for men and women remained consistently very high and positive, slightly exceeding that observed for absenteeism ( $r = 0.92$  in 2019,  $r = 0.91$  in 2024,  $p < 0.001$ ). Despite this strong correlation, the distribution of leave rates across counties differed notably between sexes ( $p < 0.001$  for both years, pairwise Dunn's test), and the mean rate for females was significantly higher than for males ( $p < 0.01$ , two-mean test).

Temporal trends revealed divergent patterns: the average number of leave days decreased for women ( $p < 0.01$ , two-mean test) but increased for men ( $p < 0.01$ , two-mean test). These changes resulted in a significant distributional shift for both males and females (pairwise Dunn's test,  $p < 0.001$ ). Furthermore, the distributions of the childcare leave rate and absenteeism rate were significantly different for both sexes across both years (pairwise Dunn's test,  $p < 0.001$ ).

The analysis of temporal changes in childcare absenteeism and leave rates between 2019 and 2024 reveals a persistent and widening gender gap in Poland, as the average rate of change was significantly higher for females than for males for both indicators. This disparity in the pace of change was observed in the vast majority of counties, with a greater increase in the rate of change for females compared to males in 72% of counties for absenteeism and 75% for leave rate. While male absenteeism and leave rates increased in fewer counties (26% and 46%, respectively) compared to females (46% and 66%, respectively), the distributions of these dynamics differed significantly by sex ( $p < 0.01$ ). Spatially, clusters of the largest female-male gaps in the rate of change were concentrated in rural eastern and south-eastern regions, reflecting a tendency for childcare

responsibilities to accelerate female absenteeism and leave trends in these areas disproportionately. In contrast, smaller gaps were found near urbanised and more densely populated parts of the country.

### Gender gap in childcare absenteeism and leave rates

The disparities in childcare leaves and absenteeism levels and their distributions between males and females are notable and alarming, translating into a substantial gender gap in Poland. We quantify this gender imbalance by calculating female-to-male value ratios and subtracting 1. Consequently, positive ratios indicate a female surplus, while negative ratios signify a male excess.

Both the childcare absenteeism and leave gender gap ratios for 2019 and 2024 (Fig. 4) unequivocally confirm that women bear a substantially larger burden of informal childcare across all Polish counties. For absenteeism, the excess of female carers ranged from 78% to 790% in 2019, escalating to 186% to 1061% in 2024. Similarly, for medical leave instances, the excess ranged from 100% to 758% in 2019, rising to 208% to 1047% in 2024. The widest gender gaps in absenteeism and leave were observed in Krapkowicki County (Opolskie Voivodeship) in 2019

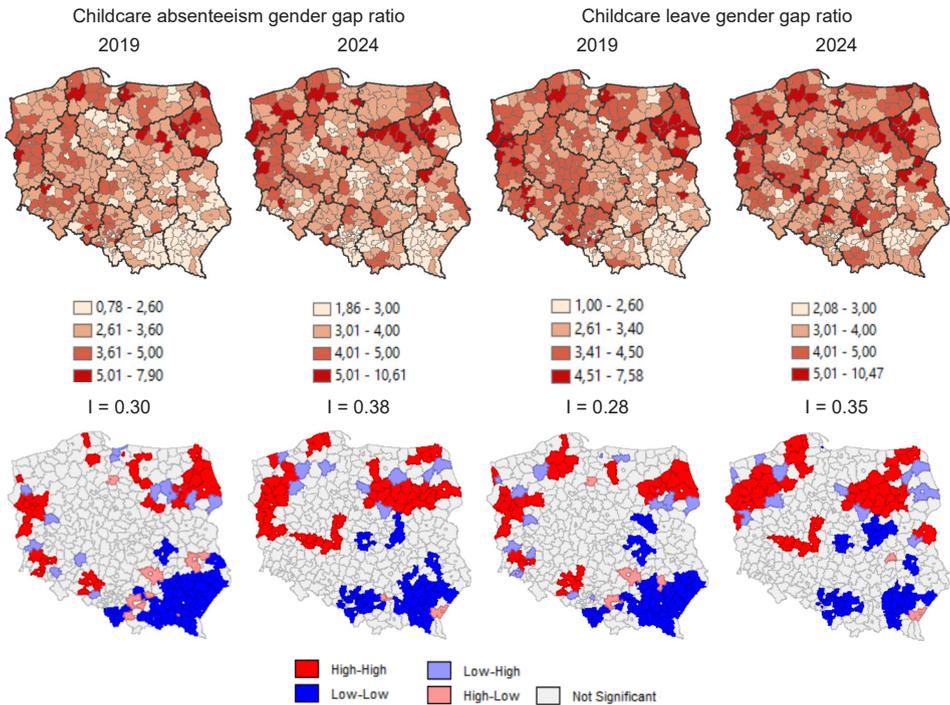


Fig. 4. Childcare absenteeism gender gap ratio and childcare leave gender gap ratio with global and local Moran's I statistic in 2019 and 2024

\*All results are statistically significant.

Source: own elaboration in ArcMap and GeoDa.

and Sejneński County (Podlaskie Voivodeship) in 2024. Conversely, the smallest imbalance for absenteeism in both years, and for leave instances in 2019, was found in Brzozowski County (Podkarpackie Voivodeship), shifting to Oświęcimski County (Małopolskie Voivodeship) in 2024. On average, the absenteeism gap ratio was 311% in 2019 and 355% in 2024, while the leave gap ratio was 324% in 2019 and 378% in 2024. The observed gap ratio was consistently higher for leave instances than for absenteeism days in 2019 and 2024 ( $p < 0.01$ , two-mean test). These escalating gender gap ratios indicate a burden on women that is several times larger than that on men, with a clear, increasing imbalance over time. This trend is evident in the notable rise of both the mean ( $p < 0.01$ , two-mean test) and the lower and upper range boundaries over the five years.

The spatial patterns of both childcare absenteeism and leave gender gap ratios remained broadly similar and relatively stable over time. However, their distributions showed some differences ( $p < 0.001$  for both gap measures and years, pairwise Dunn's test). The correlation between the absence and leave instance gaps was consistently very high and significant ( $r = 0.94$ ,  $p < 0.01$  in 2019;  $r = 0.95$ ,  $p < 0.01$  in 2024). However, the association of these gaps over time (between 2019 and 2024) was only of medium strength yet significant ( $r = 0.52$ ,  $p < 0.01$  for absenteeism;  $r = 0.46$ ,  $p < 0.01$  for leaves), indicating some notable shifts in their spatial distributions.

For absenteeism, the smallest gender gap was observed in Poland's south-eastern regions, specifically in counties within the Podkarpackie, Lubelskie, and Małopolskie Voivodeships. Conversely, the greatest gender disparity was concentrated in the country's north, northwest, and northeast. These patterns are further confirmed by the clustering of counties based on local autocorrelation. The global spatial pattern was more pronounced for the absenteeism gender gap than for leave instances in 2019 and 2024. Nevertheless, for both childcare imbalance indicators, the strength of global autocorrelation increased over time, leading to a rise in the number of "hotspots" – clusters of counties exhibiting wide gender gaps. This increase was particularly evident in northern Poland, including provinces like Mazowieckie, Podlaskie, Zachodniopomorskie, and Wielkopolskie (Fig. 4).

Although the overall share of women among absentees may change only slightly over time (see Table 1), the rate-based gender gap can nevertheless widen. This occurs partly because of changes in the structure of employment: the number of working women and men evolves differently across regions, and even modest increases in absences can have unequal effects relative to each sex-specific workforce. As a result, rate-based gaps are not directly comparable to absolute counts, and heterogeneous growth patterns can amplify disparities even when aggregate shares appear stable.

The dynamics of the gender gap ratios, measured in percentage points (pp.), varied considerably across Poland (Fig. 5). For the absenteeism gap, the change between 2019 and 2024 ranged from  $-379$  to  $402$  pp., with the mean indicating a moderate increase of  $44$  pp. The dynamics of the absence instances gap were both higher (mean  $54$  pp.;  $p < 0.01$ , two-mean test) and more widely diverse (from

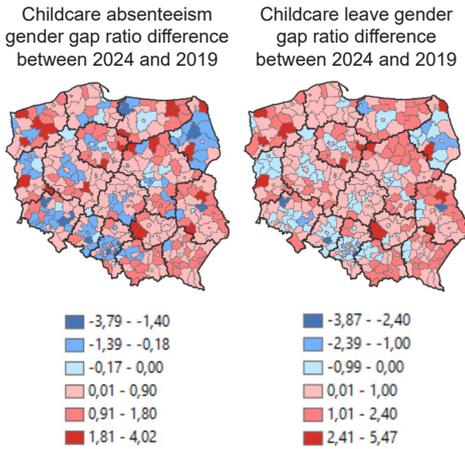


Fig. 5. Percentage point dynamics between 2019 and 2024 of the childcare absenteeism gender gap ratio and childcare leave gender gap ratio

Source: own elaboration in ArcMap and GeoDa.

for women in both 2019 and 2024 ( $p < 0.01$  for both years). While the average span decreased for both sexes over time, the share of counties where men had a longer average absence span increased from 71% in 2019 to 81% in 2024. This is reflected in the gender gap ratio, which shows that women spent approximately 3% less time per leave in 2019 and 5% less in 2024 than men. Spatially, women's absences were more extended in central regions (such as Łódzkie), while men's were longer in more rural counties, particularly in south-eastern Poland. Despite these differences, the leave spans for men and women showed a high positive correlation, suggesting common drivers influence the overall length of absence. However, the gender gap itself changed little over time (Fig. 6).

Focusing on the dynamics of change between 2019 and 2024, the average decrease in the childcare absence span was significantly greater for men (13%) than for women (12%), with men exhibiting a higher dynamic than women in 59% of counties ( $p < 0.01$ ). This difference in the rate of change suggests a slightly faster decline in the average length of male-taken leaves. However, the spatial patterns of these dynamics were distinct: women's dynamics showed significant clustering (low growth in the south-east and hotspots in the west), whereas men's dynamics showed no overall global spatial autocorrelation. The overall gender disparity in the dynamics of the average span was minimal (a mean difference of 1 percentage point, negative, favouring men). It showed no clear global spatial pattern, indicating that the changes in leave length are heterogeneous and localised across Poland.

–387 to 847 pp.) than for absenteeism. Interestingly, neither the absenteeism nor the absence instances gender gap dynamics showed a strong spatial pattern, with a global autocorrelation of 0.17 for both.

### Average childcare absence span by sex

Finally, we assessed sex-based differences in the average childcare absence span for each county, its gender ratio, and dynamics. Gender analysis of the average childcare absence span reveals a subtle yet persistent disparity: the average length of childcare medical leave was consistently longer for men than for

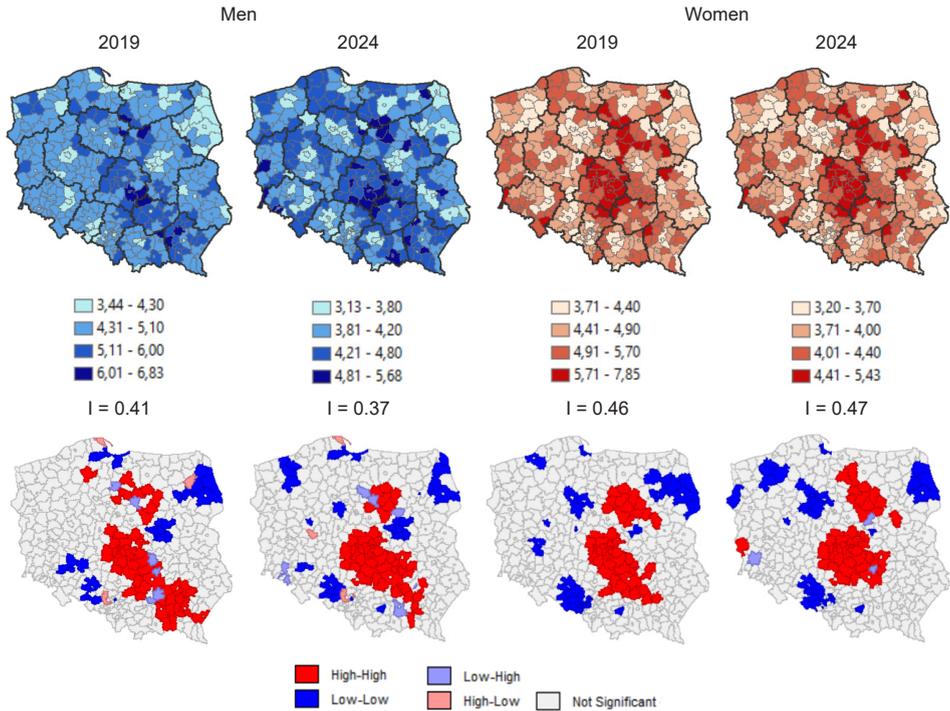


Fig. 6. Average childcare absence span [days] and global and local Moran's I statistic for men and women in 2019 and 2024

\*All results are statistically significant.

Source: own elaboration in ArcMap and GeoDa.

## Conclusions and recommendations

The conducted analyses confirmed a substantial and widening gender gap in childcare-related medical leave from work in Poland. In both 2019 and 2024, women bore a disproportionately larger burden, with average gap ratios exceeding 300% for both childcare absenteeism (total number of days) and leave instances (number of occurrences). This inequality indicates that women undertake several times more childcare responsibilities than men, and this imbalance has deepened over time.

Importantly, this gender disparity displayed clear spatial patterns. While the highest overall childcare absenteeism and leave rates were consistently observed in the northern and western voivodeships, the most pronounced gender disparities were concentrated in rural areas of north and eastern Poland. This pattern points to entrenched structural inequalities in the division of care labour, shaped by a combination of socio-demographic, labour market, and institutional factors that vary across counties. Potential determinants include differences in the age structure of children, gender-specific employment patterns, and local labour

market conditions, as well as income levels and wage dispersion across counties and between women and men, which may influence households' capacity to absorb care-related work interruptions. Spatial variation may further reflect differing degrees of urbanisation and accessibility, alongside the availability and quality of childcare infrastructure such as nurseries and kindergartens. In addition, regionally embedded social norms and gender role expectations are likely to reinforce unequal divisions of care responsibilities, particularly in more rural or peripheral areas.

The dynamics of change between 2019 and 2024 revealed that female childcare absenteeism increased in nearly half of the counties, particularly in rural eastern and central Poland, while male rates rose in only a quarter of them. The increase among women was even more pronounced for childcare leave, observed in two-thirds of counties, while for men it rose in less than half. In the majority of counties, the rate of change was greater for women, reinforcing the persistent trend of an increasing female childcare burden. Furthermore, spatial clustering analysis highlighted significant regional inequalities, with high-growth female clusters prevalent in rural south-eastern regions and low-growth clusters near urban centres.

Interestingly, although women bore the greater overall burden, men's average length of absence from childcare was slightly longer. However, this specific gender difference in duration remained relatively stable over time and did not exhibit any clear spatial pattern.

These findings demonstrate that childcare absenteeism and leave in Poland are characterised by significant regional and gender disparities, with women shouldering a disproportionate and growing burden. Extensive research shows that prolonged or frequent caregiving-related absences can exacerbate gender inequalities in employment outcomes by reducing women's working hours, limiting their occupational mobility and career advancement, and even increasing the likelihood of labour market withdrawal. In the long run, these patterns result in permanent declines in income and retirement security (Samtleben, Müller 2022, Josten et al. 2024, Spijker et al. 2025).

The regional variation in childcare absenteeism and leave patterns highlights the importance of place-based policy interventions. Rural areas, particularly in northern and eastern Poland, demonstrate the highest childcare burdens for women, driven by deeply rooted socio-cultural norms that reinforce traditional caregiving roles. Promoting social awareness and challenging these norms through education and public campaigns could gradually improve gender equity (OECD 2019).

It is also essential to implement policies that enable flexible work hours, remote work options and short-term caregiving breaks without income loss. These provisions would mitigate the negative career impacts on carers, particularly women, and improve work-care reconciliation (Stephenson 2020, Nadash 2022). Furthermore, Poland's legal limit of 60 annual childcare leave days – regardless of the number of children – appears insufficient. Increasing this limit, especially for larger families or those with chronically ill children, or introducing per-child

quotas could provide essential support and reduce reliance on informal coping strategies.

In conclusion, the persistent and deepening gender gap in childcare absenteeism and leave in Poland not only reflects enduring inequalities in the distribution of unpaid care work but also poses significant risks to women's economic security and regional development. Addressing these disparities requires comprehensive social and labour-market policies that enhance gender equality, support carers, and ensure equitable economic participation for women across all regions. Future research will extend this analysis by examining the socio-economic and demographic determinants of these disparities using spatial regression models, thereby providing a more robust evidence base for targeted policy intervention.

### **Conflict of interest & Authors' contributions**

The authors declare that there is no conflict of interest. They declare that the text of the article is entirely their own work. The authors' contributions are as follows:

- Conceptualisation: KLG, AŻ,
- Methodology: KLG, AŻ,
- Research organisation: KLG, AŻ,
- Formal analysis: KLG, AŻ,
- Writing: KLG, AŻ.

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## Appendix

Testing results for Pearson correlation, two-mean test, and Dunn's test of distributional differences

Variables (1st vs 2nd)	Pearson's correlation	Paired-samples two-mean t-test (one-tailed): sign (between 1st vs 2nd variable) & p-values	Pairwise Dunn's test for related samples (p-value)
A_M19 – A_F19	0.896***	< (p < 0.001)	p < 0.001
A_M19 – A_M24	0.750***	> (p < 0.001)	p < 0.001
A_F19 – L_F19	0.985***	×	p < 0.001
A_F19 – A_F24	0.738***	> (p < 0.001)	p = 0.369
L_M19 – L_F19	0.916***	< (p < 0.001)	p < 0.001
L_M19 – L_M24	0.789***	> (p = 0.006)	p < 0.001
L_F19 – L_F24	0.816***	< (p < 0.001)	p = 0.005
A_M24 – A_F24	0.892***	< (p < 0.001)	p < 0.001
L_M24 – L_F24	0.907***	< (p < 0.001)	p < 0.001
A_M24 – L_M24	0.968***	×	p < 0.001
A_F24 – L_F24	0.907***	×	p < 0.001
A_F/M19 – L_F/M19	0.936***	< (p < 0.001)	p < 0.001
A_F/M19 – A_F/M24	0.521***	< (p < 0.001)	p < 0.001
A_F/M24 – L_F/M24	0.956***	< (p < 0.001)	p < 0.001
L_F/M19 – L_F/M24	0.464***	< (p < 0.001)	p < 0.001
A_F/M24-19 – L_F/M24-19	0.945***	< (p < 0.001)	p = 0.004
A_M24/19 – A_F24/19	0.694***	< (p < 0.001)	p < 0.001
A_M24/19 – L_M24/19	0.967***	< (p < 0.001)	p < 0.001
A_F24/19 – L_F24/19	0.982***	< (p < 0.001)	p < 0.001
L_M24/19 – L_F24/19	0.703***	< (p < 0.001)	p < 0.001
A_F-M24/19 – L_F-M24/19	0.984***	< (p < 0.001)	p < 0.001
S_M19 – S_F19	0.733***	> (p < 0.001)	p < 0.001
S_M24 – S_F24	0.826***	> (p < 0.001)	p < 0.001
S_M19 – S_M24	0.786***	> (p < 0.001)	p < 0.001
S_F19 – S_F24	0.855***	> (p < 0.001)	p < 0.001
S_F/M19 – S_F/M24	0.537***	> (p < 0.001)	p = 0.187
S_M24/19 – S_F24/19	0.419***	> (p < 0.001)	p = 0.003

A – absenteeism, L – leaves, S – average span, F – value for females, M – value for males, F/M – sex ratio, F-M – percentage point difference between females' and males' values, 19 – value for 2019, 24 – value for 2014, 24/19 – change index between 2019 and 2024 values, 24-19 – percentage point difference between 2019 and 2024 values, x – test not applicable; \* – 10%, \*\* – 5%, \*\*\* – 1% confidence (calculations in SPSS)

## Kto się troszczy? Nierówności płci w nieformalnej opiece nad dziećmi w Polsce – perspektywa przestrzenno-czasowa

**Zarys treści:** Głównym celem badania było określenie różnicy pomiędzy płciami w absencjach chorobowych z tytułu opieki nad dziećmi w Polsce oraz analiza ich zróżnicowania przestrzennego i czasowego. Zastosowano dane statystyczne ZUS dla lat 2019 i 2024 na poziomie powiatów, wykorzystując metody GIS, eksploracyjną analizę danych przestrzennych oraz testy statystyczne, m.in. współczynnik

korelacji Pearsona, test t dla prób zależnych i test Dunna. Wyniki wskazują na znaczne i pogłębiające się różnice między kobietami a mężczyznami – kobiety są wielokrotnie bardziej obciążone. Zjawisko to nasila się w północnych i wschodnich regionach kraju.

**Słowa kluczowe:** nierówności płci w nieformalnej opiece nad dziećmi, nieobecność w pracy spowodowana opieką nad dziećmi, ekonomia zdrowia, rynek pracy, analiza przestrzenno-czasowa, GIS

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