



## Sick Leave in Colombia in the 2016–2018 period: A Retrospective Cross-Sectional Observational Study

Licencia por enfermedad en Colombia en el período 2016-2018: Estudio observacional transversal retrospectivo

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### Abstract

**Introduction:** To understand the sick leave situation and the causes and effects of a temporary loss of capacity to work allows for the strengthening of policies and management in the provision of health services. **Objective:** To analyze sick leave in Colombia in the 2016–2018 period. **Materials and methods:** A retrospective cross-sectional observational study and the relative risk was calculated. Sick leave reports were provided by the Ministry of Health and Social Protection. 12,410,837 reports from formal workers between the ages of 18–70 years and had at least one temporary disability were processed. **Results:** The average age of people with sick leave was 37.11 years, 53% corresponding to females. On average, sick leave was 90.6% and 5.6% for dependent and independent workers, respectively. The principal causes of disability were musculoskeletal diseases and were more likely in men and adults according to RR. Men in comparison to females and adults in comparison to youths are less likely to have sick leave due to respiratory disease. **Conclusions:** In Colombia, females presented more temporary sick leave, even if males had more days of disability, even though the median was three days in both genders. Youth and adults had more sick leave days.

**Keywords:** Sickness absence; sick leave; disability insurance; delivery of health care; public health surveillance (Source: DeCS, Bireme).

### Resumen

**Introducción:** Comprender la situación de incapacidad por enfermedad, causas y efectos de una pérdida temporal de la capacidad de trabajo fortalece las políticas y la gestión en la prestación de servicios de salud. **Objetivo:** Analizar las incapacidades por enfermedad en Colombia en el período 2016-2018. **Materiales y métodos:** Estudio observacional transversal retrospectivo, con cálculo del riesgo relativo. Se procesaron 12.410.837 registros de trabajadores formales entre 18 y 70 años de edad y con al menos una incapacidad temporal, según los informes del Ministerio de Salud y Protección Social. **Resultados:** La edad promedio de las personas fue de 37,11 años, 53% fueron mujeres. En promedio, el 90,6% de las incapacidades fue para trabajadores dependientes y el 5,6% trabajadores independientes. Las principales causas de incapacidad fueron las enfermedades del sistema musculoesquelético más frecuentes en hombres adultos según RR. Los hombres en comparación con las mujeres y los adultos en comparación con los jóvenes tienen menos probabilidades de tener licencia por enfermedad respiratoria. **Conclusiones:** Las mujeres presentaron más incapacidades temporales por enfermedad, aunque los hombres tuvieron más días de incapacidad, la mediana fue de tres días en ambos géneros. Los jóvenes y los adultos tenían más días de baja por enfermedad.

**Palabras clave:** Ausencia por enfermedad; baja laboral por enfermedad; absentismo por enfermedad; licencia por enfermedad; días de baja por enfermedad (Fuente: DeCS, Bireme).

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## Introduction

Sick leave (SL) is a nation's occupational health indicator, determined by factors such as work environment, ergonomic aspects, psychosocial aspects, and others like employment conditions<sup>(1)</sup>. In addition to occupational and multifactorial factors such as patient's age, gender, social security scheme and diagnosed disease<sup>(2)</sup>. In order to strengthen policies and management in the provision of health services and to make changes to the health system, it is fundamental to understand the SL situation and analyze the causes and effects of a temporary loss of capacity to work<sup>(3,4)</sup>.

SL is a personal health condition due to an illness or injury, which prevents employees from doing their work-certain amount of time and requires a medical staff certification in all cases<sup>(5)</sup>. Its effects are, in most cases, repercussions of the social and economic orders. It is a situation considered a public health problem because of its negative effect on the individual's wellbeing, the sustainability of employment, in addition to the productivity and an increase of costs at the business level and in the health system<sup>(6,7)</sup>.

In the literature, studies using different methodologies and results applied to a country or region can be found, making it difficult to compare the results between studies<sup>(5)</sup>. However, it is estimated that the average cost of absenteeism due to illness is 2.5% of Gross Domestic Product (GDP) in Colombia<sup>(8)</sup>.

SL trends have been analyzed on the basis of three groups of variables<sup>(5)</sup>: a) sociodemographic; b) occupational; and c) health conditions. This makes it possible to link evidence concerning the causes of sickness absence, its duration, diagnosis of illness, and the association with age and gender. Other variables analyzed with less frequency are seniority in the workplace, geographic area, educational level, employee conditions (salary, occupation, and type of contract), and others such as organizational factors (economic sector, working activity, and workplace size)<sup>(9,10)</sup>. Regarding gender, the duration of SL is more extensive in females than in males, and the diseases are directly related to the SL duration, where muscular and mental disorders are the most common<sup>(3,9)</sup>.

Few studies in Colombia put forward proposals to establish a public policy on SL, one of the reasons

being a lack of empirical evidence to generalize the results for an entire population<sup>(10,11)</sup>. Thus, the present study had as its main objective the analysis of the SL trends due to disease in Colombia between 2016–2018.

## Methods

### Design and population

A retrospective, cross-sectional observational study was carried out using the total SL records reported by the Ministry of Health and Social Protection (MHSP) of Colombia between 2016–2018. In total the universe of SL due to general illness in Colombia was 12,480,837 records analyzed of which 3,072,795 were from 2016, 3,767,364 from 2017, and 5,494,150 from 2018. The records for 2016 corresponded to 1,514,224 people, 1,672,296 people for 2017, and 2,315,043 for 2018.

The study population was constituted from the totality of records of formal workers between the ages of 18–70 years, affiliated to the Social Security General Health System who contributed to the contributory system, and presented at least one SL episode during the years of the study. During these three years, 4,018,415 workers reported SL, who, distributed by year, represented approximately 12.4% of the total workers affiliated to the system.

### Variables

The information provided by the MHSP was classified into three categories: 1) sociodemographic; 2) related to work; and 3) related to SL.

The first category included gender (female and male) and age. Age was calculated based on the date of birth and start date of the SL. Two variables were constructed from the simple age: one by age group per five-year period and another by life cycle<sup>(12)</sup>: adolescence (12–18 years), youth (19–26 years), adulthood (27–59 years), and elderly (60–70 years). Since the records for those under 18 years of age and over 70 years of age were excluded, when cross-checked with the five-year age group categories, two non-quinquennial age groups were left: those between 18–19 years of age and those over 70 years of age.

The second category included three types of workers (employees, self-employed, and other)<sup>(13,14)</sup> and income, as another variable. Income was organized in relation to the Current Legal Monthly Minimum Wage

(CLMMW) for each year in Colombia<sup>(15-17)</sup>, in ranges of less than two CLMMW, between two and five CLMMW, and more than five CLMMW<sup>(18)</sup>.

The third category was the diagnosis of the SL according to the chapters of the International Classification of Diseases, 10th revision (ICD-10)<sup>(19)</sup> and to the disease burden groups, as listed in the Global Disease Burden Study<sup>(20)</sup>, which are: non-communicable diseases (NCD), communicable and nutritional diseases (CND), maternal and perinatal conditions (MPC), external causes of morbidity and mortality (caused by injuries), and ill-defined causes. The days of SL duration were classified into the following groups: up to 2 days, between 3 and 90 days, 91–180 days, and 181–540 days.

### Data analysis

A univariate and bivariate descriptive statistical analysis was performed, where percentages were estimated for each study variable, using the R Project for Statistical Computing software, version 3.6.2. The ethics committee of the Jorge Tadeo Lozano University (UTADEO) and National Health Institute approved this study. The data were made anonymous by the MHSP in order to ensure the confidentiality of the information. Additionally, the flow of data followed the information security and data protection protocols of the UTADEO. For the estimate of the relative risk (RR), the SL whose cost was zero were excluded, the calculation was made for each year and consolidated for the years 2016 to 2018. The calculations were made according to gender and age group and the RR has a confidence interval of 97.5%

(CI: 97.5%), higher than that commonly used in epidemiological studies of public health.

### Ethical considerations

The ethics committee of the UTADEO and National Health Institute approved this study. The data was anonymized by the MHSP in order to ensure the confidentiality of the information. Additionally, data followed the information security and protection protocols of the UTADEO.

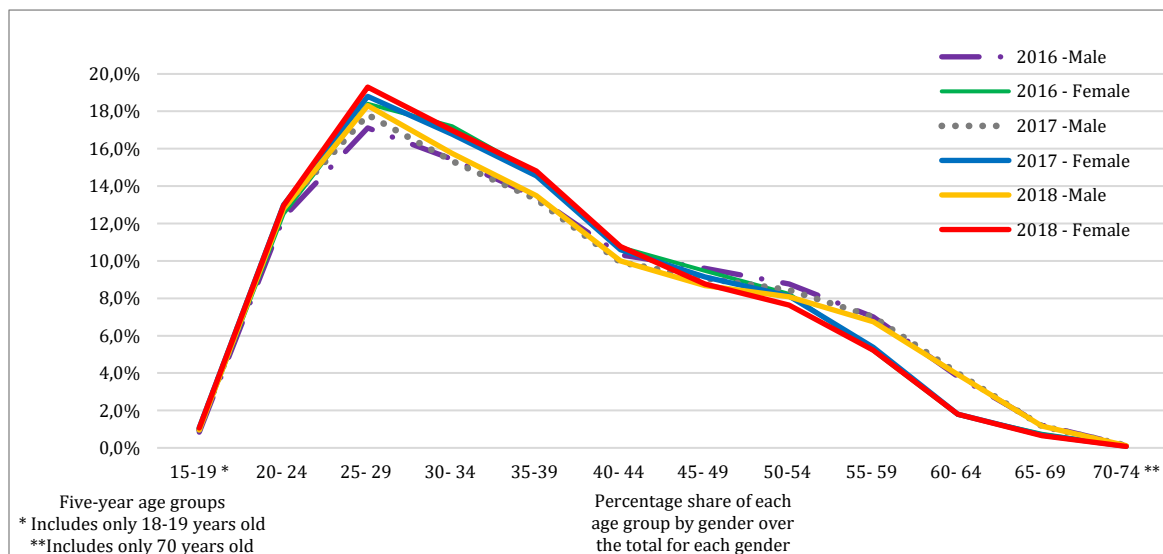
## Results

The SL descriptive analysis was discriminated by age and gender.

### Sociodemographic variables

We study a total 12,480,837 of SL which correspond to 47% males and 53% females, with an average age of 37.11 years (females 36.48 and 37.76 males). All the processes were considered without differentiating between those who had a single process and those who accumulated several processes of SL.

Figure 1 shows that the distribution of SL by age group was skewed to the left, typical of a population of productive age. A maximum peak was observed in the 25–29-year age group in both genders and a gradual decrease in later years. Females had more records than males in the first five age groups, while male participation was more considerable than females in the groups of 50 and more years.



**Figure 1.** Distribution of sick leave by quinquennial age groups and gender, 2016-2018 period

### Variables related to employment conditions

The average number of SL records per person was: 2.02 for 2016, 2.25 for 2017, and 2.4 for 2018. As for the type of employment, on average, for the three years, the distribution of SL corresponded to 90.6% for dependent workers, 5.6% for independent workers, and 3.18% for other categories.

Taking into account that employment conditions are different from one year to the next, in the distribution per year, for 2016, 89.23% corresponded to dependent workers, 8.10% to independent workers, and 2.67% to other linking categories. For 2017, 92% corresponded to dependent workers, 4.82% to

independent workers, and 3.18% to other linking categories. For 2018, 92% corresponded to dependent workers, 5.6% to independent workers, and 2.4% to other linking categories.

In the case of the CLMMW, Table 1 shows that, with respect to the average, a slight increase was observed in 2017, with a decrease in salaries for 2018 in both genders in the median and the average. Concerning the CLMMW ranges for the three years, the highest proportion of SL was in the lower range (77-86%), was located in the lower range corresponding to less than two CLMMW, and the lowest (3-5%) in the upper range, corresponding to more than five CLMMW.

**Table 1.** Sick leave by gender and income in the CLMMW for 2016–2018

Parameter Incomes in CLMMW <sup>(1)</sup>	2016			2017			2018		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Median	1.21	1.13	1.16	1.26	1.15	1.20	1.03	1.00	1.00
Average	1.86	1.75	1.80	1.88	1.73	1.80	1.43	1.27	1.34
< 2 CLMMW	77.73%	79.58%	78.68%	77.11%	79.42%	78.32%	83.51	85.99%	84.85%
2 to 5 CLMMW	17.13%	15.86%	16.48%	17.80%	16.35%	17.04%	12.85%	11.06%	11.88%
> 5 CLMMW	5.13%	4.56%	4.84%	5.10%	4.23%	4.64%	3.64%	2.95%	3.27%

(1) According to the Exchange of COP per US dollar, the CMLLV for each year was: 1 CLMMW = U\$229,76 (2016), 1 CLMMW = U\$ 247,22 (2017), and 1 CLMMW = U\$ 240,40 (2018). The simple average is U\$ 239,13

### Variables related to sick leave

With respect to diagnoses, the principal causes of SL were musculoskeletal system and connective tissue diseases (Chapter XIII), followed by trauma, poisoning, and some other consequences of external causes (Chapter XIX) for the period of the study. For the years 2017 and 2018, diseases of the respiratory system were also frequent (Chapter X), and for 2016, there were infectious and parasitic diseases (Chapter I).

When reviewing the behavior by gender, we found that for females, 17.3% of the SL was caused by Chapter XIII (musculoskeletal system and connective tissue) diseases and for males it was 20.7% with the same causes. It was found that in the three years of the study, the percentage of Chapter XIX (trauma, poisoning, and some other consequences of external causes) was on average 21.6% of all the male and 10.8% of female

According to age group, the primary causes of SL in adolescence were Chapter X (respiratory system) diseases, with 17.3% of the youth group, while diagnoses related to Chapter XIX (trauma, poisoning, and some other consequences of external causes) accounted for 15.2%, and for the adult and elderly groups, diseases of Chapter XIII (musculoskeletal system and connective tissue) accounted for 20.7% and 28.6%, respectively. Although the diseases of chapter XIII are the most numerous globally, in men the first cause of LS is the diseases of chapter XIX.

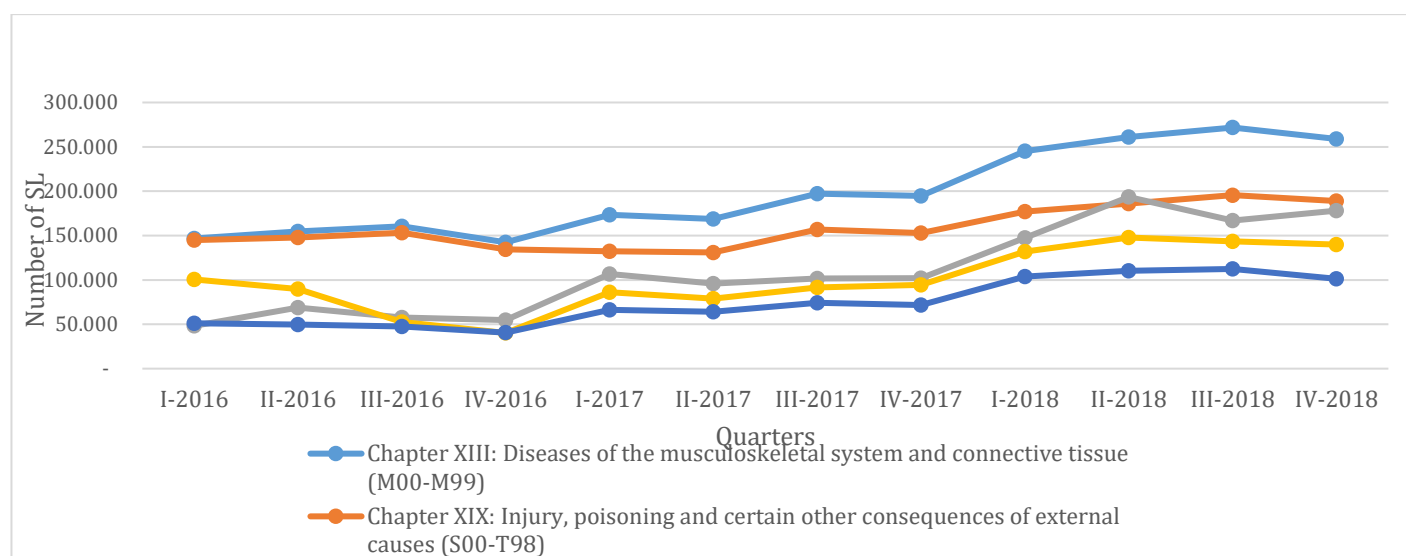
Figure 2 shows the quarterly behavior of SL related to the chapters that included the diagnoses affecting the majority of the population of this study and a slight increase for the second quarter of the years 2016 and 2018 of SL related to diseases of the respiratory system.

When analyzing the total amount of SL generated by quarter, an increasing trend was found in all, being

more accentuated in Chapters XIII and X, and for diseases of the respiratory system, there was an increase in the second or first quarter of each year.

Table 2 presents the grouping of the disease burden<sup>(20)</sup> by age group according to life cycle<sup>(12)</sup>. In adolescence and youth, there was a close percentage share by categories between the groups of NCDs and the causes of injuries, while for the groups of adulthood and the elderly there was an important and large contribution of NCDs.

Regarding the burden of disease<sup>(20)</sup> and gender for the three years, there was a contribution between 52% and 54% of the NCD group in both genders. The causes of injuries increased every year in female participants, being 13% in 2016, 21% in 2017, and 24% in 2018, while in the CND group, there is a decrease in females from 17% in 2016 to 11% in 2017 and 10% in 2018.



**Figure 2.** Quarterly trend of SL between 2016-2018 period, according to ICD-10 diagnosis chapter

**Table 2.** Sick leave distribution between 2016–2018 for the disease burden groups, by age according to life cycle

Burden groups	Adolescents			Youth			Adults			Older persons		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Non communicable diseases	35	36	38	36	39	39	55	56	54	74	73	71
External morbidity and mortality causes - injuries	26	34	35	26	27	31	19	19	22	14	10	11
Communicable and nutritional diseases	28	18	14	22	19	16	16	15	14	8	13	13
Ill-defined causes	8	10	11	8	10	18	6	7	8	4	5	5
Maternal, perinatal conditions	3	2	1	8	5	4	4	3	2	0	0	0
Total percentage (%)	100	100	100	100	100	100	100	100	100	100	100	100

In males, these two disease burden groups had a similar but irregular trend. Injury causes decreased from 27% (2016) to 20% (2017) and 23% (2018), while in the NCDs, they started at 15% (2016), achieved 21% (2017), and ended at 19% (2018). For females, the MPCs decreased with time, being 9% in 2016, 6% in 2017, and 4% in 2018.

Concerning duration of SL by gender, the authors found that the percentage of SL between three and 90 days was always higher in males than in females for the three years analyzed. By year, this group of SL in males was 59% (2016), 68% (2017), and 57% (2018), while in females it was 56% (2016), 66% (2017), and 53% (2018). Similarly, SL exceeding 90 days was less than 1%, with a tendency to be greater in females than males.

When classifying SL duration by age group, it was found that in the adolescent and youth group, the highest proportion of SL was less than three days, and that in the adult and older group, it was between three and 90 days.

Finally, for quarterly behavior, according to the start date of the SL, the authors found that from the second quarter and in all ranges of duration, there was a sustained increase until the fourth quarter of the year.

### Relative risk of sick leave 2016 to 2018 period

As can be seen in the Table 3, the RR does not have significant variations in the comparison of the period between men and women. Men are less likely to have a SL than women.

**Table 3.** Estimate of the relative risk per year and 2016 to 2018 period according to the number of sick leave and the total population.

Year	Sick Leave Number			RR Male/Female	RR, CI: 97.5%	
	Male	Female	Total			
2016	1,354,401	1,455,316	2,809,717	0.77509	0.77508	0.77509
2017	1,329,773	1,428,096	2,757,869	0.78347	0.78346	0.78347
2018	1,621,492	1,758,396	3,379,888	0.78728	0.78728	0.78728
<b>Total</b>	4,305,666	4,641,808	8,947,474	0.78172	0.78172	0.78172

For diseases of the respiratory system, statistically with a 97.5% confidence level, for each year (2016: RR 0.73582, 97.5% CI: 0.73579-0.73585; 2017: RR 0.77578, 97.5% CI: 0.77576-0.77580; 2018: RR 0.78067, 97.5% CI: 0.78065-0.78069) and in the total (RR: 0.76641, 97.5% CI: 0.76640-0.76642) the risk in the male gender of having SL is lower than in the female gender. Statistically with a 97.5% confidence level, for each year (2016: RR 1.14451, 97.5% CI: 1.14445-1.14457; 2017: RR 1.17979, 97.5% CI: 1.17974-1.17983; 2018: RR 1.16777, 97.5% CI: 1.16773-1.16781) and in the total (RR: 1.16453, 97.5% CI: 1.16451-1.16454) is higher the risk of having SL in the youth life cycle than the adult life cycle.

For chapter XIII, related to musculoskeletal system and connective tissue diseases (M00-M99), it was obtained that statistically with a 97.5% confidence level, for each year (2016: RR 1.14805, 97.5% CI: 1.14804-1.14807; 2017: RR 1.18363, 97.5% CI:

1.18361-1.18364; 2018: RR 1.14591, 97.5% CI: 1.14590-1.14592) and in the total (RR: 1.15805, 97.5% CI: 1.15804-1.15805) the risk of having a SL is higher in the male than in the female gender. By life cycle, statistically with a 97.5% confidence level, for each year (2016: RR 0.44917, 97.5% CI: 0.44916-0.44919; 2017: RR 0.44288, 97.5% CI: 0.44286-0.44289; 2018: RR 0.44074, 97.5% CI: 0.44073-0.44075) and in total (RR: 0.44384 CI 97.5% =0.44384-0.44385), the life cycle risk of having SL in youth life cycle is lower than in adulthood.

Finally, for chapter XIX, trauma, poisoning, and some other consequences of external causes (S00-T98), statistically with a 97.5% confidence level, for each year (2016: RR 2.05849, 97.5% CI: 2.05846-2.05852; 2017: RR 1.94921, 97.5% CI: 1.94918-1.94924; 2018: RR 1.90193, 97.5% CI: 1.90190-1.90195) and in the total (RR: 1.96553, 97.5% CI: 1.96553-1.96554), the risk of the male is higher have SL than in the female gender. By life cycle, statistically with a 97.5%

confidence level, for each year (2016: RR 1.33526, 97.5% CI: 1.33524-1.33528; 2017: RR 1.31037, 97.5% CI: 1.31035-1.31040; 2018: RR 1.33825, 97.5% CI: 1.33823-1.33827) and in total (RR: 1.32903, 97.5% CI: 1.32903-1.32904), the risk of having SL in youth life cycle is higher than the life cycle of adulthood.

## Discussion

As it is a study in which the universe of SL was analyzed, it is broad and representative, avoiding any bias issues. In Colombia, SL predominance in the females is consistent with that presented by Vaquero-Álvarez *et al*<sup>(1)</sup>. of 52.4% of SL in females, with a median of three days in both sexes (median in males of 8.28 days and 6.89 days in females). The results presented by López Barragán *et al*<sup>(5)</sup>. Showed that even if females presented more SL, males required more days of SL.

Similarly, the fact that most SL corresponded to young people and adults of productive age may reflect possible adverse working conditions, causing absenteeism due to illness, a phenomenon that has implications for labor productivity<sup>(1,21)</sup>.

The population average age of 37.1 years observed in this study differs from studies carried out in Europe (47.1 years)<sup>(1)</sup>, which could be attributed to the European population's demographic characteristics, where there is a predominance of older adults. The concentration of SL in the 20–29-year age group partially approaches other results that show significant duration differences of more than 20 days of SL in workers with ages between 16–25 years<sup>(9)</sup>.

The presence of less SL in females over the age of 50 years than males could be explained because in Colombia, females retire at 57 years of age while males retire at 62 years of age. The higher occurrence of SL between three and 90 days in the group of adults and older persons is consistent with other studies that showed that age is a determinant for SL, due to chronic health processes that generally begin after 50 years<sup>(5,9-11)</sup>.

In relation to employment conditions, most people who had SL earned less than two CLMMW; there were very few high-income persons, and there were no substantial differences between males and females. These findings diverge from evidence that low-

income females with mental health disorder events require prolonged periods of SL<sup>(11)</sup>.

The three main diagnoses that generated SL were diseases of the musculoskeletal system, followed by trauma and other external causes, and in third place, diseases of the respiratory system. Diagnoses of musculoskeletal disorders were present in between 60–70% of those that presented SL mainly due to lumbar and cervical pain, as indicated by other studies<sup>(1,10,22)</sup>. Consequently, it is necessary to review the plans and actions in public health and occupational health aimed at preventing NCD that may aggravate disease and control risk factors in the working environment as a determinant of the worker's health condition.

Respiratory system diseases have been increasing, being the first cause of SL in adolescents, while for young people, it was due to trauma, and in older adults, it was due to diseases of the musculoskeletal system. The increase in the occurrence of respiratory system diseases in SL has been highlighted as the second cause after musculoskeletal diseases<sup>(1,10)</sup>. According to the RR results, men are less likely to have a disability due to respiratory disease, but it increases in the case of musculoskeletal diseases and trauma, poisoning and other causes. In the case of adult in comparison with youths, there is a greater probability of presenting disability due to illness of the musculoskeletal system but it is lower for the respiratory system and trauma. The evidence indicates that respiratory diseases are the main cause of SL (31%), that absenteeism is higher in women than in men (RR 1.65, 95% CI: 1.53-1.77), in addition to the existence of a direct relationship between absenteeism and age (RR 1.25, 95% CI: 1.12-1.38) and the association between work absenteeism with a sedentary lifestyle (RR 2.17, 95% CI: 1.72-2.73)<sup>(23)</sup>.

In terms of analysis by disease burden, most SL was associated with NCDs. In fact, a study in Australia and Japan showed that such diseases are associated with an increased need for health services<sup>(1)</sup>. Looking at the life cycle<sup>(12)</sup>, in adolescents and young people, NCDs predominate, followed by causes of injury; however, in adults, NCDs are highly prevalent, and in older people, they reach 70%, which is associated with age.

In Colombia, the average number of days of SL in males was 8.28 days and in females, it was 6.89 days, although the median was three days in both genders.

The study carried out by the Arrieta Burgos *et al*<sup>(21)</sup> indicates that 55.3% of SL had a duration of 1–2 days; while in our findings, differences were observed by age groups, where young people had SL of short duration (less than three days), in contrast to adults and older people who had SL of three to 90 days.

This study's main limitation was not having data on occupation or economic activity, which would allow analysis of disability and its relationship with possible occupational risk factors. Additionally, since different institutions provided the information to the MHSP, there were problems with these records' quality.

One of the strengths of this study was in being the first developed with data from official sources and representing the entire Colombian population that belongs to the Contributive Health System, which allows comparison and establishment of results that point significantly toward health management public policy guidelines. These are raw data covering the entire sample population.

In Colombia, females have more SL than males. In addition, females have, on average, longer incapacities. On the other hand, adolescents and young people have more SL due to NCDs and injuries, while for the adult and elderly groups there is an important and large contribution of NCDs. Injuries and traumas possibly have effects on work productivity, which suggests the need for more detailed studies, especially of the young population.

Additionally, analyzing three years of information allows us to have a baseline to evaluate the changes in SL behavior in each year. On the other hand, it presents information discriminated by gender and age groups, detailed in other studies, that only present general information.

**Conflict of Interest:** The authors have no conflicts of interest associated with the material presented in this paper.

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