Legal Medicine 81 (2026) 102793

Contents lists available at ScienceDirect

Legal Medicine

journal homepage: www.elsevier.com/locate/legalmed

Retrospective analysis of suicide cases in the province of Ferrara☆

Luca Diani [a,*], Giada Rovito [a], Irene Pradelle [a], Matilde Ruju [a], Rosa Maria Gaudio [b], Margherita Neri [c]

[a] Università degli Studi di Modena e Reggio Emilia, Italy
[b] Dipartimento di Medicina Traslazionale e per la Romagna, Università degli Studi di Ferrara, Italy
[c] Dipartimento di Scienze Mediche, Università degli Studi di Ferrara, Italy

ARTICLE INFO

Keywords:
Suicide
Retrospective analysis
Italy

ABSTRACT

Introduction: In 2016, the Postgraduate School of Forensic Medicine of the University of Ferrara presented a paper at the Annual Congress of the AAFS that analyzed some characteristics of suicides in the territory of the Province of Ferrara between 1996 and July 2016. This presentation is intended to stand as an ideal follow-up to that work. Since 2017, the number of suicides in Italy has been progressively decreasing and peaked in 2021 (0.40 per 10,000 inhabitants). In Emilia-Romagna, available data confirm a steady decline in the number of suicides since 2001.

Materials and methods: Records collecting necrosectorial activity of the Institute were retrospectively analyzed. During the period between August 2016 and April 2025, about 1000 autopsies were performed, 153 of which involved suicide cases. For each of these autopsies, factors regarding the people who committed suicide, as well as the suicide method and the type of activity carried out by the Institute pathologists were examined.

Results and discussion: Among deaths by suicide, 77% are male (118 vs 35), with percentages not dissimilar to those between 1996 and 2016.

The most frequently used suicide method is confirmed to be hanging (49%), followed by the use of firearms (15.6%) and precipitation (9.8%).

Suicide cases come to the attention of the Institute overwhelmingly at the request of the Judicial Authority (87.2%) with judicial autopsy performed in 60% of cases.

Thus, the data collected show that suicide trends have not changed over the past nine years and are in line with national data.

1. Introduction

In 2016, the School of Specialization in Legal Medicine at the University of Ferrara presented a paper at the annual congress of the American Academy of Forensic Sciences analyzing certain characteristics of suicides in the province of Ferrara between 1996 and July 2016. Almost ten years later, this research continues along the same path, analyzing suicides in the province of Ferrara that have come under the scrutiny of the Institute of Legal Medicine.

According to the World Health Organization (WHO), more than 720,000 people worldwide die by suicide each year, a figure that represents approximately 1.1% of all global deaths. In 2019, suicide was the 17th leading cause of death worldwide, and in 2021 it was the 21st leading cause of death [1,2].

Italy has one of the lowest suicide rates in Europe, with a crude rate of 8.2 per 100,000 inhabitants, but there are significant geographical and gender disparities [3].

Since 2017, the number of suicides in Italy has been gradually declining, before peaking in 2021 (0.40 per 10,000 inhabitants) [4], when 3,870 suicides were recorded, compared to 3,748 in 2020, with a 16% increase among 15- to 34-year-olds, where suicide is unfortunately still one of the leading causes of death among young people. The highest mortality rate is found in the age groups over 75 for men and over 85 for women [5].

☆ This article is part of a special issue entitled: 'Proceedings Congress Forensic Science' published in Legal Medicine.

* Corresponding author at: Department of Translational Medicine and for Romagna, Unit of Legal Medicine, University of Ferrara, Via Fossato di Mortara 70, Ferrara 44121, Italy.

E-mail addresses: dnilcu@unife.it (L. Diani), giada.rovito@unife.it (G. Rovito), irene.pradelle@unife.it (I. Pradelle), matilde.ruju@unife.it (M. Ruju), atf@unife.it (R.M. Gaudio), mremgh@unife.it (M. Neri).

https://doi.org/10.1016/j.legalmed.2026.102793
Received 7 September 2025; Received in revised form 2 January 2026; Accepted 20 January 2026
Available online 21 January 2026
1344-6223/© 2026 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

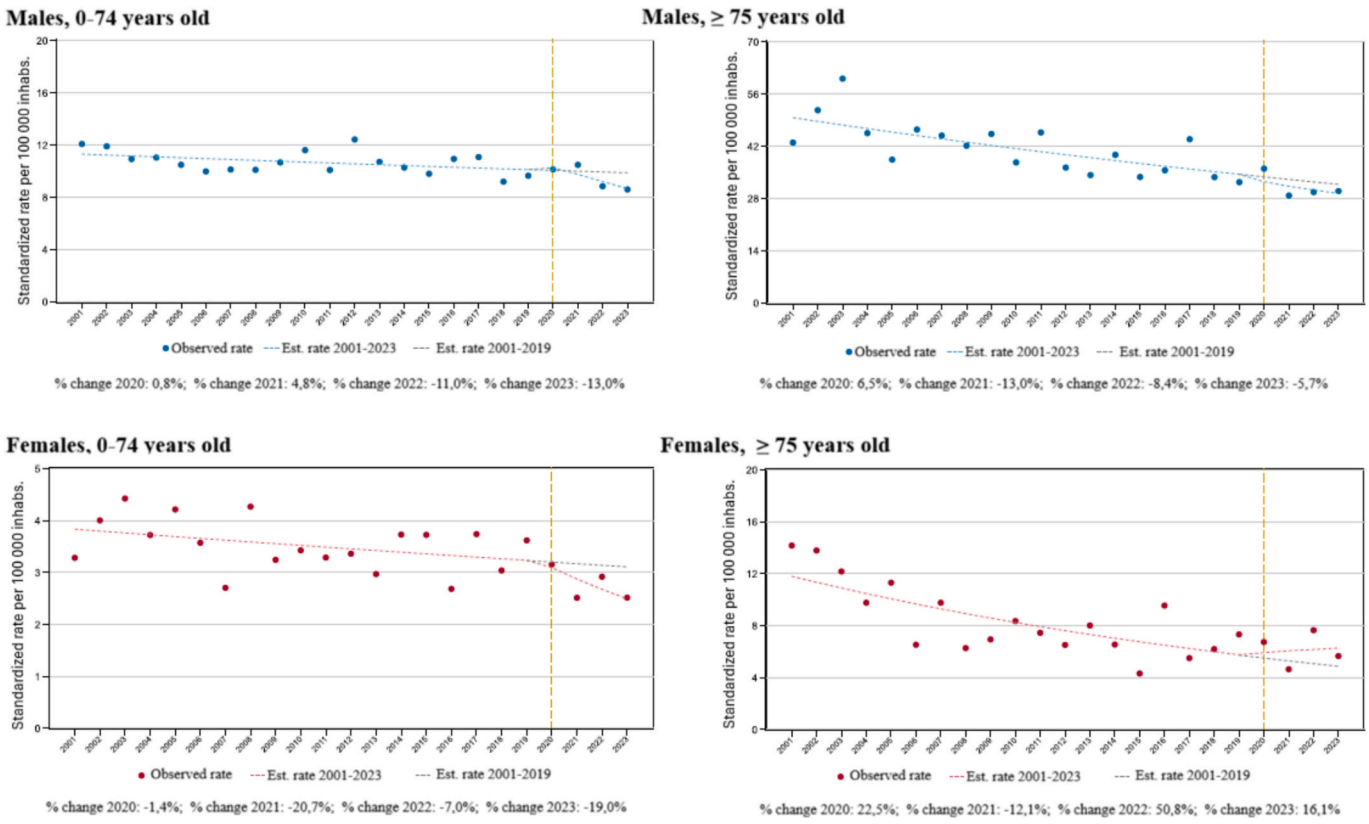


Fig. 1. Suicide rates in Emilia-Romagna per 100.000 inhabitants, 2001–2023.



Fig. 2. Comparison between suicide percentages by sex, 1996–2016 and 2016–2025.

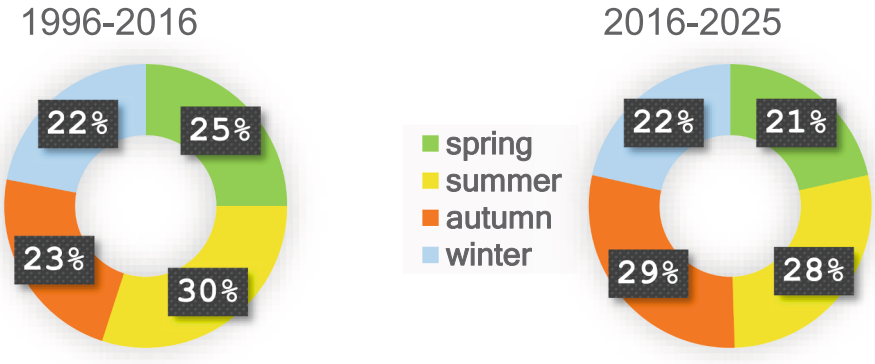


Fig. 3. Suicides sorted by different season, 1996–2016 and 2016–2025.

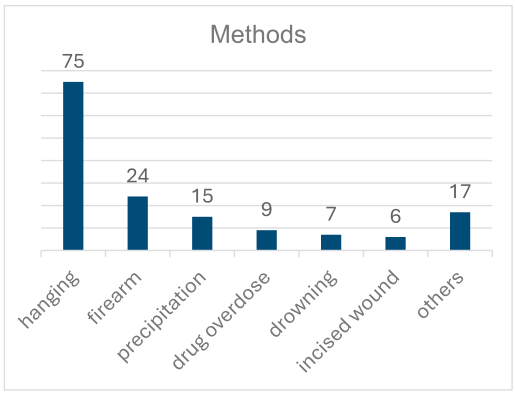


Fig. 4. Methods of suicide.

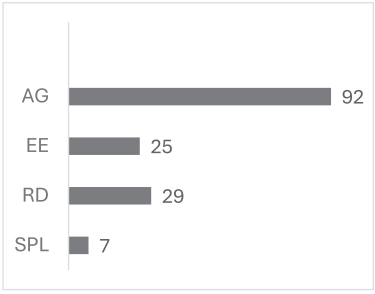


Fig. 5. Activity of the Ferrara Institute of Legal Medicine in suicide cases.

According to ISTAT (Istituto Nazionale di Statistica; Italian National Institute of Statistics) data, in 2022 (the last year for which data is currently available) 3,934 people took their own lives in Italy. 78.4% of suicide deaths were men. The (crude) suicide mortality rate for men was 12.1 per 100,000 inhabitants, while for women it was 3.2 per 100,000.

Suicide mortality rates are higher in northern Italy and, particularly for men, in the northeastern regions. For both men and women, the lowest suicide rates are recorded in the southern regions of Italy [6].

In Emilia-Romagna alone, available data confirm an almost constant decline in the number of suicides since 2001, in both sexes (Fig. 1) [7].

2. Materials and methods

The data available in the registers that collect the autopsy activity of the Institute of Legal Medicine of the University of Ferrara were analyzed retrospectively. Between August 2016 and April 2025, just under 1,000 autopsies were performed, 153 of which concerned cases of suicide.

For each of these autopsies, depending on the availability of data, certain factors were examined concerning the epidemiological characteristics of the individuals who committed suicide, the time of year when the suicide was committed, the methods used, and the type of activity carried out by the Institute of Legal Medicine in Ferrara.

3. Results and discussion

Among those who died by suicide in the Province of Ferrara, 77% were male (118 compared to 35), with percentages similar to those found between 1996 and 2016, when males accounted for 71% (Fig. 2).

Between 2016 and 2025 Unlike the data collected previously, the most represented season is autumn (29%), followed by summer (28%) and, tied for third place, spring and winter (21.5%) (Fig. 3).

The most common method of suicide continues to be hanging (49%, not far from the 47% recorded between 1996 and 2016), followed by firearms (15.6%) and precipitation (9.8%) (Fig. 4).

Suicide cases are brought to the attention of the Institute of Legal Medicine largely at the request of the judicial authorities (87.2%), with a judicial autopsy (AG) performed in 60% of cases, possibly following a scene investigation. In approximately 20% of cases, a non-judicial autopsy for diagnostic purposes only (RD) was performed to clarify the causes of death. In 16% of suicides, only an external examination (EE) was performed. In the remaining cases, the body was returned to the family after only a scene investigation (SPL) had been carried out (Fig. 5).

AG: judicial autopsy/EE: external examination/RD: non-judicial autopsy/SPL: on-scene investigation.

The data collected therefore show that suicide trends in the Province of Ferrara have not changed significantly over the last nine years and are in line with national data.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] "Suicide rates," https://www.who.int/data/gho/data/themes/mental-health/suicide-rates.
[2] "Suicide data," https://www.who.int/teams/mental-health-and-substance-use/data-research/suicide-data.
[3] M. Vichi, B. Vitiello, S. Ghirini, M. Pompili, Does population density moderate suicide risk? An Italian population study over the last 30 years, Eur. Psychiatry 63 (2020), https://doi.org/10.1192/j.eurpsy.2020.69.
[4] E. Grande *et al.*, "Causes of Death during the First COVID-19 Pandemic Wave in Italy: A Comparison with Some European Countries," *COVID*, vol. 1, pp. 751–756, Dec. 2021, doi: 10.3390/covid1040060.
[5] D. De Leo, M. Vichi, K. Kolves, M. Pompili, Late life suicide in Italy, 1980–2015, Aging Clin. Exp. Res. 32 (2020) 465–474, https://doi.org/10.1007/s40520-019-01431-z.
[6] "(PDF) Caratteristiche e andamento temporale della mortalità per suicidio in Italia: uno studio descrittivo sugli ultimi 30 anni (Patterns and trends in suicide mortality in Italy: a 30-year descriptive study)," https://www.researchgate.net/publication/349811213_Caratteristiche_e_andamento_temporale_della_mortalita_per_suicidio_in_Italia_uno_studio_descrittivo_sugli_ultimi_30_anni_Patterns_and_trends_in_suicide_mortality_in_Italy_a_30-year_descriptive_study.
[7] https://salute.regione.emilia-romagna.it/normativa-e-documentazione/rapporti/atlante-di-mortalita/mortalita-rer_2023.pdf/@@download/file/Mortalit%C3%A0%20RER_2023.pdf.