Cyber Guardians

Healthier Digital Lives

Cyber
Guardians

We **believe** that unrestricted or uncontrolled access to the Internet by children and young people—whether via tablets or smartphones—and **digital services designed without considering their mental health** is one of the key factors influencing the results of our research.

This **analysis** highlights that **Spain** has a **severe problem** with mental health among children and adolescents up to the age of 20, **particularly among girls aged 11 to 20**, who also show a strong correlation with **eating disorders and obesity**.

Since **2012**, when high-speed Internet penetration reached 50% of Spanish households, tablets and smartphones have become easily accessible, and there has been broad—global—social acceptance of social media use among minors. As a result, **cases of mental illness among children and adolescents have seen an explosive increase**, alongside a **rising trend** in adolescent **suicides**.

These phenomena reached their peak impact in the months immediately following the **Covid-19** pandemic—a period of maximum digital media use across all age groups—causing a sharp rise in hospitalisation costs for children and young people due to diagnoses primarily related to mental health issues.

Cyber
Guardians

Technology offers remarkable opportunities for our young people, but navigating the digital world is a complex task that children cannot manage alone. Pediatricians and medical professionals recommend no screen time for children aged **0 to 2 years**. For children aged **3 to 5 years**, no more than one hour of screen time per day is advised, with joint supervision—and less is better.

The following recommendations are for parents and caregivers, focusing on guidance, communication, and supervision once children reach the appropriate age to consume digital media independently. Additionally, on **our website**, we have included further information from the **Spanish Paediatrics Association**, so that any family can create a personalised media plan.

1 **Set Device-Free Zones and Times**

Designate specific places (bedrooms, dinner table) and times (meals, one hour before bedtime) as technology-free. This promotes better sleep, family connection, and helps children develop the ability to be present without digital distractions.

2 **Use Parental Controls Effectively**

Implement age-appropriate content filters, privacy settings, and time limits using built-in tools on your child's devices and platforms. Regularly review and adjust these controls as your child matures and demonstrates responsible behavior.

3 **Practice "Side-by-Side" Media Engagement**

Regularly participate in your child's digital activities to understand their interests and provide real-time guidance. Co-viewing and co-playing creates opportunities for meaningful discussions about content, online interactions, and digital citizenship.

4 **Establish Clear Consequences**

Create and consistently enforce specific rules about what happens when digital boundaries are crossed. Ensure consequences are related to the behavior (e.g., temporarily reducing screen time for misuse) and focus on learning rather than punishment.

5 **Teach Privacy Protection**

Show your child how to safeguard personal information, create strong passwords, recognize scams, and understand data collection. Help them grasp that once information is shared online, it may become permanently accessible to others.

6 **Build Digital Resilience**

Equip your child with strategies to handle cyberbullying, inappropriate content, and peer pressure. Teach them when to block or report harmful content, when to disengage from negative interactions, and when to seek adult help.

7 **Create a Family Tech Agreement**

Develop a written contract together that clearly outlines expectations for device use, digital behavior, and safety practices. Review and revise this agreement as children mature and technology evolves.

8 **Balance Online and Offline Activities**

Ensure your child engages in regular physical activity (at least 60 minutes daily), face-to-face social interactions, and non-digital creative pursuits. Schedule technology breaks and model this balance in your own habits.

9 **Coordinate Policies with Other Parents**

Work together with other parents to establish and agree on specific policies regarding technology use, ensuring consistency across peer groups and environments.

10 **Delay Personal Use of Smart Devices**

Postpone the introduction of smartphones and tablets for personal use by children until at least 16 years old, promoting gradual and responsible adoption of technology.

11 **Encourage Outdoor and Social Sports**

Provide incentives for children to participate in outdoor activities and social sports to foster healthy habits and reduce screen dependency.

12 **Discuss Real-World Risks**

Engage in joint exploration of public cases where teenagers and adolescents have encountered risky situations, including those with tragic consequences, to educate and promote responsible decision-making.

Cyber
Guardians

About Us

This project has been carried out by researchers and analysts from the cyber-intelligence and digital risk analysis firm **Alto Intelligence**, with the invaluable support of **Dr Manuel Carnero (MD, PhD)** from Hospital Clínico San Carlos, a surgeon, researcher at CNIC, and statistical advisor for various national and international medical journals.

We are a **non-profit initiative** dedicated to **promoting healthier digital lives**. Through this analysis, we aim to enhance understanding of the effects of technology on young people, fostering greater collaboration between parents, educators, researchers, and policymakers to protect children and adolescents from the harms associated with the improper or excessive use of social media and digital platforms. Our efforts have focused on understanding the current situation to prevent the potential harm that may arise from the proliferation of generative artificial intelligence-based services.

The mission of this project is twofold: to **expand knowledge** on this crucial topic and to **drive civil and policy actions** towards regulatory changes that support the mental well-being of younger generations in an ever-evolving digital environment.

All data sources used in this project are publicly available, and the key sources are detailed in the Annex of this document, along with the study's methodology and scientific background.

Our goal is to **encourage other organisations in different countries to conduct similar analyses using local data**, in order to assess the extent to which we are experiencing a global phenomenon. Therefore, we provide our methodology and scripts as open source, allowing for broader adoption and replication of the analyses presented in this study.

Stat tunned

WEB
LinkedIn
Email

Cyber Guardians Healthier Digital Lives

Research

Internet Use & Mental Illness in Children & Adolescents in Spain

1997 - 2022

Cyber
Guardians

Contents

Cyber
Guardians

Key Findings in the Updated 2022 Data

Several key trends in adolescent mental health continue to emerge:

Gender Differences in Mental Health

- Girls under 20 years old still show a **37.2% higher incidence of primary mental health diagnoses** compared to pre-pandemic levels, despite a slight improvement in **2022 (-5.41% vs. 2021).**
- In contrast, boys have shown improvement both compared to 2021 and pre-pandemic levels, with incidence rates now 7.94% lower than in 2019.

Trends by Age Group

- **Overall improvement among girls**, except for those aged **16 to 20**, where incidence **increased in 2022 (+0.19% vs. 2021).**
- Girls aged **11 to 15** continue to show **higher incidence rates than boys aged 16 to 20**, reinforcing the trend already observed in 2021.

Increase in Adolescent Suicides

- Sustained growth in suicide rates among adolescents **aged 15 to 20**, particularly among girls.
- Since 2020, suicide rates among girls have reached levels comparable to those of boys—**an unprecedented phenomenon in historical data.**

Obesity, Physical Activity, and Social Security Costs

- **Slight improvement in obesity indicators**, though **no progress in physical activity levels**.
- **Social Security costs remain stable**, with a slight tendency toward improvement.

Confirmation of the 'Toxic Cocktail'

- The three key risk factors are once again confirmed:
    1. **Early and intensive use of smartphones and tablets.**
    2. **Unrestricted access to high-speed internet.**
    3. **Platforms designed to maximize youth engagement and capture their attention and data.**

- Unlike last year, **greater control and restrictions** on minors' digital access are recommended:
    - **No personal smartphones or tablets before age 14.**
    - **Supervised and restricted use until ages 16-18,** depending on maturity and environment.

These findings highlight **the long-term effects on the mental health of an entire generation** and reinforce the need for stricter prevention and regulatory measures.

Cyber
Guardians

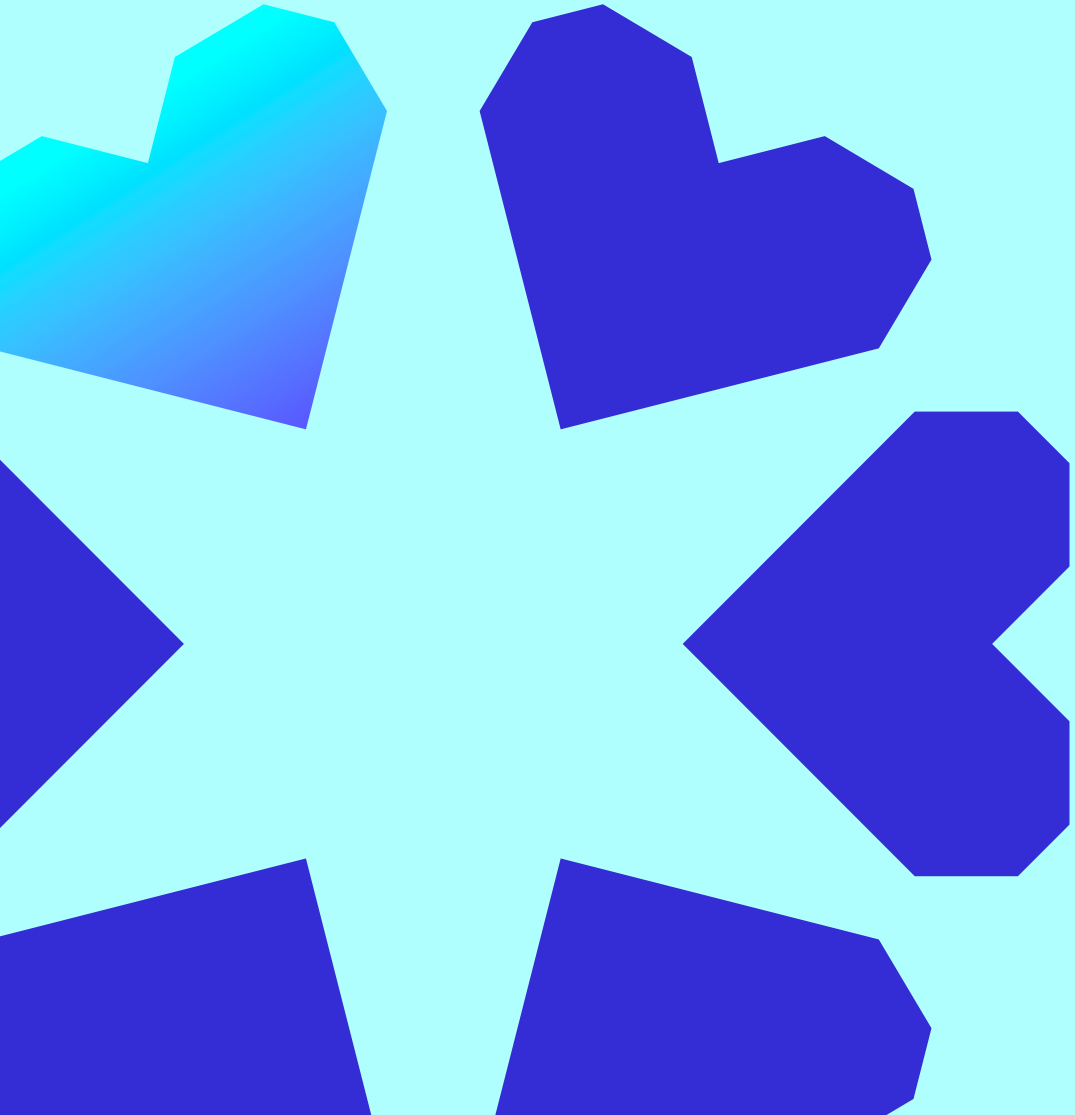
Executive Summary - 1997-2021

1. **Mental illnesses among young people up to the age of 20 in Spain have experienced an explosive rise since 2012, particularly among girls.** This increase peaked in the months immediately following the onset of the Covid-19 pandemic in Spain, reaching record highs in the historical series with a **+300% growth** compared to 1997.
2. **Adolescents have progressively stopped suffering from injuries, trauma, or bone fractures since the late 1990s,** with a more pronounced decline over the past decade, indicating a likely severe reduction in their physical activity. **There is a strong correlation, in both boys and girls, between the decrease in physical activity and the rise in mental illnesses**. Likewise, the evolution of all diagnoses of childhood obesity and eating disorders from 1997 to 2022 among children and adolescents aged 0 to 20 shows a consistent increase in cases for both sexes. However, **from 2011-12 onwards, there is a particularly significant rise, especially among girls, which became even more pronounced during Covid-19.** The correlation between obesity cases and eating disorders with mental health issues is strong (0.96 out of 1 in girls).
3. **Arenas-Arroyo et al. (2023) had already concluded that for every one standard deviation (SD) increase in High-Speed Internet penetration in Spanish households (HSI, fibre optic, fibre to the home), there was a +13.3% rise in cases of mental health disorders, with a particular increase in cases of anxiety, mood disorders, substance abuse, self-harm, and suicide attempts.** This study establishes not only a correlation but also a **causal relationship** between increased internet speed and the rise in mental illnesses. Our analysis estimates that by 2012, at least 50% of households in all Spanish regions had High-Speed Internet (fibre) access. When assessing the correlation over the full period from 2007 to 2022, **the evidence is very clear: with the exception of boys aged 16-20, where correlations vary significantly between strong, weak, or even non-existent in some regions, the rest of the age groups—particularly girls—show predominantly strong correlations between High-Speed Internet access at home and mental health problems in most regions.**
4. **From 2011-12, there is also a clear change in suicide patterns, with an increase that became even more evident during the Covid-19 period.** These data clearly indicate that the mental health crisis among young people aged 0-20 is real and not merely the result of an increase in medical diagnoses due to greater awareness or social and medical sensitivity.
5. **The cost analysis of hospitalisations for primary diagnoses of mental illness reveals two concerning trends: firstly, the cost has progressively increased by over 500% in recent years**, with more than 10% of Spain's total hospital costs related to mental illnesses being allocated to treating minors up to 20 years old. Additionally, **there is an alarming trend in the costs associated with treating girls, who now account for 75% of the total expenditure dedicated to young people under 20.**

* It is important to emphasise that the internet, as a technology, is neutral—that is, it provides access to information and services. The internet is already a fundamental element of national economies and productivity, as we experienced during the Covid-19 crisis. What this analysis and others suggest very clearly is that unrestricted access to the internet, particularly social media, via smart devices (tablets, smartphones) by children or adolescents—without limitations on usage time or content types—can lead to severe mental health issues.

* Data fluctuations may be observed, particularly over the past five years, as a result of common delays in data and case reporting from hospitals.

Cyber Guardians Healthier Digital Lives

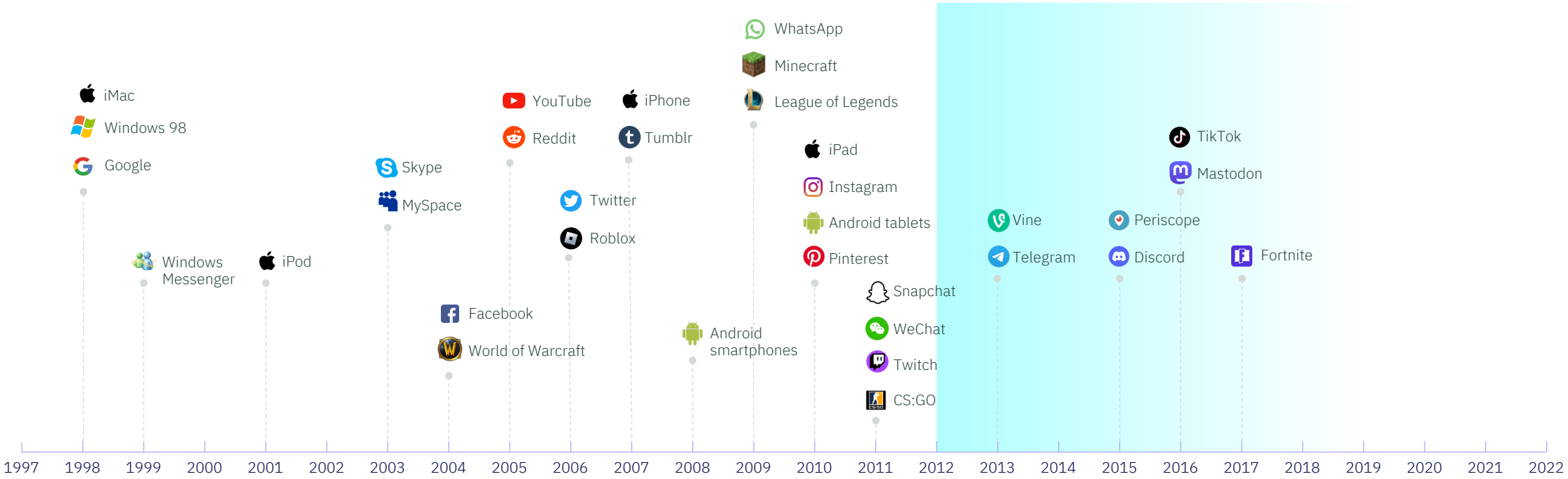


Temporal analysis of the initial dimensions of the research

Cyber
Guardians

Temporal evolution of the main *technologies for accessing the Internet and Social Media*

Advances in devices with internet access, social networks and video games between 1997 and 2022. Since the beginning of 2012, unique conditions have arisen in Spain, as well as in the rest of the world: **the widespread use of smart phones and tablets has spread while a wide variety of social networks and high-speed Internet access have become available**. Already active since the middle of the first decade of the 21st century, the trend of massive use of social networks has been consolidated after the launch of Instagram, WhatsApp, Snapchat and, more recently, TikTok.



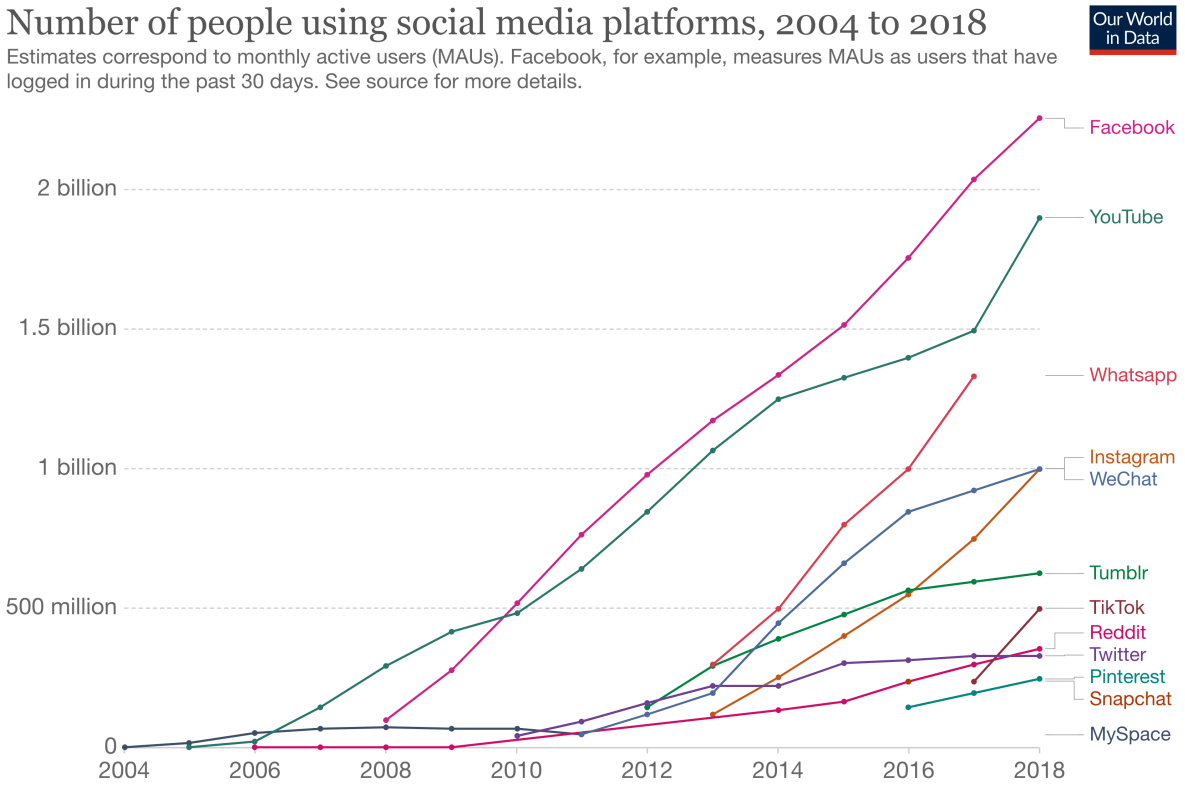
Cyber
Guardians

Social media users from 2004 to 2018, globally and locally.

Platforms such as Facebook and YouTube were the first to be used globally, although after 2012 extensive use of many other social networks also began.

The most visited social networks daily in **Spain** are:

- YouTube with an average time of 1 hour and 22 minutes
- TikTok with 1 hour and 21 minutes
- Instagram with an average of 1 hour and 13 minutes of daily use
- Facebook with 1 hour
- Twitter (X) and LinkedIn have lower usage times: 48 and 37 minutes per day, respectively.



https://ourworldindata.org/rise-of-social-media

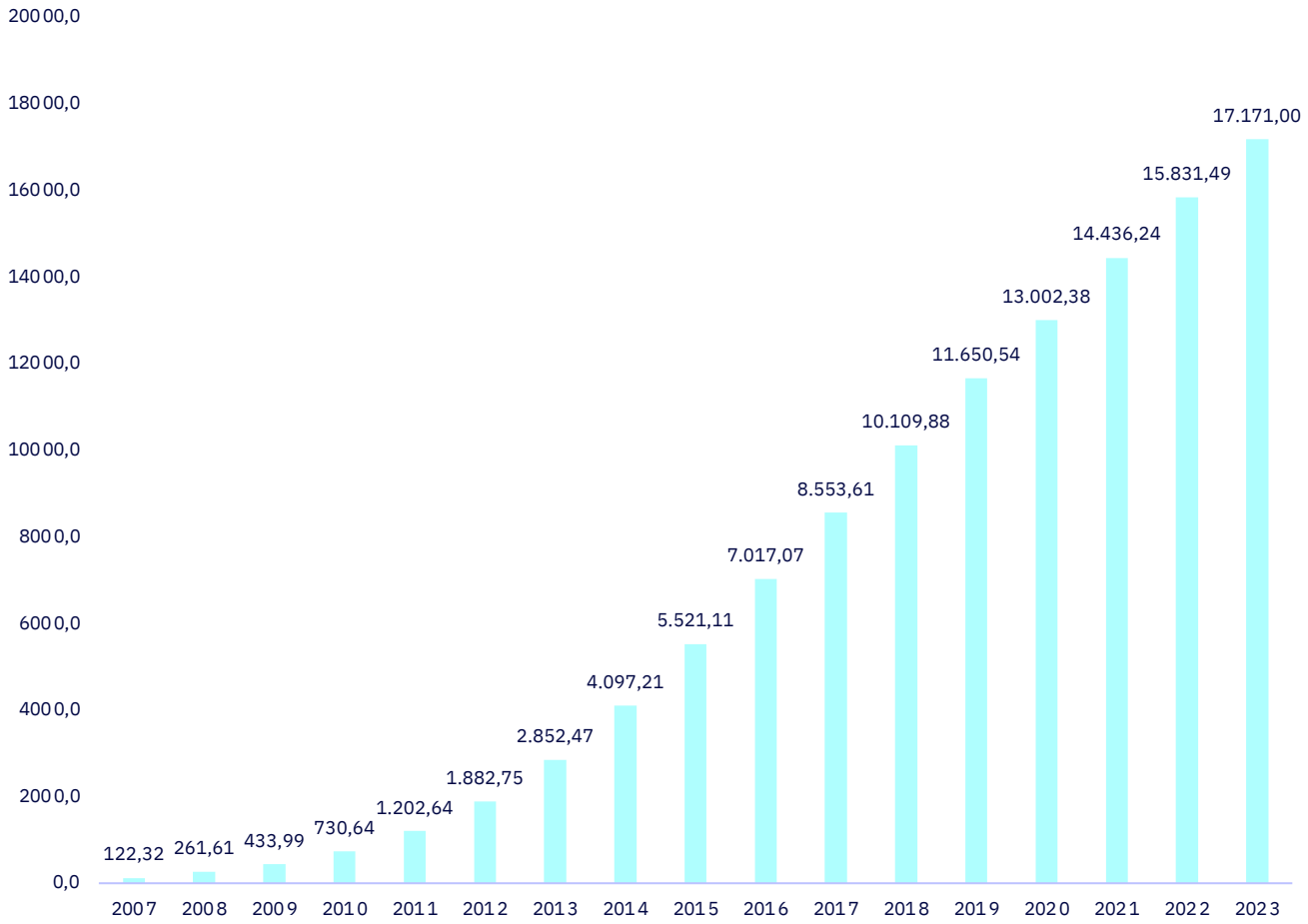
https://unavidaonline.com/estadisticas-redes-sociales/

Cyber
Guardians

Smartphone sales between 2007 and 2023 (global cumulative sales) show that from 2011-2012 onwards there was a significant change in the total number of phones accumulated on the planet. It is reasonable to think that this accumulation was concentrated in developed countries given the cost of these devices in those years.

During 2016, total sales of these devices were greater than the total population of the planet.

NUMBER OF SMARTPHONES SOLD WORLDWIDE FROM 2007 TO 2023
(IN MILLION UNITS) (CUMULATIVE SALES)

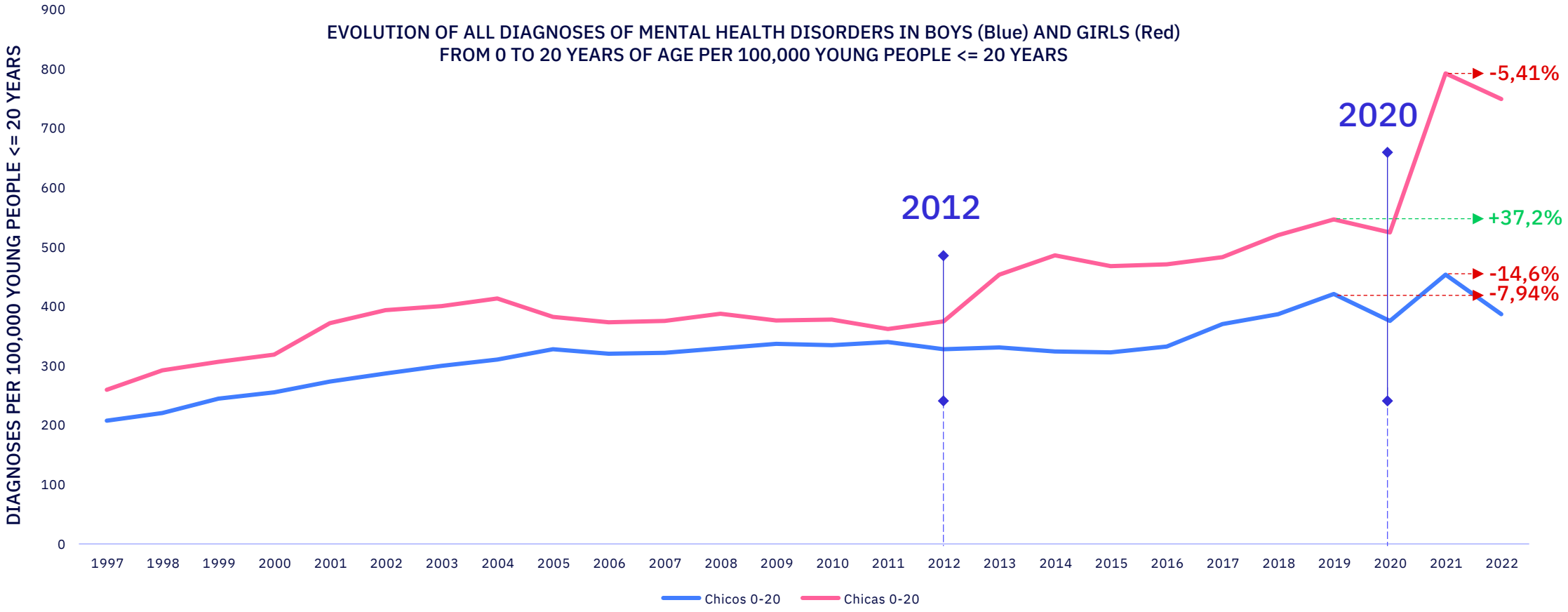


https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/

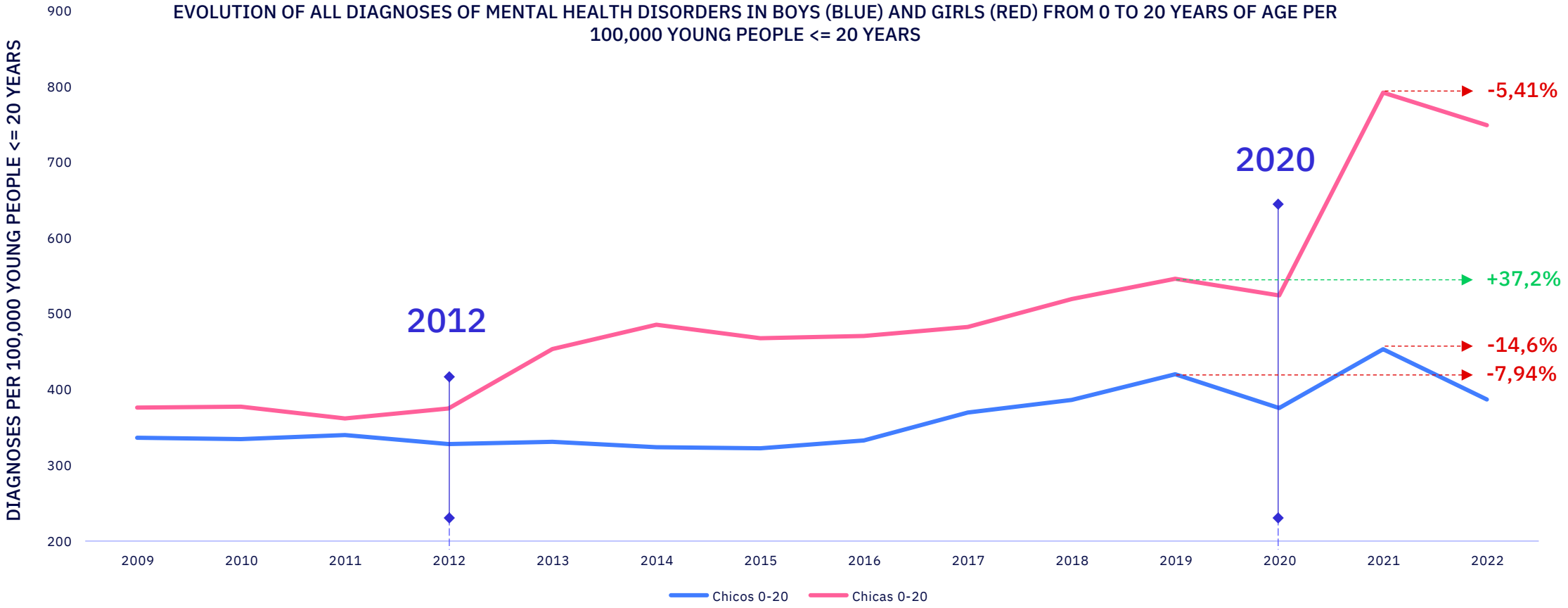
Cyber
Guardians

Temporal evolution of mental illnesses in *young Spaniards between 1997 and 2022*

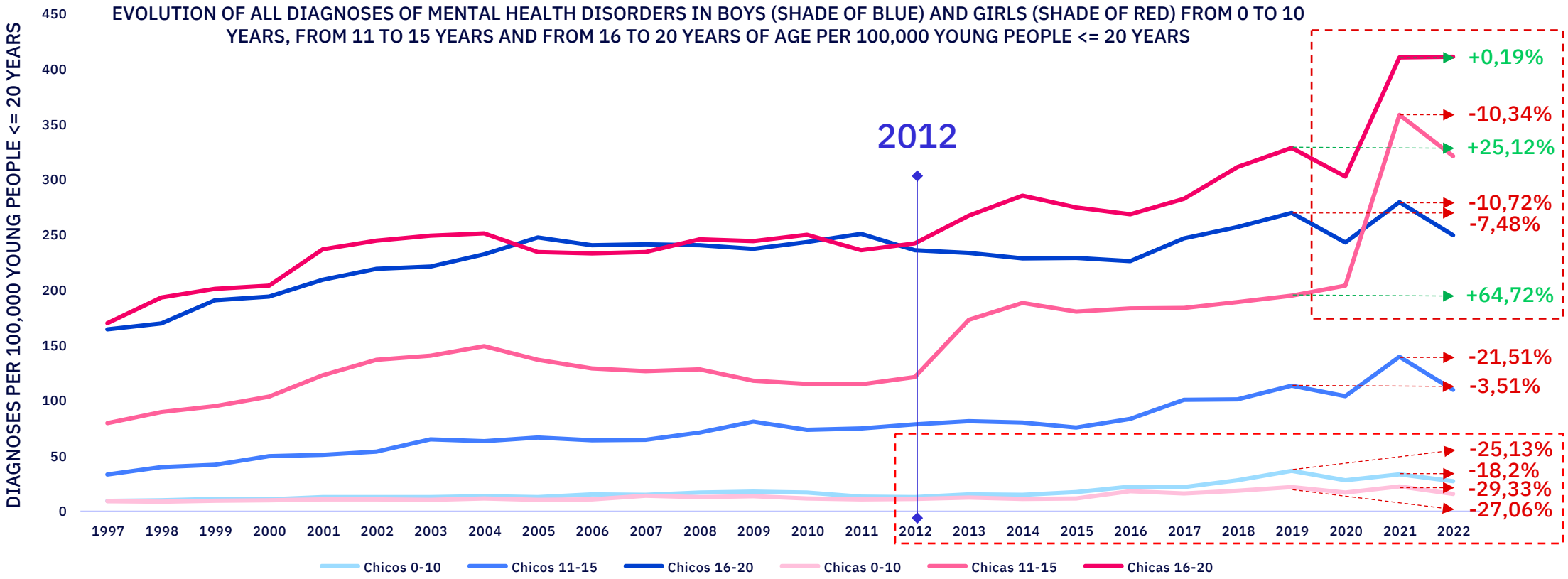
Mental Illness as a Primary and Secondary Diagnosis in Boys and Girls up to the Age of 20. Mental illness among young people up to the age of 20 had been progressively increasing since 1997 but had always remained below 415 cases per 100,000 individuals. However, **from 2012 onwards, the incidence began to rise sharply, particularly among girls, culminating in the months immediately following the onset of the Covid-19 pandemic in Spain, reaching the highest recorded levels in the historical series with a +300% increase compared to 1997.**



Focus on 2009 – 2022. Regarding the previous graph, focusing on the most recent period, the findings of other similar analyses outside Spain are confirmed: **girls are more likely to suffer the impact of mental illness, especially since 2012** (as already referenced in relation to the studies by Arenas-Arroyo et al. (2023), Braghieri et al. (2022), Golin (2022) and McDool et al. (2020). It is noteworthy that, as a result of the Covid-19 crisis, the gap between boys and girls widens significantly once preventive measures are relaxed and they can receive medical attention.



Breakdown by Age Groups. For the first time in the historical series, **by the end of 2021, girls aged 11 to 15 surpassed older boys (16 to 20 years old) in mental illness cases, highlighting the particularly severe impact of the Covid-19 crisis on girls**. A detailed analysis of primary and secondary diagnoses—where mental illness is either the main or secondary reason for medical attention—indicates that in girls, **primary diagnoses contribute most to this shift in trend. In other words, mental illness is the main cause behind hospital records**. Notably, **the number of cases among girls aged 11 to 15 is now almost equal to that of girls aged 16 to 20, while the increasing trend in children under 10, for both sexes, continues to consolidate.**



Cyber
Guardians

Description of the categories of Mental Illnesses analyzed

MOOD [AFFECTIVE] DISORDERS
This category includes disorders in which the primary disturbance is a change in mood or affect, either towards depression (with or without associated anxiety) or euphoria. Mood changes are generally accompanied by alterations in overall activity levels, with most other symptoms being secondary or easily understood within the context of the mood and activity shift. Most of these disorders tend to be recurrent, and the onset of individual episodes is often linked to stressful events or situations.

SCHIZOPHRENIFORM, SCHIZOID, AND DELUSIONAL DISORDERS
This category includes schizophrenia, as the most significant condition in the group, along with schizoid disorder, persistent delusional disorders, and a broader group of acute and transient psychotic disorders.

PERSONALITY AND BEHAVIOURAL DISORDERS IN ADULTS
This category encompasses a variety of clinically significant conditions and behavioural patterns that tend to be persistent and appear to reflect an individual's characteristic lifestyle and way of relating to themselves and others.

NEUROTIC, STRESS-RELATED, AND SOMATOFORM DISORDERS
This category includes various disorders related to phobic anxiety, obsessive-compulsive behaviour, severe stress reactions, dissociative [conversion] disorders, and somatoform disorders.

BEHAVIOURAL SYNDROMES ASSOCIATED WITH PHYSIOLOGICAL DISORDERS AND PHYSICAL FACTORS
A group of disorders characterised by early onset (usually within the first five years of life), a lack of persistence in activities requiring cognitive engagement, and a tendency to shift from one activity to another without completing any, along with disorganised, poorly regulated, and excessive activity.

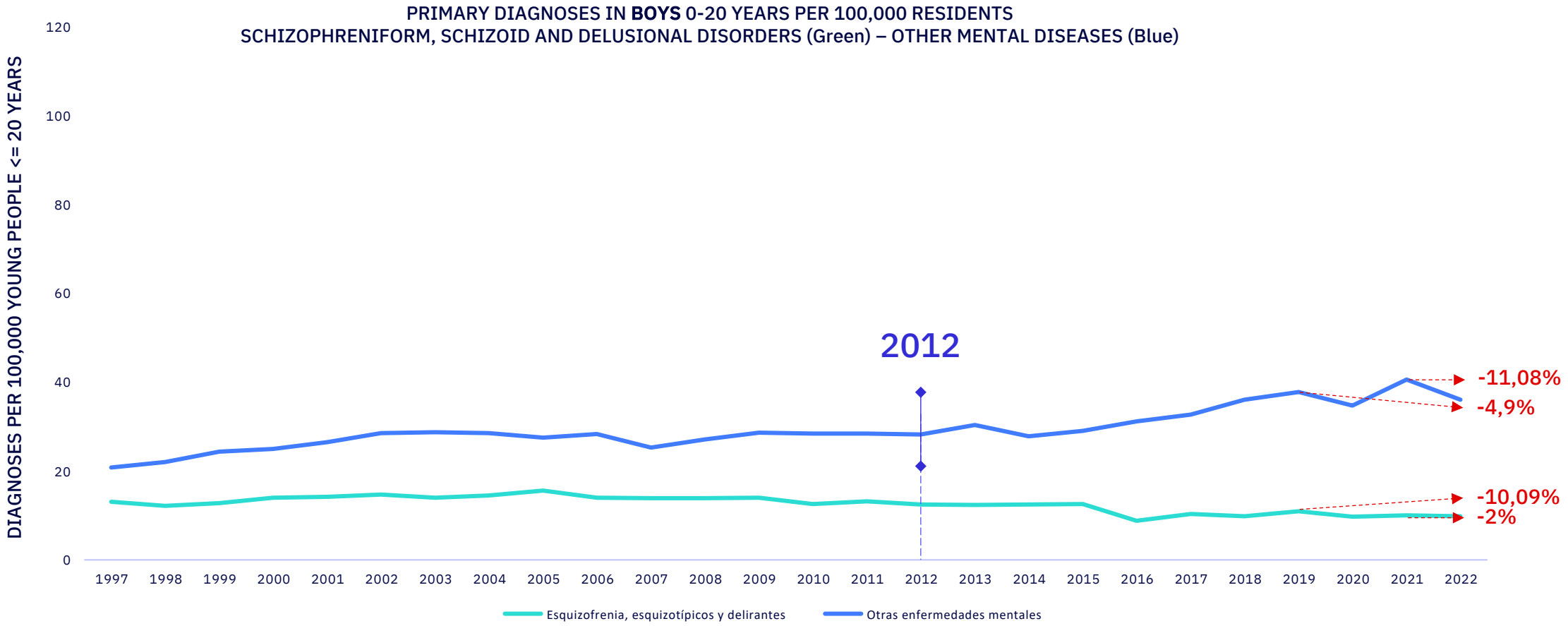
MENTAL AND BEHAVIOURAL DISORDERS DUE TO THE USE OF PSYCHOACTIVE SUBSTANCES
This category includes a wide range of disorders that vary in severity and clinical presentation but are attributable to the use of one or more psychoactive substances, which may or may not have been medically prescribed.

BEHAVIOURAL AND EMOTIONAL DISORDERS WITH ONSET USUALLY OCCURRING IN CHILDHOOD AND ADOLESCENCE
A group of disorders characterised by early onset (usually within the first five years of life), a lack of persistence in activities requiring cognitive engagement, and a tendency to shift from one activity to another without completing any, along with disorganised, poorly regulated, and excessive activity..

ICD-10 Version:2019 (who.int)

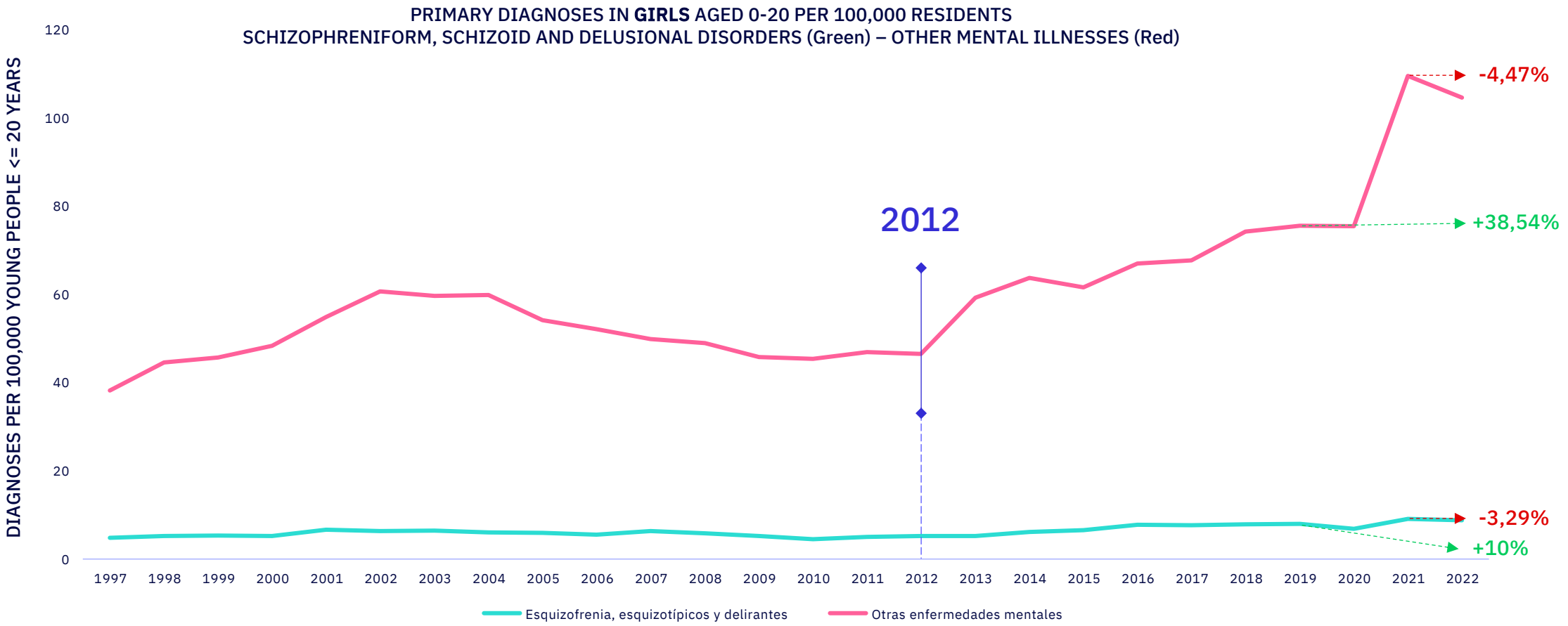
Cyber
Guardians

Mental illness as the main diagnosis in children aged 0-20 years, by category. Schizophrenia appears to be the most stable mental illness in terms of incidence, with the rest of the mental illnesses contributing to the progressive increase in cases.



Cyber
Guardians

Mental illness as the main diagnosis in girls aged 0-20 years, by category. As with boys, girls are not affected by an increased incidence of schizophrenia.

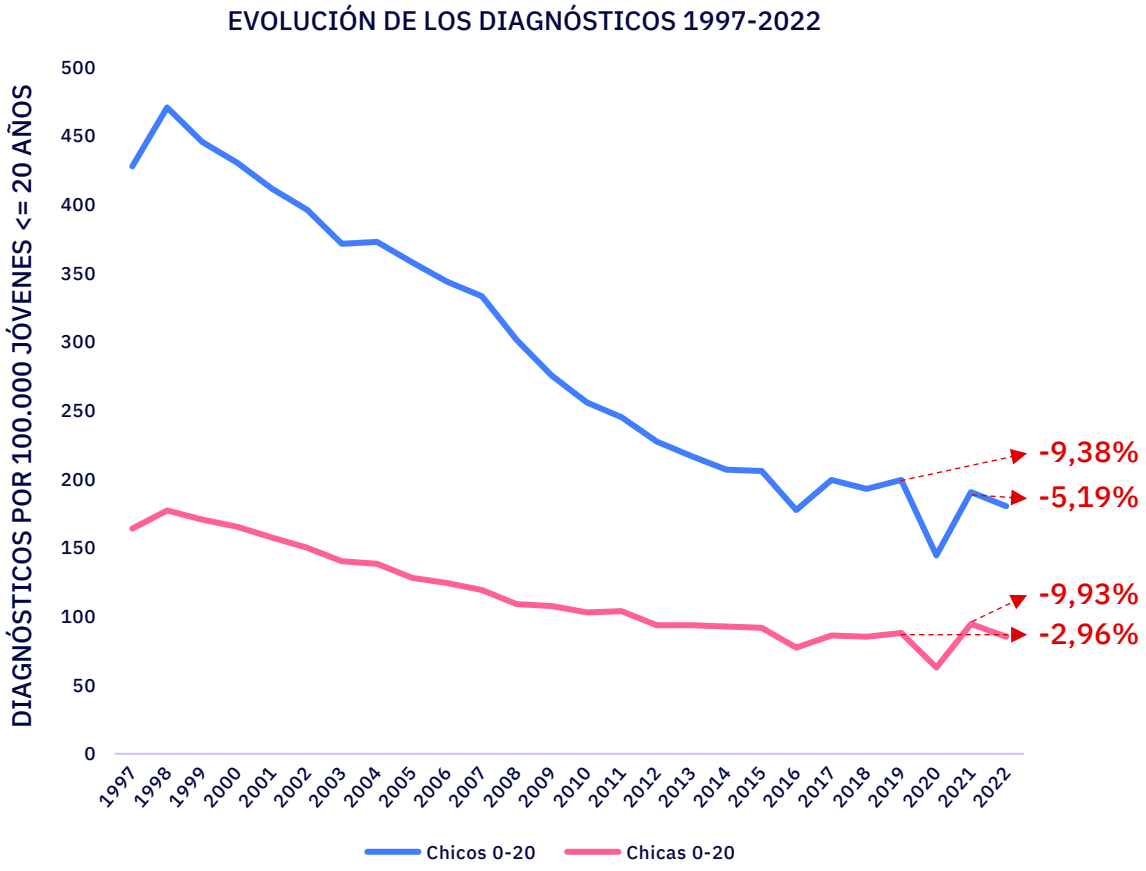


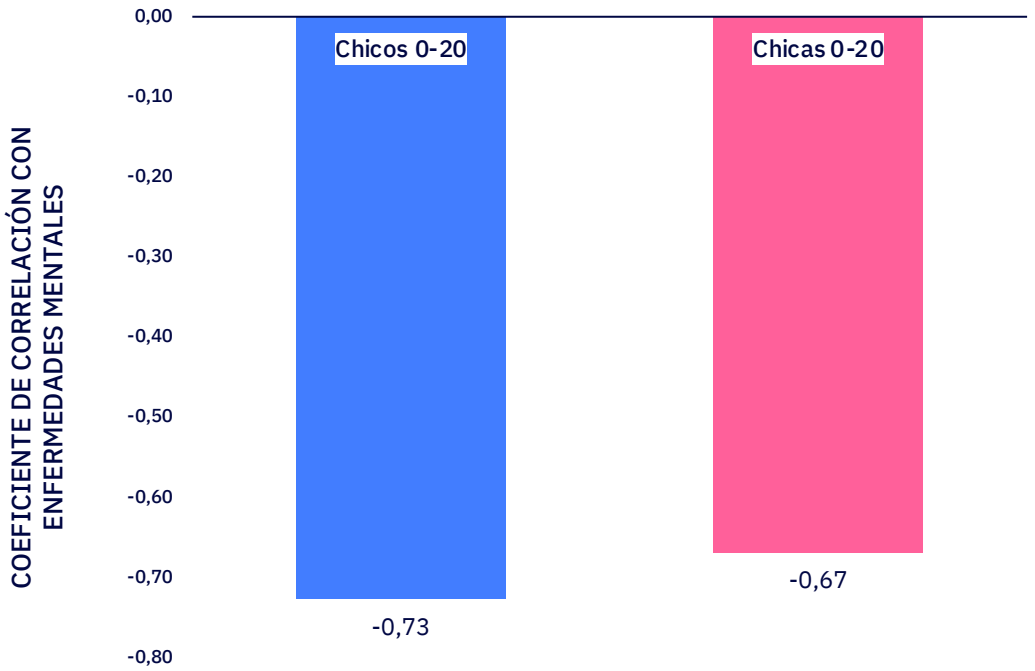
Cyber
Guardians

Temporal evolution and correlation of mental illnesses *and injuries attributable to physical activity in young Spaniards between 1997 and 2022*

Cyber
Guardians

Evolution of diagnoses of wounds and traumas attributed to physical activity 1997-2022 and their correlation with Mental Illnesses. Adolescents have progressively stopped suffering wounds, traumas or bone fractures since the late 1990s and more markedly in the last decade, evidencing a more than possible severe decrease in their physical activity. There is a **strong correlation in both boys and girls between the decrease in this physical activity, at certain ages, closely related to outdoor play, and the increase in mental illnesses.**





Interpretación del coeficiente de correlación en valores absolutos

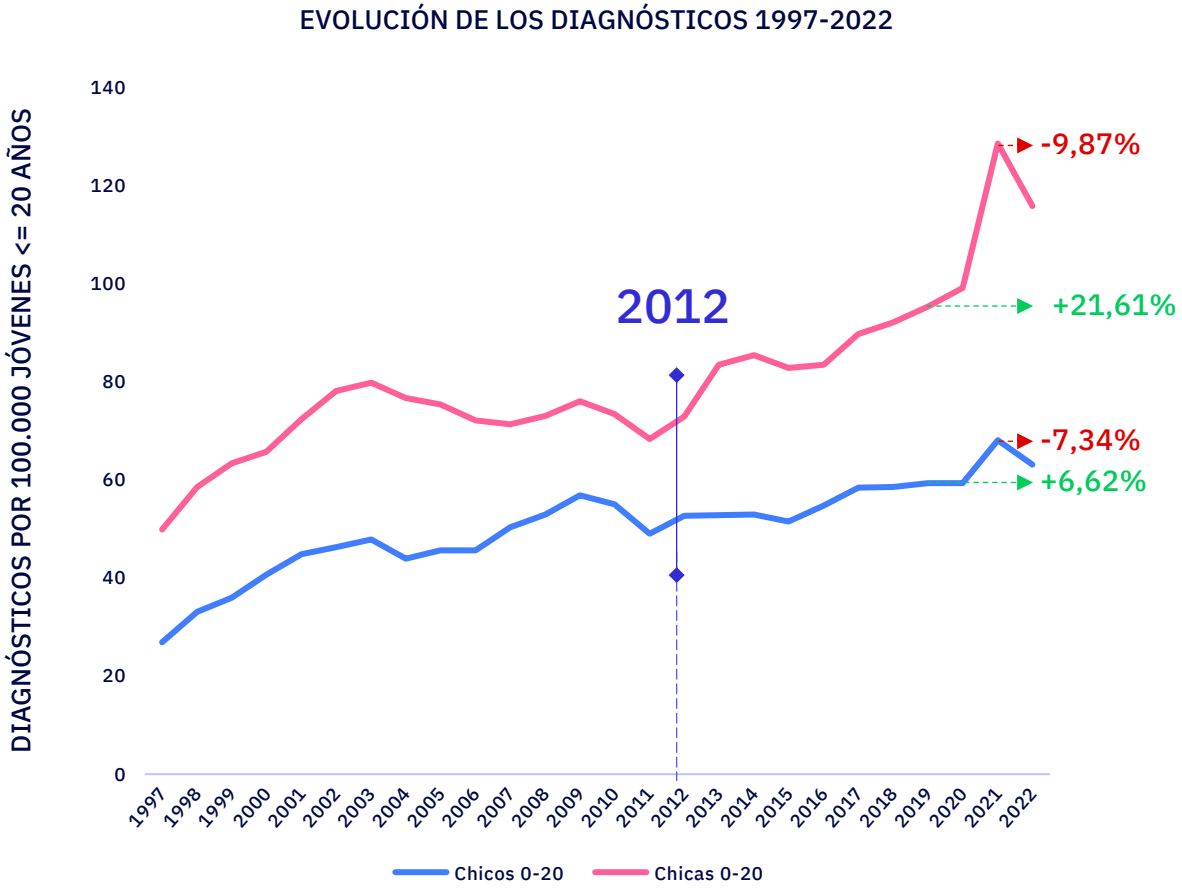
Entre 0 y 0,10: sin correlación
Entre 0,10 y 0,29: correlación débil
Entre 0,30 y 0,50: correlación moderada
Entre 0,50 y 1: correlación fuerte

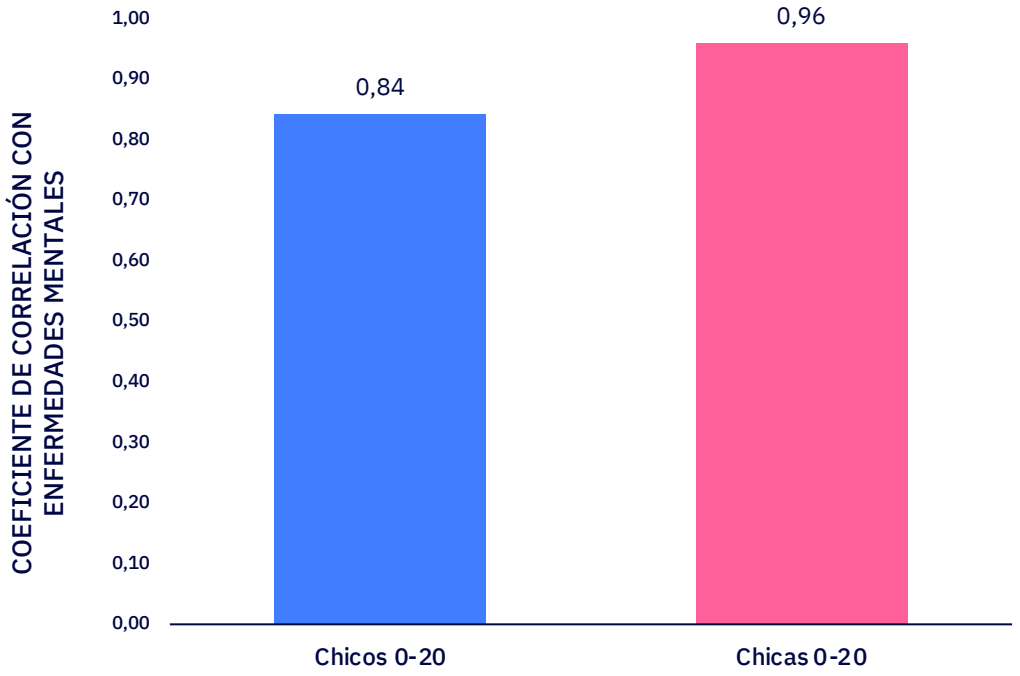
Cyber
Guardians

Temporal evolution and correlation of mental illness *and obesity or eating disorders in young Spaniards between 1997 and 2022*

Cyber
Guardians

Evolution of all diagnoses of childhood obesity and eating disorders from 1997 to 2022 in children and adolescents aged 0 to 20 years. The number of cases in both sexes has experienced a constant increase, **although from 2011-12 there has been an explosion, especially in girls, which has increased significantly during Covid-19**. The correlation between cases of obesity and eating disorders with mental health problems is strong: 0.96 out of 1 in girls.





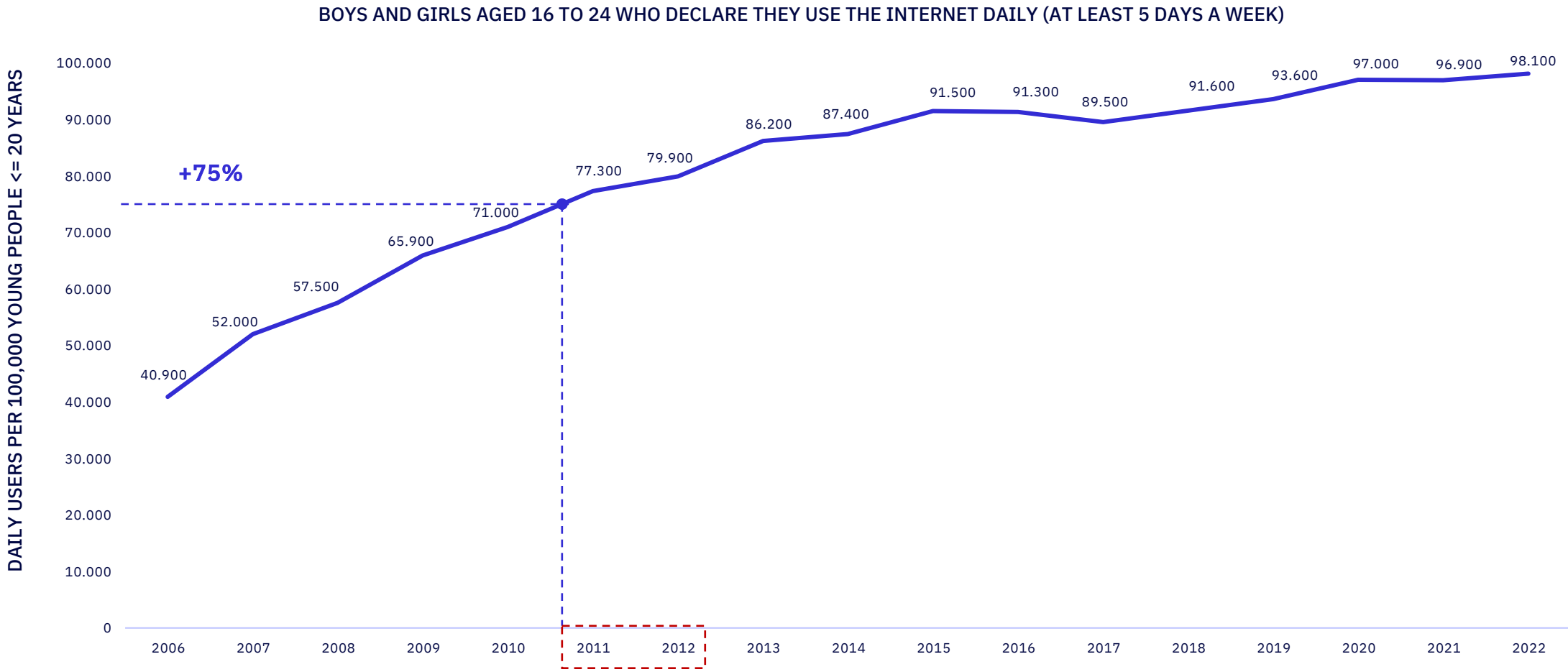
Interpretación del coeficiente de correlación en valores absolutos

Entre 0 y 0,10: sin correlación
Entre 0,10 y 0,29: correlación débil
Entre 0,30 y 0,50: correlación moderada
Entre 0,50 y 1: correlación fuerte

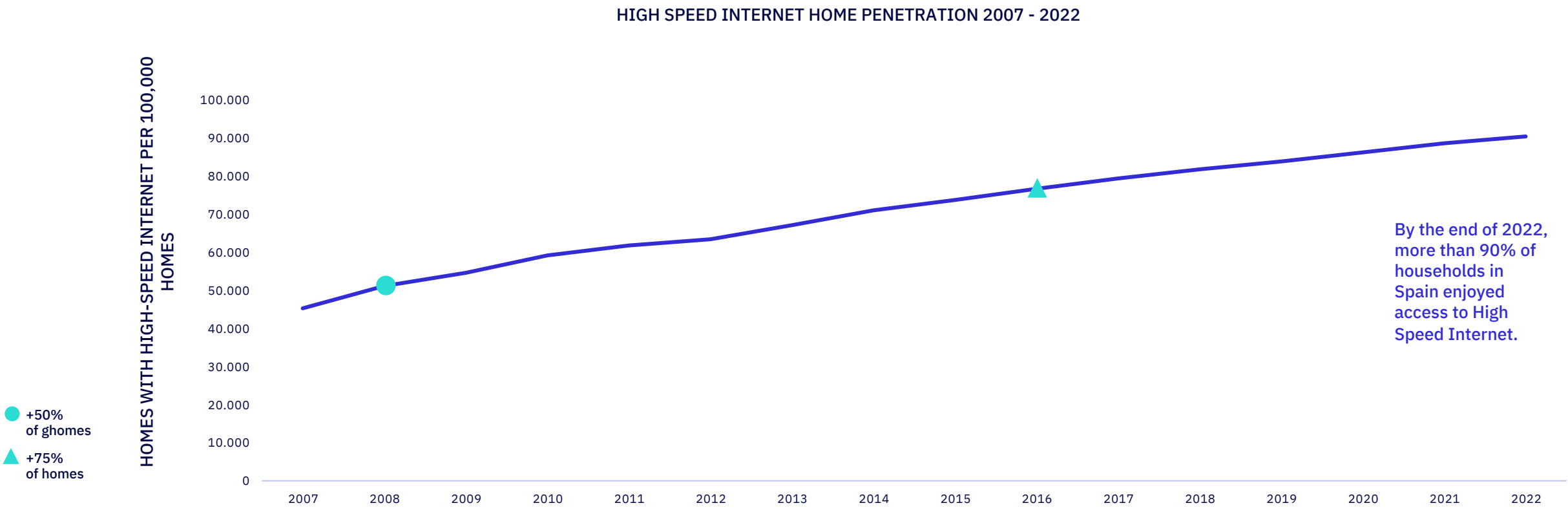
Cyber
Guardians

Correlation and Causality between the evolution of *mental illness* diagnoses *and Internet* access

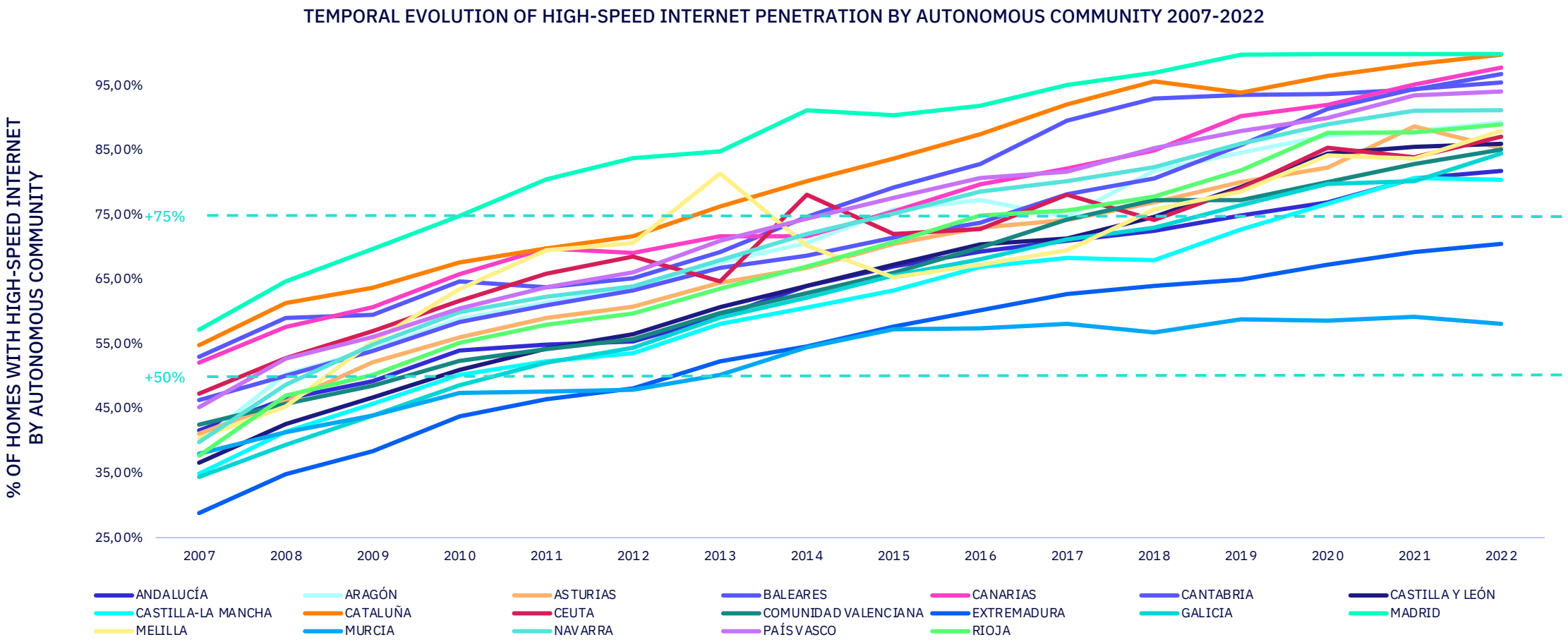
Daily Internet use by young people aged 16 to 24 (at least 5 days a week). There has been a progressive increase in reported use, reaching 75% of young people in Spain in 2011.



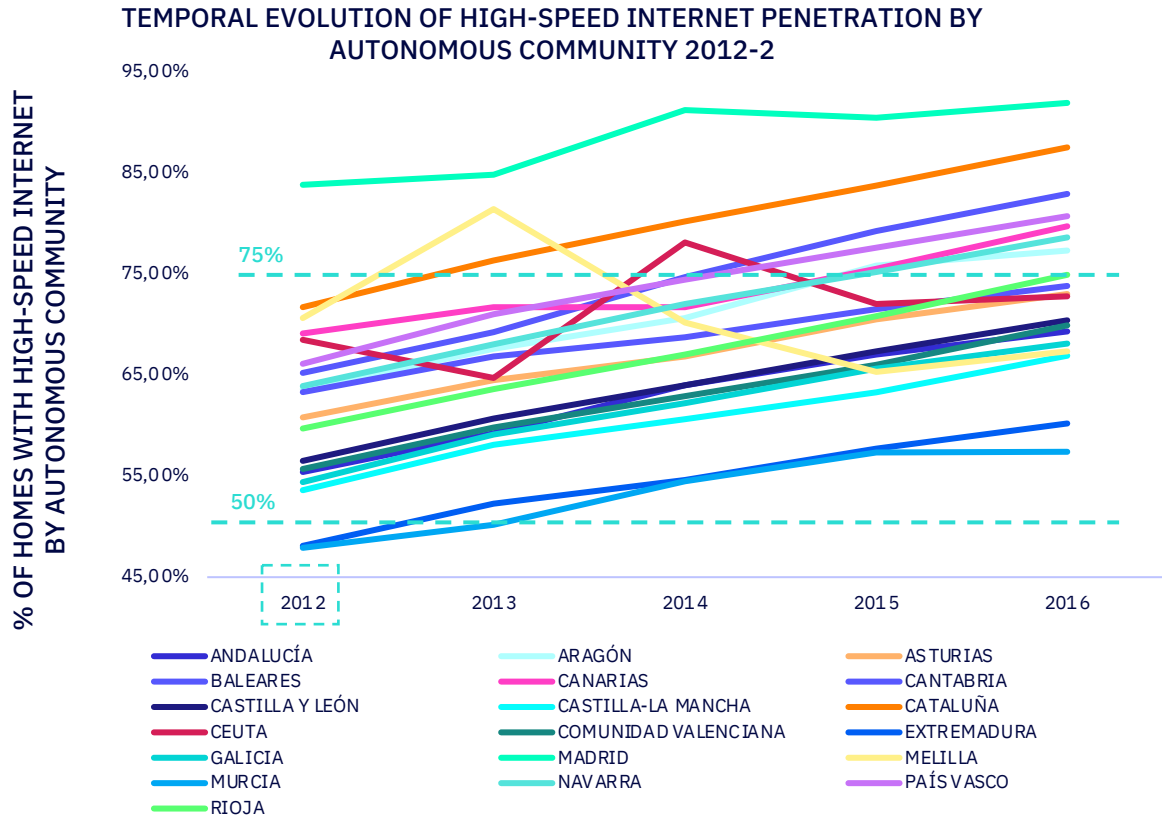
Households with High-Speed Internet (HSI) 2007–2022. The previously mentioned data on self-reported Internet access by adolescents aged 16 to 24 is consistent with the rollout of HSI (FTTH, Fibre to the Home, Fibre) in Spain. It is important to note that, as detailed on the following page, this progressive rollout over several years was not uniform (due to multiple factors, as already indicated in the analysis by Arenas-Arroyo et al., 2023).Two effects can therefore be expected:a) Regions where HSI penetration was slower should show a weaker correlation with the incidence of mental illnesses.b) The massive increase in HSI usage during the Covid-19 pandemic should be reflected in a significant rise in mental illness cases—something that has already been confirmed in previous analyses.

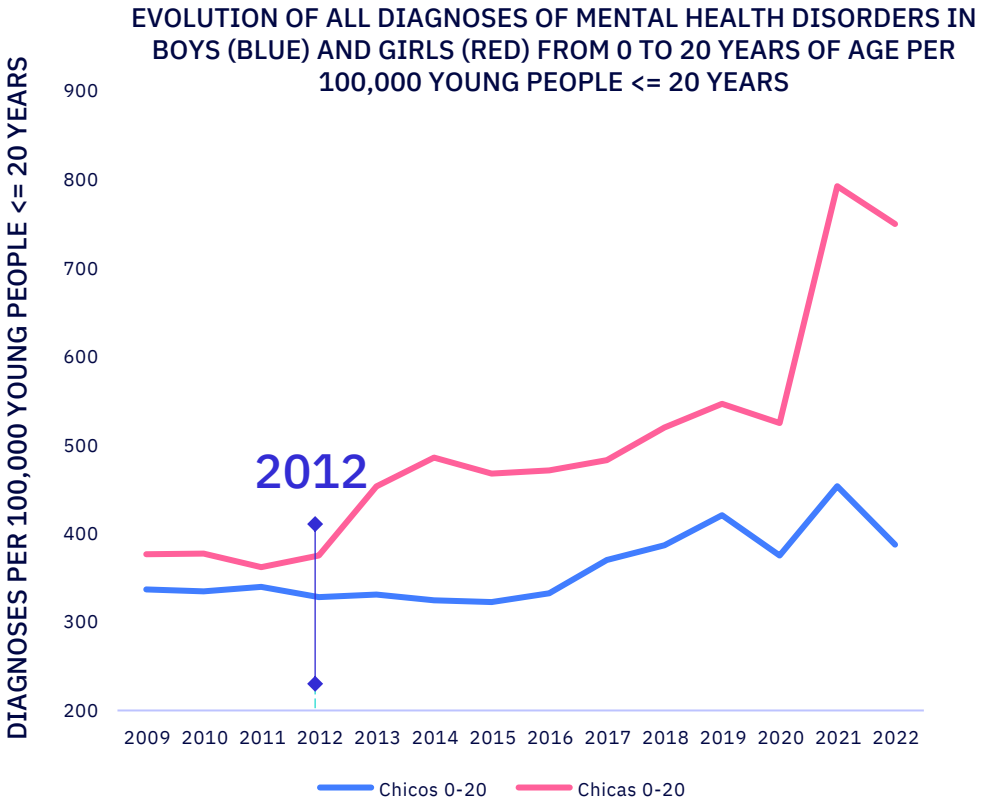


% of households with High-Speed Internet (HSI) by autonomous community 2007-2022. The data in this graph confirm that, as Arenas-Arroyo et al. (2023) already reported, High-Speed Internet (HSI) **penetration in homes is very uneven over time**: in Extremadura, 50% of households with High-Speed Internet (HSI) was not reached until after 2012, while in Madrid, 75% of households with High-Speed Internet (HSI) penetration was exceeded before 2010. To understand the causes in more detail, we recommend reading the Annex to this document.



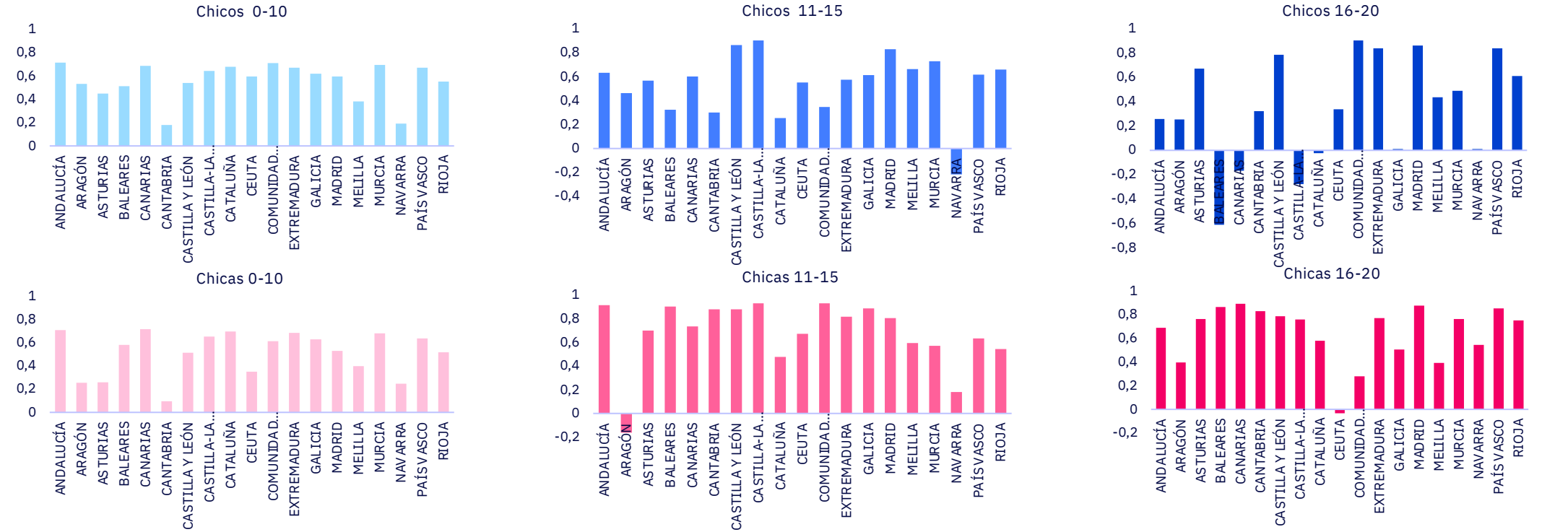
Focus on 2012. The data in this graph focus on the period 2012 – 2016, a key period as indicated since **it was in 2012 when a significant increase in cases of Mental Illness in children and adolescents was recorded that has not yet ceased** - especially in girls. And it was precisely throughout **2012 when at least 50% of household penetration of IAV was reached in all autonomous communities**. Arenas-Arroyo et al. (2023) also conclude that for each increase of one standard deviation (SD) in the penetration of IAV (fibre optic, fibre to the home), that is, the greater the penetration of IAV, **an increase in cases of mental health disorders of +13.3% was observed, with a special increase in the incidence of cases of anxiety, mood disorders, substance abuse, self-harm and suicide attempts. This data already suggested that an increase in use would imply an increase in cases, which is what reflects the effect of the impact of the Covid-19 crisis.**





Correlation between households with fixed broadband and increases in mental illness in all diagnoses from 2007 to 2022. In our study, when determining the correlation in the entire period 2007 – 2022, the evidence is very clear: with the exception of Boys between 16-20 years old in which the correlations vary significantly between strong and very weak or without apparent correlation in some autonomous communities, in the rest of the age groups, and especially with girls, **a predominance of strong correlations is observed in the majority of autonomous communities between access to High Speed Internet at home and mental health problems.** It is important to **remember and reiterate that the Internet, as a technology, is neutral, that is, it is a capacity to access information and services.** What this analysis and others like it suggest **very clearly is that Internet consumption, from smart devices (tablets, smartphones), without restrictions on time or types of content, by children or adolescents, can lead to very serious mental health problems**.

CORRELATION BETWEEN HOUSEHOLDS WITH FIXED BROADBAND (FBB) AND INCREASES IN MENTAL ILLNESSES BY AUTONOMOUS COMMUNITY FROM 2007 TO 2022 ACCORDING TO AGE GROUP (YOUNG PEOPLE UP TO 20 YEARS OLD) AND SEX. THE 'Y' AXIS REPRESENTS THE CORRELATION COEFFICIENT. PRIMARY AND SECONDARY DIAGNOSES AGGREGATED.



Interpretation of the correlation coefficient in absolute values

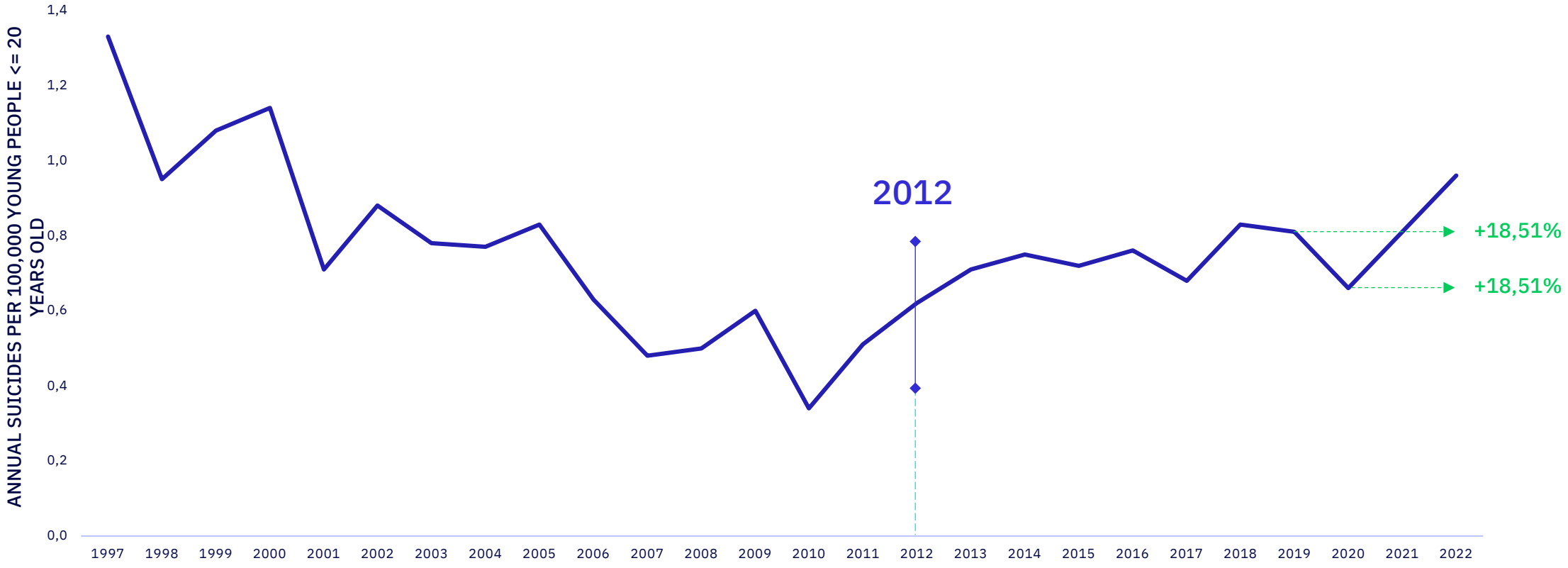
Between 0 and 0.10: no correlation
Between 0.10 and 0.29: weak correlation
Between 0.30 and 0.50: moderate correlation
Between 0.50 and 1: strong correlation

Cyber
Guardians

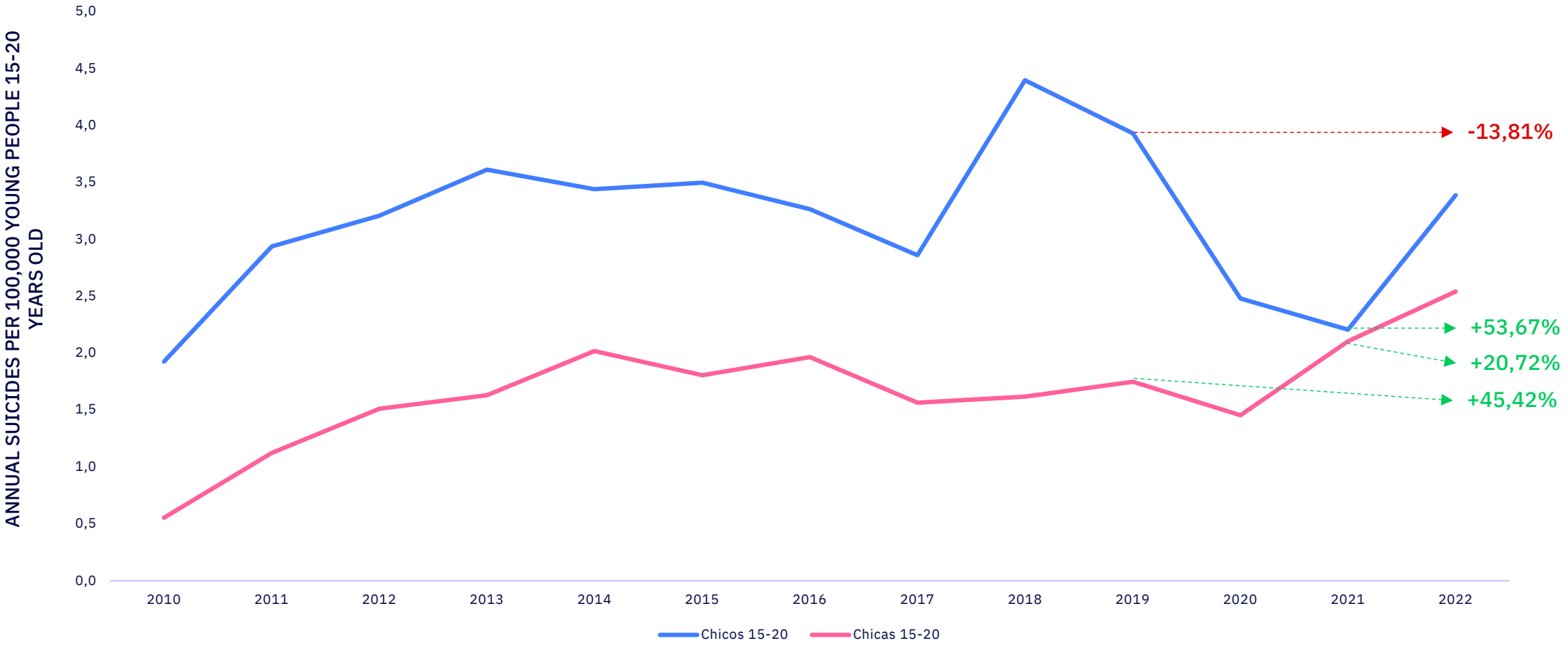
Temporal evolution of suicides *in Spain in young people up to 20 years old*

Cyber
Guardians

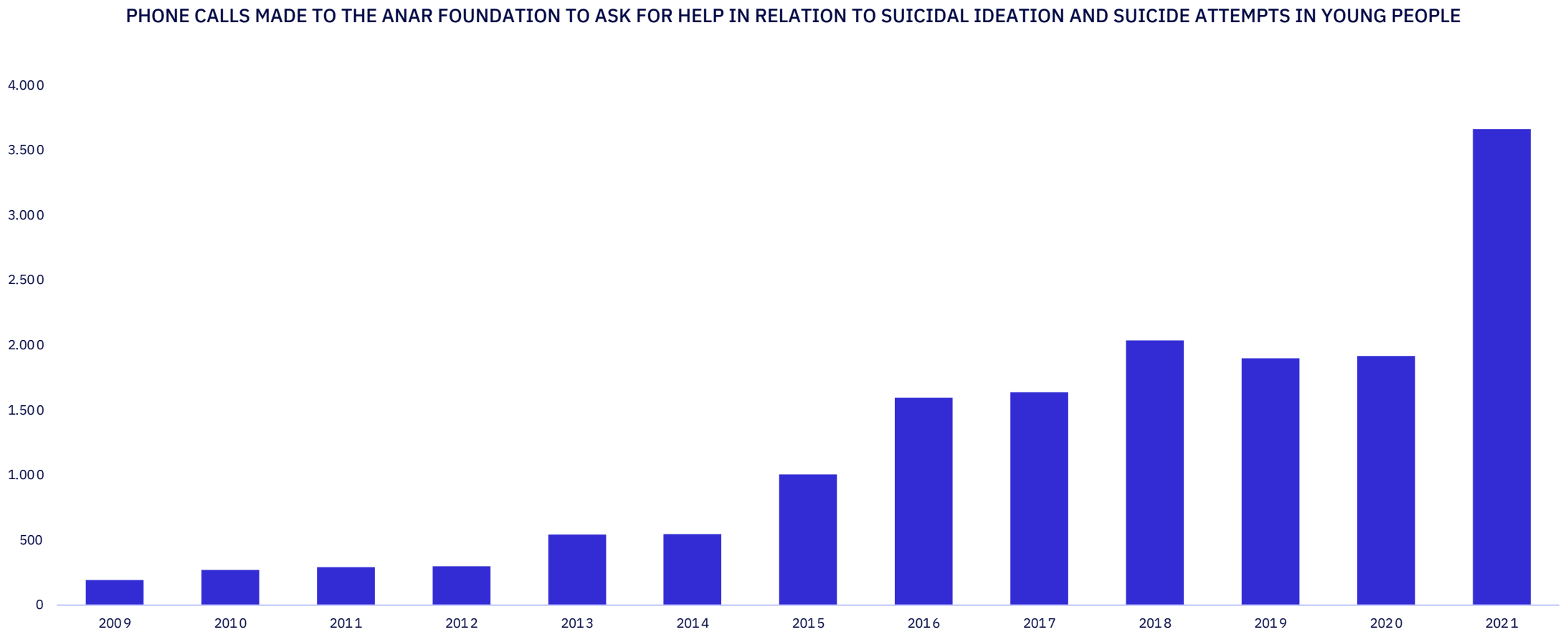
***Suicide deaths in young people up to 20 years old*.** From 2011-12, a change in trend that had begun in the late 1990s is evident. It is again in the Covid-19 stage where a greater increase is noted. These data are **clear evidence that the mental health problem in young people up to 20 years old is real and is not the result of a greater number of medical diagnoses due to greater social and medical awareness or sensitivity.**



Suicides in boys and girls between 15 and 20 years old. It is relevant to highlight that the traditional predominance of suicide among men has disappeared in 2021 when the effectiveness in committing suicides between boys and girls is almost equal.



Requests for help related to suicidal ideation and suicide attempts in young people from the ANAR Foundation. The increase in suicide deaths in young people up to 20 years old since 2011-2012 coincides with a significant increase in requests for help from young people reported by the ANAR Foundation and which peaked in 2021.



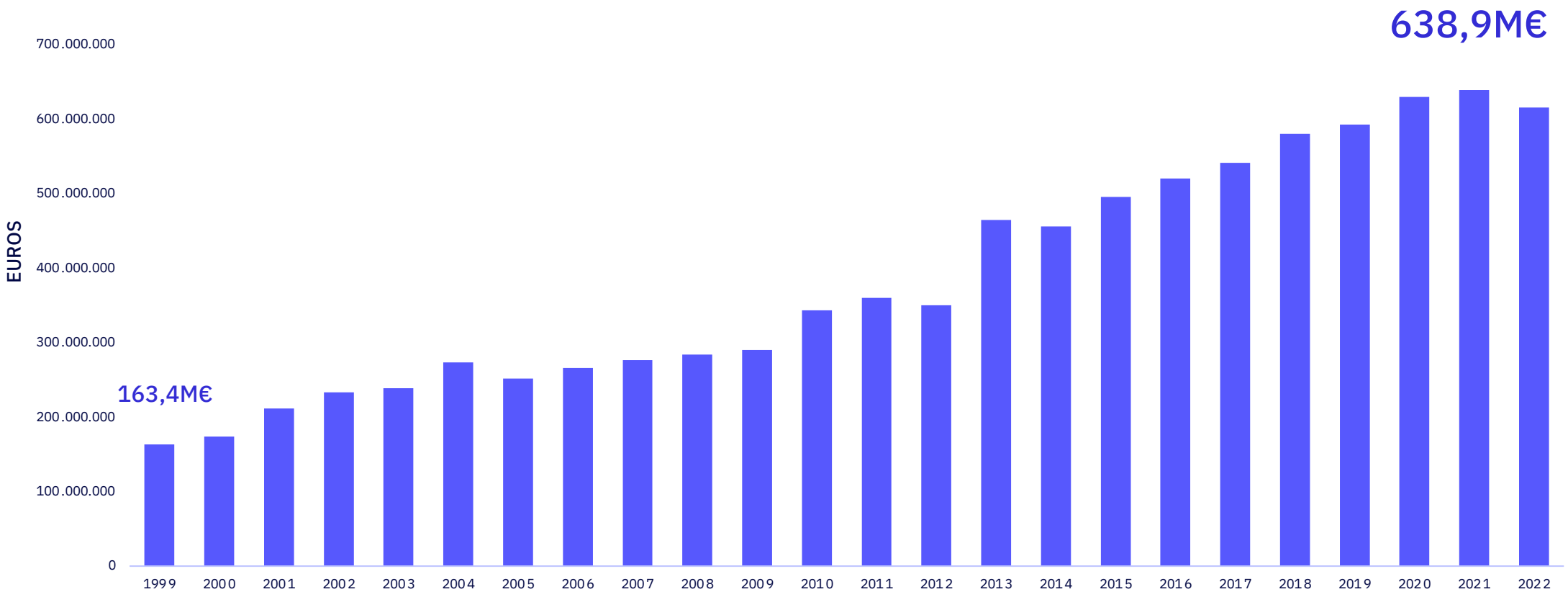
https://www.epdata.es/datos/cifras-suicidio-espana-datos-estadisticas/607?accion=2

Cyber
Guardians

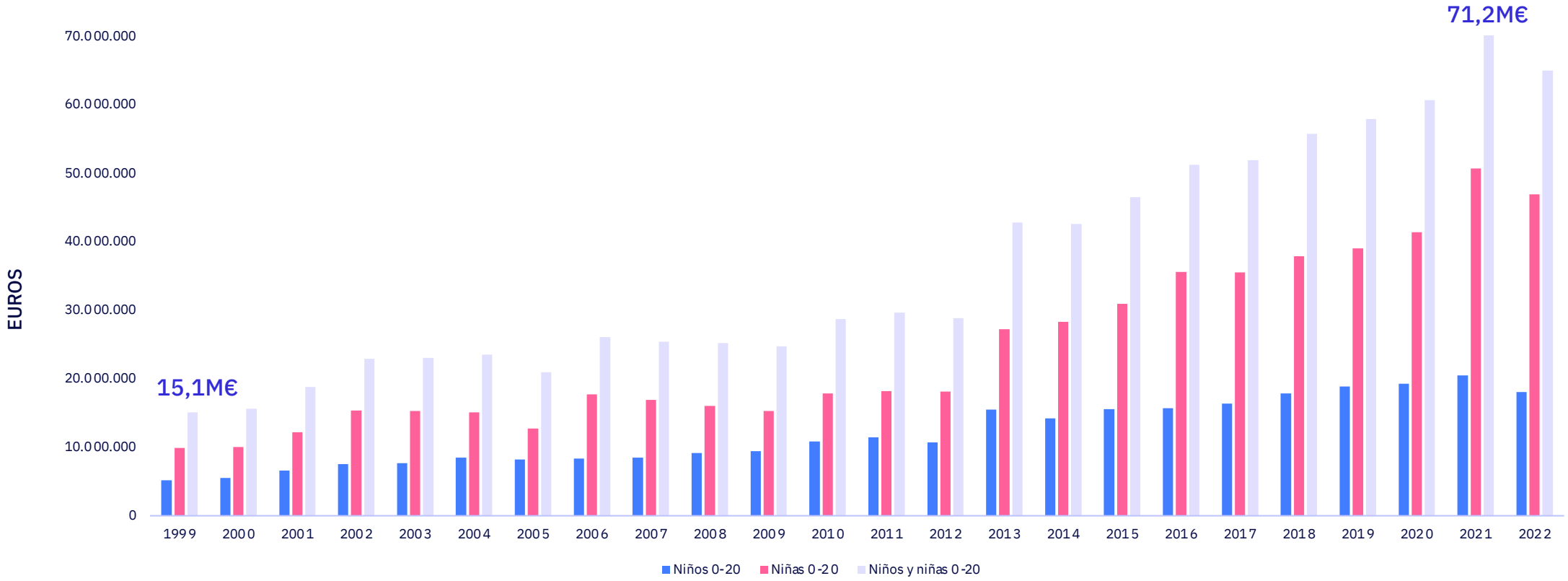
Cost Analysis of Mental Illnesses *by Hospitalizations by Primary Diagnoses 1999 -2022*

Cyber
Guardians

Costs of diagnoses related to mental illness in Spain for all ages. The total cost – of expenses associated with all ages ***– has progressively increased from 163.4 million euros in 1999 to 638.9 million euros in 2021. This represents an increase of almost 400%. Only cases where mental illness is the main diagnosis and not a secondary one have been considered. In this way, we avoid over-representing the cost in the case where diagnoses unrelated to mental illness are the main cause of admission and their diagnosis or procedure is more expensive.ostes de los diagnósticos relacionados con enfermedades mentales en España para todas las edades.***



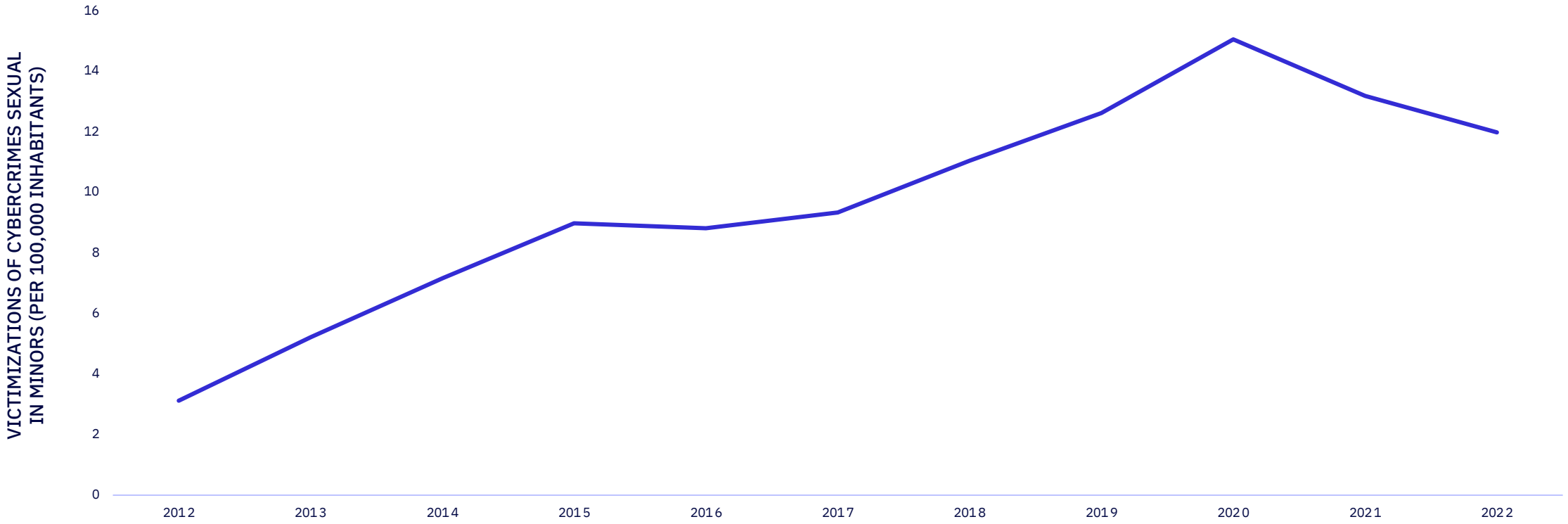
Costs arising from hospitalisations primarily related to mental illness in children and adolescents aged 0 to 20 years. It is very important to note that only hospital costs are represented here, that is, the costs arising from the hospitalisation of young people up to 20 years of age for reasons arising from mental illness, that is, the most serious cases. When we asked what the reasons are that may lead to hospitalisation, we were told that there are two: that **the patient may attempt against his or her life or against the life of others, that is, only extreme cases are reflected in this cost analysis.** Two worrying trends stand out in the graph: on the one hand, the cost has progressively increased from 15.1 million euros in 1999 to 71.2 million euros in 2021. Therefore, more than 10% of the total hospital costs related to mental illness in Spain are dedicated to caring for young people up to 20 years of age, and this expenditure has grown by more than 500% since 1999, with a significant increase again **since 2012 and particularly marked in the post-Covid-19 period. In addition, there is a worrying evolution of the costs dedicated to the care of girls, which now account for 75% of the total cost.**



Cyber
Guardians

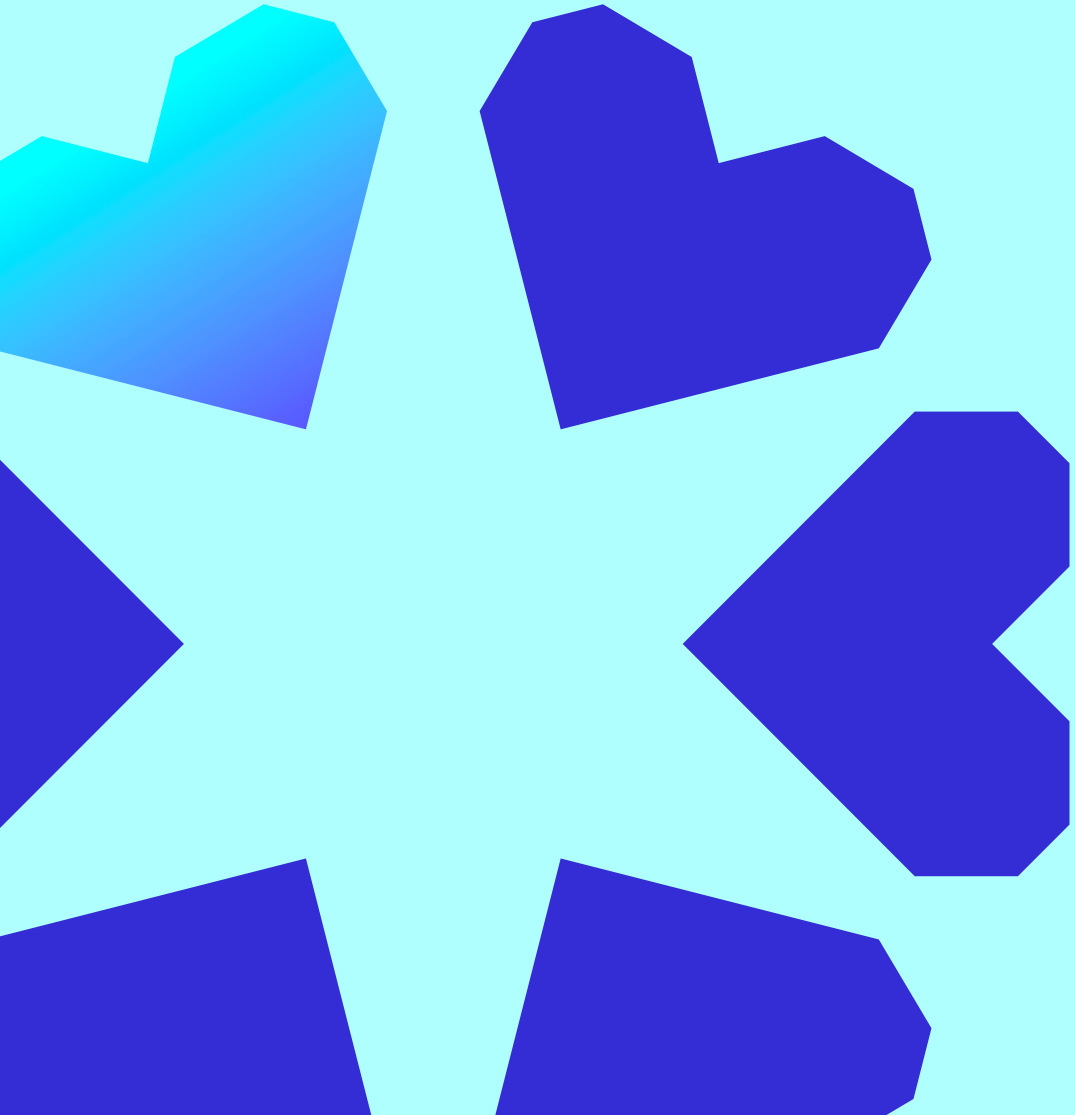
Analysis of Victimization of Minors *in Sexual* Cybercrime *2012-2022*

Cybercrime sexual victimizations in minors. The concept of victimization refers to the number of events reported by people in which they claim to be victims or to have suffered harm due to a crime. It differs from the concept of 'victim' in that the latter refers to individual persons. This metric **experienced significant growth in minors from 2012 to 2020 in line with the rest of the variables analyzed in this research**, with only a slight decrease detected in 2021-22. **The correlation of these phenomena with diagnoses of mental illness is also strong (0.74 out of 1)** as the graph itself suggests..



https://estadisticasdecriminalidad.ses.mir.es/publico/portalestadistico/dam/jcr:bcd88e41-d513-4f15-8676-860c7980222f/02_02_Metodolog%C3%ADa_Hechos_Esclarecidos_.pdf
https://www.interior.gob.es/opencms/pdf/prensa/balances-e-informes/2021/Informe-delitos-contra-la-libertad-e-indemnidad-sexual-2021.pdf

Cyber Guardians Healthier Digital Lives



A look to the future & conclusions

The Future is Now: Generative AI and Youth Mental Health

Generative AI is no longer a distant concern—it is actively reshaping how young people interact with the digital world. From hyper-realistic filters that distort self-image to advanced recommendation algorithms fueling social media addiction, AI is amplifying the very risks this report seeks to address.

AI is also blurring the line between support and harm. While some tools offer mental health resources, unregulated AI chatbots and recommendation systems can expose vulnerable youth to dangerous content. Recent cases have shown AI chatbots engaging in harmful conversations with teenagers, with tragic consequences.

Why Action Is Urgent

Regulation and awareness are critical. At CyberGuardians, we believe AI safety should not be left in the hands of tech platforms alone and warrants a whole-of-society response to ensure safety and responsible development. Stronger safeguards are essential to protect young people online.

We urge parents, educators, and policymakers to take action by:

- ***Sharing this report*** to spread awareness.
- ***Supporting our campaign on Change.org*** to push for stronger AI regulations in Spain and across Europe.
- ***Advocating for responsible AI policies*** that prioritize child and adolescent well-being.

AI is here to stay—but we have the power to shape its impact on the next generation's mental health and well being.

Let's act now.

Cyber
Guardians

Annex

Cyber Guardians Healthier Digital Lives

Background, Scientific Basis of the Analysis, and Main Research Questions

- This analysis is largely inspired by the work of **Professor Jonathan Haidt**, a social psychologist at New York University. Haidt has been researching the deep mental health crisis in young people in recent years in preparation for his recently published book **“The Anxious Generation”**. Haidt’s work in collaboration with other researchers has been of great help to us in setting the scope of this analysis and orienting it to maximize its contribution to existing research. In particular we would like to point out 3 of Haidt’s collaborative and ongoing studies that we find most interesting:
  - Haidt, J., Rausch, Z., & Twenge, J. **Adolescent mood disorders since 2010: A collaborative review**. Unpublished manuscript, NYU.
  - Haidt, J., Rausch, Z., & Twenge, J. **Social media and mental health: A collaborative review.** Unpublished manuscript, NYU.
  - Haidt, J., Rausch, Z. **Alternative Hypotheses to the Adolescent Mental Illness Crisis,** NYU.
- Professor Jonathan Haidt has excelled in his defense of a central idea: **social media is a major driver of the global epidemic of mental illness among children and adolescents**. Haidt has grouped together possible alternative explanations to his main thesis in his work to test its robustness and has thus systematically responded with data and logical reasoning to each one: from the impact of increased drug use, the presence of environmental toxins or the use of new drugs to changes in family models or in international standards for coding mental illness (ICD or DSM in English). His blog and many of his articles are a good starting point for those seeking a deeper understanding of this problem.
- Jonathan Haidt has published the 5 rules for parents that he considers key to mitigating the negative effects of this crisis and that we find of interest:
  1. Give children much more time to play with other children. Ideally, this play should take place outdoors, in mixed-age groups, with little to no adult supervision—just as most parents grew up, at least until the 1980s.
  2. Find more ways to integrate children into real-world, stable communities. Social media is nowhere near as bonding or fulfilling.
  3. Do not give a smartphone as a first phone. Instead, provide a specialised phone or watch that allows only voice communication, without internet apps.
  4. Avoid giving a smartphone until secondary school. This is easier to do if many of your child's friends' parents follow the same approach.
  5. Delay opening accounts on most social media platforms until at least the start of secondary school. This will be easier to achieve if we support lawmakers in raising the "internet age of majority" from the current 13 years (without verification) to 16 years (with mandatory verification).

- It is also important to highlight the great relevance of the study **"IZA Institute of Labour Economics DP No. 15728 High-Speed Internet and the Widening Gender Gap in Adolescent Mental Health: Evidence from Hospital Records"** by Esther Arenas-Arroyo, Daniel Fernández-Kranz, and Natalia Nollenberger from the Vienna University of Economics and Business, IZA, and IE University. This study is based on an analysis of **hospital data from Spain** and forms the foundation of our own research.
- In the updated version of the IZA study, published in May 2023, it was detailed how the rise in adolescent mental health issues in **Spain** coincided with the increased use of digital media and social networks. The most significant changes were observed among girls, who are more sensitive than boys to social interactions, particularly during adolescence (LaFontana & Cillessen, 2010; Flook, 2011; Shih, 2006).
- The study also demonstrated that **unrestricted or uncontrolled access to high-speed internet (fibre) increases addictive internet use while significantly reducing the time spent on sleep, schoolwork, and socialising with family and friends.** Finally, the study showed that uncontrolled internet access negatively impacts the **quality of parent-daughter relationships**, particularly in cases where pre-existing conflicts were present
- This study contains multiple important findings, but perhaps the most relevant for our research is how it takes advantage of the variable speed at which fibre-optic broadband was rolled out across Spanish provinces between 2007 and 2019—a key factor in high-speed internet access—to analyse its effect on diagnosed adolescent mental and behavioural health conditions in hospital records and **establish a causal relationship:**
  - The study demonstrates that the penetration of fibre-optic broadband—meaning the increased ability to access social media and audiovisual content intensively—significantly increases cases of adolescent mental health**For every one standard deviation (SD) increase in fibre-optic penetration, there was a 13.3% rise in diagnosed mental health disorders** disorders (BMH, in English)., with increased incidence in cases of anxiety, mood disorders, substance abuse, self-harm, and suicide attempts. Additionally, the study provides evidence suggesting that **high-speed internet access contributes to a significant increase in deaths related to suicide or self-harm among adolescents**. It is important to note that the study assumes that adolescents have internet-accessible devices and unrestricted access to social media and digital platforms.
  - In simplified terms, ***the study can be explained as follows: as fibre broadband was rolled out unevenly across different households, adolescent mental health disorders increased accordingly, with a delayed onset of negative effects in households without high-speed internet access.*** As will be evident in our study, the ability of households to access fibre—and thus video- and image-based social media services—was unevenly distributed during the analysed period, particularly between 2012 and 2018.

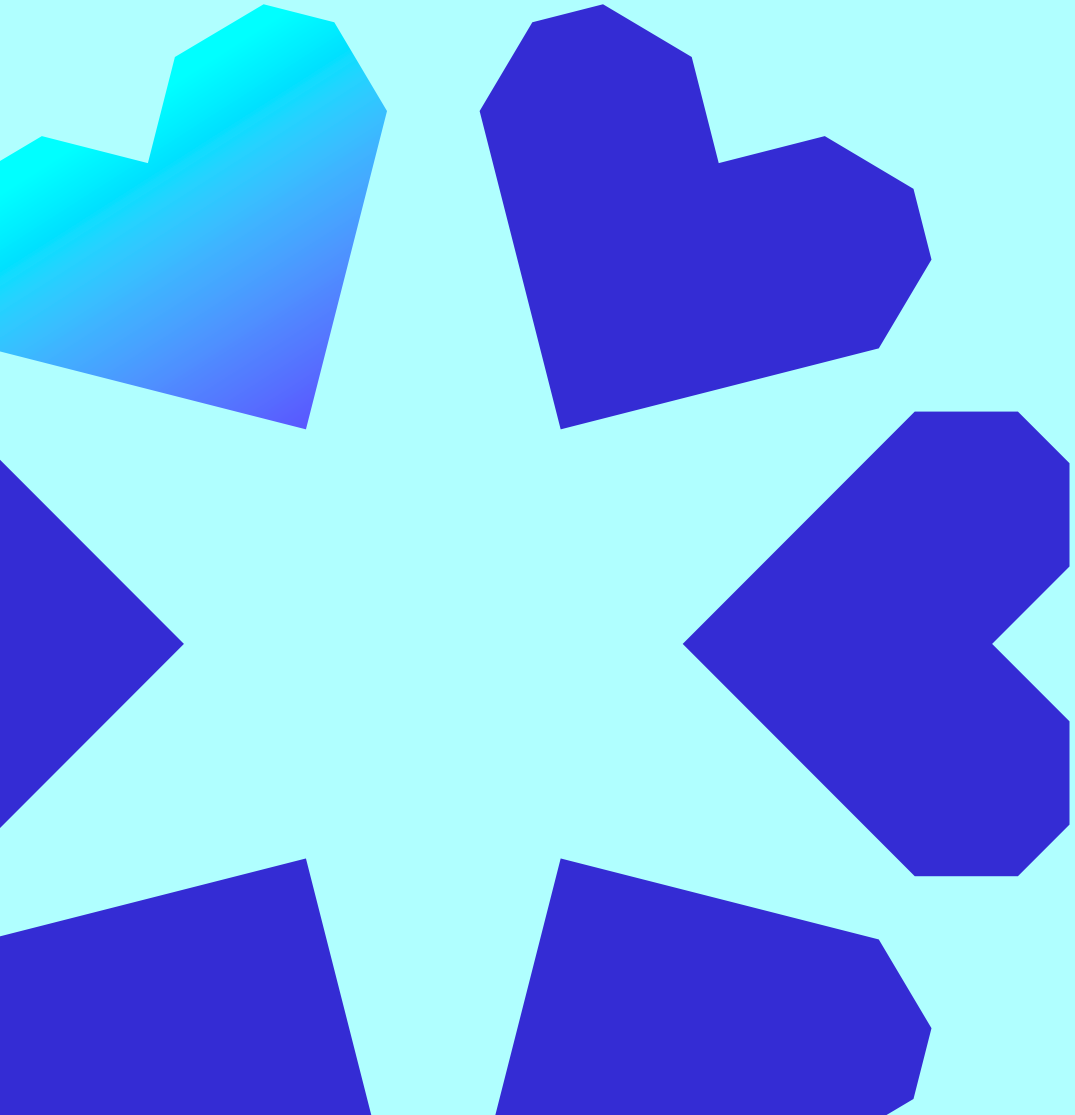
- The IZA study highlights the growing body of scientific research that has established **causal links between internet access and young people's mental health. The results are highly robust across various sensitivity tests, reinforcing the aforementioned causality**. This IZA study complements and aligns with Braghieri et al. (2022), who found that the gradual introduction of Facebook in US universities worsened students' mental health due to unfavourable social comparisons. Similarly, Nieto and Suhrcke (2021) found that access to digital television in the UK led to unhealthy habits and ultimately worsened children's mental health. As the researchers indicate, their findings are consistent with those of Braghieri et al. (2022), Golin (2022), and McDool et al. (2020), who also documented a more negative effect of broadband internet on girls than on boys.

- In addition to the studies mentioned above, **we have reviewed over 100 scientific and general-interest articles, reports, and interviews with experts similar to those referenced in this brief introduction**. Some of these resources have been compiled on our website in the "Knowledge Hub" section.

- **The findings of all these studies have helped us understand and explain the significant deterioration in adolescent mental health. They have also confirmed that there is a consensus within the scientific community regarding a causal—not merely correlational—relationship between the decline in children's and adolescents' mental health and the uncontrolled, indiscriminate use of the internet. This is particularly true when accessed via advanced mobile devices (smartphones, tablets) for social media and digital services designed to be addictive, given that their business models rely on monetising users' attention through advertising exploitation and/or the collection of personal data**

- Despite all the above, there remained a **set of highly relevant questions and hypotheses that, in the case of Spain, were not fully addressed in any of the studies we reviewed. These became our initial research questions:**
  - What was the trend in mental health disorders before 2010?
  - What is the financial cost of this phenomenon for Spain's public funds?
  - Could increased awareness and healthcare sensitivity towards mental health explain the rise in diagnoses?
  - Do the findings and hypotheses of all previous studies, particularly Arenas-Arroyo et al. (2023), hold true for dates beyond 2018, especially in the period immediately following Covid-19?
  - How is this phenomenon reflected in suicide behaviour patterns?What relationship can be established with cybercrime?
  - What additional risks could Artificial Intelligence pose in exacerbating the decline in young people's mental health?

Cyber Guardians Healthier Digital Lives



Detail of Data Sources and Methodology

Description of the process for carrying out the analysis as well as the data sources used

- The data on mental illness diagnoses from 1997 to 2022 have been requested from the Ministry of Health. Source: Ministry of Health. Registry of Specialized Care Activity – Minimum Basic Data Set (RAE-CMBD). Definition and links to interpretation codes: https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm
- Definitions of data variables: https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBDdocs/2018_ANEXO_solicitud_RAE_CMBD.pdf
- Diagnoses between 1997 and 2015 were given by the International Classification of Diseases ICD 9, and from 2016 onwards diagnoses are classified by ICD 10. Differences between data from 1997-2015 and 2016-2022 associated with the change in diagnosis codes are reconciled. In this way, all ICD 9 and ICD 10 diagnostic codes related to mental illness have been detected and all diagnoses have been requested, both primary (when the diagnosis is the main reason for admission) and secondary (unrelated to the main reason for admission) from 1997 to 2022.
- The different categories of mental illness selected in the search are:
  - Organic mental disorders, including symptomatic disorders.
  - Mental and behavioural disorders due to the use of psychoactive substances.
  - Schizophrenia, schizotypal disorders and delusional disorders.
  - Mood (affective) disorders.
  - Neurotic disorders, stress-related disorders and somatoform disorders.
  - Personality and behavioural disorders in adults.
  - Psychological development disorders.
  - Emotional and behavioural disorders that usually appear in childhood and adolescence.
  - Unspecified mental disorder.

- All mental illness diagnoses from 1997 to 2015 (ICD 9) and from 2016 to 2022 (ICD 10) are processed.
- The data is cleaned: date formats, null values, etc.
- The data format of both diagnosis CSVs (ICD9 and ICD10) is shared in order to integrate them. It is detected that, possibly due to a delay in the adaptation in some hospitals and autonomous communities to the change of classification from ICD9 to ICD10, the evolution of diagnoses between 2015 and 2016 reflects a punctual and non-homogeneous discontinuity in its distribution by autonomous communities. In order to eliminate the distortion in the time series, the difference between the volume of diagnoses in January 2016 and the average of the previous months of January of the historical series is calculated and increased in the following months, effectively and rigorously reconciling said difference.
- All data is integrated to have only one CSV with all unified diagnoses
  - Duplicates are filtered (e.g. diagnoses with identical record codes whose entry date is repeated).
- With the integrated data from 1997 to 2022, 3 diagnosis tables are created:
  - Primary Diagnoses - We filter only the primary diagnoses of Mental Illnesses, that is, when it is the main reason.
  - Secondary Diagnoses - We exclude the primary diagnoses of Mental Illnesses, and leave only those diagnoses of mental illness that are detected when the main (primary) diagnosis is another cause.
  - All diagnoses (Unfiltered data table)
- The different tables are combined with other data sources to produce the report.
- To calculate any data per 100,000 inhabitants, the population data by age, year and autonomous community have been extracted: Source: https://www.ine.es/jaxi/Tabla.htm?path=/t20/e245/p08/l0/&file=01003.px&L=0
- To measure the relationship between two sets of data, we use the correlation coefficient, which is interpreted as follows (in absolute values).
  - Coefficient between 0 and 0.1: non-existent correlation
  - Coefficient between 0.1 and 0.29: weak correlation
  - Coefficient between 0.3 and 0.5: moderate correlation
  - Coefficient between 0.5 and 1: strong correlation

- Chart of social media users from 2004 to 2018 worldwide. Source: https://ourworldindata.org/rise-of-social-media
- Chart of smartphone sales from 2007 to 2023 worldwide.
  Source: https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/
- Physical activity – To deduce the levels of physical activity and study the correlation with mental illnesses, diagnoses of fractures and sprains have been requested from the Ministry of Health since 1997.
  Source: Ministry of Health. Specialized Care Activity Registry. RAE-CMBD – Definition and links to interpretation codes:
  https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm
- Eating disorders and obesity – Data on eating disorders and obesity have also been requested from the Ministry of Health. Source: Ministry of Health. Registry of Specialized Care Activity. RAE-CMBD – Definition + links to interpretation codes:
  https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm
- Broadband by Autonomous Community – Information is provided on lines, accesses, subscribers and base stations in Spain by autonomous community for the main telecommunications and audiovisual sector markets and operators since 2007.
  Source – CNMC. https://data.cnmc.es/telecomunicaciones-y-sector-audiovisual/conjuntos-de-datos/datos-provinciales/telecomunicaciones
- Number of households – To compare the broadband data per household with the number of households, the data on the number of households per autonomous community have been extracted. Source – INE. https://www.ine.es/jaxi/Datos.htm?path=/t20/p274/serie/prov/p02/l0/&file=02006.px
- Daily internet use (at least 5 days a week) - Annual press release on the Survey on Equipment and Use of Information and Communication Technologies in Homes since 2006. Source – INE: https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=estadistica_C&cid=1254736176741&menu=ultiDatos&idp=1254735976608
  Example (2021): https://www.ine.es/prensa/tich_2021.pdf
- Suicide figures in Spain by age – Epdata report on suicides in Spain since 1980 and requests for help due to suicide ideation or suicide attempt in minors since 2009. Source – Epdata (INE and Fundación Anar): https://www.epdata.es/datos/cifras-suicidio-espana-datos-estadisticas/607?accion=2
- Cost analysis – The costs per diagnosis are given in the diagnosis database of the Ministry of Health. The cost of each diagnosis is estimated by the average cost of the **DRG (Diagnosis Related Groups)** of the diagnosis in question and the level of severity. Because the cost represents the most expensive diagnosis (if there were secondary diagnoses), **only cases where mental illness is the main and not secondary diagnosis have been considered. In this way we avoid over-representing the cost in the case where diagnoses unrelated to mental illness are the main cause of admission and their diagnosis or procedure is more expensive.**

Cyber
Guardians

About Us

This project has been carried out by researchers and analysts from the cyber-intelligence and digital risk analysis firm **Alto Intelligence**, with the invaluable support of **Dr Manuel Carnero (MD, PhD)** from Hospital Clínico San Carlos, a surgeon, researcher at CNIC, and statistical advisor for various national and international medical journals.

We are a **non-profit initiative** dedicated to **promoting healthier digital lives**. Through this analysis, we aim to enhance understanding of the effects of technology on young people, fostering greater collaboration between parents, educators, researchers, and policymakers to protect children and adolescents from the harms associated with the improper or excessive use of social media and digital platforms. Our efforts have focused on understanding the current situation to prevent the potential harm that may arise from the proliferation of generative artificial intelligence-based services.

The mission of this project is twofold: to **expand knowledge** on this crucial topic and to **drive civil and policy actions** towards regulatory changes that support the mental well-being of younger generations in an ever-evolving digital environment.

All data sources used in this project are publicly available, and the key sources are detailed in the Annex of this document, along with the study's methodology and scientific background.

Our goal is to **encourage other organisations in different countries to conduct similar analyses using local data**, in order to assess the extent to which we are experiencing a global phenomenon. Therefore, we provide our methodology and scripts as open source, allowing for broader adoption and replication of the analyses presented in this study.

Stat tunned

WEB
LinkedIn
Email

Cyber
Guardians

Notes and Corrections

The data may vary, especially over the last five years,
due to delays in hospitals and centers reporting case data.

https://www.cyber-guardians.org/en/notes-and-corrections/