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Healthier Digital Lives

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We believe that uncontrolled and unrestricted access to the Internet by minors and young people – via tablets or smartphones – and to **digital services designed without consideration for their mental health**, is one of the determining factors in the results we have obtained in our research.

This **analysis** shows that we have a **serious problem** in **Spain** with mental health in children and adolescents up to the age of 20, **which is more pronounced in girls ages 11 to 20**, who also show a high correlation with eating **disorders and obesity.**

Since **2012**, the year when the penetration of High-Speed Internet reached 50% of households in Spain, tablets and smartphones have become easily accessible and there has been a widespread social acceptance – globally – of the use of social media by minors. **Cases of mental illness of children and adolescents have skyrocketed**, while **patterns of increasing suicide** among adolescents are reinforced.

These phenomena reached their peak impact in the months immediately following the **Covid-19 pandemic** – months of peak digital media use across all age groups – with hospitalization costs for children and young people skyrocketing due to diagnoses primarily related to mental health issues.

ABOUT CYBER-GUARDIANS.ORG

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) of the San Carlos Clinical Hospital, Surgeon, CNIC Researcher and Statistical Advisor of various national and international medical journals and Dr. Garcia-Bernardo, Psychiatrist, former Head of Service of the Gregorio Marañón University General Hospital

We are a non-profit project dedicated to empowering healthier digital lives. With this analysis, we seek to improve knowledge about the effects of technology among young people by promoting greater collaboration between parents, educators, researchers and policy makers in the defense of children and adolescents against the harms derived from the inappropriate or abusive use of social networks and digital media. Our efforts have focused on understanding the current situation to prevent the damage that we anticipate may be caused by the proliferation of services based on generative artificial intelligence.

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The mission of this project is twofold: to expand knowledge on this important topic, as well as to promote civil and political actions for a regulatory change that favors the mental well-being of our young generations in a constantly evolving digital environment.

All the data sources used in this project are public and the main ones are detailed on the Cyber-Guardians.org website along with the methodology and scientific background of this study.

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KEY FINDINGS OF OUR 2026 ANALYSIS

The youth mental health crisis has a child's face: hospitalizations of girls continue to skyrocket and 75% of hospital costs for mental health reasons in people under 20 years of age are concentrated in them.

One of the main causes is confirmed to be the combined effect of the universalization of access to smartphones, high-speed internet and digital platforms designed to massively capture the attention of young people, demonstrating that these three elements, combined, constitute a "poisonous cocktail" for cognitive development and the mental and physical health of young people.

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IT IS NOT PERCEPTION, THIS IS THE DATA: A SUSTAINED CRISIS SINCE 2012

- Hospital diagnoses for mental disorders in people under 20 years of age continue to be at historic highs since 2012. We are not talking about mild discomfort, but about severe cases. We only look at hospitalizations where mental illness is a primary or secondary diagnosis.
- They have grown in recent years by +200% to +300% since 1997.
- Suicides in minors change trend from 2011-12 and increase especially after Covid.
- Admissions for primary diagnosis occur in extreme situations.
- Requests for help for suicidal ideation reach all-time highs (ANAR Foundation, peak in 2023 that remains in 2024).

GIRLS ARE THE MOST AFFECTED

- Girls aged 11 to 15 already outnumber boys aged 16 to 20 in diagnoses (which was already an unprecedented event in the historical series).
- Girls account for more than 75% of the hospital cost of youth mental health in the last two years.
- The historical gender gap in suicides disappears: girls equal boys in effectiveness.

3 Structural technological changes as important causes of this crisis: universalization of access to smartphones, high-speed internet and digital platforms designed to massively capture the attention of young people

2012 marks the beginning of the escalation – just when at least 50% of households in all autonomous communities had access to high-speed internet, most social networks were accessible without restrictions and there was a reduction in the cost of smart devices. By 2024, more than 75% of households in all autonomous communities already have high-speed internet.

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Technology offers notable opportunities for our young people, but navigating the digital world is a complex task that children cannot manage on their own. Pediatricians and medical professionals recommend no screen time for children **aged 0 to 2**. For children **aged 3 to 5**, no more than one hour of screen time per day is recommended, with co-viewing and supervision, and less is better.

The following recommendations are for parents and caregivers, focusing on guidance, communication, and supervision once children are old enough to engage with digital media independently. Additionally, on our **WEBSITE** we have included further information from the **Spanish Association of Pediatrics** so that any family can create a personalized media plan.

1 **Zero screen exposure between the ages of 0 and 6.**

There is no safe level of screen exposure in this age group. The Spanish Association of Pediatrics recommends the complete absence of screen time. Exceptionally, brief and supervised use may be permitted for specific purposes such as reading a story or a video call.

2 **Delay the age of the first smartphone with Internet access.**

Between the ages of 13 and 16, priority should be given to phones without Internet access or social media, installing parental control tools, and establishing clear usage routines. The introduction of connected devices should be gradual and supervised.

3 **Screen time limited to one hour per day between the ages of 7 and 12, including school use.**

The use of Internet-connected devices should be restricted, prioritizing protective factors: physical activity, in-person social interaction, and outdoor life. When devices are used, they should be stationary, located outside bathrooms and bedrooms, and always under adult supervision.

4 **Screen time limited to two hours per day between the ages of 13 and 16, including school use.**

When device use is permitted, parental control tools must be installed and devices without Internet connectivity should be prioritized. Active supervision is a necessary measure, not an optional one.

5 **Establish spaces and moments completely free of devices.**

Mealtimes, the family table, bedrooms, and the hour before bedtime should be designated as technology-free zones. This measure supports sleep quality, family connection, and children's attention capacity.

6 **Understand the platforms and digital services that children use.**

It is essential to understand how recommendation algorithms work, data collection policies, and the specific risks that social media and digital services pose to the social and emotional development of children and adolescents.

7 **Coordination among families to establish shared rules.**

Social pressure is one of the main drivers of early access to devices and social media. An effective response requires collective agreements among families in a child's environment regarding usage limits, age of access, and types of permitted devices.

8 **Ensure a minimum of 60 minutes daily of physical activity and in-person social life.**

Experts recommend at least 60 minutes of daily physical activity for children aged 5 to 17. Routines should be established that include sports, in-person social activities, and outdoor time, modeling this behavior from within the family environment.

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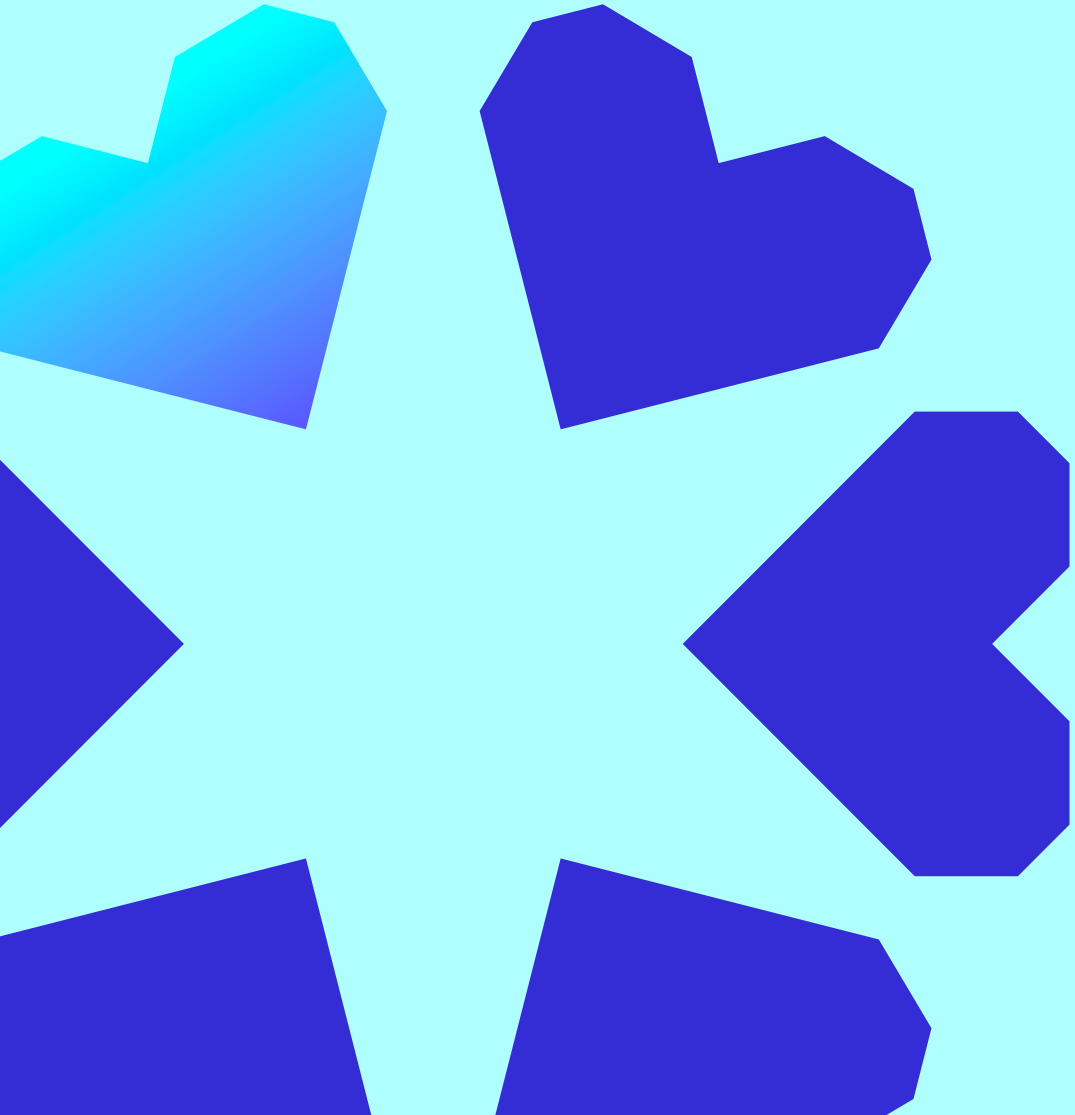

INVESTIGATION

Use of Internet & Mental Illnesses in children & adolescents in Spain

1997 - 2024

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Contents

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Executive Summary

1. **Mental illness among young people, up to age 20 in Spain, has rise sharply since 2012, especially among girls.** This increase peaked in the months immediately following the start of the Covid-19 pandemic in Spain , reaching the highest levels in recorded history with a **+300% increase compared to 1997.**

2. **Adolescents have progressively suffered fewer injuries, traumas and broken bones since the late 1990's,** and even more markedly in the last decade, showing a more than likely severe decrease in their physical activity. **There is a strong correlation in both boys and girls between the decrease in physical activity and the increase of mental illnesses.** Similarly, the evolution of all diagnoses of childhood obesity and eating disorders from 1997 to 2024 in children and adolescents aged 0 to 20 shows that the number of cases in both sexes has increased steadily, **although again, from 2011-12 onwards, there has been a very significant increase, especially in girls,** which has grown remarkably during the Covid-19 pandemic. The correlation between cases of obesity and eating disorders with mental health problems 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, fiber optics, fiber to the home), there was a +13.3% increase in cases of mental health disorders, with a particular increase in incidence of anxiety, mood disorders, substance abuse, self-harm and suicide attempts.** In other words, it demonstrates the **causal relationship**, in addition to correlation, between increased Internet access speed and increase in mental illness*. It is precisely throughout 2012 that our analysis estimates that at least 50% of households in all autonomous communities achieved high-speed (fiber) Internet penetration. When determining the correlation for the entire period from 2007 to 2024, **the evidence is very clear: with the exception of boys between 16-20 years of age in which correlations vary significantly between strong and very weak or without apparent correlation in some autonomous communications, in the rest of the age groups, especially with girls, it was founded that there is a predominance of strong correlations in the majority of autonomous communities between high-speed Internet access at home and mental health problems.**

4. **From 2011 to 2012, a trend reversal of suicide patterns is also evident, increasingly,** and it is once again evident that during the Covid-19 pandemic a greater total increase is observed. This data clearly demonstrates the issue of mental health, in youth ages 0-20, is real and is not the result of a greater number of medical diagnoses due to greater social and medical awareness or sensitization.

5. The analysis of **the cost of hospitalization from primary diagnoses due to mental illnesses reveals two worrying trends**: on one hand, **the cost has increased progressively by more than 500% in recent years** and on top of 10% of the total hospital costs related to mental illnesses in Spain being dedicated to caring for minors up to 20 years of age. In addition, a **preoccupying evolution of the costs dedicated to carrying for women, who already account for 75% of the total cost dedicated to young people up to the age of 20.**

* It is important to remember and reiterate that the Internet, as technology, is neutral, that is, it is a means of accessing information and services. The Internet is now a fundamental element in countries' economies and their productive capacity and is there essential, as we experienced during the Covid-19 crisis. What this analysis, and others like it, clearly suggest is that access to the Internet, especially to social media, from smart devices (tablets, smartphones) without restrictions on usage time or content types, by children or adolescents, can lead to very serious mental health problems.

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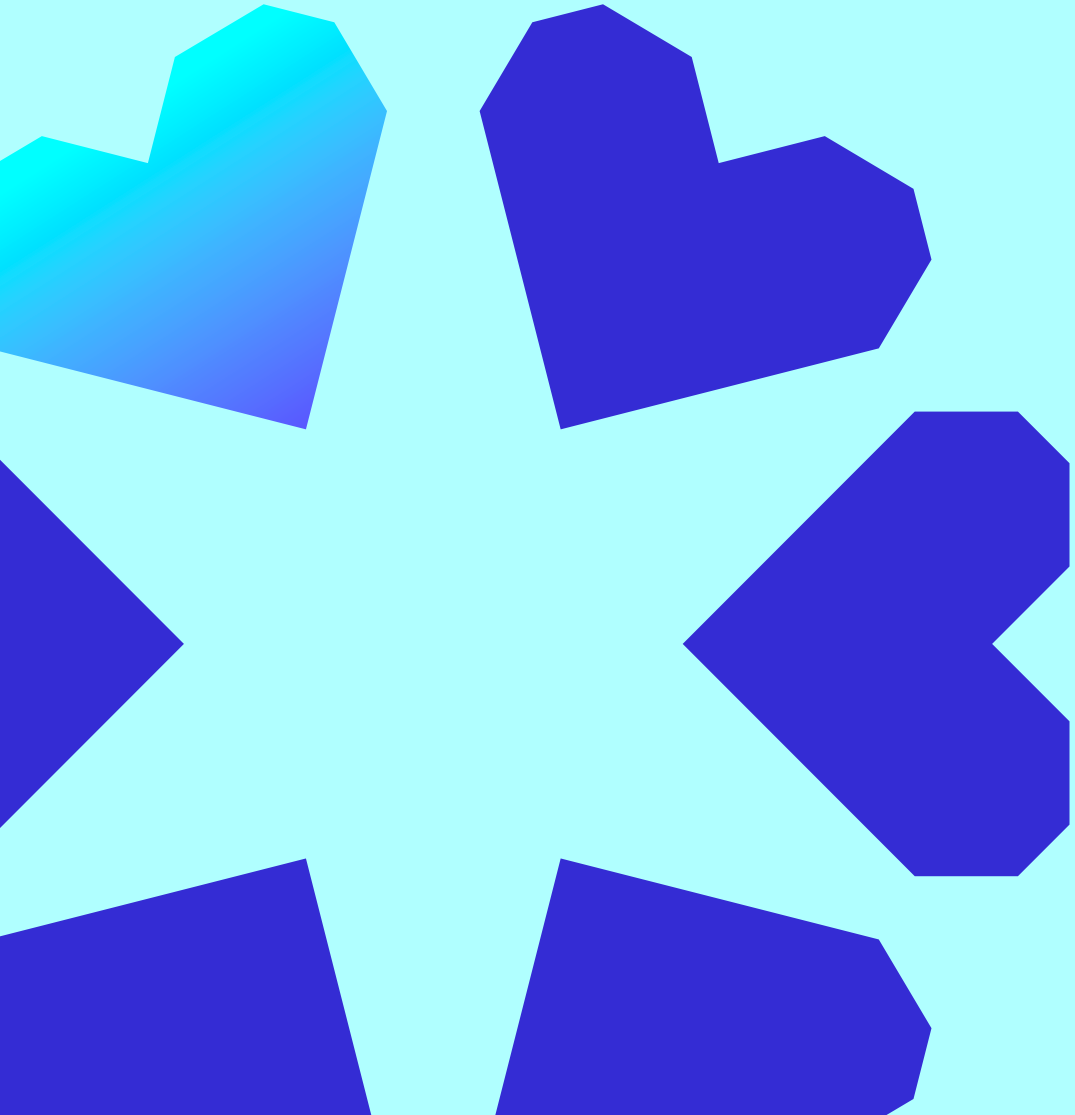

A temporal analysis of the initial dimensions of the investigation

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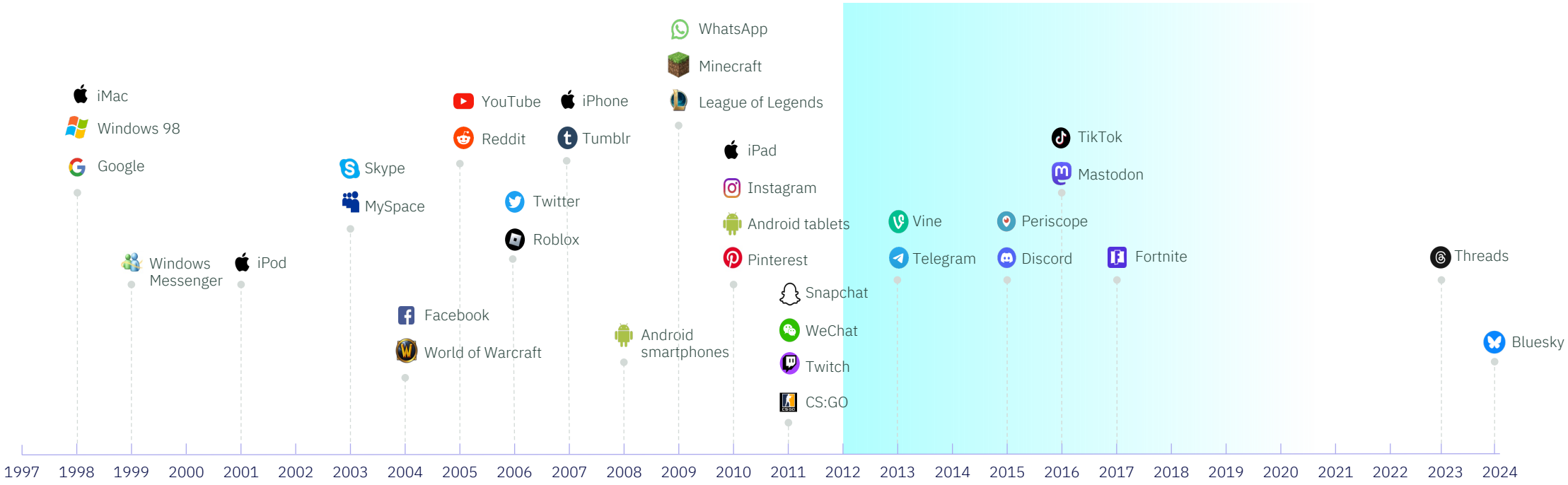
The temporal evolution of the principal *technologies for accessing the Internet and Social Media*

Advances in devices with internet access, social media and video games between 1997 y 2024. Since the beginning of 2012, unique conditions have existed in Spain, as well as in the rest of the world: **the widespread use of smartphones and tablets has expanded, while a wide variety of social media platforms and high-speed internet access have become available**. Already active since the mid-2000s, the trend toward a massive use of social media has been consolidated following the launch of Instagram, WhatsApp, Snapchat, and more recently, TikTok.



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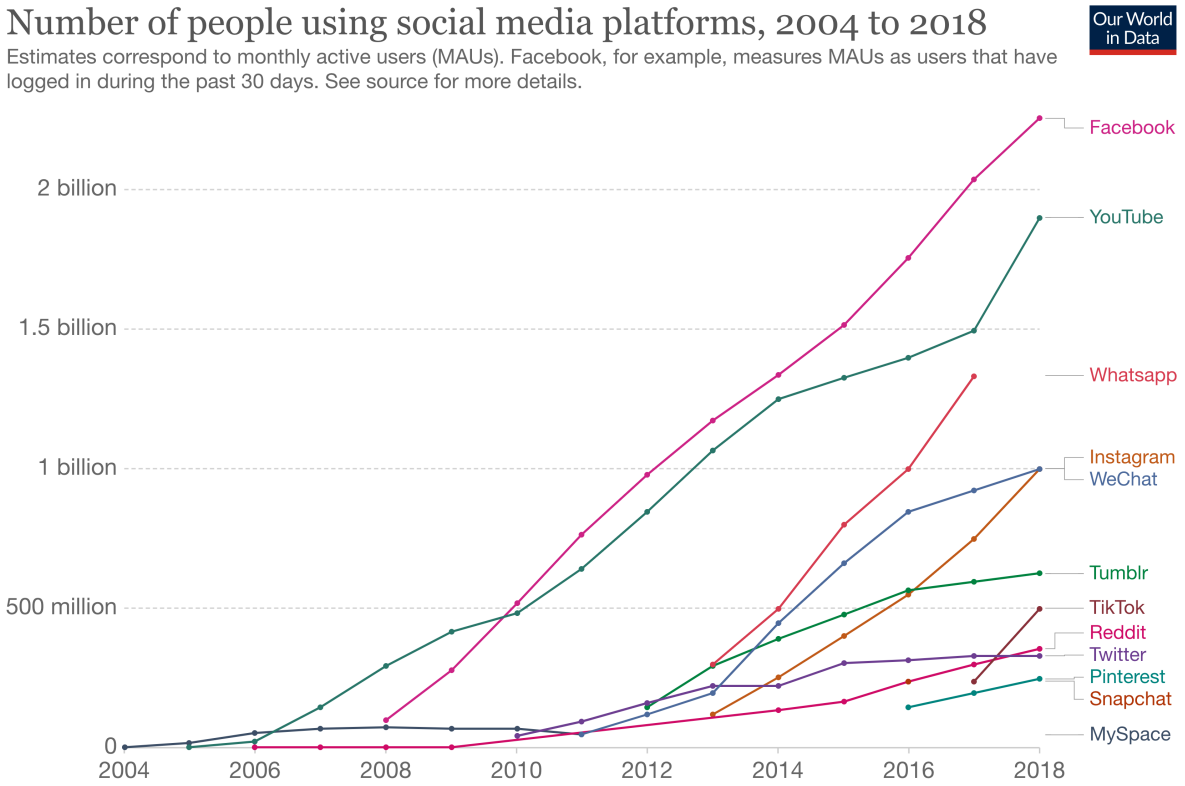
Social media users from 2004 to 2018, globally and locally.

Platforms like Facebook and YouTube were the first with a global use, although after 2012 an extensive use of many other social media platforms also began.

The most visited social media platforms in Spain on a daily basis are:

- YouTube with an average time of 1 hour and 22 minutes
- TikTok with 1 hour y 21 minutes
- Instagram with an average of 1 hour and 12 minutes daily use
- Facebook with 1 hour
- Twitter (X) and LinkedIn have shorter usage times: 48 and 37 minutes per day, respectively.



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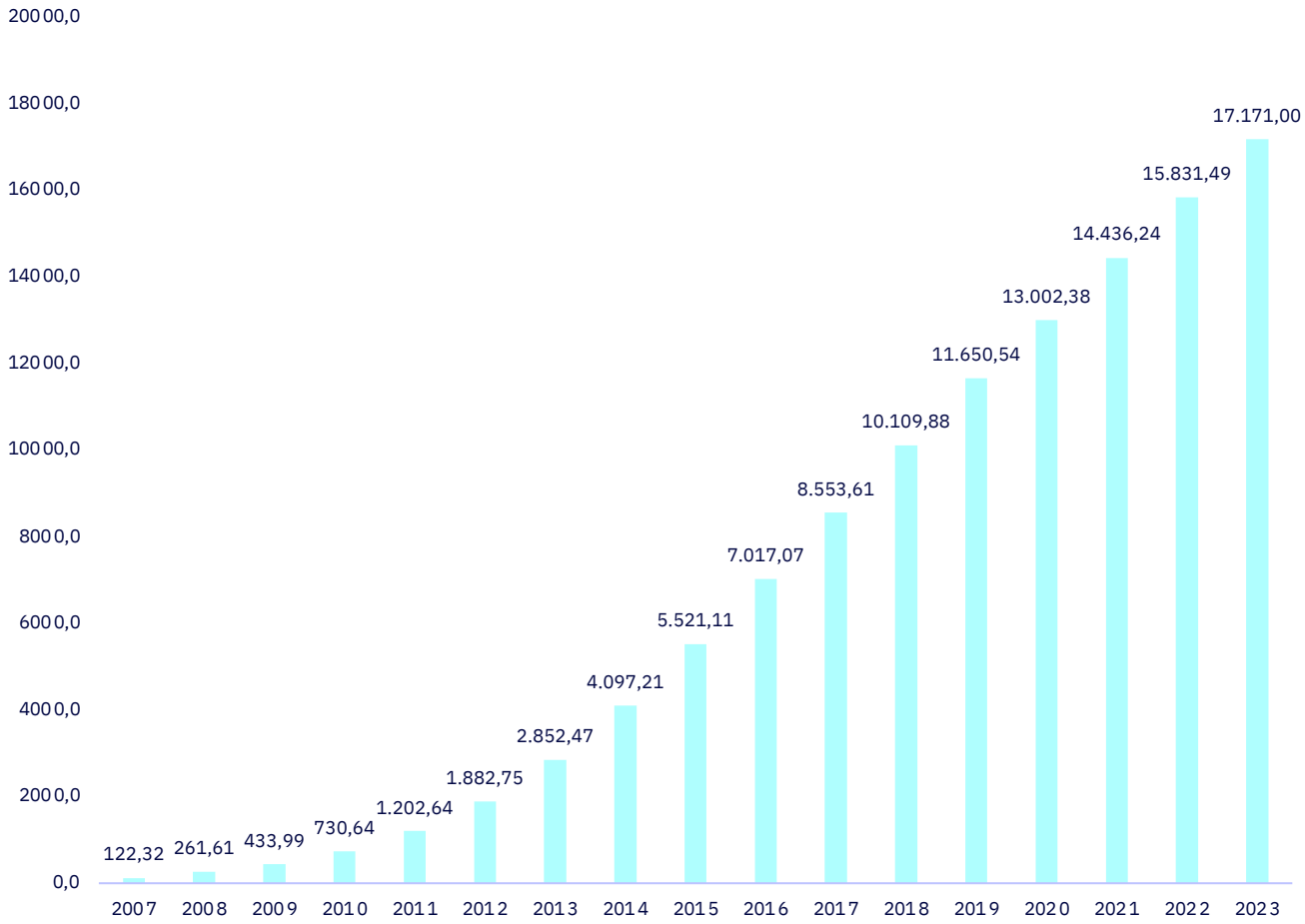
Smartphone sales between 2007 and 2023 (global cumulative sales) show that from 2011-2012 there was a significant change in the total number of phones accumulated worldwide. It is reasonable to assume that this accumulation was concentrated in developed countries, given the cost of such devices during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

During 2016, total sales of these devices exceeded the total population of the planet.

NUMBER OF SMARTPHONES SOLD GLOBALLY FROM 2007 TO 2023
(IN MILLIONS OF UNITS) (CUMULATIVE SALES)



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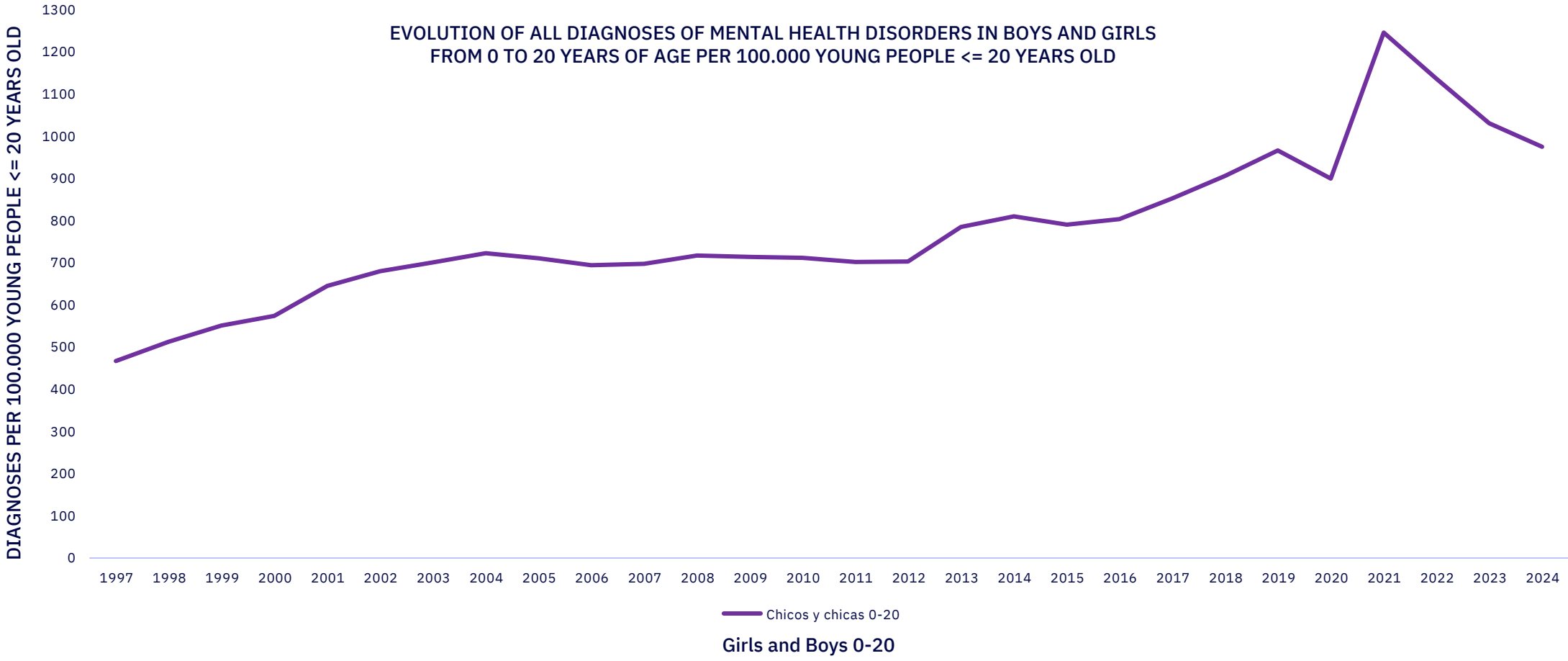
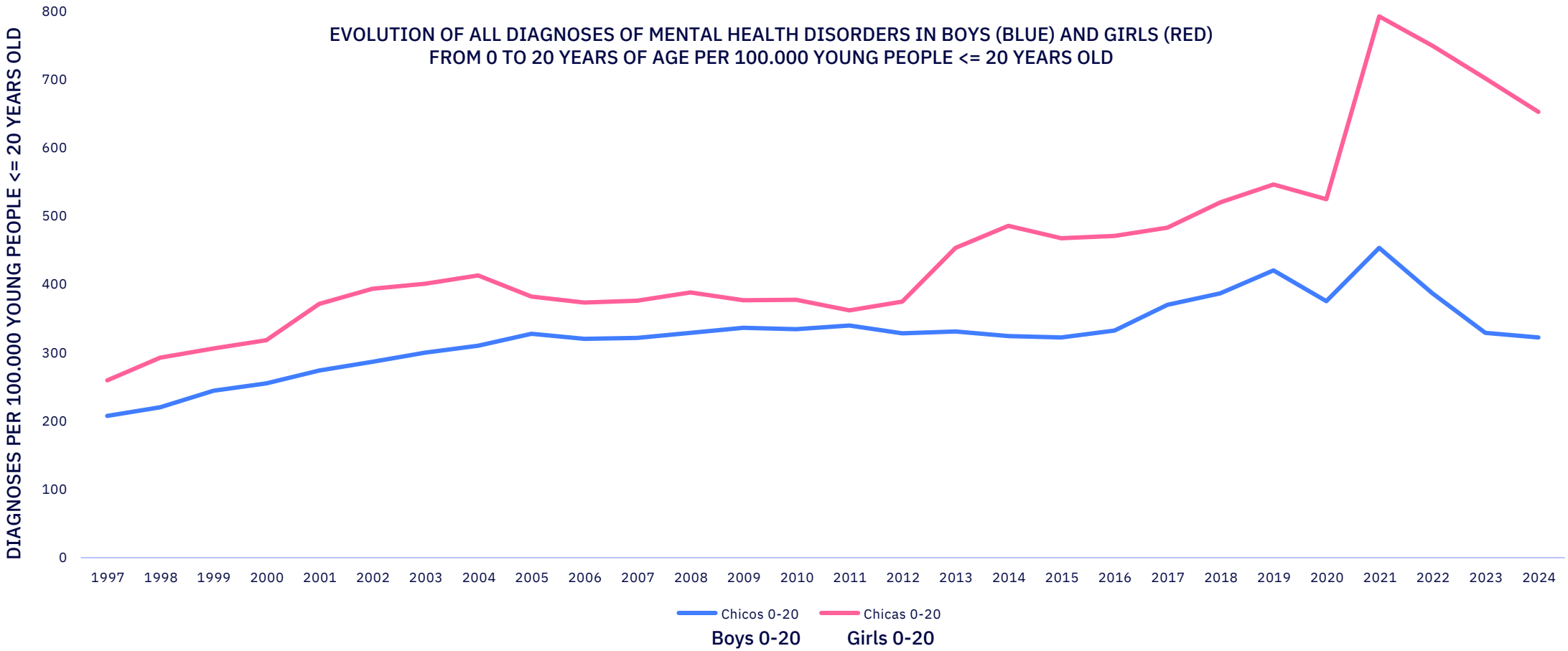
Temporal evolution of mental illnesses in Spanish young people between 1997 and 2024

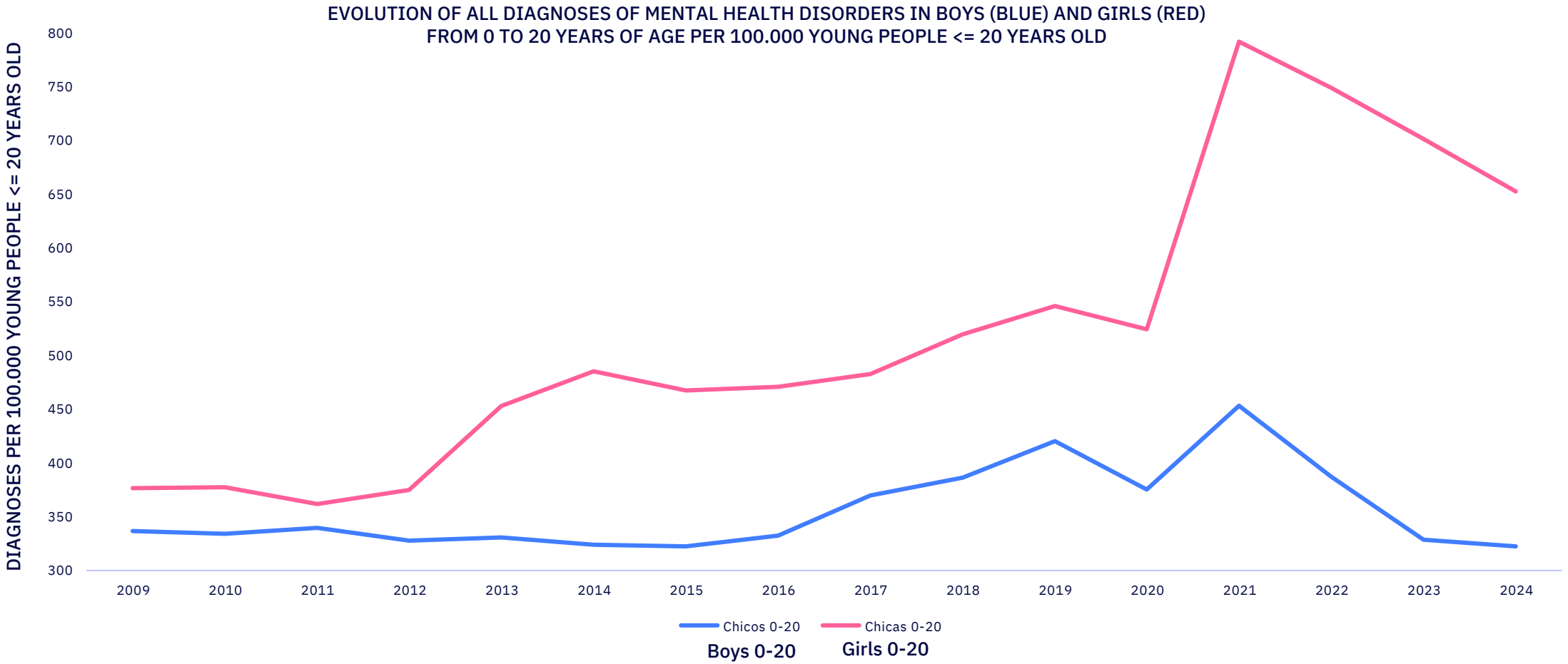
Mental illness as primary and secondary diagnoses in boys and girls up to age 20. Mental illness among young people up to age 20 was growing significantly from 1997, consistently staying below 725 cases for every 100.000 individuals**, however, it was from 2012 onwards that the incidence began its explosive rise, culminating in the months immediately following the start of the Covid-19 pandemic** in Spain, with the **highest figures in all of recorded history, showing a 300% increase compared to 1997.**



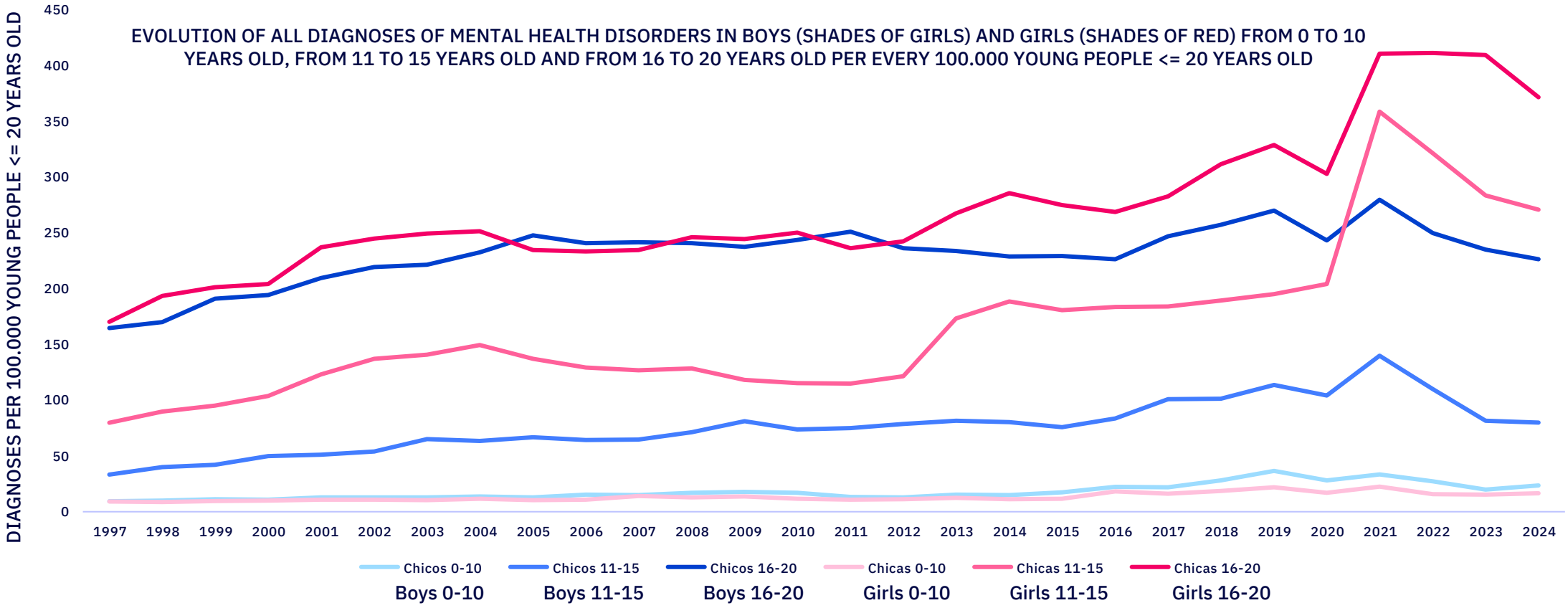
Breakdown by gender. Mental illness among young people up to age 20 was growing significantly from 1997, consistently staying below 415 cases for every 100.000 individuals**, however, it was from 2012 onwards that the incidence began its explosive rise, culminating in the months immediately following the start of the Covid-19 pandemic** in Spain, with the **highest figures in all of recorded history, showing a 300% increase compared to 1997.**



Focus on 2009 – 2024. About the previous graph, focusing on the most recent period, confirms the findings of other similar analyses outside of Spain: **girls are most 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 pandemic, the gap between boys and girls widened significantly once preventive measures were relaxed and they were able to receive medical care.



Breakdown by age groups. For the first time in recorded history, **at the end of 2021, girls aged 11 to 15 surpassed older boys aged 16 to 20 in terms of mental illness**, demonstrating that the Covid-19 crisis had a special impact on girls. A detailed analysis of primary and secondary diagnoses – the principal or secondary reason for seeking medical attention is mental illness – indicates that **primary diagnoses in girls are the main contributors to this trend, i.e., mental illness is the main cause of the hospital data records.** It is noteworthy that **cases among girls aged 11 to 15 are almost equal to those among girls aged 16 to 20, and that the upward trend among children under 10 is consolidating for both sexes.**



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Description of the categories of Mental Illnesses analyzed

MOOD DISORDERS [AFFECTIVE]
This block includes disorders in which the fundamental disturbance is a change in affect or mood towards depression (with or without associated anxiety) or towards euphoria. The mood change is generally accompanied by a change in overall activity level; most other symptoms are secondary or easily understood in the context of the change in mood and activity. Most of these disorders tend to be recurrent, and the onset of individual episodes can often be related to stressful events or situations

SCHIZOPHRENIFORM, SCHIZOID AND DELUSIONAL DISORDERS
This block brings together schizophrenia, as the most important member of the group, schizoid disorder, persistent delusional disorders, and a broader group of acute and transient psychotic disorders.

PERSONALITY AND BEHAVIORAL DISORDERS IN ADULTS
This block includes a variety of clinically significant conditions and patterns of behavior that tend to be persistent and appear to be an expression of the individual's characteristic lifestyle and way of relating to themselves and others.

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

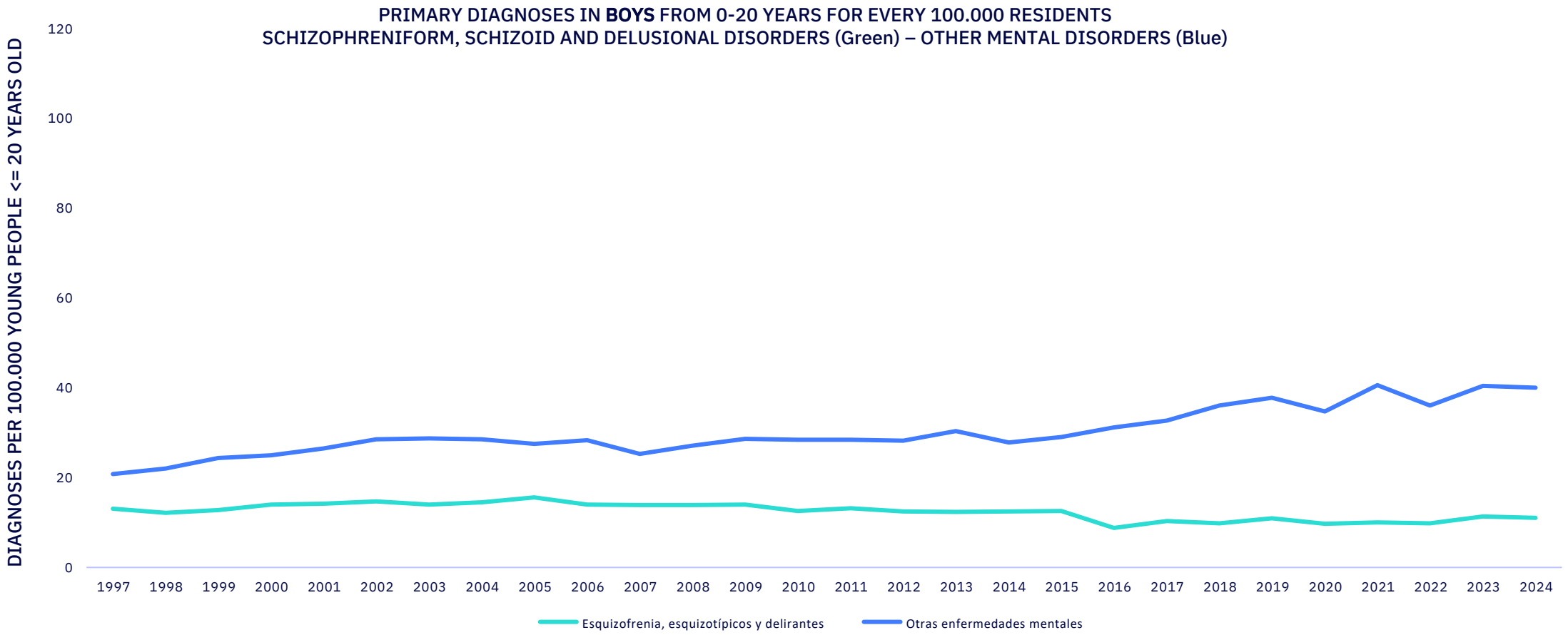
BEHAVIORAL SYNDROMES ASSOCIATED WITH PHYSIOLOGICAL DISORDERS AND PHYSICAL FACTORS
A group of disorders characterized by early onset (usually with the first five years of life), lack of persistence in activities requiring cognitive engagement, and a tendency to move from one activity to another without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

MENTAL AND BEHAVIORAL DISORDERS DUE TO THE USE OF PSYCHOACTIVE SUBSTANCES
This block contains a wide variety of disorders that differ in severity and clinical form, but which are attributable to the use of one or more psychoactive substances, which may or may not have been medically prescribed.

BEHAVIORAL AND EMOTIONAL DISORDERS THAT GENERALLY BEGIN IN CHILDHOOD AND ADOLESCENCE
A group of disorders characterized by early onset (usually within the first five years of life), lack of persistence in activities requiring cognitive engagement, and a tendency to move from one activity to another without completing any, along with disorganized, poorly regulated, and excessive activity.

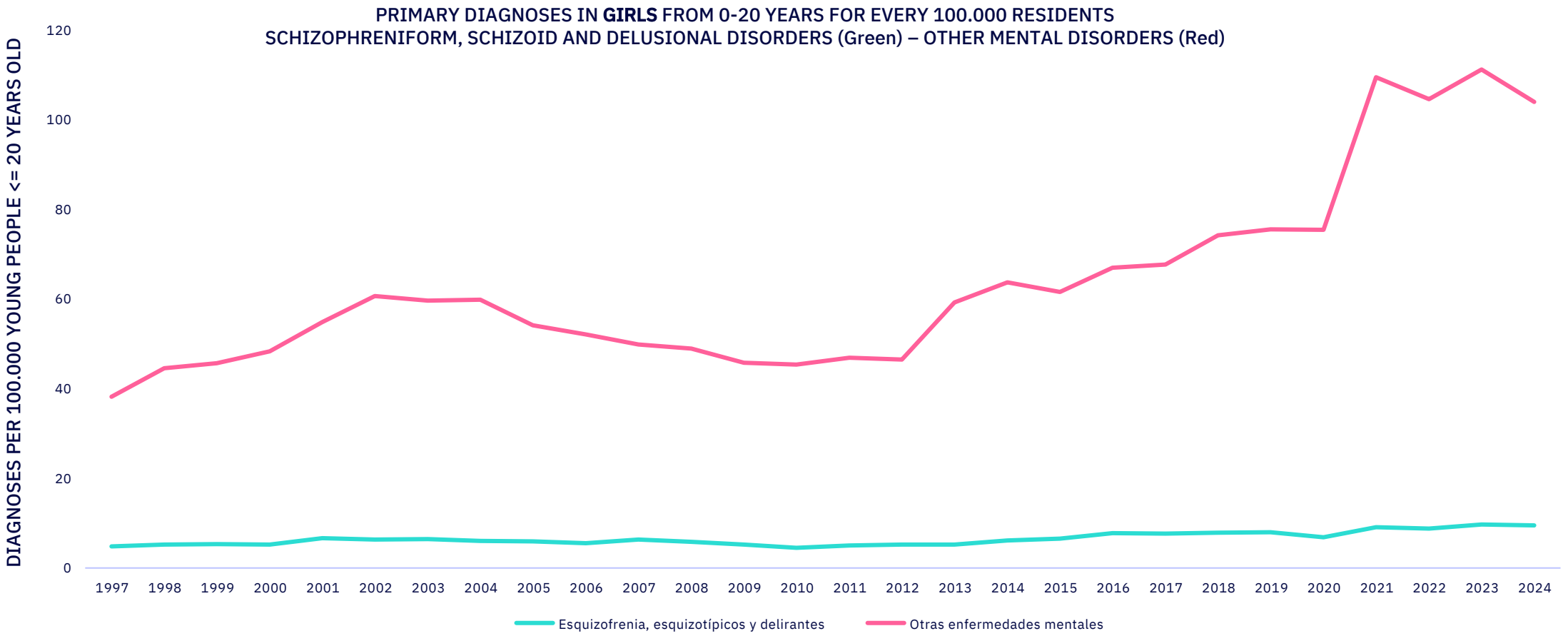
ICD-10 Version:2019 (who.int)

Mental illness as a primary diagnosis in boys aged 0 to 20 years, by category. Schizophrenia appears to be the mental illness with the most stable incidence, while other mental illnesses contribute to the progressive increase in cases.



Schizophreniform, Schizoid and Delusional Disorders – Other Mental Disorders

Mental illness as a primary diagnosis in girls aged 0 to 20, by category. As with boys, girls are not affected by an increase in the incidence of schizophrenia.



Schizophreniform, Schizoid and Delusional Disorders – Other Mental Disorders

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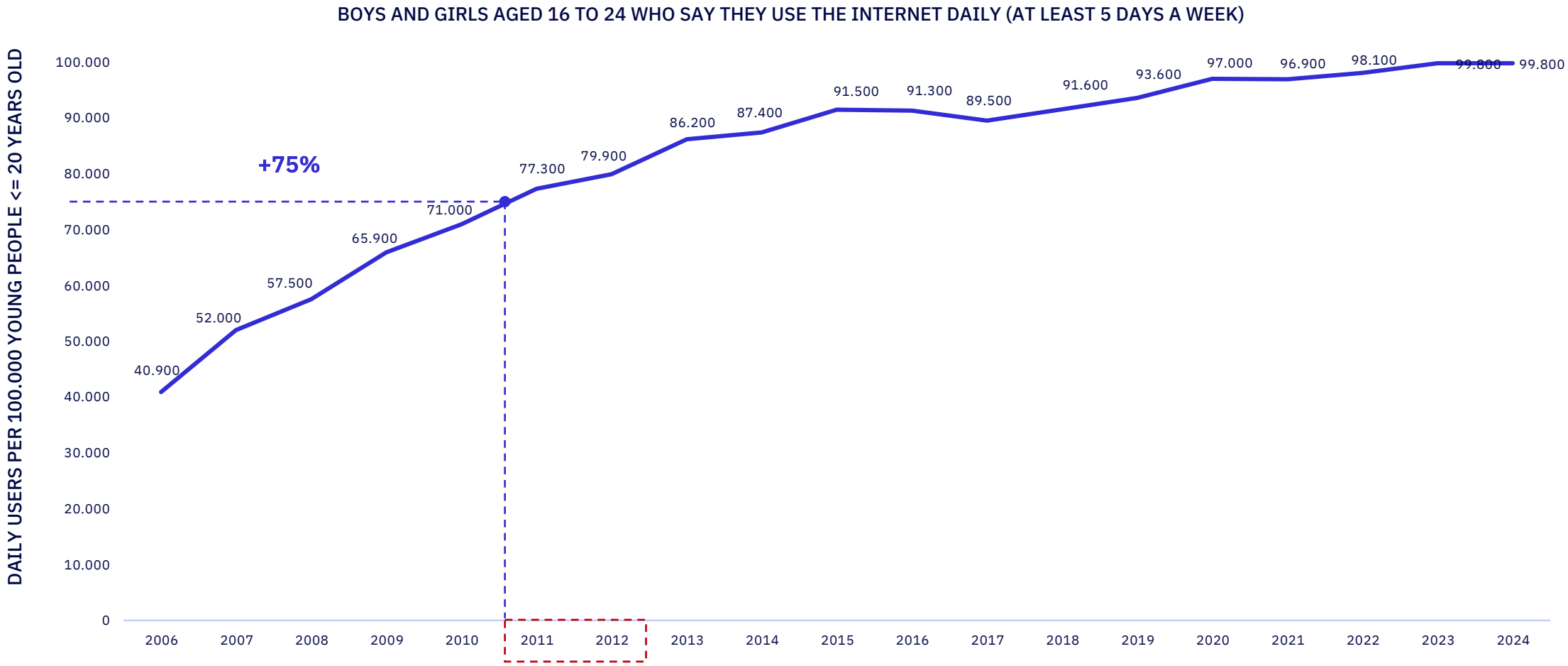
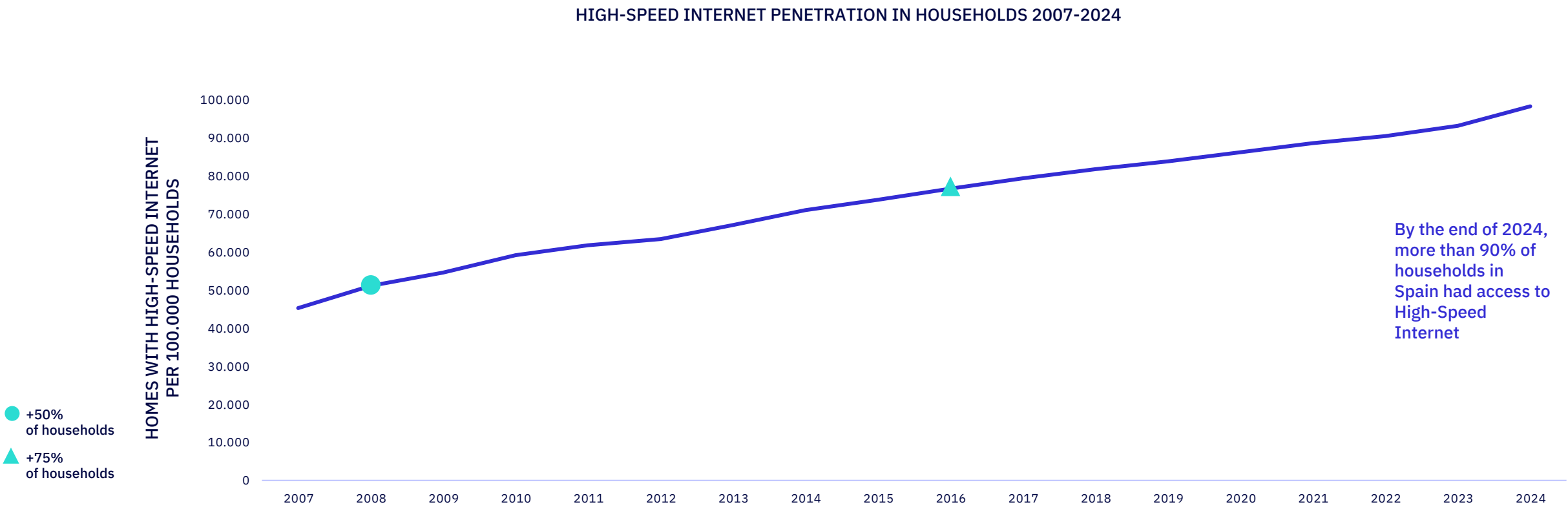
Temporal evolution and correlation of mental illnesses *and injuries attributable to physical activity among Spanish youth between 1997 and 2024*

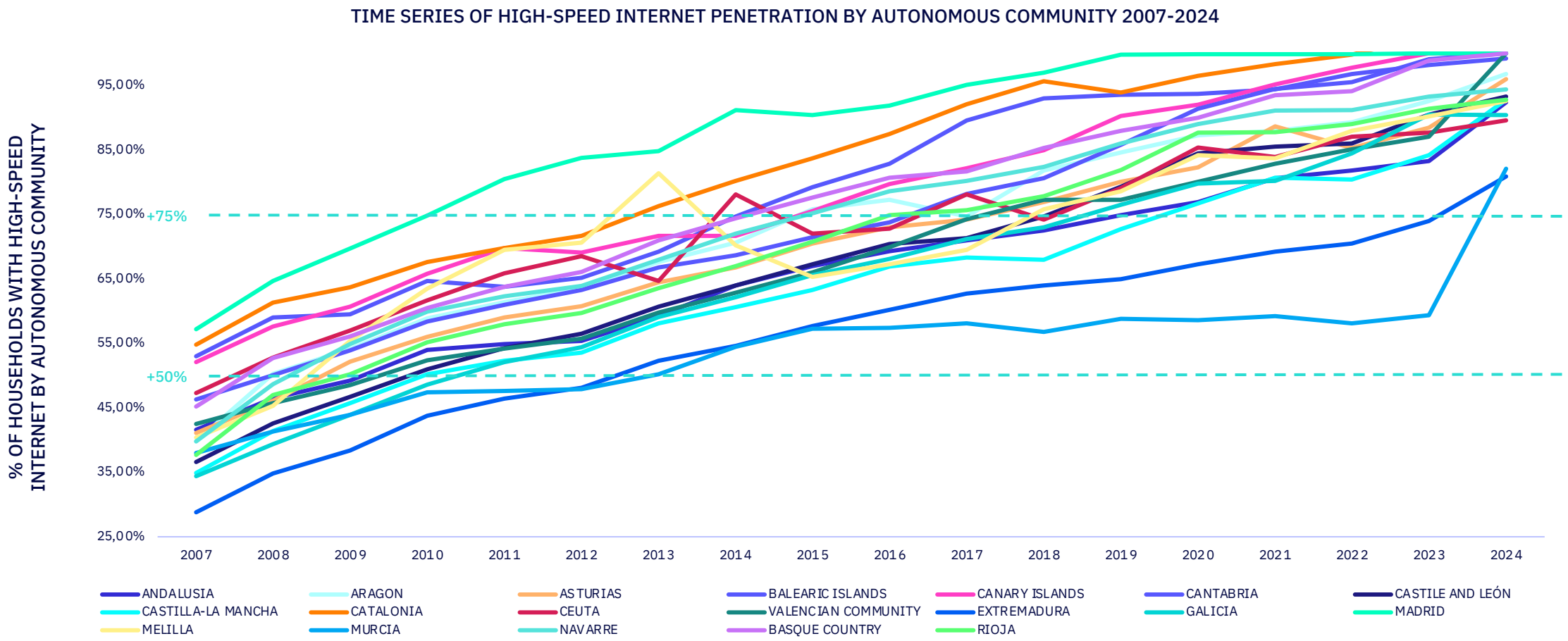
Daily Internet use among young people aged 16 to 24 (at least five days a week). There has been a gradual increase in reported use, reaching 75% of young people in Spain in 2011.



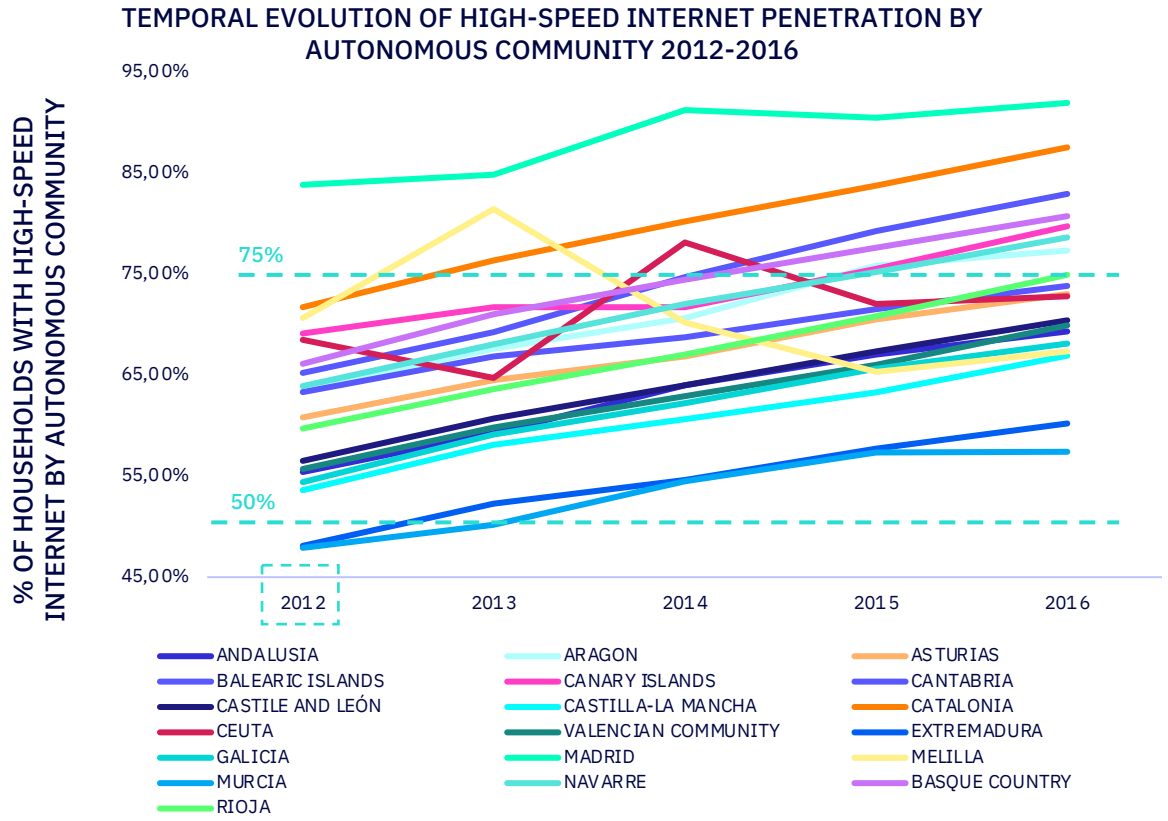
Households with High-Speed Internet (HIS) 2007-2024. Previous data on the declared use of Internet access by adolescents between the ages of 16 y 24 are consistent with the deployment of HSI (FFTH, Fiber to the Home) in Spain. It's important to note that, as detailed on the following page, the progressive deployment over several years was not uniform (for a variety of reasons, as already indicated in the analysis by Arenas-Arroyo et al.,2023). Two effects can therefore be expected: a) that those communities in which FTTH penetration was slower should show a lower correlation with the incidence of mental illness, and b) that the massive increase in the use of HSI during the Covid-19 pandemic should reflect a massive increase in cases of mental illness, something we have already seen in previous analyses.

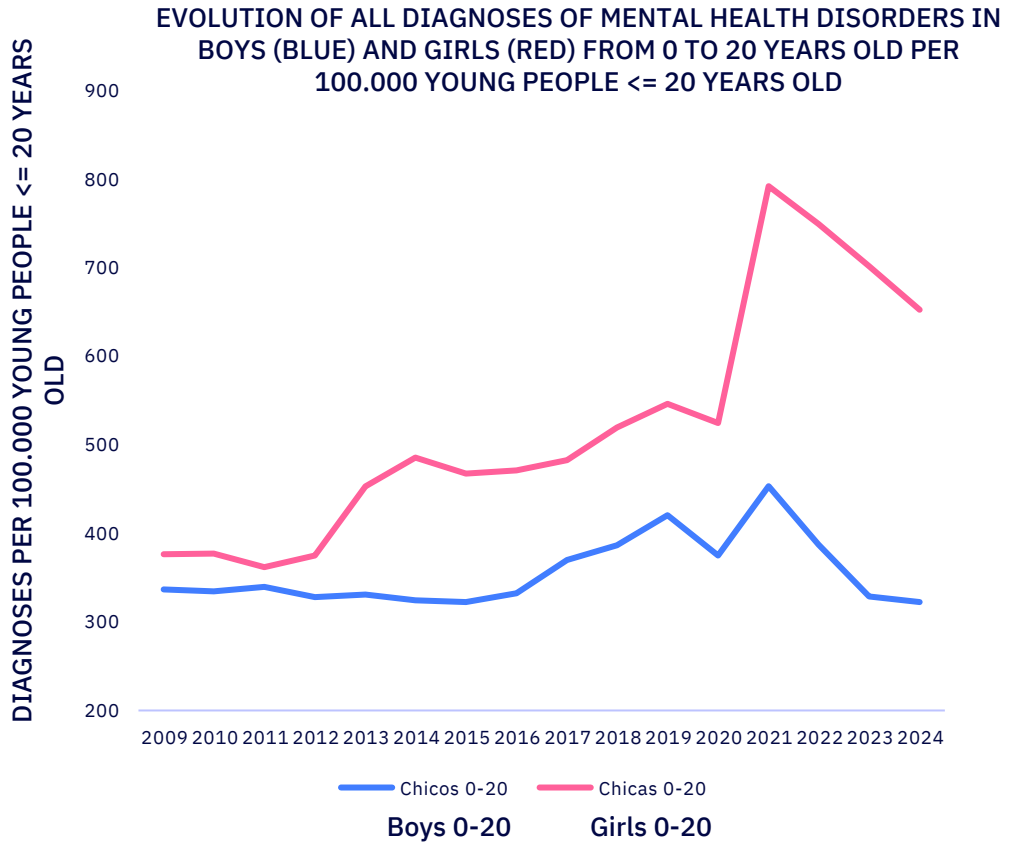


% of households with High-Speed Internet (HSI) by autonomous community 2007-2024. The data points in this graph confirm that, as already mentioned in Arenas-Arroyo et al. (2023), **the penetration of High-Speed Internet (HSI) into households is very uneven most of the time:** in Extremadura HSI penetration of 50% of households was not achieved until after 2012, while in Madrid HSI penetration exceeded 75% in households prior to 2010. To understand the causes in greater detail, we recommend reading the Annex to this document.



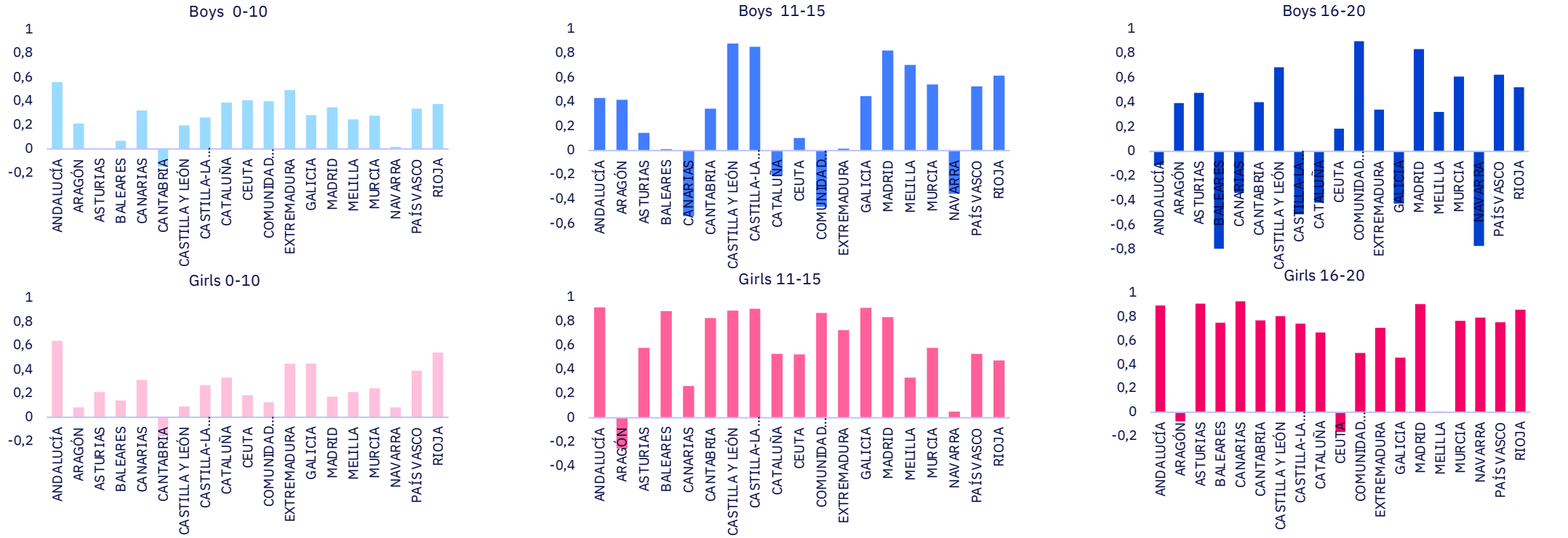
Focus on 2012. The data points in this graph focus on the 2012 – 2016 period, a key period as already indicated, **since 2012 is when there was a significant increase in cases of mental illness in children and adolescents that has not yet ceased** - especially in girls. And it was precisely **throughout 2012 that all autonomous communities achieved at least 50% HSI penetration in households.** Arenas-Arroyo et al. (2023) also concludes that for every one standardd deviation (SD) increase in HSI penetration (optical fiber, FTTH), in other words, an increase in HSI penetration, **there was a 13.3% rise in cases of mental health disorders, with a particular increase in the incidence of anxiety, mood disorders, substance abuse, self-harm and suicide attempts. This data already suggested that increased use would lead to an increase in cases , which is reflected in the impact of the Covid-19 crisis.**





Correlation between households with fixed broadband and increases in mental illnesses across all diagnoses from 2007 to 2024. In our study, when determining the correlation over the complete period 2007–2024, the evidence is very clear: with the exception of Boys aged 11–20, where correlations vary significantly between strong and very weak or with no apparent correlation in some autonomous communities, in the remaining age bands, and especially with girls, **a predominance of strong correlations is observed in the majority of autonomous communities between access to high-speed Internet in the 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 for accessing information and services. What this analysis and similar ones 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 (IAV) AND INCREASES IN MENTAL ILLNESSES BY AUTONOMOUS COMMUNITY FROM 2007 TO 2024 BY 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

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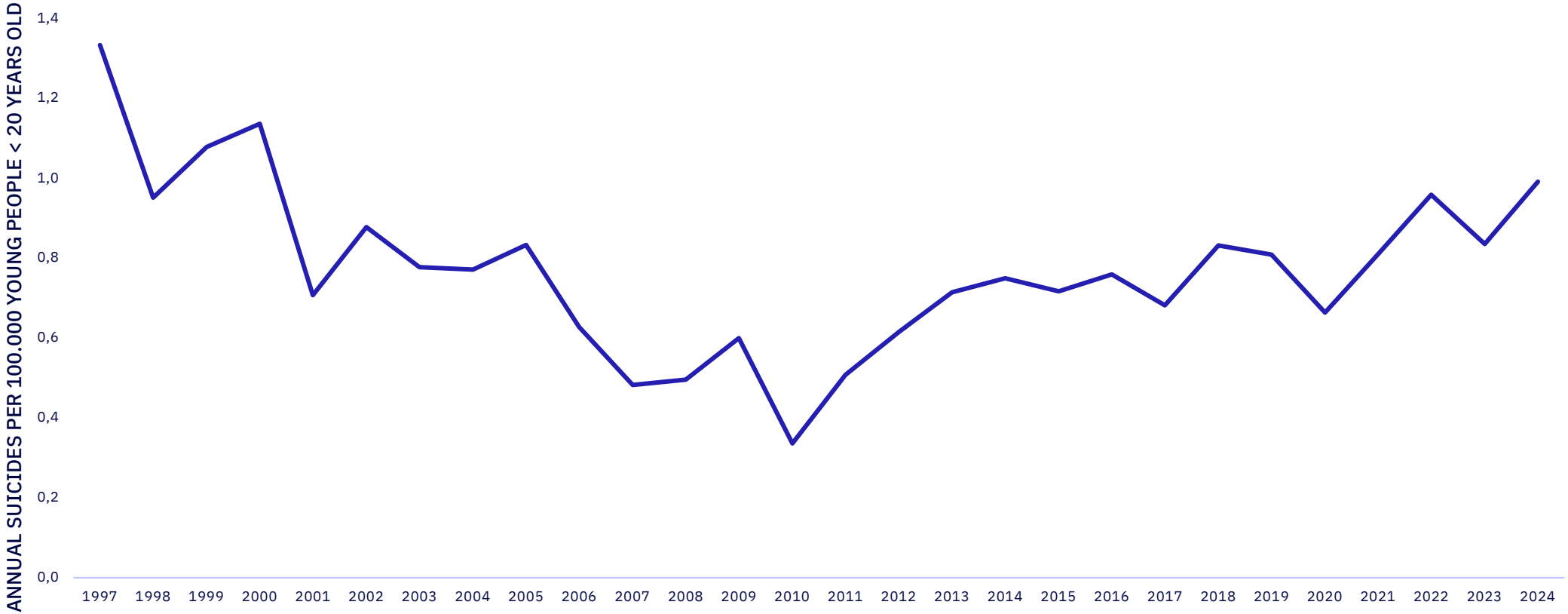
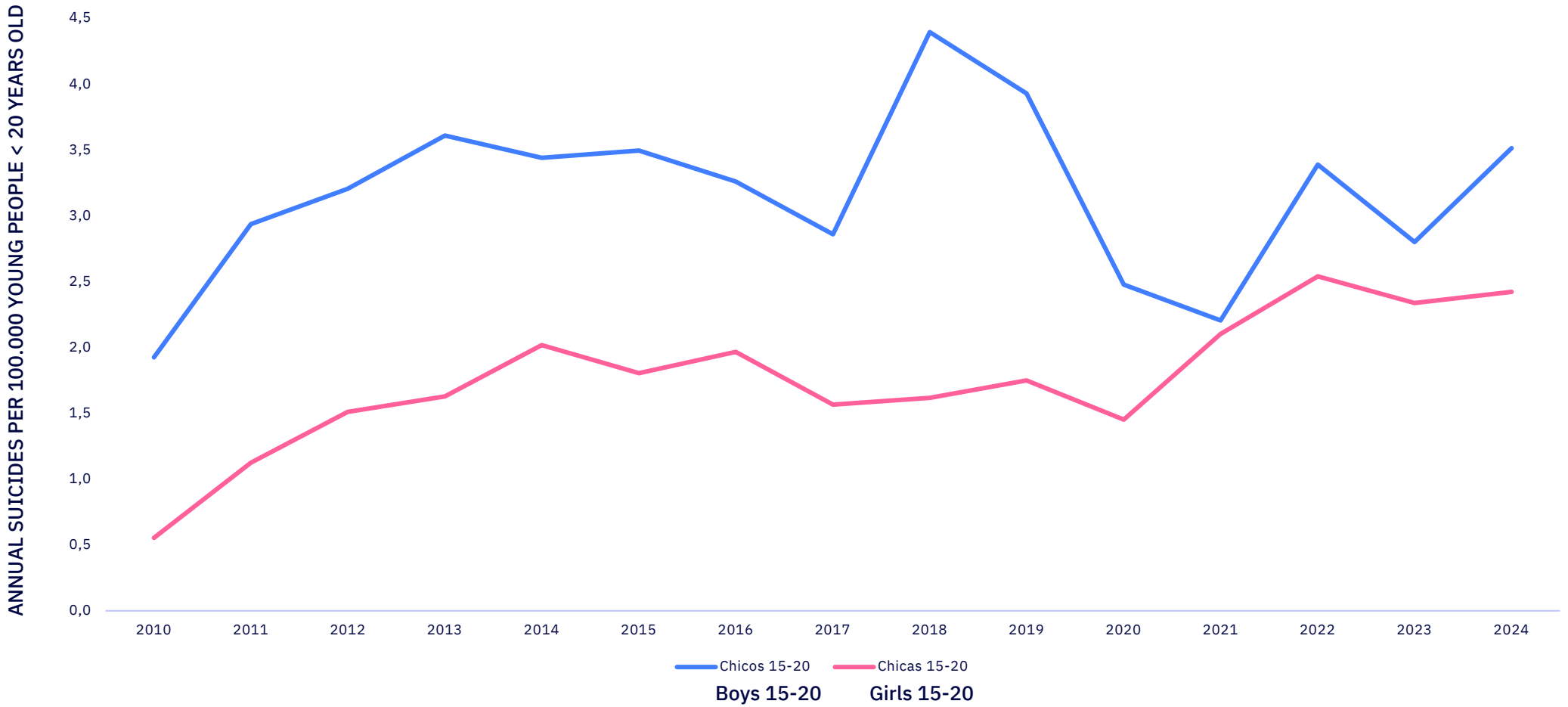
Temporal evolution of Suicides *in Spain in people under 20 years of age*

Deaths by suicide in people under 20 years of age. Starting in 2011-12, there was a noticeable change in a trend that had begun in the late 1990's. It is again during the Covid-19 pandemic that the greatest increase has been observed. These data points are **clear evidence that the problem of mental health in people under 20 is real and is not the result of a higher number of medical diagnoses due to to greater social and medical awareness or sensitivity.**

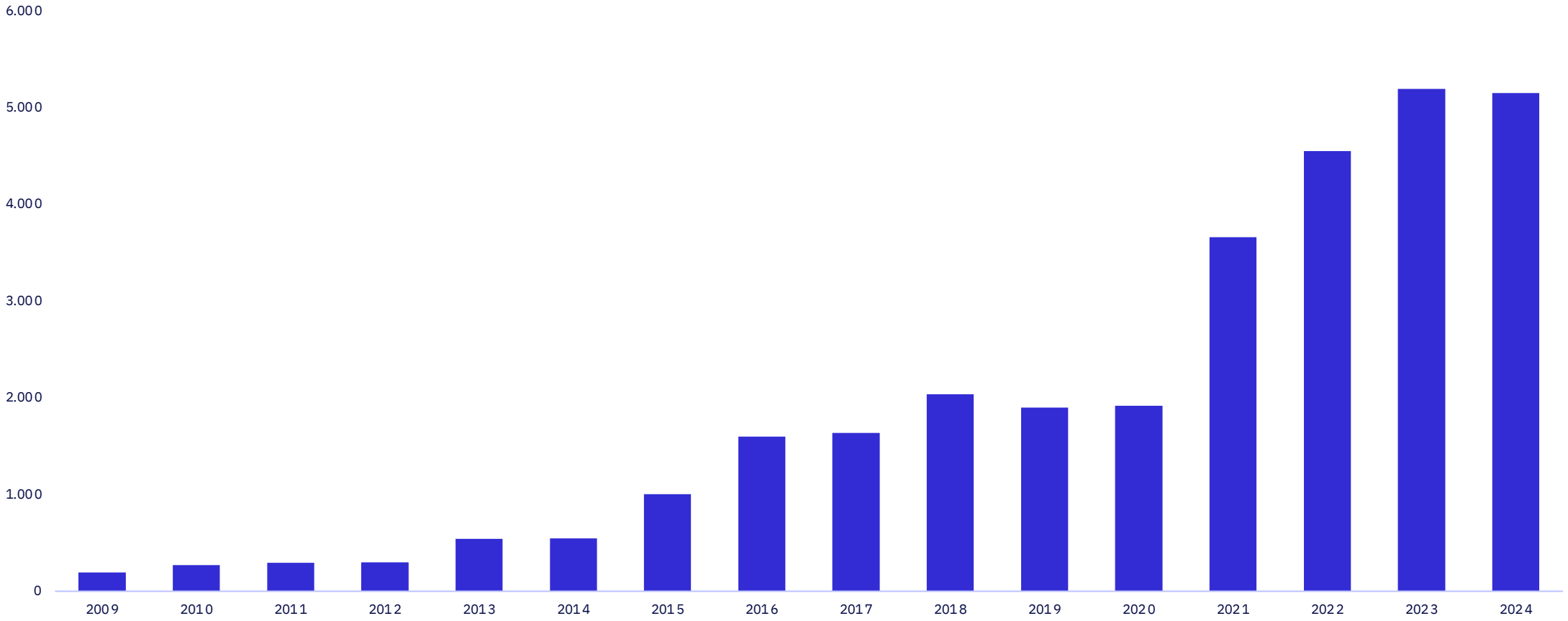


Suicides in boys and girls between 15 and 20 years old. It's important to note that the traditional predominance of suicide among males had disappeared in 2021, when the effectiveness of committing suicide among boys and girls is almost equal.



Requests for help related to suicidal ideation and suicide attempts among young people from the ANAR Foundation. The increase in deaths by suicide for people younger than 20 years old since 2011-12 coincides with a significant increase is requests for help by young people as reported by the ANAR Foundation, which peaked in 2023.

TELEPHONE CALLS MADE TO THE ANAR FOUNDATION TO REQUEST HELP IN RELATION TO SUICIDAL IDEATION AND SUICIDE ATTEMPTS IN YOUNG PEOPLE.



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Analysis of the Costs *of Mental Illness by* hospitalizations *by primary diagnoses 1999 -2024*

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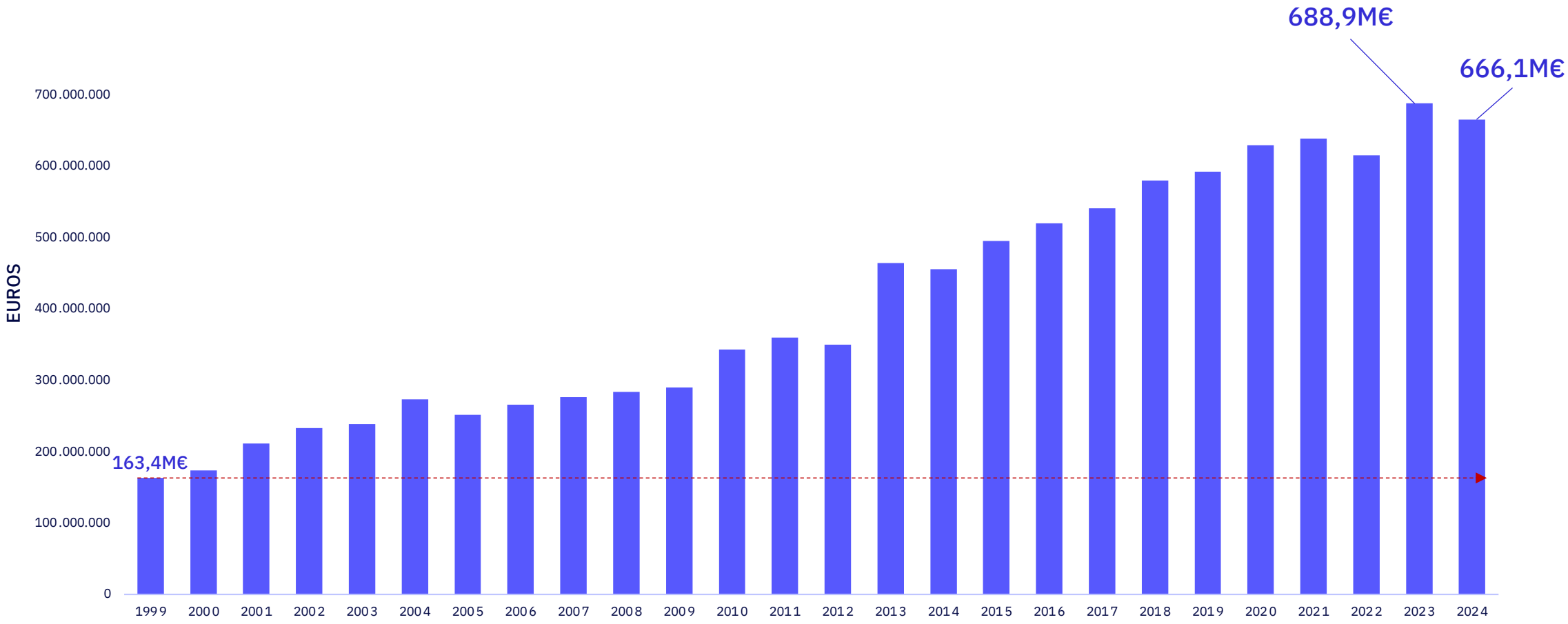
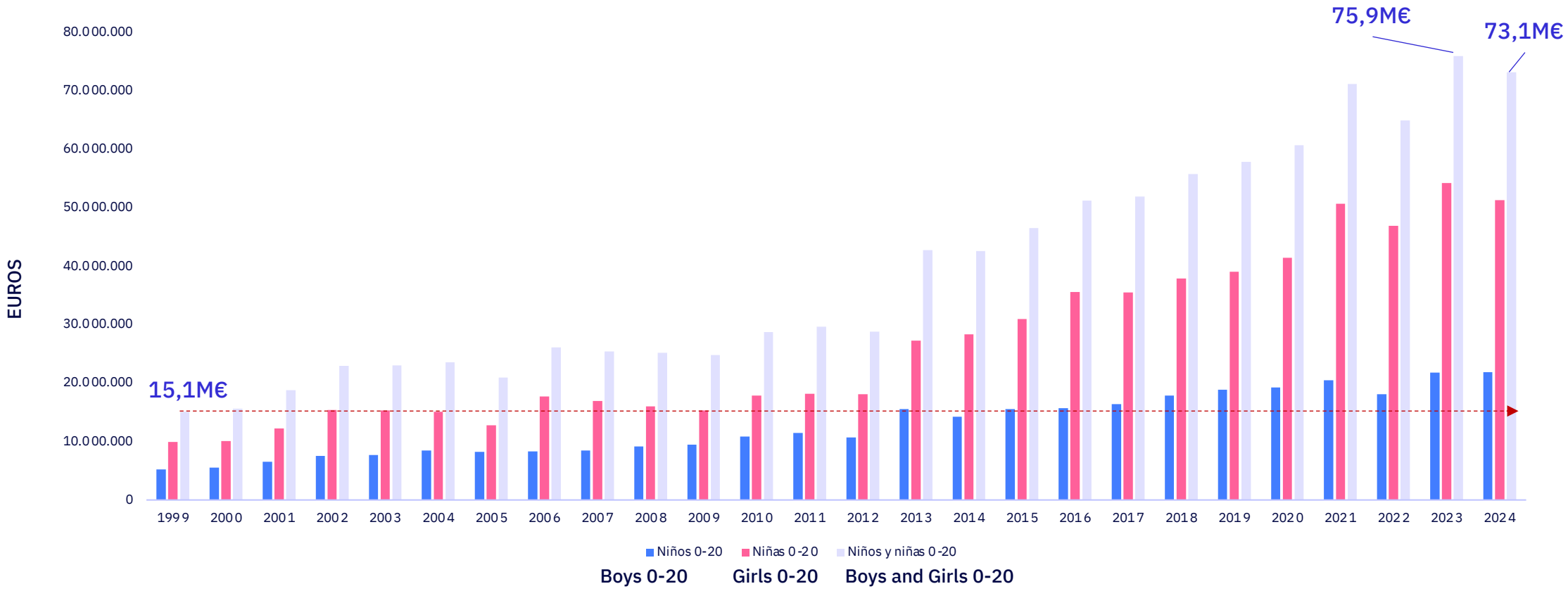
Costs of diagnoses related to mental illness in Spain for all ages. The total cost – of expenses associated with all ages – **has increased significantly from 163,4 million of euros in 1999 to 688,9 million euros in 2023. This represents an increase od more than 400%.** ***Only cases where mental illness is the primary diagnosis and not secondary have been considered. This avoids overrepresenting the cost in cases where diagnoses unrelated to mental illness are the main cause of admission and their diagnosis or procedure is more expensive.***



Costs from hospitalizations relate primarily with mental illnesses in children and adolescents aged 0 to 20 years. Its very important to not that this represents on the hospital costs, in other words, the costs derived from the hospitalization of young people up to age 20 for reasons related to mental illness, in other word, the most serious cases. When we ask what the reasons for hospitalization might be, we were told that there are two: that the patient may attempt to harm themselves or others, **meaning that only extreme cases are reflected in this costs analysis.** Two worrying trends stand out in this graph: on the one hand**, the cost has increased progressively from 15,1 million euros in 1999 to 75,9 million euros in 2023. Therefore, more than 10% of the total hospitalization costs related to mental illness in Spain are dedicated to caring for people under 20 years old, and the cost has grown by more than 500% since 1999 once again showing a significant increase since 2012, which had been particularly marked in the post-Covid-19 period.** In addition, there has been a worrying trend in the costs of caring for girls, **which now account for 75% of the total costs.**



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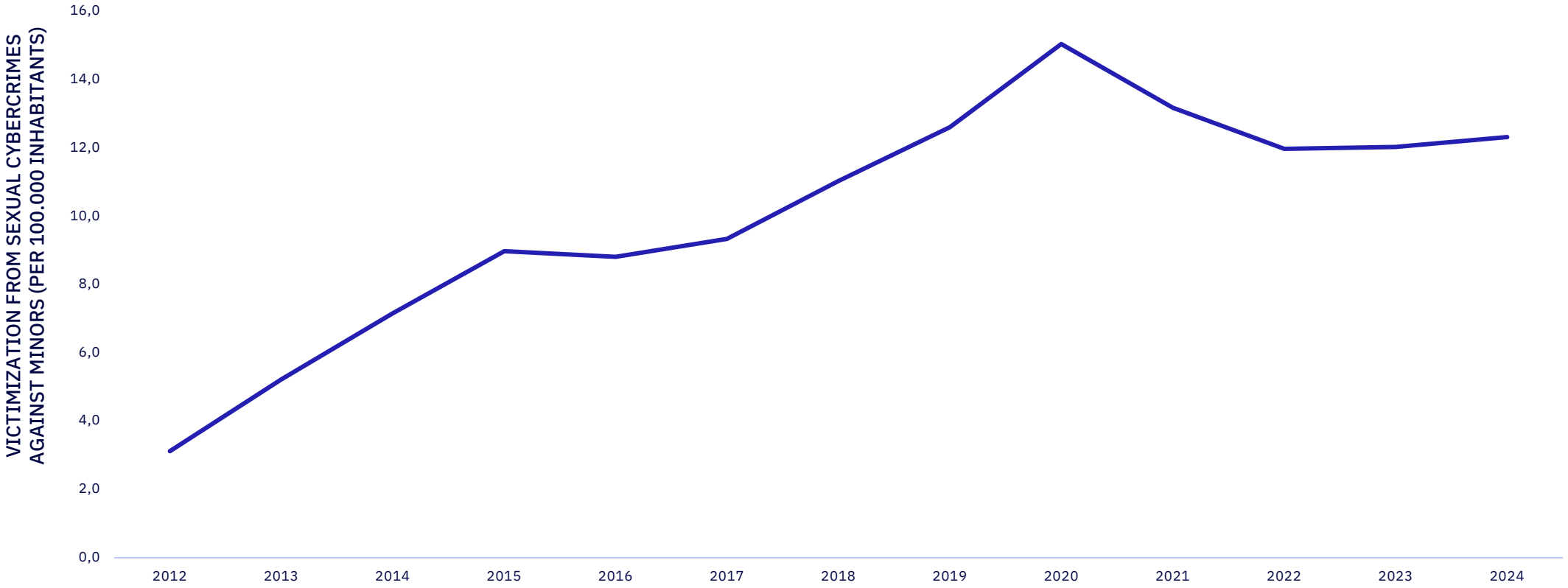
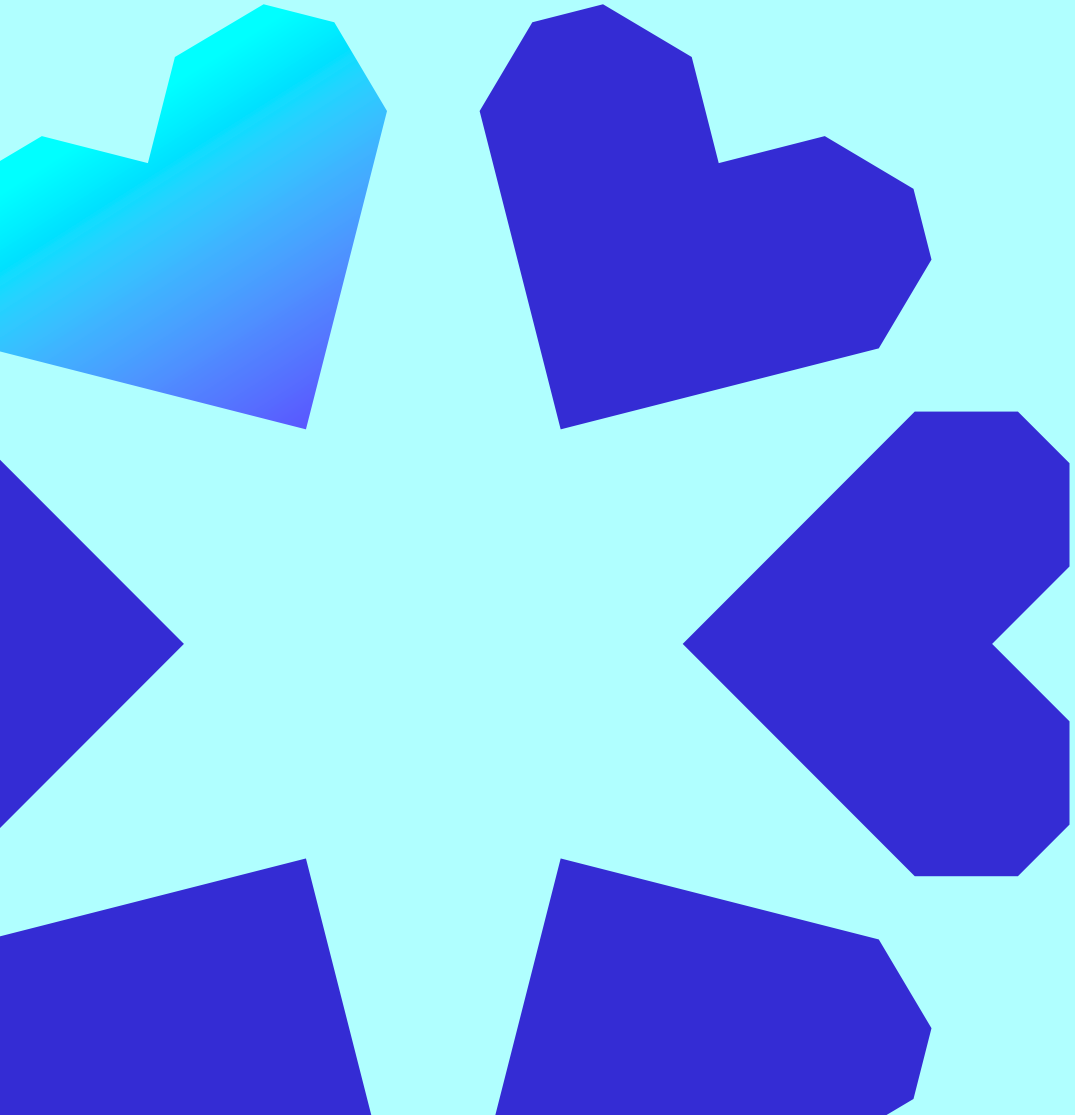
Analysis of the Victimization of minors in *sexual cybercrime 2012-2024*

Victimization of minors by sexual cybercrime. The concept of victimization refers to a number of events reported by individuals in which they claim to be victims or to have suffered harm due to a crime. It differs from the concept of a 'victim' in that the latter refers to individuals. **This metric experienced significant growth among minors from 2012 to 2020, in line with the other variables analyzed in this study**, with only a slight decline detected in 2021-22. **The correlation between these phenomena and mental illness diagnoses is also strong (0.68 out of 1), as suggested by the graph itself.**



Cyber Guardians Healthier Digital Lives



A look to the future & conclusions

A Look into the Future: Artificial Intelligence and New Cognitive Threats

Artificial intelligence is already transforming the digital experience — and with it, the risks for young people. We are not talking about future scenarios: these cases are already happening.Deepfakes and body image manipulation: AI filters that transform faces and bodies in real time are normalizing unattainable standards.

There are already documented cases of teenagers generating fake intimate images of classmates. AI-enhanced addiction algorithms: recommendation systems are becoming increasingly sophisticated at capturing and retaining attention, especially among the most vulnerable users. Unsupervised chatbot interactions: minors are engaging in prolonged conversations with generative AI systems without any filters or parental controls, with cases that have already led to serious consequences.These threats do not replace the ones we already know — they amplify them.

The business model of the attention economy, built on the exploitation of cognitive vulnerabilities, now has exponentially more powerful tools at its disposal.Various authorities are already responding.

The Spanish Association of Pediatrics has established clear recommendations on phone-free spaces and age-based screen time limits.

At CyberGuardians, we are convinced that a shift in approach is possible, and that it must begin with the commitment of each one of us. We encourage parents, educators, and citizens to visit our website, share this analysis, and, if they see fit, support legislative initiatives at the Spanish and European level that ensure healthier digital lives for young people.

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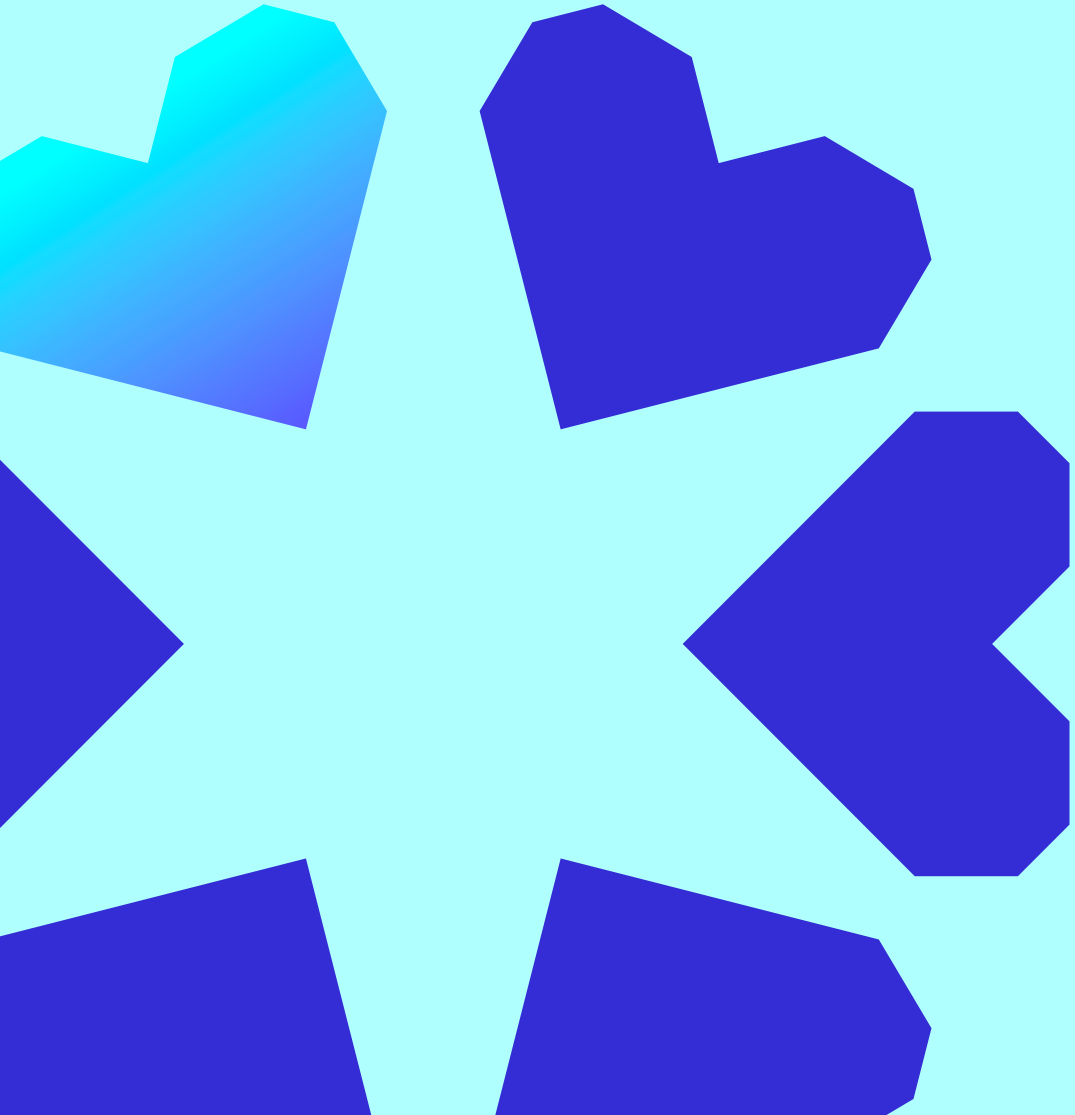
Appendix

Cyber Guardians Healthier Digital Lives



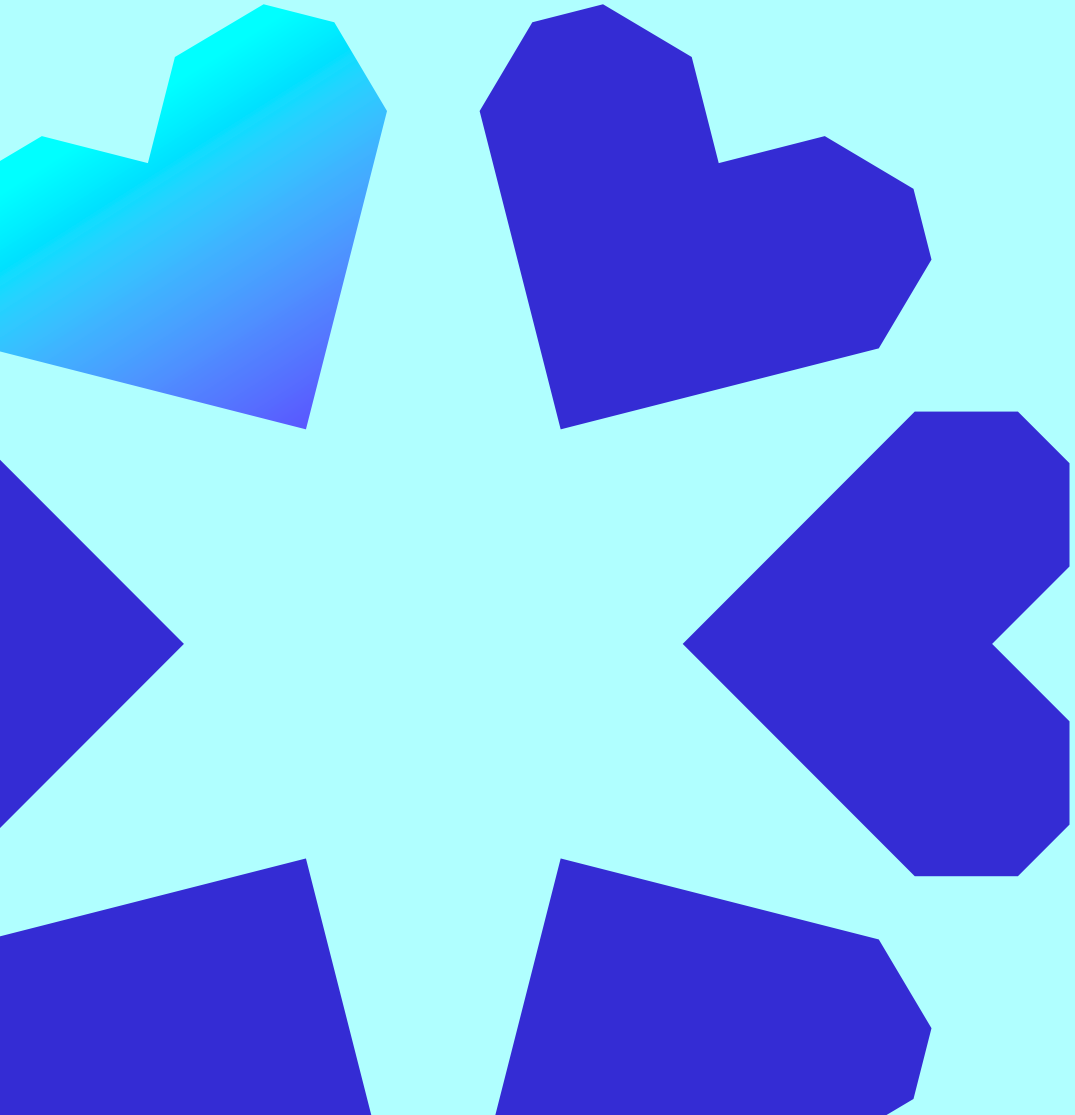
Background, scientific basis for the analysis, and main research questions

- This analysis is largelyy inspired by the work of **Professor Jonathan Haidt**, a social psychologist at New York University. Haidt has spent the last few years researching the profound mental health crisis among young people in preparation for his latest book "***The Anxious Generation"*** which was recently published. Hadit's work , in collaboration with other researchers, has been extremely helpful in establishing the scope of this analysis and guidingg it to maximize its contribution to existing research. In particular, we would like to highlight three of Haidt's collaborative studies, still in development, that we consider 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 distinguished himself 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, in his work, possible alternative explanations to his main thesis in order to test its robustness and has thus systematically responded to each of them with data and logical reasoning: from the impact of increased drug use, the presence of environmental toxins or the use of new drugs to changes in family models or international standards for coding mental illness (ICD or DSM). 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 five rule for parents that his considers key to mitigating the negative effects of this crisis and that we find interesting:
  1. Give children much more time to play with other children. This play should ideally be outdoors, in mixed-age groups, with little or no adult supervision (which is how most parents grew up, at least until the 1980s)
  2. Find more ways to integrate children into stable, real-world communities. Social media is nowhere near as bonding or satisfying.
  3. Don't give a smartphone as a first phone. Give them a phone or watch that specializes in voice communication, not internet apps.
  4. Don't provide a smartphone until middle school. This is easy to do if many of your children's friends' parents are doing the same.
  5. Delay opening accounts on almost all social media platforms until the start of middle school (at a minimum). This will be easier to achieve if we support lawmakers who are trying to raise the age of "internet majority" from the current 13 (without verification) to 16 (with mandatory verification)

- It is also important to note the great usefulness 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-Kranzy Natalia Nollenberger of the Vienna University of Economics and Business, IZA and IE University. This study is based on the analysis of **Spain's hospital information** and lays the groundwork for out study.
- The updated version of the IZA study published in May 2023 details, in the case of **Spain**, how increases in mental health problems in children and adolescents has coincided with the increase in use of digital media and social media and how the most significant changes occurred among girls, who are more sensitive than boys to social interaction, especially during adolescence (LaFontana y Cillessen, 2010; Flook, 2011; Shih, 2006).
- The study demonstrates that **access to High-Speed Internet (HSI) without restrictions or control increasing the addictive use of the Internet and significantly decreases that time dedicated to sleeping, doing homework and socializing with family or friends in adolescents.** Finally, the study shows that access to the Internet without control harms **the quality of the relationship between parents and daughters**, especially when there were previous conflicts.
- This study contains multiple interesting findings, but possibly the most relevant one for us was taking advantage of the variable speed in the deployment of fiber optics in Spanish provinces between 2007 and 2019 – key for access to High-Speed Internet (HSI) - to analyze the effect on the cases of diagnoses of mental health illnesses and the behavior of adolescents discharged from hospitals and establish a casual relationship**:**
  - The study demonstrates that the penetration of fiber optics, in other words, the possibility of intensive access to social media and audiovisual content significantly increases the cases of mental health illness (BMH) in adolescents. For **every increase by one standard deviation (SD) of the penetration of fiber optics found an increase of cases of mental health problems by 13,3%** in cases of anxiety, mood disorders, substance abuse, self-harm and suicide attempts. The study also provides evidence that suggests that **access to High-Speed Internet (HSI) is a contributing factor in the significant increase in deaths related to suicide or self- harm in adolescents**. It's important to note the study assumes that adolescents have access to a device with Internet access and have no restrictions on their use of social media and networks.
  - In simplified form the study can be explained like this: ***it analyzed how, as uneven fiber penetration reached households, cases on mental health disorders in adolescents increased, delaying the negative effects in those households without access to High-Speed Internet.*** It is important to note, as can be seen in our study, that the ability of households to access fiber, and therefore video- and image- based social media services, was uneven during the period analyzed, particularly between 2012 and 2018.

- The study by IZA demonstrates that there is a growing body of scientific analysis that has established that **causal links between Internet access and the mental health of young people. The results are very robust to various sensitivity tests that reinforce the aforementioned causality** This study by IZA complements and is consistent with Braghieri et al. (2022), which discovers that the gradual introduction of Facebook into universities in the United States worsened the mental health of university student due to negative social comparisons. In a similar manner, Nieto y Suhrcke (2021) encountered that access to a digital television in the United Kingdom brought unhealthy habits and, ultimately, worsened the mental health of children. As the investigators indicated, their results are in accordance with those of Braghieri et al. (2022), Golin (2022) y McDool et al. (2020), who have also documented that broadband Internet has had a more negative impact on girls than among boys.
- In addition to the previously cited studies, **we have revised more than 100 scientific and informative articles, reports and interviews with specialists similar to those noted in this brief introduction,** some of which we have included on our website in the "Knowledge Hub" section.
- **The results of all of these studies have helped us to understand and explain the great deterioration of mental health among adolescents. In addition, they have confirmed that a consensus among the scientific community exists about the casual relationship, not merely correlation, between the diminishing mental health of children and adolescents and the indiscriminate use, without control, of the Internet, especially from advanced mobile devices (smartphones, tablets) to access social media and digital services designed to be addictive, as their business models are based on monetizing the attention captured from their users via advertising and/or the exploitation of the users' own data.**
- Despite everything previously mentioned there was **a set of questions and hypotheses that we found relevant and which were not entirely clear in the case of Spain in any of the revised studies and which we pose as the initial questions for our analysis:**
  - What was the trend in mental health illness level prior to 2010?
  - What is the cost of this phenomenon to the public coffers in Spain?
  - Could it be that greater health awareness about mental health explains the variation in the number of diagnoses?
  - Are the results and hypotheses of all the analyses confirmed, particularly those of in the study by Arenas-Arroyo et al. (2023) for dates after 2018 and specifically for the period immediately following Covid-19?
  - How was this phenomenon reflected in suicide behavior pattern?
  - What connection could be made with cybercrime?
  - What additional dangers could Artificial Intelligence pose to the mental health of our young people?

Cyber Guardians Healthier Digital Lives



Details of Data Sources and Methodology

Description of the process used to perform the analysis and the data sources used.

- Data on mental illness diagnoses from 1997 to 2024 have been requested from the Ministry of Health.
  Source: Ministerio de Sanidad. Registro de Actividad de Atención Especializada – Conjunto Mínimo Básico de Datos (RAE-CMBD). Definition and links to interpretation codes:
  https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm
- Data variable definitions:
  https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBDdocs/2018_ANEXO_solicitud_RAE_CMBD.pdf
- Diagnoses between 1997 to 2015 were given by the a Clasificación Internacional de Enfermedades CIE 9 (ICD-9), and diagnoses since 2016 have been classified according CIE 10 (ICD-10). Differences between data from 1997-2015 and 2016-2024 associated with the change in diagnosis codes have been reconciled. In this way, all (ICD-9) and (ICD-10)codes related to mental illness have been detected and all primary diagnoses (when the diagnosis is the main reason for admission) and secondary diagnoses (unrelated to the main reason for admission) have been requested from 1997 to 2024.
- The different categories of mental illness selected in the search are:
  - Organic mental disorders, including symptomatic disorders
  - Mental and behavioral disorders due to psychoactive substance use
  - Schizophrenia, schizotypal disorders and delusional disorders
  - Mood (affective) disorders
  - Neurotic, stress-related and somatoform disorders
  - Personality and behavioral development disorders
  - Psychological development disorders
  - Emotional and behavioral disorders that usually appear in childhood and adolescence
  - Unspecified mental disorder

- All diagnoses of mental disorders from 1997 to 2015 (ICD-9) and from 2016 to 2024 (ICD-10) are processed.
- The data is cleaned: date formats, null values, etc.
- The data formats of both diagnostic CSVs (ICD-9 and ICD-10) are standardized so that they can be integrated. It is detected that, possibly due to a delay in the adaptation of some hospitals and autonomous communities to the change from ICD-9 to ICD-10 classification, the evolution of diagnoses between 2015 and 2016 reflects a specific and non-homogeneous discontinuity in their distribution by autonomous communities. With the goal of eliminating the distortion in the time series, the difference between the volume of diagnoses in January 2016 and the average of the previous Januarys in the historical series in calculated and increased in the following months, effectively and rigorously reconciling the difference.
- All data is integrated to create a single CSV file containing all unified diagnoses
  - Duplicates are filtered out (e.g., diagnoses with identical record codes and repeated admission dates).
- With the integrated data from 1997 to 2024, three diagnosis tables are created:
  - Primary Diagnoses – we filter only the primary diagnoses of Mental Illnesses, i.e., when it is the main reason
  - Secondary Diagnoses – we exclude the primary diagnoses of mental illness and leave only those diagnoses of mental illness that are detected hen 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, population data has been extracted by age, year and autonomous community:
  Source: https://www.ine.es/jaxi/Tabla.htm?path=/t20/e245/p08/l0/&file=01003.px&L=0
- To measure the relationship between two data sets, we use the correlation coefficient, which is interpreted as follows (in absolute values)
  - Coefficient between 0 and 0.1: no 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

- Graph showing social media users worldwide from 2004 to 2018.
  Source: https://ourworldindata.org/rise-of-social-media

- Graph showing sales of smartphone worldwide from 2007 to 2023
  Source : https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/

- Physical activity – in order to deduce levels of physical activity and study the correlation between mental illness and diagnoses of fractures and sprains since 1997 requested from the Ministry of Health
  Source : Ministerio de Sanidad. Registro de Actividad de Atención Especializada. RAE-CMBD – Definición y enlaces de códigos de interpretación:
  https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm

- Eatin disorders and obesity – Data on eating disorders and obesity have also been requested from the Ministry of Health.
  Source : Ministerio de Sanidad. Registro de Actividad de Atención Especializada. RAE-CMBD – Definición + enlaces de códigos de interpretación:
  https://www.sanidad.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm

- Banda Ancha Por CCAA – Information is provided on lines, accesses, subscribers and base stations in Spain by autonomous communities for main markets and operators in telecommunications and audiovisual sector since 2007.
  Source : CNMC. https://data.cnmc.es/telecomunicaciones-y-sector-audiovisual/conjuntos-de-datos/datos-provinciales/telecomunicaciones

- Number of households – To compare broadband data per household with the number of households, data on number of households per autonomous community has been extracted for the CCAA.
  Source : INE. https://www.ine.es/jaxi/Datos.htm?path=/t20/p274/serie/prov/p02/l0/&file=02006.px

- Daily internet use (at least five days a week) – annual press release on the Survey on Equipment and Use of Information and Communication Technologies in Households 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 suicidal thoughts or attempts among minors since 2009.
  Source : Epdata (INE y Fundación Anar): https://www.epdata.es/datos/cifras-suicidio-espana-datos-estadisticas/607?accion=2

- Victimization of minors by sexual cybercrime – methodology and statistics on crime against the sexual privacy of minors.
  Source : Ministerio del Interior. https://estadisticasdecriminalidad.ses.mir.es/publico/portalestadistico/dam/jcr:bcd88e41-d513-4f15-8676-860c7980222f/02_02_Metodolog%C3%ADa_Hechos_Esclarecidos_.pdf
  Example (2021): https://www.interior.gob.es/opencms/pdf/prensa/balances-e-informes/2021/Informe-delitos-contra-la-libertad-e-indemnidad-sexual-2021.pdf

- Cost Analysis – Diagnosis costs are provided in the Ministry of Health's diagnosis database. The cost of each diagnosis is estimated based on the average cost of the DRG (Diagnosis Related Groups) for the diagnosis in question and the level of severity. Since the cost represents the most expensive diagnosis (if there are secondary diagnoses), **only cases where mental illness is the primary diagnosis and not a secondary one have been considered, this avoids overrepresenting the cost in cases where diagnoses unrelated to mental illness are the main cause of admission and their diagnosis or procedure is more expensive.**

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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, Surgeon, CNIC Researcher and Statistical Advisor to various national and international medical journals.

We are a **non-project project** dedicated to **promoting healthier digital lives**. With this analysis, we seek to improve knowledge about the effects of technology on young people, encouraging greater collaboration between parents, educators, researchers and policymakers in protecting children and adolescents from the harm caused by the inappropriate or abusive use of social media and digital media. Our efforts have focused on understanding the current situation in order to prevent the harm we anticipate may result from the proliferation of services based on generative artificial intelligence.

The mission of this project is twofold: **expand knowledge** on this important issue and to **promote civil and political action** **for regulatory change that promotes the mental well-being of our younger generations in an ever-evolving digital environment.**

All data sources used in this project are public, and the main ones are detailed in the Appendix to this document, together with the methodology and scientific background of this study.

Our intention is to **encourage other organization in other countries to carry out the same analysis with local data** in order to understand the extent to which we are suffering the effects of a global phenomenon. Therefore, we are offering the methodology and scripts used to carry out the analyses contained in this study as ”Open Source” (Fuente Abierta).

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