FAST TRACK

Assessing early effects of Australia's Social Media Minimum Age Act on adolescents' social media use: observational study

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ABSTRACT

OBJECTIVES

To examine the early effect of a world first national policy (Social Media Minimum Age Act 2024, which established a national minimum age of 16 years for holding accounts on designated social media platforms) on adolescent social media use, and to describe adolescent use of social media platforms subject to the Act, experience of age verification strategies, any efforts to circumvent them, and any perceived behavioural substitution or displacement.

DESIGN

Observational study.

SETTING

Community based study conducted across Australia.

PARTICIPANTS

Australian adolescents aged between 12 and ‹17 years at the time of implementation of the age restrictions.

INTERVENTION

The Australian Government's Online Safety Amendment (Social Media Minimum Age Act 2024), which requires designated social media platforms to implement reasonable measures to prevent users under 16 years of age from holding accounts.

MAIN OUTCOME MEASURES

Data were collected immediately before (baseline) and approximately three months after introduction of the Act. Co-primary outcomes were adolescents' self-reported use of social media in the previous seven days (every day versus not every day) and time spent using social media per day. A sharp regression discontinuity design was used to evaluate the impact of the Act on social media use. Differences in outcomes at each side of the age threshold were estimated using local linear regression with triangular kernel function.

RESULTS

Follow-up data were available from 408 of the 436 adolescents recruited at baseline. More than 85% of participants aged under 16 years reported using social media platforms subject to the Act at follow-up, predominately via use of their own accounts (54-68%), 66% of whom reported exposure to platform age verification, most commonly self-declared age (24-39%) or uploading of a picture ("selfie") (13-27%). Efforts to circumvent restrictions, such as use of a "fake" account (15-19%) or social media access via a private browser (6-11%) were also reported. Between baseline and follow-up, daily social media use was stable among 12-13 year olds; reduced somewhat among those aged 14-15 years (from 78% to 69%), and increased for those aged ›16 years (from 80% to 89%). Time spent per day using social media was relatively stable between baseline and follow-up for 12-13 year olds and those aged ›16 years but was lower at follow-up for those aged 14-15 years (from 3.40 to 3.13 units on an ordinal scale). In regression discontinuity design analyses, insufficient evidence was available to support a discontinuity in social media use on these primary outcomes (P≥0.60).

CONCLUSIONS

Despite the intent of the Social Media Minimum Age Act 2024 to delay access to social media platforms and reduce the potential for online harms, little evidence was found of immediate substantive reductions in reported social media use by adolescents under 16 years.

TRIAL REGISTRATION

Australian New Zealand Clinical Trials Registry ACTRN12625001056482.

WHAT IS ALREADY KNOWN ON THIS TOPIC

In response to growing concerns about the potential harm of social media use to adolescents' health and wellbeing, governments are considering or implementing age based restrictions

Scarce empirical evidence is available evaluating the real world effects of these types of policies on adolescents' social media use

In December 2025 Australia introduced a national policy requiring specific social media platforms to restrict access for under-16s, creating an opportunity for early policy evaluation

WHAT THIS STUDY ADDS

Implementation of age assurance measures by social media platforms is suboptimal, and evidence suggests that these are being circumvented by adolescents

The effects of the Social Media Minimum Age Act on adolescents' social media use seem to be limited although uncertain

The impacts of the Act may be enhanced and accrue over time; evaluation in the longer term is needed to assess this

Introduction

Adolescents are highly digitally connected, with use of social media platforms embedded in their daily routines. Globally, adolescents spend increasing amounts of time on platforms such as TikTok, Instagram, Snapchat, and YouTube, often accessing multiple platforms each day and across several devices.[1-3] In England and Australia, more than 90% of children aged 13-18 years report using social media,[1] often for more than three hours a day.[2] Similarly, in the US, up to 95% of young people aged 13-17 years use a social media platform and more than a third report that they use social media "almost constantly."[1 3]

Digital media environments, including social media, provide adolescents with opportunities for connection, self-expression, and access to information and can support social development and the maintenance of peer relationships.[4] Social media may also allow young people to explore interests, access educational content, and engage with supportive online communities. However, some patterns of adolescents' social media use, including excessive or unregulated use, may have negative effects on adolescents' health and wellbeing,[5-9] including increased psychological distress (for example, symptoms of anxiety and depression),[5-8 10] poorer sleep (for example, later bedtimes and reduced sleep duration), and other factors that contribute to broader concerns about adolescents' physical and mental health.[10] The longitudinal Millennium Cohort Study and large meta-analyses report associations between adolescents' social media use and substance use,[11 12] in addition to other health risk behaviours in young people.[13] However, the evidence base remains largely correlational, and reported associations are often weak, heterogeneous, and dependent on individual characteristics, the social media content adolescents are exposed to, how they engage with it, and the context in which they do so.[14 15]

The Joint Select Committee on Social Media and Australian Society described balancing the conflicting realities of social media as a "wicked problem," highlighting both the potential benefits of online connection and access to information and the concerns about platforms' design features (for example, opaque algorithms) that may maximise engagement and expose some users to harm.[16] Similar concerns have been raised by the Office of the Children's Commissioner for England,[17] and in a report published by the US Office of the Surgeon General which concluded that insufficient evidence was available to determine whether social media was sufficiently safe for use by children and adolescents.[18]

Consistent with public health precautionary principles,[19] considerable recent policy action has taken place to reduce the risk of online harm. Australia implemented a world first regulatory reform targeting social media platforms in late 2025: the Online Safety Amendment (Social Media Minimum Age) Act 2024 (hereafter the "Act"). The Act established a national minimum age of 16 years for holding accounts on 10 designated social media platforms including TikTok, Instagram, and Snapchat. Under the Act, these platforms must take reasonable steps to prevent users under 16 from creating or maintaining accounts, including through age assurance measures.[20 21] The Australian government has framed the legislation as an effort to reduce (or delay) exposure to online harms and support healthier development during adolescence.[20 21] It forms part of a broader package of proposed digital safety reforms tackling risks associated with algorithm driven engagement, including exposure to harmful content, persuasive design features, and downstream effects on mental health, physical activity, and social development.[20 21]

Since the enactment of the legislation, international momentum for similar reform has been growing. In June 2026 the UK government announced plans to prevent social media platforms from offering services to children and adolescents under 16 years of age, broadly following a similar approach to Australia but with additional restrictions.[22] The French National Assembly has passed legislation to prohibit access to social media accounts for children under 15 years,[23] with provisions for parental consent, and similar proposals are being considered in countries such as Slovenia, Poland, Spain, Denmark, and Malayasia.[24-26] Despite this rapid policy diffusion, the evidence base remains uncertain and debate continues about the potential benefits, unintended consequences, and practical feasibility of enforcement of such strategies.[27 28] In this context, rigorous and independent evaluation of Australia's Social Media Minimum Age Act is needed to inform ongoing efforts of the Australian government to mitigate online harms for children and adolescents and to guide decisions of other nations considering similar policy.[29]

This study sought to examine the real world impact of the Social Media Minimum Age Act 2024 on adolescents legally subject to it. Specifically, the primary objective of the study was to examine any early (three month) effects of legislation to restrict social media accounts of children under 16 years of age on their use of social media. We hypothesised that social media use would be reduced among adolescents younger than 16 years of age following the introduction of the Act and remain stable for those aged 16 years and older. We also describe adolescents' use of social media platforms subject to the Act, experience of age verification strategies, efforts to circumvent them, and perceived behavioural substitution or displacement.

Methods

The research was conducted and reported in accordance with the requirements of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (supplementary file 1),[30] as well as in line with recommended criteria for conducting regression continuity designs.[31 32] In this report, we present the primary outcomes of the study at three month follow-up. A 12 month follow-up is also planned to occur in December 2026.

Study design and setting

This was an observational study of adolescents aged 12 to <17 years. We used data collected both before and after the implementation of the Act to describe use of social media by adolescents and other study measures. We evaluated the effect of the Act by using a sharp regression discontinuity design, restricted to observations within a bandwidth around the policy threshold (that is, 16 years). We used a continuity based approach to regression discontinuity design to assess the effects of the Act, using age at follow-up as the running variable with a threshold of 16 years. We estimated causal effects of being exposed to the

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Act at the policy age threshold of 16 years (that is, the intention-to-treat effect) by assessing differences between the outcomes of adolescents aged just below 16 years and those aged just above 16 years. Regression discontinuity design allows estimation of the average causal effects of an intervention or policy, in this case exposure to the social media age restrictions, by using an exogenous variable (that is, age) that determines treatment assignment but is otherwise unrelated to the outcome and confounders.[33 34] This design is appropriate for the research question and recommended for use of policy level interventions as it allows us to assess the real world impact of introducing a social media age restriction, for which randomisation is neither feasible nor appropriate.[32 35 36] It also allows for causal inferences to be estimated more robustly than with other observational designs that are vulnerable to unmeasured confounding. When key assumptions have been verified, the validity of the estimated local effects have been likened to those of a randomised controlled trial design for the population close to the threshold.[32 34]

Sample and participants

Participants included adolescents aged between 12 and less than 17 years at the time of implementation of the age restrictions (Social Media Minimum Age). To be eligible, adolescents were required to have consent from a parent or legal guardian (hereafter referred to as parents) to participate, reside in Australia, and have sufficient English to understand and complete study procedures.

Recruitment procedures

We used multiple strategies to recruit participants, including social media advertisements, contacting parents who had previously participated in trials conducted by the research group, distribution of newsletters at meetings and events, website promotions, and through mailing lists, groups, and networks or databases held by the research group, study partners, and relevant health organisations. The recruitment strategies predominately targeted parents as parental consent was required before the research team contacted their adolescent. Recruitment occurred before the implementation of the social media age restriction, between September and December 2025. Participation required parents to complete an online expression of interest followed by an eligibility and consent process online or via a telephone call with a trained research assistant. We then contacted adolescents via email, text message, or telephone call (as selected by their parent) to confirm their eligibility and obtain assent. Only adolescents who provided assent participated in the study. Adolescents whose parent provided consent but who did not themselves provide assent were excluded from participation. In accordance with approved ethics processes, details about non-assent of adolescents were not disclosed to parents to protect adolescents' confidentiality.

Social media age restriction

In December 2024 the Australian Parliament enacted a national minimum age of 16 years for holding social media accounts under the Online Safety Amendment (Social Media Minimum Age) Act 2024. The law, implemented in December 2025, applied to platforms that meet the statutory definition of an "age restricted social media platform," as determined by the Australian eSafety Commissioner, typically characterised by features such as user interaction, algorithmic content curation, and large scale engagement, while exempting lower risk or functional services.[20 21] In-scope platforms are required to take reasonable steps to prevent users under 16 years of age from creating or maintaining accounts, including through the implementation of robust, privacy preserving age verification measures.[21] The legislation does not prescribe specific age assurance technologies; it instead allows platforms to determine appropriate methods, provided they are effective and proportionate. This includes measures to detect and deactivate accounts belonging to age restricted users; prevent age restricted users from creating accounts; and prevent, detect, and respond to circumvention. Platforms that fail to comply risk substantial penalties, including civil fines of up to 150 000 penalty units (equivalent to A$49.5m (£26.1; €30.2m; US$35.0m) for corporations). Although the Act restricts account based use, it does not prohibit access to all social media content. Young people may still be able to view some publicly available content or access platforms that do not require an account.[21] The assumed pathway to impact of the Act was: the introduction of the Act will increase age verification among social media platforms; such restrictions will yield a behavioural response among those subject to them (for example, reduced use of targeted platforms, circumvention of restrictions, behavioural substitution) but reduce social media exposure; reduced exposure will in turn improve measures of adolescents' health and wellbeing.

Data collection procedures and measures

Data collection to assess study outcomes took place at baseline and approximately three months after the implementation of the Act. The primary endpoint for the main trial outcomes of adolescent social media use (described below) was three month follow-up. We collected data via online or telephone surveys with adolescents (supplementary file 2) and stored the data in the Hunter Medical Research Institute's instance of Research Electronic Data Capture (REDCap) secure online data collection platform.[37 38]

To minimise attrition of participants, we used several evidence based strategies previously applied by the research team,[39 40] including pre-notification via text message of upcoming data collection, opportunity to complete data collection online or by telephone, multiple reminders for survey completion, and reimbursement for their time (A$20 e-gift card). We provided the reimbursement to offset the burden of participation, and it was consistent with institutional

ethics guidance on non-coercive compensation for participating in research.

Primary outcomes

Social media use (co-primary outcomes)

Daily social media use: We assessed participants' reporting of social media use in the previous seven days by using a survey item adapted from a validated single item measure of frequency of social media use previously used in national and international population based surveillance surveys of adolescents.[41 42] Adolescents rated their frequency of social media use over the previous seven days by using a four point Likert-type scale, with responses ranging from 1 (every day) to 4 (not at all). Daily use was dichotomised as everyday use versus all other responses.

Time spent per day using social media: We assessed time spent using social media with an item adapted from a previously validated instrument used in population based surveillance surveys of adolescents.[43 44] Adolescents were asked to respond on a seven point scale, ranging from 0 (I do not use social media) to 6 (five or more hours per day), analysed as a continuous variable.

Contextual factors influencing social media use

To assist in the interpretation of the findings, we collected several contextual factors that may affect the observed effects of exposure to the Act via the adolescent surveys. Specifically, we assessed the following factors.

Use of restricted social media platforms and exposure to age verification: Measures included use, daily use, and number of social media platforms used by adolescents that were subject to the Act, including access via their own account. Additionally, we assessed any exposed exposure to age verification checks by such platforms.

Circumvention strategies: We assessed strategies used by adolescents to access restricted platforms, including the use of others' accounts, "fake" accounts, private browsers, a virtual network provider, or proxy server. These measures provide an assessment of adolescents' compliance with any age verification strategies implemented by social media platforms subject to the Act

Perceived displacement or substitution behaviour: We assessed perceived changes in time spent using social media platforms not subject to the Act, in online gaming, using messaging apps, and engaging with AI companions, as well as time spent in outdoor play and recreation. These measures provided an indication of any displacement or behavioural substitution

Other measures

Participants' characteristics: We collected adolescents' characteristics, including gender, age (via date of birth), postcode (to enable socioeconomic status and rurality to be determined), cultural and linguistic diversity, and Aboriginal and/or Torres Strait Islander identity via an online or telephone survey at baseline.

Sample size

We determined sample size by using Monte Carlo simulation to estimate power to detect a discontinuity in the probability of the binary outcome (daily versus not daily frequency of use) at the pre-specified threshold of 16 years using a regression discontinuity design. In each simulated dataset, baseline age was generated uniformly within a conservative bandwidth of 14 and <18 years, and the running variable was defined as age at three month follow-up. Treatment assignment was deterministic at the age cut-off (treated if age ≥16 years; control otherwise). The outcome was generated from a Bernoulli distribution with a smooth relation between age and outcome on the logit scale and an instantaneous jump at the age cut-off, such that the outcome risk immediately below the age cut-off was 0.90 and that immediately above the age cut-off was 0.45, corresponding to an absolute risk difference of 0.45 at the age cut-off.[45 46]

We estimated the regression discontinuity design effect by using local linear regression implemented in the rdrobust R package with a triangular kernel. Inference was based on the robust bias corrected P value from rdrobust using a two sided significance level of 0.025. Power was defined as the proportion of simulated datasets with P<0.025. A total recruited sample size of n=450 was estimated to provide 80% power under these assumptions. Sensitivity analyses varied the assumed discontinuity size and the underlying smooth age trend.

We did power simulations for the continuous primary outcome (average daily use) under the same design but with an effect size of 0.5 standard deviation; 80% power was achieved with 450 participants. For smaller effects (0.3-0.4 SD), power ranged from 40% to 75%. These findings indicate that recruiting at least 450 participants within 24 months of the threshold provided adequate power to detect moderate policy effects.

Statistical analyses

We did the analysis according to the statistical analysis plan, published in an open access repository before collection of follow-up data (https://osf.io/h3d84). We used descriptive statistics, including proportions, means, and standard deviations, to describe participants' characteristics, as well as adolescents' social media use at baseline and follow-up. We also used descriptive analyses to describe use of restricted platforms, experience of age verification strategies, circumvention methods, and perceived displacement or substitution behaviours.

We estimated the effect of the Act on adolescents' social media use (primary outcomes) by using a regression discontinuity design following an intention-to-treat framework, whereby we analysed participants' data according to their age at follow-up relative to the policy eligibility threshold. Accordingly, the estimand

captured the "real world" effects of legal exposure to the Act, rather than the effect of actual compliance with age restriction. Before analysis of the primary outcomes, we constructed binned scatterplots for each outcome as a function of the running variable and with polynomial functions fitted at each side of the threshold.[31] We examined these for potential discontinuity at the threshold before proceeding to inferential analysis.

For the dichotomous outcome (daily use of social media), we assessed differences between groups at follow-up. For the continuous outcome (daily time spent using social media), we assessed differences between groups in the change in outcome from baseline to follow-up. For each outcome, we fitted an unadjusted local linear regression model separately on each side of the age threshold, applying triangular kernel weights. We estimated the gap between the two fitted lines (that is, the discontinuity point), representing the average causal effect of exposure to the social media age restriction. For each outcome, we selected the bandwidth separately by using the mean squared error-optimal procedure (mserd) implemented in rdrobust,[47 48] which balances bias and variance in estimating the treatment effect at the age cut-off. This data driven approach reduces researcher discretion and avoids ad hoc specification choices and specification searching.[36]

We additionally did sensitivity analyses using alternative bandwidth selection methods to assess the robustness of findings to bandwidth choice. We estimated robust bias corrected 95% confidence intervals and P values to determine statistical significance,[49] denoted at an α level of 2.5% for the co-primary outcomes (Bonferroni adjusted). For missing outcome data, we used multiple imputation under a missing-at-random assumption, conducted using the mice package in R.[50] We computed 50 imputed datasets with predictive mean matching used for continuous outcomes and logistic regression for dichotomous outcomes. The imputation model included all outcomes, variables relating to pre-specified subgroups of interests (that is, region of residence, socioeconomic classification, and sex at birth), and auxiliary variables found to be associated with missing outcomes, including Aboriginal or Torres Strait Islander status and age. We combined estimates across multiple imputed datasets by using

Table 1 | Sample characteristics at baseline. Values are numbers (percentages) unless stated otherwise

	Age of participants at follow-up			
Characteristics	**12-13 years (n=139)**	**14-15 years (n=197)**	**≥16 years (n=100)**	**Total (n=436)**
Mean (SD) age, years	12.63 (0.48)	14.47 (0.50)	16.43 (0.59)	14.33 (1.48)
Gender*:				
Man or male	75 (53)	83 (42)	45 (45)	203 (47)
Woman or female	63 (45)	108 (55)	52 (53)	223 (52)
Non-binary	1 (1)	4 (2)	1 (1)	6 (1)
Sex recorded at birth:				
Male	75 (54)	83 (42)	44 (44)	202 (46)
Female	64 (46)	114 (58)	55 (55)	233 (53)
Another term	0	0	1 (1)	1 (0)
Australian state or territory of residence:				
New South Wales	95 (68)	124 (63)	74 (74)	293 (67)
Victoria	13 (9)	30 (15)	7 (7)	50 (11)
Queensland	12 (9)	19 (10)	7 (7)	38 (9)
South Australia	6 (4)	11 (6)	6 (6)	23 (5)
Western Australia	10 (7)	6 (3)	0	16 (4)
Tasmania	1 (1)	3 (2)	1 (1)	5 (1)
Australian Capital Territory	2 (1)	3 (2)	5 (5)	10 (2)
Aboriginal or Torres Strait Islander status†:				
Aboriginal, Torres Strait Islander, or both	11 (8)	10 (5)	6 (6)	27 (6)
Neither	128 (92)	187 (94)	92 (93)	407 (94)
Rurality‡:				
Major cities	119 (85)	164 (83)	82 (82)	365 (84)
Inner/outer regional, remote/very remote	20 (16)	32 (16)	18 (18)	70 (16)
Socioeconomic status‡:				
Low	45 (32)	60 (30)	28 (28)	133 (30)
High	94 (67)	136 (69)	72 (72)	302 (69)
Country of birth:				
Australia	131 (94)	185 (94)	92 (92)	408 (94)
England	2 (1)	4 (2)	0	6 (1)
Other	6 (4)	8 (4)	8 (8)	22 (5)
Main language spoken at home‡:				
English	135 (97)	194 (99)	97 (97)	426 (98)
Other	4 (3)	2 (1)	3 (3)	9 (2)

SD=standard deviation.
*Denominator is 432 for this item owing to missing data from four participants.
†Denominator is 434 for this item owing to missing data from two participants.
‡Denominator is 435 for this item owing to missing data from one participant.

Rubin's Rule.[49] We assessed pre-specified exploratory subgroup effects (gender and baseline social media use defined as everyday use versus not every day) by doing separate local linear regression analyses for each subgroup category.

We did multiple sensitivity analyses and falsification and verification tests to assess the robustness of the findings, evaluate key assumptions of the regression discontinuity design, and evaluate the impact of potential biases (see statistical analysis plan at https://osf.io/h3d84 and supplementary file 3). This included analysis of screenshot data of adolescents' social media use provided by a subset of participants, assessment for assignment manipulation, and falsification of the continuity assumption.

Patient and public involvement

Patients and members of the public were not involved in the design or conduct of the study. The study aimed to evaluate a national policy that had already been legislated, limiting opportunities for public involvement in research question and design development. Informed consent was obtained from all participants.

Results

Sample characteristics

The sample included 436 adolescents at baseline, 408 of whom completed follow-up data collection (retention rate of 94%). At baseline, adolescents had a mean age of 14.33 (standard deviation 1.48) years, and 54% (n=223) identified as female (table 1). Adolescents were predominately from New South Wales (n=293; 67%), resided in major cities (n=365; 84%), and were born in Australia (n=408; 94%). Participants' demographic characteristics were similar across age groupings. A statistically significant association existed between participants' age group at follow-up and social media daily use and average social media use at baseline (supplementary file 4). The main differences observed were for those aged 12-13 years at follow-up, highlighting the importance of assessing the causal effects close to the threshold to ensure that the continuity assumption is upheld.

Baseline characteristics of participants retained and lost to follow-up were broadly similar. Of the 28 adolescents lost to follow-up, 11 were aged 12-13 years (82% were daily social media users at baseline), 15 were aged 14-15 years (80% daily social media users), and two were 16 years of age (50% daily social media users). Fifteen (54%) of the 28 identified as female, and most resided in New South Wales. When we compared characteristics statistically, we found limited evidence of systematic differences between adolescents who were retained at follow-up and those lost to follow-up (table 12 in supplementary file 4).

Description of adolescents' overall social media use before and after introduction of Act

The proportion of adolescents reporting any daily social media use was similar between baseline and follow-up among those aged 12-13 years, reduced from 78% to 69% for those aged 14-15 years, and increased from 80% to 89% for those aged 16 years and over (table 2). Time spent using social media was lower at follow-up among those aged 14-15 years (from 3.40 to 3.13 scale units) and was similar among younger (12-13 years) and older (≥16 years) adolescents.

Analysis of primary outcomes: effect of Act on adolescents' social media use

At follow-up, insufficient evidence existed to support a discontinuity in the probability of daily use of social media (every day versus not every day) at the age threshold of 16 years. Using the mean squared error-optimal bandwidth, the estimated absolute difference in the probability of everyday use at the threshold was approximately 0.05 (95% confidence interval -0.92 to 0.83; P=0.92) (table 3). Figure 1 shows the regression discontinuity plot, which shows limited evidence of a jump at the threshold.

Similarly, we found no evidence of a discontinuity in the difference in change from baseline to follow-up in the time spent using social media per day at the age threshold of 16 years. Specifically, using the mean squared error-optimal bandwidth, the estimated effect at the age cut-off was -0.35 units (95% confidence interval -1.65 to 0.96; P=0.60) (table 3; fig 2). Analyses conducted on screenshot data provided by a subset of adolescents were consistent with self-reported data on time spent using social media per day both for complete case (that is, data from subset only) and using bias corrected estimates with the entire sample (table 1 in supplementary file 4).

We found no evidence of subgroup effects by sex at birth or baseline daily use of social media (every day versus not every day) (table 13 in supplementary file 4).

Table 2 | Description of adolescents' social media use

	Age of participants at follow-up					
	12-13 years (n=139)†		14-15 years (n=197)†		≥16 years (n=100)†	
Outcome	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Daily social media use, No (%, 95% CI)	71 (51%, 43% to 59%)	64/130 (49%, 41% to 58%)	153 (78%, 71% to 83%)	124/179 (69%, 62% to 76%)	80 (80%, 71% to 87%)	86/97 (89%, 81% to 94%)
Mean (SD; 95% CI) time spent using social media per day*	2.64 (1.53; 2.38 to 2.90) (n=137)	2.49 (1.54; 2.22 to 2.76) (n=130)	3.40 (1.45; 3.20 to 3.61)	3.13 (1.46; 2.91 to 3.34) (n=180)	3.76 (1.51; 3.46 to 4.06) (n=99)	3.84 (1.47; 3.54 to 4.14) (n=96)

CI=confidence interval; SD=standard deviation.
*Item scored on 7 point scale: 0=I do not use social media; 1=less than 1 hour per day; 2=1 hour per day; 3=2 hours per day; 4=3 hours per day; 5=4 hours per day; 6=5 or more hours per day.
†Cell percentages may not add to equal total sample because of missing values.

Table 3 | Findings from local linear regression for study primary outcomes

Primary outcomes	Treatment effect (robust 95% CI)	P value	Bandwidth (h)	N^-_h	N^+_h
Social media daily use	-0.05 (-0.92 to 0.83)	0.92	225.35	49	38
Social media average daily use*	-0.35 (-1.65 to 0.96)	0.60	340.21	80	55

CI=confidence interval; N^-_h=sample size below threshold; N^+_h=sample size above threshold.
*Item scored on 7 point scale: 0=I do not use social media; 1=less than 1 hour per day; 2=1 hour per day; 3=2 hours per day; 4=3 hours per day; 5=4 hours per day; 6=5 or more hours per day.

Results of pre-specified falsification and assumption checks are reported in supplementary file 3.

Contextual factors influencing social media use

Use of restricted social media platforms and exposure to age verification

At follow-up, more than 86% of participants aged under 16 had accessed one or more social media platforms subject to the Act in the previous seven days, 66% of whom reported exposure to platform age verification. Descriptively, small reductions occurred between baseline and follow-up in reported access, daily access, and number of restricted platforms accessed among participants of all age groups but particularly among those aged 12-13 and 14-15 years (table 4).

Circumvention strategies

Beyond use of their own accounts, strategies used by adolescents to access restricted social media platforms among those under 16 years included the use of someone else's account (9-29%) and the use of a fake account (15-19%) or private browser (6-11%) (table 5). Reported use of a virtual network provider or proxy server was rare (2-3%).

Displacement and substitution behaviours

Across age groupings, the proportion of participants who reported spending more time using messaging apps (for example, WhatsApp (20-54%)) after the introduction of the Act was higher than those who believed they spent less time using such apps (3-13%) (supplementary file 5). The proportion of participants reporting that they spent less time using AI companions (23-40%) since the Act was introduced was higher than those reporting they spent more time using AI companions (8-12%). The proportion of participants reporting that they spent more time in outdoor play and recreation (25-39%) was higher than those that reported that they spent less time in these activities (4-9%). Otherwise, the proportions of participants reporting more or less time spent online gaming and using social media platforms not subject to the Act were broadly similar.

Discussion

This study provides early evidence on the impact of a world first national policy requiring in-scope social media platforms to restrict access for children under 16 years of age (Social Media Minimum Age Act 2024). Using a regression discontinuity design in a real world implementation context, this study examined changes observed three months after enactment of the legislation. The findings suggest that the period immediately after introduction of the Act was characterised by limited implementation, incomplete compliance, and substantial circumvention of social media restrictions. In this context, overall, we found insufficient evidence to conclude that exposure to the Act had any early substantial effects on social media use among adolescents aged under 16 years. The findings contrast with similar legislative requirements of web based services, for example in the UK, where access to pornographic websites substantively reduced (by 30-50%) following introduction of age assurance measures.[45 46]

Possible explanations for findings

Several factors may explain the lack of significant effects on social media use in our assessment of the impacts of the Act on our primary outcomes. The confidence intervals of the primary analyses were wide, so the effects are uncertain. The findings do not preclude the possibility that exposure to the Act may have achieved modest but meaningful reductions in social media use. Descriptively, for example, we observed small pre-post reductions in daily social media use among participants aged 12-13 years and 14-15 years of between 2% and 9%. We also found similar sized reductions in these groups in the use of restricted social media platforms.

Alternatively, the findings may show the durability of social media use and the inadequacy of legislative age based restrictions to reduce it. Social media use is ubiquitous and habitual among adolescents and serves core social functions, including supporting peer interaction, identity formation, and social connectedness.[4] Furthermore, the architecture of social media platforms is designed to incentivise and reinforce their use. In this context, adolescents may be highly motivated to circumvent age based restrictions or to seek other social media platforms or websites where such restrictions are not in place. We identified some evidence of both in our study. Interventions that tackle a broader range of drivers of harmful social media use and in a way that aligns with the social and digital realities of young people are probably needed to substantially modify this behaviour.[51 52] Such interventions may occur as part of further digital safety reforms planned by the Australian government.[20 21]

Primarily, however, policy implementation by social media platforms does not seem to have been successful in preventing their use by adolescents. Descriptively, some small reductions in everyday use of social media platforms subject to the Act were observed among 12-13 and 14-15 year olds, as well as in the mean number

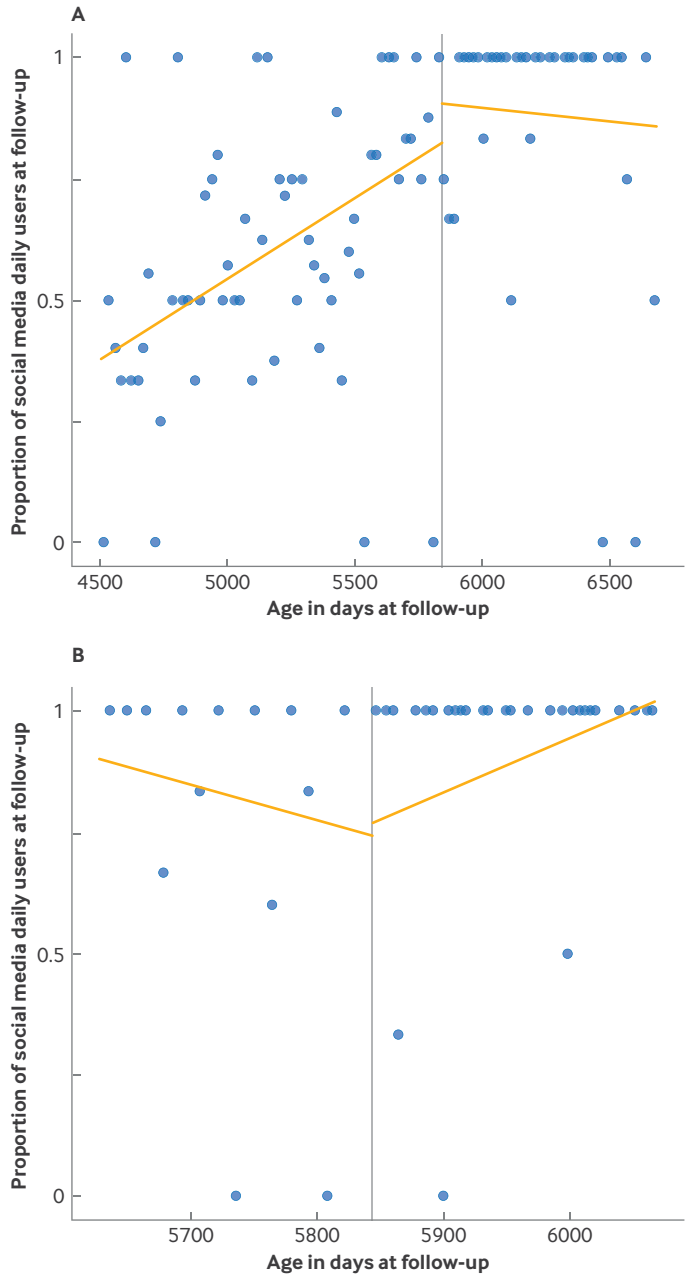

Fig 1 | A: regression discontinuity plot of social media daily use at follow-up including full participant sample. Bins are constructed using evenly spaced mimicking variance (ESMV) method, and a local linear (p=1) smoothing function is applied separately on either side of age cut-off. B: regression discontinuity plot of social media daily use at follow-up for analytical sample, restricted to mean squared error-optimal bandwidth. Bins are constructed using ESMV method, and a local linear (p=1) fit is applied separately on each side of age cut-off

of platforms accessed. However, more than 86% of adolescents <16 years continued to use restricted social media platforms at follow-up, most via their own account. Exposure to age assurance measures, a requirement of the Act, was also not universally reported, with ≤39% of participants aged under 16 reporting any age assurance measure across platforms subject to the Act.

The Australian eSafety Commissioner has noted the need to strengthen policy implementation after a survey of parents, in which as many as seven in 10 children reportedly retained accounts three months after the implementation of the Social Media Minimum Age Act 2024.[53] In a recent compliance update, the Australian eSafety Commissioner concluded that a substantial proportion of children under 16 years continue to access social media.[53] The findings suggest that "reasonable steps" required by platforms to restrict adolescents from creating and/or maintaining social media accounts may need greater specification and adherence. Problems with policy compliance have been reported with similar legislation aimed at creating safer digital environments for children. For example, major enforcement actions have been taken against technology companies for violation of the Children's Online Privacy Protection Act that governs the collection and use of information on children under 13 years.[54] Enforcement action has also been undertaken by independent regulators in the UK (the Office of Communications) and the European Commission for violations of the Online Safety Act 2023 and Digital Services Act following failure of companies to implement strategies to protect children from harmful content.[55 56] Investigation by the Australian government into social media companies' adherence to the Social Media Minimum Age Act are under way. Such investigations, or the threat or imposition of sanctions, may improve platforms' adherence to the Act in the future.

However, considerable debate remains about the effectiveness and adequacy of age verification strategies.[57] This is in part due to the ability of adolescents to circumvent them. Following the UK Online Safety Act, virtual network provider (VPN) subscriptions - a means of routeing web access through countries outside the UK - surged, in some cases by more than 1000%.[56] Our study found that although most users of in-scope social media platforms continued to use their own account, efforts to circumvent the Act among adolescents under 16 years were also evident. The most frequent strategy was the use of accounts of others or accounts with false age related information ("fake accounts"). The use of VPNs, however, was rarely reported. The most common means of verification reported by adolescents in this study was self-declared age, a technique that has been criticised in the past by regulators in Australia, the UK, and Europe owing to its limited effectiveness in protecting children.[58 59] The implementation of more stringent age verification strategies, including those recommended by the Australian eSafety Commissioner and UK Information Commissioner's Office, such as device based age estimation and third party age assurance services, may be needed to prevent circumvention and improve the effectiveness of the Act.[58 59]

In the context of the initial period of implementation, poor compliance, and frequent circumvention, drawing definitive conclusions about the efficacy of the Act on adolescents' social media use is difficult. Evaluations conducted under conditions of greater implementation fidelity, stronger enforcement, and higher adherence

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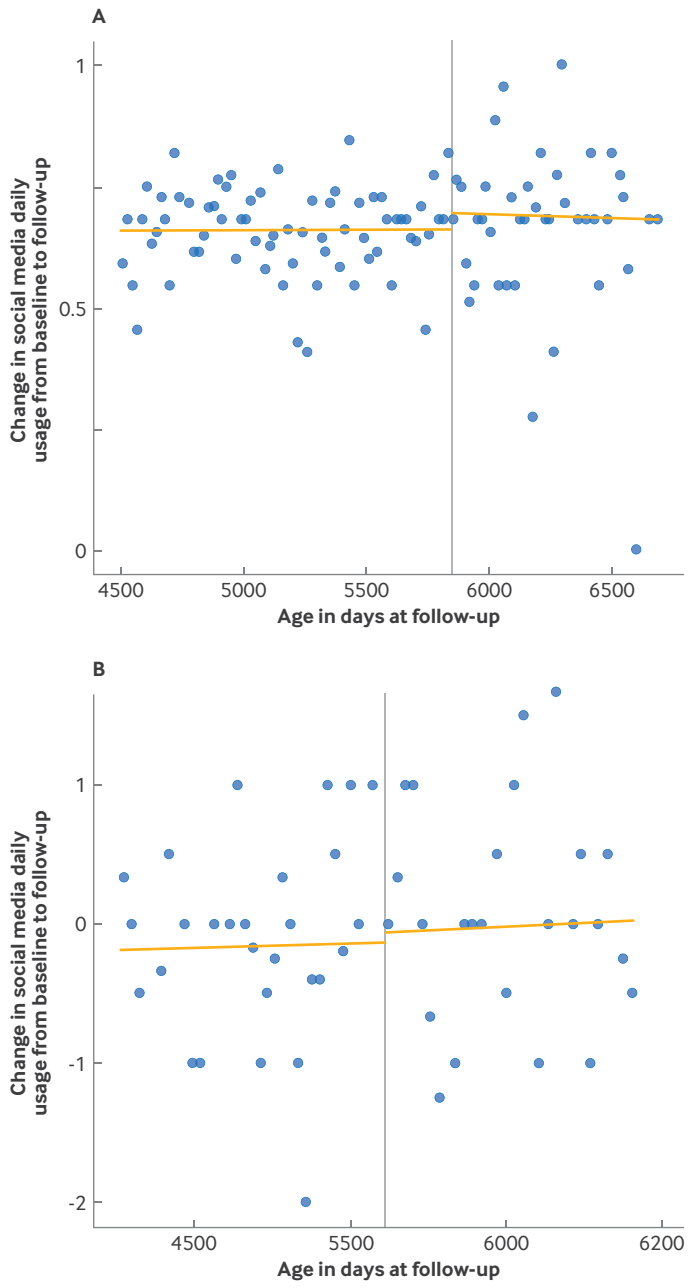

Fig 2 | A: regression discontinuity plot of change in average daily social media use from baseline to follow-up including full participant sample. Bins are constructed using evenly spaced mimicking variance (ESMV) method, and a local linear (p=1) smoothing function is applied separately on either side of age cut-off. B: regression discontinuity plot of change in average daily social media use from baseline to follow-up for analytical sample, restricted to mean squared error-optimal bandwidth. Bins are constructed using ESMV method, and a local linear (p=1) fit is applied separately on each side of age cut-off

may be better positioned to assess its inherent effects. Nevertheless, as a real world evaluation, this study provides important insights into the practical complexities in implementing and evaluating such legislation, highlighting how implementation and compliance challenges may shape outcomes.

The intent of the Act was to reduce (or delay) exposure to online mental health and other harms and support healthier development during adolescence.[20 21] As we found little difference in social media use, such outcomes are unlikely, particularly in the short term, given the period of latency between reductions in exposure to social media and any improvements in health and wellbeing. Substantive and sustained reductions in exposure to social media use will be needed if these ambitions are to be achieved. Longer term follow-up may provide greater opportunity for the social media restrictions to take effect and for changes in adolescent behaviours to accrue. Longer term assessments should also seek to formally assess and characterise other effects such as behavioural substitution or displacement towards other forms of media use (for example, messaging services) and social interactions or offline activity (outdoor recreation) suggested by our descriptive findings. Such research would provide more comprehensive insights into the collective impacts of the Act.

The effects of the Act may differ depending on the developmental timing and duration of social media exposure. In this study, we sought to test whether exposure to legislation requiring the withdrawal of access to selected social media accounts may reduce social media use among those close to the Act's 16 year threshold. The greatest opportunity for beneficial impacts of the Act may be among pre-adolescent cohorts of children who are yet to be substantially exposed to social media. By the age of 10, social media use is already widespread among children in many countries, including the UK and Australia, with recent Australian data suggesting that >80% of children aged 8-12 years have used at least one social media or messaging platform.[60] The Act may be more effective in preventing or delaying access to social media (until age 16) among young children (<8 years) who are yet to engage with it rather than withdrawal or restriction of access for current adolescents among whom social media use is already well established. Longitudinal research to monitor and evaluate impacts among younger child cohorts over the coming years is warranted to examine this hypothesis.[61 62]

Limitations of study

Several limitations should be considered when interpreting our findings. Firstly, the study was underpowered. Although the study sample included 436 adolescents, the bandwidth for inclusion of the sample in formal analyses of effects was statistically determined, balancing the trade-off between bias and variance. A substantial number of participants, particularly those aged 12-13 years, were not included in the regression discontinuity design analyses as they were too far from the threshold of 16 years. This reduced the precision of our estimated effects, precluding the detection of meaningful effects of exposure to the Act on the study outcomes. This also reduced our opportunity to robustly explore subgroup effects. Recruitment of a greater number of participants aged 14-18 years is recommended to retain sufficient power to detect meaningful differences in trial outcomes in future evaluations of the Act's impact using this design.

Table 4 | Description of adolescents' use of social media platforms subject to Australia's Social Media Minimum Age Act (restricted)

	Age of participants at follow-up					
	12-13 years (n=139)		14-15 years (n=197)		≥16 years (n=100)	
Outcomes	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Use of ≥1 restricted platform in previous week, No (%, 95% CI)	132 (95, 90 to 98)	119 (86, 79 to 91)	192 (98, 94 to 99)	176 (89, 84 to 93)	100 (100%, 96% to 100%)	96 (96, 90 to 98)
Everyday use of ≥1 restricted platform in previous week, No (%, 95% CI)	79/132 (60, 51 to 68)	65/124 (52, 44 to 61)	148/192 (77, 71 to 83)	122/188 (65, 58 to 71)	89 (89, 81 to 94)	84/99 (85, 77 to 91)
Mean No (SD; 95% CI) of restricted platforms accessed in previous week	2.14 (1.41; 1.90 to 2.37)	1.87 (1.53; 1.61 to 2.13)	3.04 (1.35; 2.85 to 3.23)	2.59 (1.68; 2.35 to 2.82)	3.59 (1.24; 3.34 to 3.84)	3.5 (1.39; 3.22 to 3.78)

CI=confidence interval; SD=standard deviation.
Among adolescents who reported using restricted social media platforms at follow-up, the most common strategies reported to verify age were platforms requesting users to report their age (24-39%) or to upload a picture ("selfie") (13-27%) (table 5). Requests for parental permission for verification were also prevalent among those aged 12-13 years and 14-15 years (12-13%), as was request for photo identification for those aged 16 years and over (16%).

Secondly, the age at which the restrictions were applied, and so discontinuity examined, is also socially, culturally, and developmentally important in Australia. Sixteen years is the age of consent in most states, the age that adolescents can obtain a learners' licence to drive a motor vehicle, and when they are able to exit secondary education or transition to senior schooling. Such experiences may also influence the extent to which students engage with social media and bias estimates of the regression discontinuity design analyses. We found some evidence suggesting potential concerns about the continuity assumption, with significant associations observed between age and both primary outcomes at baseline (table 7 in supplementary file 4). We observed a significant discontinuity for the pre-specified covariate of socioeconomic status (table 9 in supplementary file 4) that may indicate residual differences across the threshold. Such matters raise concerns about whether the design can adequately support causal inference regarding the efficacy of the policy and the importance of interpreting the findings with consideration of the patterns of social media use reported in the broader descriptive analyses.

Thirdly, the reliance on self-reported measures to assess adolescents' social media use is a considerable methodological limitation of the study. Although self-reported measures are commonly used in digital media research in adolescents, studies have consistently shown discrepancies between self-reported and objectively measured digital media use.[14 62 63] In this study, the true changes in adolescents' social media use following the implementation of the Act may be different from those reported. However, we found similar patterns of social media use across our primary outcomes and those describing use of specific platforms subject to the Act, as well as in analyses of social media use captured by mobile phone data in a subset of participants. Nevertheless, future evaluations would be strengthened with greater use of objective device or platform level measures.

Finally, the sample was concentrated in one Australian state (New South Wales; 67% of participants). The proportion of adolescent participants who reside in major cities (84%) and were born in Australia (94%) is broadly consistent with national demographic patterns, with 75% of Australian young people (aged 15-24 years) residing in major cities and 79% being Australian-born.[64] Although patterns of adolescents' social media use have been reported to be comparable across a range of sociodemographic and geographical contexts,[65-67] the generalisability of

Table 5 | Age verification strategies used by restricted social media platforms and methods of adolescents' access*. Values are numbers (percentages)

Strategies	Age 12-13 years (n=119)	Age 14-15 years (n=176)	Age ≥16 years (n=96)
Reported age verification strategies			
Ask how old you were	29 (24)	69 (39)	30 (31)
Require parental permission	14 (12)	23 (13)	7 (7)
Selfie or picture	15 (13)	48 (27)	19 (20)
Speak or send a voice recording	4 (3)	14 (8)	4 (4)
Photo of official ID	6 (5)	20 (11)	15 (16)
Provide official ID numbers	5 (4)	13 (7)	5 (5)
Provide bank card information	1 (1)	3 (2)	5 (5)
Use app or program to confirm age	2 (2)	11 (6)	5 (5)
Other	0	3 (2)	3 (3)
Circumvention strategies used to access restricted social media platforms			
My own account	64 (54)	119 (68)	90 (94)
Through someone else's account	34 (29)	16 (9)	4 (4)
Through a fake account	18 (15)	34 (19)	7 (7)
Using incognito or private browser mode	13 (11)	10 (6)	1 (1)
Used a virtual network provider or proxy server	3 (3)	4 (2)	0

*Of social media platforms subject to restriction. Reported among those who had reported accesses to restricted platforms at follow-up.

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the study findings beyond the study sample requires further investigation. The study recruitment strategies, including the use of social media advertising, and requirement for parental consent may have also introduced selection bias - for example, an increased likelihood of participation among those for whom the use of social media in adolescence is particularly salient.[68 69]

Conclusions

Deterioration across many indicators of adolescent mental health and wellbeing over the past decade has prompted government action. Like Australia, many countries are considering measures that may restrict or delay use of social media platforms among adolescents.[24-26] We found limited policy implementation, efforts among adolescents to circumvent restrictions, and insufficient evidence of any substantive early effects of exposure to Australia's Social Media Minimum Age Act 2024 on the social media use of adolescents. Lessons from previous public policy changes, however, suggest that the potential benefits of the legislative change take time to manifest and often require investment in accountability and education mechanisms to encourage compliance and uptake.[70] The full impacts of the Act may not be evident for a decade. Nevertheless, the findings of this study provide key early insights that can guide government refinement and future actions to promote health and wellbeing.

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Contributors: LW and CB conceived the study. LW, CB, AH, and SM led the development of data collection procedures and acquisition of data. AH, LW, and CO led the drafting of the statistical analysis plan and the conduct of the analyses. CB and LW led the drafting of the manuscript. All authors contributed to the drafting of the manuscript and accept full responsibility for, and have read and approved, the final manuscript. CB is the guarantor. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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Competing interests: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/disclosure-of-interest/ and declare: support from Preventive Health SA, Government of South Australia and Healthway for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work. No authors advised government on the legislation, contributed to parliamentary submissions, engaged in advocacy related to the policy, or consulted with regulators or advocacy organisations prior to conducting the study.

Ethical approval: Ethics approval was obtained from the University of Newcastle Human Research Ethics Committee (H-2025-0242). Informed consent was obtained from all participants involved in the study.

Data sharing: Use of data not covered by the current ethics approval will require additional ethics approval before the data are made available. Anyone seeking to access the data will need to contact the lead investigator, along with seeking appropriate ethics clearances. Only once those approvals are granted will de-identified data be shared via an encrypted communication channel.

Transparency: The lead author (the manuscript's guarantor) affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned and registered have been explained.

Dissemination to participants and related patient and public communities: Study findings will be disseminated through peer reviewed publications, conference presentations, policy briefs, and plain language summaries through relevant networks.

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