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Can police data predict harm? Evaluating risk in missing person cases using a Harm Vulnerability Framework

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ABSTRACT

Assumed risk of harm plays a crucial role in response strategies and resource allocation in missing person investigations, where misclassification or delay can result in serious or fatal consequences. While police adopt a clinical judgement approach to assessing risk, few empirical studies have examined whether routinely captured police data can support structured harm prioritisation tools. Drawing on Lifetime Exposure Theory, logistic regression analyses were conducted on missing incidents ($N = 16{,}454$) and individual-level cases ($N = 4206$) reported to UK police forces to test whether variables from a Harm Vulnerability Framework predicted harmful outcomes. Among child incidents, being high risk, older, female, transgender, likely to commit suicide, mental health issues, and prior harm were associated with harm, although no variables were significant at the individual level. Among adult incidents, being high risk, likely to commit suicide, and prior harm were significant predictors, whilst being high or medium risk, and likely to commit suicide predicted harm at the individual level. Multivariate regression analyses confirmed the predictive value of suicide concern and prior harm across children and adults, although explained variance remained modest. Suicide concern already forms a key aspect of police decision-making. However, harm suffered during a previous missing episode may warrant greater operational attention. Results highlight opportunities for developing child-focused harm prioritisation tools while also revealing limitations in police data. Future research should explore how police and partner-agency interventions influence harm outcomes and how other data sources can strengthen harm assessments.

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KEYWORDS
Missing person investigations; lifetime exposure theory; Harm Vulnerability Framework; harm prediction

Introduction

In the UK, a missing person is defined as 'anyone whose whereabouts cannot be established' who 'will be considered missing until located, and their well-being or otherwise confirmed' (College of Policing [CoP] 2021). A person is reported missing every 90 seconds (Missing People 2024) and responding to missing episodes represents a major demand on police resources (Fyfe *et al*. 2015). Whilst many missing people are located quickly or return voluntarily, harmful outcomes include physical, sexual, and self-harm (Missing People 2022, National Crime Agency [NCA] 2023). Police

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therefore prioritise cases requiring immediate and urgent responses as misclassification or delay may result in serious harm or fatality (Hedges and Shalev-Greene 2016).

In current police guidance in England and Wales, missing persons are categorised as high, medium, low, and very low risk (previously no apparent risk) according to vulnerability and the presumed likelihood of harm without police intervention (CoP 2024). This categorisation aims to ensure proportional responses (Vo 2015), yet officers adopt what is often described as a clinical approach, drawing on professional knowledge and operational experience to make structured but ultimately subjective judgements. Here, the term clinical judgement is used in the criminological sense to refer to professional decision-making under uncertainty, rather than in the mental health context, where clinical assessment involves formally trained diagnostic practice grounded in established psychological models. Although a substantial clinical literature exists on suicide and mental health risk assessment relevant to missing populations (e.g. Posner *et al*. 2011), such tools typically require structured interviews, specialist training, and detailed psychosocial histories. Police officers conducting initial missing person assessments operate under time constraints and are not clinically trained, meaning these models are not directly transferable to frontline policing contexts. As this study focuses on routinely collected police data, broader clinical frameworks cannot meaningfully shape the information throughout an investigation, which primarily concerns determining whether and how police resources should be deployed.

Research suggests that police clinical judgement is not without limitations. Officers rely heavily on information from reporting persons, such as family members, which may vary in accuracy or completeness, particularly in cases involving undisclosed mental health or suicide crises. Operational constraints further shape decision-making. Officers report limited training and confidence in missing person risk assessment (Smith and Shalev Greene 2015), and because harmful outcomes are rare, typically around 4% (Doyle and Barnes 2020), many officers lack direct experience of harm cases. Judgements may therefore be influenced by prior experience, values, and perceptions, potentially leading to over- or under-estimation of risk (Kemshall 2010, Hedges 2017), and in some cases risk-averse use of the medium category as a default position (Vo 2015).

To aid clinical judgements, police forces draw on similar risk assessment question sets, but variations exist. Questions were developed without empirical support and may not accurately forecast harm, and forces often adapt questions based on risk variables they consider important (Eales 2017). Consequently, there have been calls for stronger empirical guidance for missing person risk assessment, and a structured professional judgement approach is being developed (Chan *et al*. 2023). This study provides complementary actuarial research exploring the feasibility of using police data to produce evidence-based harm prioritisation tools.

Theoretical framework

Existing research describes the scale and nature of missing person cases and the vulnerabilities involved (e.g. Babuta and Sidebottom 2020), but few studies apply a clear theoretical lens to explain harm risk. This matters for the present study because actuarial findings without theoretical integration may identify statistical patterns without providing explanatory coherence or guidance for application or generalisation. One exception is Ferguson *et al*. (2023), who draw on Lifestyle Exposure Theory (LET) to explore how repeated exposure to risky environments contributes to victimisation among missing persons. LET proposes that victims' demographic characteristics and lifestyle routines influence the likelihood of encountering offenders (Hindelang *et al*. 1978). Ferguson *et al*. (2023) observed that missing children, females, transgender individuals, and older adults were frequently described in police records as vulnerable to victimisation due to intersecting demographic and experiential factors. These findings align with cumulative risk perspectives, where harm arises through accumulated vulnerabilities over time (Bermudez *et al*. 2020).

While LET traditionally focuses on victimisation, its simplicity and adaptability make it useful for understanding a broader range of harms recorded in police data. Demographic and lifestyle factors

are theorised to influence exposure to risky situations and resulting vulnerability. Harm in policing has been defined as life-threatening or traumatic risk from which physical/psychological recovery may be difficult or impossible (Doyle and Barnes 2020). LET provides a coherent framework through which repeated exposure to risky situations can be understood as contributing to harmful outcomes. The following sections review evidence on harm prevalence in missing child and adult cases and factors associated with harm risk.

Missing children and harm

Children under 18 years are disproportionately represented in the missing population, accounting for 63% of the 319,745 reports recorded in England and Wales in 2022/23 (NCA 2023), and nearly half experience repeat episodes (e.g. 47%, Hutchings *et al*. 2019). The circumstances in which children go missing are often non-suspicious (Biehal *et al*. 2003) and most return voluntarily and relatively quickly (80% within 24 h, 91% within 48 h, NCA 2023). Overall, 97.5% of missing children experience no recorded harm, although when harm occurs it may involve physical injury (35%), self-harm (30%), unspecified harm (13%), sexual exploitation (11%), accidental harm (7%), and emotional harm (3.5%) (NCA 2023).

Despite this low base rate, UK statutory guidance treats missing children as medium or high risk because of their age and vulnerability (Department of Education 2014). Without access to safe accommodation, supportive adults or peers, missing children may sleep rough (Hill *et al*. 2014) or lack access to safe spaces, increasing exposure to harms including exploitation, grooming, survival crime, or thrill-seeking behaviour (Hutchings *et al*. 2019, Babuta and Sidebottom 2020). Missing episodes often reflect broader underlying difficulties (Hutchings *et al*. 2019). Nearly 70% of children report being 'pushed' from home by family violence, sexual abuse, or exploitation (Stevenson and Thomas 2018). Children in care placements, including unaccompanied migrant children (Missing People and ECPAT 2022a, 2022b), are also more likely to go missing, often due to instability in placements or exploitation-related 'pull' factors.

Other risk factors associated with harm include substance misuse (Babuta and Sidebottom 2020), mental health issues (NCA 2023), criminality and associations with antisocial or criminal peers (Shalev 2011). These vulnerabilities frequently co-occur; Roy *et al*. (2004) found that illicit drug use among street youth was strongly associated with suicide and overdose, highlighting the heightened risks faced by young people without stable accommodation or adult support.

Such patterns align with LET, with risk exposure accumulating through interactions between demographic and lifestyle factors. Empirical studies illustrate these patterns. Both police perceptions (Ferguson *et al*. 2023) and incident analyses (Doyle and Barnes 2020, Sidebottom and Davies 2025) identify elevated harm risk among female children. Associated indicators include suicide ideation, mental health difficulties, living in care, learning disability, hearing impairment, sexual exploitation risk, and repeat missing episodes (Doyle and Barnes 2020). Sidebottom and Davies (2025) similarly identify female gender, suicide ideation, mental health concerns, and prior harm during previous missing episodes as significant predictors within multivariate models.

Police also perceive transgender children and young people as particularly vulnerable due to intersecting vulnerabilities, including victimisation histories, mental health needs, substance use, and repeat episodes (Ferguson *et al*. 2023). However, empirical analysis remains limited. In Sidebottom and Davies (2025), transgender individuals were almost twice as likely to experience harm, although this association did not reach statistical significance and was therefore excluded from the final predictive model. For male children, fewer lifestyle-related risks appear in police perceptions (Ferguson *et al*. 2023), although police data indicate suicide ideation and care status may still predict harm (Doyle and Barnes 2020).

Together, these findings suggest that pathways to harm for missing children reflect cumulative and intersecting vulnerabilities, consistent with LET. Understanding these vulnerabilities may help refine risk assessments and support a more targeted preventative response for children who go missing.

Missing adults and harm

Although adults account for a smaller proportion of missing person reports, they are four times more likely than children to come to harm while missing, and most fatal outcomes in missing person cases involve adults (NCA 2023). This pattern may partly reflect reporting practises. Adults are often reported missing only when there are substantive concerns about their safety or vulnerability, whereas children are more frequently reported as a precautionary safeguarding measure. Among non-fatal harms, self-harm (48%) and physical injuries (31%) are most common, followed by accidental harm (8%), unspecified harm (7%), emotional harm (4%), and sexual victimisation (2%) (NCA 2023). Despite this elevated harm risk, research examining harm predictors among missing adults remains limited compared with the child literature (Eales 2017).

Consistent with LET, gender shapes exposure to harm in missing adult cases. Females show heightened victimisation risks, including multiple past and current experiences of harm (Ferguson *et al*. 2023) and female gender predicts harm among adults under 65 years (Doyle and Barnes 2020, Sidebottom and Davies 2025). Missing person homicide cases are also more likely to involve female victims (Newiss 2004). Among fatal cases, approximately three quarters involve suicide, with the remainder resulting from accidents or homicide (Whibly *et al*. 2023). Missing males have also been found to be vulnerable within certain contexts. Males are overrepresented in long-term and fatal missing person cases (Newiss 2004, 2005) and situational risks such as intoxication, isolation, and unfamiliar environments may increase harm exposure, for example during nights out (Newiss and Spencer 2019). Harm has also been associated with being male, over 65, and having physical illness, mental illness, or substance abuse issues (Phoenix and Francis 2022), although Ferguson *et al*. (2023) reported fewer perceived victimisation risks for males beyond substance misuse. Less is known about transgender adults. However, Ferguson *et al*.'s (2023) findings regarding transgender children, characterised by intersecting vulnerabilities such as mental health difficulties, reflect similar concerns for transgender adults.

Age is another consistent harm predictor. Among adults under 65, both Doyle and Barnes (2020) and Sidebottom and Davies (2025) identify female gender and suicide ideation as predictors of harm. Doyle and Barnes (2020) additionally report reduced mobility, mental illness, disability, and being identified as vulnerable. Sidebottom and Davies (2025), by contrast, identify out-of-character behaviour, prior harm during previous missing episodes, and other contextual risk indicators as increasing harm likelihood, while social services involvement, missing from healthcare settings, and domestic violence involvement were associated with lower harm risk. Among adults over 65, both studies identify suicide risk as a predictor. Doyle and Barnes (2020) additionally report visual impairment and the absence of prior missing episodes, while Sidebottom and Davies (2025) identify disability and out-of-character behaviour. Phoenix and Francis (2022) found older age to be associated with harm, particularly when combined with male gender and health-related vulnerabilities. Police also perceive older adults with cognitive, physical, or mobility impairments to be vulnerable to victimisation (Ferguson *et al*. 2023). Cognitive decline for such adults may reduce ability to assess risk, seek help, or navigate safely, aligning with work showing older adults with cognitive impairment experience elevated risk of both fatal and non-fatal outcomes while missing (Perkins *et al*. 2011).

Lifestyle factors also shape harm pathways. Mental health conditions are particularly salient, with 80% of missing adults experiencing some form of mental disorder, including schizophrenia, bipolar disorder, depression, or dementia (Biehal *et al*. 2003). These conditions increase the likelihood of going missing (NCA 2023) and the risk of fatality, including suicide (Sveticic *et al*. 2012). Substance misuse also increases exposure to violence and exploitation (Newiss 2011) and may motivate missing episodes, for example to escape distress or access substances (Hedges 2017). Family breakdown is also linked to increased vulnerability to harm, including sexual exploitation, injury, and suicide (Newiss 2011), highlighting the compounding role of disrupted social support networks.

Repeat missing episodes may also signal cumulative vulnerability. Approximately 20% of adults are reported missing three or more times (Biehal *et al*. 2003), with higher rates among those from

institutional settings such as care homes or hospitals (Hayden and Shalev Greene 2014). These environments often reflect deeper support needs or psychological distress. Repeat incidents, especially when accompanied by mental health concerns or out-of-character behaviour, may therefore signal escalating vulnerability (Hedges 2017), consistent with LET.

Taken together, these studies suggest harm among missing adults reflects overlapping demographic, situational, and lifestyle vulnerabilities. LET provides a useful framework for interpreting these interactions, as individual characteristics such as gender, age, or cognitive impairment combine with lifestyle and situational vulnerabilities including addiction, poor mental health, or institutionalisation to increase harm risk during missing episodes.

Previous attempts to predict harm using police data

Although some characteristics are statistically associated with harm, predicting harmful outcomes based on police data may be limited. Most information is recorded at the time of reporting, often before the circumstances of the missing episode are known. As a result, key elements of harm exposure, including events occurring while the person is missing, may go unrecorded. This limits the ability to examine situational risks central to LET and raises questions about whether routinely collected police data can support harm prioritisation models. Empirical research addressing this issue remains limited.

Tarling and Burrows (2004) examined 1,000 missing person reports, supplemented with 'problematic' and 'unsolved' cases to increase the proportion of harm outcomes. They found it difficult to establish predictive categories due to the heterogeneity of outcomes and the low base rate of harm. These challenges highlight the difficulty of applying statistical techniques to missing person harm prediction (Newiss 2005) and were used to support arguments for clinical decision-making approaches (Tarling and Burrows 2004). In response, Newiss (2004, 2005) examined predominantly adult cases and conducted analyses of fatal and outstanding outcomes using age, gender and duration predictor variables. However, these studies did not examine broader non-fatal harms or multivariate predictors.

More recent studies have examined fatal and non-fatal harm outcomes using larger police datasets. Doyle and Barnes (2020) analysed over 90,000 missing reports from one UK police force over 11 years and identified several demographic and case-related factors associated with harm. Their findings support a range of demographic and lifestyle factors, consistent with LET. However, the large number of tests conducted without preplanned hypotheses raises the possibility of family-wide error and false positive associations (Armstrong 2014). Further research is therefore required to examine whether these findings replicate under more conservative statistical approaches. Phoenix and Francis (2022) used a similar predictive approach with 4,746 missing person reports from one police force, analysing children and adults within the same model using age as a variable. As discussed above, however, harm outcomes differ substantially between these populations.

Finally, and most closely aligned with the present study, Sidebottom and Davies (2025) analysed over 44,000 missing person incidents from two police forces to examine whether harmful outcomes could be predicted using routinely recorded police data. Ten variables were associated with increased harm risk, including age, female gender, suicidal ideation, mental health concerns, and prior harm during a previous missing episode, with predictors varying by age group. The resulting model demonstrated acceptable predictive performance (AUC = 0.75) and was proposed as a tool to complement existing police risk assessments. Separate analyses for children and adults identified suicide ideation, prior harm, and out-of-character behaviour as consistent predictors. However, the modelling strategy was data-driven rather than theoretically specified. Predictors were identified using a conventional significance threshold ($p \leq .05$) across a relatively large set of variables. While appropriate for exploratory modelling, future research may benefit from integrating theoretical frameworks and applying more conservative statistical thresholds to reduce Type I error and improve the generalisability of predictive models across police datasets.

The current study

Despite longstanding concerns about the lack of objective evidence underpinning risk assessment in missing person investigations, few studies have directly addressed this gap. This study evaluates the feasibility of using routinely captured police data to predict harm outcomes amongst children and adults. Building on theory-driven prioritisation approaches used in related areas of psychology (e.g. Long *et al*. 2016), this study applies LET to conceptualise how demographic and lifestyle factors accumulate and interact with situational vulnerabilities to shape harm pathways. Police data includes a range of demographic and lifestyle variables frequently associated with harm, alongside variables used in police risk assessments and other case-specific information. Together these form the basis of a Harm Vulnerability Framework, through which the predictive value of each variable is tested against known harm outcomes.

To account for repeat missing episodes, analyses were conducted on two samples; Sample 1 comprising all incidents recorded over a one-year period, and Sample 2 comprising individual-level data. Because harm profiles differ between children and adults, these groups were analysed separately. Robust statistical procedures, including corrections for multiple comparisons, were used to improve the reliability and generalisability of findings.

Guided by existing evidence and LET, it is anticipated that single vulnerabilities within the Harm Vulnerability Framework will be associated with increased harm risk. The most consistently identified predictors in the literature include suicide ideation, prior harm during previous missing episodes, gender, age, and mental health concerns. Current police risk grading (no apparent risk, low, medium, high) is also included to provide a direct test of operational risk assessment. These categories are expected to predict harm outcomes but are unlikely to be sufficient alone. Predictive performance is therefore expected to improve when additional variables capturing cumulative vulnerability are incorporated.

As such, multivariable models including all statistically significant vulnerabilities will be developed to assess predictive utility for children and adults, across both individual- and incident-level analyses. The cumulative vulnerability argument is theoretically motivated by LET and supported by qualitative evidence (e.g. Ferguson *et al*. 2023) but has not yet been extensively tested quantitatively. Accordingly, interactions between vulnerability indicators remain exploratory and exact combinations are not specified in advance. If successful, these combinations may inform actuarial harm prioritisation tools capable of complementing existing police risk assessments and supporting structured professional judgement.

Finally, it is anticipated that incident-level analyses may provide greater insight into harm vulnerability, as repeat incidents capture cumulative exposures across episodes rather than relying on a single snapshot of individual characteristics.

Method

Sample 1

Data from 16,454 missing person incidents were extracted from two UK police forces, representing all reports between January 2016 and January 2017. For Analysis 1, incidents were used as the unit of analysis; therefore, including repeat incidents. The total population consisted of 11,487 incidents involving children (69.8%) and 4967 incidents involving adults. For the child sample and when reported, 50.7% ($n = 5826$) were male, 49.2% ($n = 5647$) were female, and 0.1% were transgender ($n = 11$). The mean age was 14.4 ($SD = 2.05$), with the youngest child being 0 and the oldest 17. In the adult sample and when reported, 62.8% ($n = 3120$) were male, 37.1% ($n = 1841$) were female, and 0.1% ($n = 5$) were transgender. The mean age was 40.1 years ($SD = 17.5$; range = 18-95).

Of the 11,487 incidents involving children, 1.7% ($n = 192$) cases resulted in a harmful outcome, with 0.8% ($n = 87$) reporting physical harm, 0.5% ($n = 53$) self-harm, 0.3% ($n = 31$) sexual harm, 0.2% ($n = 23$) accidental harm, 0.1% ($n = 6$) emotional harm, and one fatal outcome. Of the 4967

cases involving adults, 6.6% ($n = 328$) suffered harm whilst missing, with 2.8% ($n = 140$) of cases reporting self-harm, 2.3% ($n = 113$) physical harm, 0.8% ($n = 42$) resulting in the missing adult being found deceased, 0.6% ($n = 32$) reporting accidental harm, 0.3% ($n = 15$) reporting sexual harm, and 0.3% ($n = 15$) reporting emotional harm. For both child and adult incidents, more than one category of harm could be recorded.

Sample 2

One force also provided data on 4206 individuals reported missing between January 2018 and January 2019. This data consisted of 1834 children and 2396 adults. In the child sample, 61.4% ($n = 1127$) were reported missing once in the dataset, whilst 14.2% ($n = 260$) were reported missing twice. One child had been reported missing 60 times. In the adult sample, 87.5% ($n = 2097$) were reported missing once in the dataset, whilst 7.8% ($n = 188$) were reported missing twice. One adult had been reported missing 16 times.

Sub-sample selection

To prevent repeat cases from being over-represented in the findings, the first recorded incident for individuals was selected to form sub-samples (children, $n = 1828$; adults, $n = 2389$[1]).

For the child sub-sample, 48.7% ($n = 891$) were male, 50.9% ($n = 931$) were female, 0.2% were transgender ($n = 4$), and in two cases, data regarding gender were missing. The mean age at reporting for children was 14.3 years ($SD = 2.18$, range = 0-17 years). In the adult sub-sample, 66.4% ($n = 1586$) were male, 33.4% ($n = 799$) female, 0.1% ($n = 3$) transgender, whilst data were missing for one person. The mean age for missing adults was 38.8 years ($SD = 16.4$, range = 18-92 years).

Out of the selected sub-sample of child incidents, 1.4% ($n = 25$) of cases reported a harmful outcome; 0.5% ($n = 9$) of cases resulted in physical harm, 0.4% ($n = 8$) reported self-harm, 0.3% ($n = 5$) reported accidental harm, 0.2% ($n = 4$) children suffered sexual harm, and 0.1% ($n = 2$) suffered emotional harm. There were no incidences of fatal outcomes in the sub-sample of children. For the adult sub-sample, 8% ($n = 189$) included reports of harm whilst missing; 3.6% ($n = 86$) reported self-harm, 2.5% ($n = 60$) reported physical harm, 1.5% ($n = 36$) resulted in a fatal outcome, 0.8% ($n = 20$) suffered accidental harm, 0.4% ($n = 9$) suffered emotional harm, and in one case, sexual harm was reported. Again, it was possible to record more than one harmful outcome for each incident.

Procedure

Variables

Demographic and lifestyle characteristics[2] were derived from the recorded reports of missing incidents. The outcome variable was whether the missing person came to any type of harm whilst missing. Harm outcome is a subjective assessment recorded by the investigating officer determined after the person has returned. This variable was dichotomously coded where 0 = no harm indicated, and 1 = harm indicated. The type of harm was not delineated due to the low rate of harmful outcomes.

Predictor variables are outlined in the Harm Vulnerability Framework presented in Table 1. They were supplemented by police assessments and case-specific information indicating vulnerability and intention regarding the missing episode. With the exception of age (in years), number of times previously missing (frequency), sex (male/female/transgender), ethnic appearance (Asian/Black/Chinese, Japanese or South Asian/Middle Eastern/White European/White South European), sexuality (Bisexual/Homosexual/Heterosexual/Pansexual) and initial and latest[3] police risk assessment of coming to harm (no apparent,[4] low, medium, high), all other variables were coded dichotomously (where 0 = absence of variable and 1 = presence of variable).

Table 1. Harm Vulnerability Framework variables derived from police data used in the analysis.

Harm Vulnerability Framework		Variables
Police assessment/case-specific information		Initial risk assessment[a]; Latest risk assessment; Out of character; Preparation for absence; Possession of a passport.
Demographics		Gender; Age; Ethnic appearance; Primary nationality[b]; Religion[2]; Sexuality[2]; Marital status[2].
Lifestyle factors	Historical	No of times previously missing; Previously suffered harm.
	Care arrangements	Care Order; Child protection plan; Absconder.
	Risk factors	Family/relationship problems; Subject of crime; Ongoing bullying/harassment; Violent or racist incident; Victim/perpetrator of domestic abuse; Education/employment/financial; Failure to complete intentions; Other risk factor.
	Physical health	Drug/alcohol dependency; Disability; Visual disability; Auditory disability[2]; Mobility disability[2]; Learning disability; Developmental problems[2]; Cognitive disability[2]; Somatic disability[2]; Unknown disability; Lacks ability to interact with others; Lacks essential medication.
	Mental health	Likely to commit suicide; Mental health issue; Schizophrenia/psychotic disorder[2]; Eating disorder[2]; Personality disorder[2]; Unknown mental health issue.[2]
	General	Reason for going missing; Vulnerable.

[a]As risk assessments can be changed throughout an investigation (see College of Policing 2024), the risk gradings applied in the initial stages and the later stages of the investigation were given.
[b]Not included in the analysis as data violated 'cases per variable' assumption (see Peduzzi *et al.* 1996).

Analysis

Bivariate logistic regressions were conducted to examine the impact that predictor variables had on the outcome variable of harm. Any significant individual predictors were inputted into the multivariate logistic regression models to assess how predictors performed when controlling for others, as well as how models that considered all predictor variables performed compared to individual predictor models. Assumptions were examined and checked (cases per variable; Peduzzi *et al.* 1996; assessment of outliers and influential cases; Tabachnick and Fidell 2013; multicollinearity; Pallant 2010). Beta values provided an indication of how likely a harm outcome was (or was not), given the presence of a predictor. Some variables contained substantial missing data. Therefore, an additional category of 'missing' was included as a category of predictor variables when relevant, allowing for the interpretation of how/whether the cases with missing data differed from other categories. A Bonferroni correction was applied to the critical *p*-value to control for a Type I error (Streiner and Norman 2011). As 32 bivariate comparisons were conducted, the *p*-value was adjusted to 0.001563 for those.

Results

Sample 1 – missing children

The overall model for initial risk was a significant fit to the data, to the adjusted *p*-value; Wald $\chi^2 = 32.67$, $df = 4$, $p \leq .001$ (Table 2). Relative to those who were at no apparent risk of coming to harm, those deemed high risk were 5.78 times more likely to suffer harm (95%, CI 1.35 to 24.82). Those in the low and medium risk groups were not significantly more likely to come to harm. The overall model for latest risk was a significant fit to the data; Wald $\chi^2 = 36.50$, $df = 4$, $p \leq .001$. However, no risk level was significantly different from the no apparent risk level. High standard error values suggest that the latest risk assessment is not an accurate measure to predict harm outcomes within this sample.

Age also statistically improved the model; older children were 1.17 (95% CI, 1.07 to 1.28) times more likely to come to harm ($p \leq .001$) than younger children.

Female children were 2.11 times more likely to come to harm than males (95%, CI, 1.55 to 2.85), whilst transgender children were 20.33 times more likely to come to harm (95%, CI, 4.31 to 95.98). Those at risk of suicide were 8.14 times more likely to come to harm (95%, CI 4.73 to 14.01). Children

Table 2. Unstandardised Beta Coefficients (Standard Errors) and Odds Ratios (OR) from logistic regressions predicting harm whilst missing for children ($N = 11, 487$) 405.

Variable		*n*	B	SE	OR	EXP_CI		Wald	df	*p* value	Nagelkerke R^2
Initial risk level*	Model							32.67	4	.00	.02
	Low	349	−.52	1.00	.60	.08	4.27	.27	1	.61	
	Medium	10118	.50	.72	1.64	.40	6.67	.48	1	.49	
	High	416	1.75	.74	5.78	1.35	24.82	5.57	1	.02	
	Missing data	395	.76	.80	2.14	.45	10.17	.92	1	.34	
Latest risk level*	Model							36.50	4	.00	.02
	Low	353	15.34	3498.16	4602302.85	.00	.00	.00	1	1.00	
	Medium	10107	17.05	3498.16	25489357.09	.00	.00	.00	1	1.00	
	High	501	18.30	3498.16	88422349.05	.00	.00	.00	1	1.00	
	Missing data	395	17.32	3498.16	33393453.23	.00	.00	.00	1	1.00	
Age	Model	11487	.16	.05	1.17	1.07	1.28	12.50	1	.00	.01
Gender*	Model							33.25	3	.00	.02
	Female	5647	.74	.16	2.11	1.55	2.85	22.98	1	.00	
	Transgender	11	3.01	.79	20.33	4.31	95.98	14.47	1	.00	
	Missing data	3	−16.69	23205.42	.00	.00	.00	.00	1	1.00	
Likely to commit suicide	Model							62.25	2	.00	.02
	Yes	152	2.10	.28	8.14	4.73	14.01	57.18	1	.00	
	Missing data	1163	.64	.20	1.89	1.28	2.80	10.16	1	.001	
Mental health issues	Model							29.31	2	.00	.02
	Yes	2002	.86	.17	2.35	1.69	3.27	25.64	1	.00	
	Missing data	1607	.66	.19	1.94	1.33	2.84	11.80	1	.00	
Previously suffered harm	Model							28.58	2	.00	.01
	Yes	573	1.14	.23	3.11	1.97	4.92	23.67	1	.00	
	Missing data	2613	.54	.16	1.72	1.25	2.37	11.08	1	.001	
Multivariate	Model							88.84	9	.00	.05
	Initial high model							9.42	2	.01	
	Yes	416	.83	.29	2.30	1.31	4.03	8.41	1	.01	
	Missing data	395	−.30	.43	.74	.32	1.73	.47	1	.49	
	Age	11487	.15	.05	1.16	1.07	1.27	11.43	1	.00	
	Likely to commit suicide model							13.68	2	.01	
	Yes	151	1.23	.34	3.42	1.75	6.68	12.95	1	.00	
	Missing data	1158	.42	.26	1.52	.91	2.53	2.55	1	.11	
	Mental health issue model							10.63	2	.01	
	Yes	1977	.58	.18	1.79	1.26	2.54	10.59	1	.01	
	Missing data	1597	.32	.25	1.38	.84	2.27	1.62	1	.20	
	Previously suffered harm model							10.49	2	.01	
	Yes	567	.78	.24	2.18	1.36	3.52	10.33	1	.01	
	Missing data	2581	.23	.19	1.23	.86	1.84	1.42	1	.23	

*Reference categories: No apparent risk; male.

suffering from mental health issues were 2.35 times more likely to come to harm (95%, CI 1.69 to 3.27), whilst children who had previously suffered harm were 3.11 times more likely to come to harm (95%, CI 1.97 to 4.92).

Multivariate logistic regressions were conducted on the significant[5] predictors of harm (initial high risk, age, being at risk of suicide, mental health issues, previously suffered harm). As Table 2 shows, the overall model for the multivariate regression was a significant fit to the data: Wald $\chi^2 = 88.84$, $df = 9$, $p \leq .001$. Controlling for other independent variables, those who were deemed as being at risk of suicide were 3.42 times more likely to come to harm (95%, CI 1.75 to 6.68), those deemed high risk were 2.30 times more likely (95%, CI 1.31 to 4.03), those who had previously come to harm whilst missing were 2.18 times more likely (95%, CI 1.36 to 3.52), those with known mental health issues were 1.79 times more likely (95%, CI 1.26 to 2.54), and those who were older were 1.16 times more likely (95%, CI 1.07 to 1.27) to suffer harm than those who were not.

Sample 1: missing adults

Compared with incidents where missing adults were initially assessed as at no apparent risk of harm, those deemed high-risk were 3.39 times more likely to come to harm using the adjusted *p*-value (95%, CI 0.11 to 1.34) (Table 3). The overall model for latest risk was a significant fit to the data; Wald $\chi^2 = 121.89$, $df = 4$, $p \leq .001$. However, no risk level was significantly different from the no apparent risk level, and high standard error values suggest that the latest risk assessment is not an accurate measure to predict harm outcomes within this sample.

Adults likely to be at risk of suicide were 3.36 times more likely to come to harm (95% CI 2.61 to 4.33). Those who had previously suffered from harm were 3.01 times more likely to suffer harm (95% CI 2.02 to 4.49).

Multivariate logistic regressions used significant predictors of harm (initial high risk,[6] risk of suicide, and previously suffered harm). The overall model for the multivariate regression was a significant fit to the data: Wald $\chi^2 = 139.50$, $df = 8$, $p \leq .001$. Controlling for other independent variables, although the initial risk assessment level model was significant, none of the other categories within this variable were significant. Those who had previously come to harm were 2.02 times more likely to have harm recorded (95% CI 1.34 to 3.07), and those who were thought to be at risk of suicide were 2.01 times more likely (95% CI 1.49 to 2.71).

Sample 2 – missing children

There were no variables present predicting harm in individual children who were more or less likely to come to harm whilst missing using the adjusted *p*-value.

Sample 2 – missing adults

Missing adults initially assessed as high risk were 8.91 times more likely to come to harm (95% CI 4.29 to 18.50), and those deemed at medium risk were 2.26 times more likely to suffer harm (95% CI 1.08 to 4.74) than those assessed as low risk, significant to the adjusted *p*-value (Table 4). Similarly, in terms of the latest risk assessment, those deemed high risk were 13.33 times more likely to come to harm (95%, CI 5.81 to 30.58), and those deemed medium risk were 3.21 times more likely to come to harm (95%, CI 1.38 to 7.46) than those deemed low risk. Those who were deemed to be at risk of suicide were 4.39 times more likely to come to harm (95% CI 3.11 to 6.20).

Multivariate logistic regressions could not be conducted on the significant predictors of harm because both initial and latest risk assessment violated the assumption of multicollinearity. As this left the variable likely to be at risk of suicide, the bivariate results for this variable should be considered.

Table 3. Unstandardised Beta Coefficients (Standard Errors) and Odds Ratios (OR) from logistic regressions predicting harm whilst missing for adult cases ($N = 4967$).

Variable		*n*	B	SE	OR	EXP_CI		Wald	df	*p* value	Nagelkerke R^2
Initial risk level*	Model							104.94	4	.00	.05
	Low	391	−.96	.64	.38	.26	.42	2.26	1	.13	
	Medium	3272	.10	.52	1.11	.05	.24	0.40	1	.84	
	High	1030	−1.22	.52	.30	.11	.82	5.51	1	.02	
	Missing data	186	−1.04	.34	.35	.18	.68	9.56	1	.77	
Latest risk level*	Model								4		.00
	Low	443	17.53	5472.20	41150386.90	.00	.00	.00	1	1.00	
	Medium	3224	18.20	5472.20	80514928.00	.00	.00	.00	1	1.00	
	High	1060	19.43	5472.20	274699151.32	.00	.00	.00	1	1.00	
	Missing data	186	18.34	5472.20	91823137.21	.00	.00	.00	1	1.00	
Likely to commit suicide	Model							95.08	2	.00	.05
	Yes	944	1.21	.13	3.36	2.61	4.33	88.44	1	.00	
	Missing data	1117	.20	.16	1.22	.89	1.66	1.53	1	.22	
Previously suffered harm	Model							29.76	2	.00	.01
	Yes	202	1.10	.20	3.01	2.02	4.49	29.50	1	.00	
	Missing data	1266	.07	.13	1.07	.82	1.39	.24	1	.62	
Multivariate model	Model							139.50	8	.00	.07
	Initial risk* model							37.02	4	.00	
	Low	391	−.93	.64	.40	.11	1.39	2.09	1	.15	
	Medium	3272	.05	.52	1.05	.38	2.90	.01	1	.93	
	High	1030	.80	.53	2.21	.79	6.24	2.26	1	.13	
	Missing data	186	.18	.63	1.20	.35	4.12	.08	1	.77	
	Likely to commit suicide model							21.43	2	.00	
	Yes	944	.70	.15	2.01	1.49	2.71	20.55	1	.00	
	Missing data	1117	.13	.17	1.14	.81	1.59	.55	1	.46	
	Previously suffered harm model							11.98	2	.01	
	Yes	202	.71	.212	2.02	1.34	3.07	11.05	1	.00	
	Missing data	1266	−.04	.15	.08	.96	.72	1.28	1	.78	

*Reference category: No apparent risk.

Table 4. Unstandardised Beta Coefficients (Standard Errors) and Odds Ratios (OR) from logistic regression predicting harm whilst missing for individual adults ($N = 2389$).

Variable		*n*	B	SE	OR	EXP_CI		Wald	df	*p* value	Nagelkerke R^2
Initial risk level*	Model							92.41	2	.00	.09
	Medium	1414	.82	.38	2.26	1.08	4.74	4.66	1	.03	
	High	630	2.19	.37	8.91	4.29	18.50	34.42	1	.00	
Likely to commit suicide	Model							75.84	2	.00	.07
	Yes	556	1.48	.18	4.39	3.11	6.20	70.43	1	.00	
	Missing data	562	.44	.22	1.55	1.01	2.36	4.06	1	.00	

*Reference category: Low risk.

Discussion

This study examined whether routinely captured police data can support the development of an evidence-based harm prioritisation tool for missing person cases. Given the high volume of missing person reports and the relatively low base rate of harmful outcomes, such a tool could support more targeted resource allocation based on harm likelihood.

Findings and practical implications

The hypotheses explicitly test core propositions of Lifetime Exposure Theory relating to single vulnerabilities, cumulative vulnerability, and repeated exposure across incidents. In practical terms, this makes explicit the cumulative vulnerability reasoning that Ferguson *et al.* (2023) found officers already use implicitly when assessing vulnerability in missing person cases. The present study considers whether routinely captured police data act as meaningful proxies for these cumulative vulnerabilities. The findings provide partial empirical support. Several single vulnerabilities were consistently associated with harm outcomes, particularly high risk, suicide ideation and prior harm during previous missing episodes. Incident-level analyses suggested that cumulative vulnerability may be better captured across repeated incidents than through individual characteristics alone. At the same time, the modest explanatory power of the multivariable models indicates that routinely captured police data represents only a partial proxy for the cumulative exposure processes anticipated by LET.

The study contributes to a small but growing body of research examining the predictive value of missing person characteristics in relation to harm outcomes. As in Sidebottom and Davies (2025), prior harm emerged as a consistent and robust predictor of future harm in both adults and children at the incident level. This finding lends empirical weight to LET's central premise that past harm increases future vulnerability and provides a clear empirical basis for risk escalation decisions.

As reported in both Doyle and Barnes (2020) and Sidebottom and Davies (2025), suicide ideation was also a strong predictor of harm across both groups. Unique to this study is the inclusion of police risk categorisation. Initial high-risk categorisation was also associated with harm across both groups. While latest risk assessments were statistically significant within incident models, no single category was independently associated with harm for children and adults, suggesting that frontline assessments at the time of initial report may be more accurate in identifying vulnerability than subsequent reassessment made later in the investigation. The only exception was the adult individual model, where both high and medium latest risk categorisations were significant predictors of harm. Medium risk categorisations were important for adult individuals at both initial and latest assessment.

These findings raise important questions about how risk judgements evolve over the course of an investigation. It is possible that organisational pressures, case progression dynamics, or officer

confidence influence reassessment practices. Further qualitative research would therefore be valuable to explore how officers interpret, revise, and justify risk decisions over time, and how confidence, experience, and information from families or partners shape these judgements in practice.

Among children, several additional variables were identified that could inform police risk assessment decisions. Children designated as high risk at the initial assessment were 5.78 times more likely to experience harm. Several predictors identified in this study are consistent with those reported by Sidebottom and Davies (2025), including female gender, mental health concerns, suicide ideation, and prior harm during previous missing episodes. Two additional factors emerged in the present study. Transgender children were significantly more likely to experience harm than non-transgender children, and older age was associated with a modest increase in harm risk (17%). Together, these LET-informed vulnerabilities provide concrete indicators that may justify risk escalation even in the absence of clear evidence of imminent harm.

Multivariate analyses showed, while some variables retained significance with reduced odds ratios, others lost significance when controlling for overlapping predictors. Among both children and adults, suicide ideation and prior harm remained significant and doubled the likelihood of harm. For children, initial high risk also doubled harm likelihood, and both mental health issues and older age continued to make a significant contribution. Some variables, such as gender and latest risk, were excluded from multivariate models due to multicollinearity. These findings highlight the need for further research into interaction effects and subgroup differences, particularly where variables are closely related.

The variance explained by multivariate models was modest, suggesting predictive utility is limited. However, in operational contexts, even moderate improvements in harm prediction can support more proportionate and defensible decision-making. For adult cases, the findings largely validate current risk practice. High-risk categorisation and suicide concern remain appropriate triggers for urgent intervention. Nonetheless, results suggest that medium-risk classifications and prior harm during previous missing episodes warrant closer scrutiny. In practice, when supervising officers review risk assessments this may justify escalation from low to medium risk, or from medium to high risk, where cumulative vulnerability is evident, particularly when prior harm is documented.

For children, the findings indicate greater scope for structured support to decision-making, including structured decision-support tools. Factors such as prior harm, gender, older age, and mental health difficulties warrant further consideration, alongside typically high-risk indicators like suicide ideation, which already influence initial risk categorisation. These factors could inform the refinement of existing risk assessment frameworks or the development of supplementary decision aids to support frontline officers in identifying cases requiring a heightened investigative response.

Beyond immediate risk grading, the findings also have implications for safeguarding pathways. Prior harm and suicide vulnerability should not only influence initial deployment decisions but also trigger structured follow-up activity, including referral, multi-agency review, and consideration within return home interview (RHI) processes. In particular, the child findings suggest that safeguarding responses may need to be strengthened where cumulative vulnerabilities are present. For example, children experiencing mental health difficulties who have previously suffered harm whilst missing may require more proactive safeguarding planning following their return. Similarly, the elevated harm risk observed among female, transgender, and older adolescents indicates that these groups may be exposed to environments or circumstances that increase vulnerability during missing episodes. Where such demographic characteristics intersect with other vulnerabilities, particularly mental health concerns or prior harm, this may warrant enhanced safeguarding attention, including information sharing with partner agencies and closer follow-up through RHI processes. Although risk assessment and safeguarding are not always formally integrated within current systems, aligning harm vulnerability indicators with safeguarding planning may improve longer-term outcomes for children and young people who experience repeated or escalating vulnerability while missing.

Academic implications

The study also contributes to the academic literature by replicating key child harm predictors identified in earlier research. In line with LET, and consistent with increased victimisation risk among females, Ferguson *et al*. (2023) identified intersecting vulnerabilities, including mental health issues and suicidal ideation, as key factors shaping officers' perceptions of risk for missing children. Alongside findings from Doyle and Barnes (2020) and Sidebottom and Davies (2025), the present study's focus on outcomes provides data triangulation supporting these qualitative policing concerns. However, several predictors identified in earlier research were not replicated. Doyle and Barnes (2020) reported associations with disability and/or learning disability, risk of sexual exploitation, living in residential care, and repeat missing episodes, while Sidebottom and Davies (2025) identified ethnicity and missing from education as being associated with reduced likelihood of harm.

This study also contributes to the limited evidence base on harm outcomes for transgender children. Existing research shows that transgender youth are disproportionately likely to be reported missing (Gambon and Gewirtz O'Brien 2020, O'Brien *et al*. 2021), yet little empirical work has examined whether they are also more likely to experience harm during missing episodes. In the present study, transgender children were significantly more likely to experience harm while missing. This finding aligns with qualitative research by Ferguson *et al*. (2023), which showed that police officers often perceive transgender individuals as particularly vulnerable, often due to intersecting mental health concerns. Some emerging quantitative evidence points in a similar direction. For example, Sidebottom and Davies (2025) found that transgender individuals were almost twice as likely to experience harm while missing. However, this association did not reach statistical significance and was therefore excluded from their final predictive model. The present results should likewise be interpreted cautiously as wide confidence intervals indicate uncertainty, and multicollinearity prevented transgender identity from being included in the multivariate model. As a result, its contribution within a cumulative risk framework could not be fully assessed. Future research using larger samples and stratified analysis is needed to better understand how gender identity intersects with other vulnerabilities to shape harm risk.

In addition to gender identity, age also emerged as an important demographic factor influencing risk of harm. From a LET perspective, this likely reflects adolescents' increasing independence, wider geographical mobility, and greater engagement in unsupervised activities (National Academies of Sciences, Engineering, and Medicine 2019). Compared with younger children, these factors increase exposure to risky environments and interactions, thereby cumulatively heightening vulnerability to harm.

The present study provides only limited replication of previously identified adult harm predictors. Consistent with national figures (NCA 2023), adults were 3.5 times more likely than children to experience harm. However, only two risk factors were consistently replicated from other studies: suicide ideation (Doyle and Barnes 2020, Sidebottom and Davies 2025) and prior harm (Sidebottom and Davies 2025). Other demographic, health, and lifestyle predictors identified in earlier research were not observed in the present analysis. For adults under 65, previous studies have reported associations between harm and factors including female gender, reduced mobility, mental illness, disability, not being a repeat missing person, vulnerable adult status, and out-of-character behaviour (Doyle and Barnes 2020, Sidebottom and Davies 2025). Similarly, the current study did not replicate predictors identified for adults over 65, such as visual impairment, disability, out-of-character behaviour, or not being a repeat missing person (Doyle and Barnes 2020, Sidebottom and Davies 2025). Current findings also diverge from research by Phoenix and Francis (2022), which linked harmful outcomes to being male, older age, physical or mental illness, and substance misuse. Likewise, findings did not validate concerns raised by Ferguson *et al*. (2023) regarding the role of cognitive decline in shaping harm risk.

Taken together, these results may suggest that many previously identified predictors of harm may be less consistent across datasets than earlier work implies, with suicide concern and prior harm

emerging as the most robust indicators. However, the failure to replicate past research among child and adult harm outcomes may also reflect the stringent thresholds adopted in the present research. Given the large sample size and number of comparisons, a conservative alpha level was used to reduce the risk of model overfitting and enhance the generalisability of findings to other police datasets and similar demographic contexts. While this approach supports confidence in the identified predictors, several variables previously linked to harm did not reach statistical significance under the Bonferroni correction. Most notably, repeat missing episodes were not significantly associated with harm among children or adults, contrasting with past research (Hayden and Shalev Greene 2014). In the present study, repeat episodes among children were associated with harm but fell below the threshold for statistical significance. Future work should revisit the role of repeat episodes, especially where concerns exist about escalation in cases initially categorised as low or medium risk.

Given the relatively low variance explained by the final models (1-9%), it remains important for officers to use structured professional judgement (e.g. Chan *et al*. 2023) to consider the presence of other known risk indicators, even when cases are assessed as low or medium risk. For children, findings from this study that were implicated but did not pass Bonferroni correction include previous missing episodes, exposure to crime or domestic abuse, bullying, disability, and other vulnerability indicators. For adults, this would include gender, out-of-character behaviour, vulnerability, substance misuse, mental health concerns, disability and other vulnerability indicators. Each of these factors fits within LET as circumstances that may increase harm exposure.

From a theoretical perspective, the findings offer partial support for the cumulative vulnerability framework proposed by LET. Although police data were not originally collected with LET in mind, theory does not require design alignment to offer explanatory value. Here, LET functions as a lens through which existing police risk indicators can be evaluated as markers of cumulative exposure. Prior harm and suicide concern consistently predicted harm, aligning with LET expectations. However, the modest explanatory power of the models reflects both the conservative statistical approach adopted to minimise model overfit and the limits of routinely captured police data. The stringent alpha threshold reduced the likelihood of spurious associations but also meant that some vulnerabilities identified in prior research did not reach statistical significance in the present analyses. At the same time, much of the information available to officers is recorded at the time of reporting, before the circumstances of the missing episode unfold, meaning exposures occurring during the missing episode remain only partially observable within routine police datasets. This gap is both theoretically and practically important, suggesting that while LET provides a useful framework for conceptualising harm vulnerability, current police datasets capture only a partial representation of the cumulative exposures that shape harm outcomes.

Limitations and future research

Several limitations may affect the validity of current findings. First, there is an issue of non-independence, as risk categorisation is partly based on the same variables included in the models. For instance, high risk classifications are often assigned in cases with suicide markers, which compromises the independence of these variables. Risk categorisation was included in this study to assess how well the models align with existing police decision-making. However, future research should consider running analyses both with and without this variable to test the robustness of the findings and to clarify the added predictive value of other factors. These issues are compounded by variations in local recording practices. For example, the risk category 'no apparent risk' was not used by one participating force during the study period, which may reflect differences in local policy or risk assessment frameworks. Although this category is used less frequently by police forces, its inconsistent application limits direct comparison and may affect model accuracy. Future work should be mindful of variation in risk categorisation practices (such as new use of 'very low risk', CoP 2024) to support more generalisable modelling.

Second, there was a substantial amount of missing data. However, this was generally not associated with harmful outcomes. In cases where missing data did relate to outcome, the pattern appeared systematic and suggested police were accurately scoring variables when information was available. For example, variables such as suicide ideation, prior harm, and mental health issues showed the same association with harm when coded as '0' or missing, indicating consistent application of risk indicators when present.

Third, the distinction between incident-level and individual-level analyses presents interpretive challenges. Associations between vulnerability and harm were clearer when analysing incidents across the one-year period than when focusing on individuals' first recorded episode. This pattern is consistent with the cumulative vulnerability perspective proposed by LET, whereby repeated exposure across incidents may increase harm risk. From a data perspective, aggregate incident-level information may also be more complete or robust as officers accumulate knowledge about children across multiple reports. However, the dataset did not allow incidents to be fully linked across time for the same individuals. As a result, while incident-level analyses may capture cumulative vulnerability more effectively, it remains possible that a small number of individuals with multiple reports could disproportionately influence the findings. The absence of statistically significant associations for repeat missing episodes somewhat mitigates this concern, but future research using longitudinal, case-linked datasets would allow a more direct examination of how harm risk evolves across repeat incidents.

Fourth, the current dataset did not allow for detailed exploration of harm by type. Harm was treated as a single outcome, yet the pathways leading to accidental injury, self-harm, or sexual harm are likely to differ. Larger or harm-specific datasets are needed to better understand the distinct predictors and mechanisms associated with different harm outcomes. In addition, not all harm experienced while missing will come to the attention of the police. Recorded harm reflects only incidents that are disclosed by the missing person or identified through other mechanisms, such as third-party reporting or hospital admission. As a result, there may be systematic biases in the types of harm, and the groups of individuals, most likely to have harm recognised and recorded. Given the limited understanding of how harm categories are operationalised across forces, further qualitative research would be valuable to examine how harm is identified, interpreted, and documented in practice.

Fifth, outcome data do not provide a true test of the relationship between missing person characteristics and harm. To assess this accurately, one would need to observe outcomes without any police intervention. Police, families, and partner organisations work hard to mitigate risk, so recorded outcomes often reflect harm that occurred despite these efforts. The consistent association between being at risk of suicide and harm in the present study may point to the often private and secretive nature of suicidal behaviour, where individuals actively try to evade detection (Joiner 2005). We do not know the outcomes that would have occurred in other high-risk situations had there been no intervention. Relatedly, evaluating the success of any future harm prioritisation tool will be difficult, since its effectiveness would be evidenced by an absence of harm. Baseline data would be required prior to implementation, but this presents challenges given the low base rate of harm and the confounding effect of police action. To address this, future studies should aim to operationalise police responses, for example, tracking investigative tasks, response times, or who located the individual, to enable a more direct test of the presumed logic of the tool.

Finally, a wider picture of harm is needed. This study highlights the complexity of harm pathways, which may not be fully captured through the limited set of indicators recorded by the police. In many cases, exposure to harm may emerge during the missing episode itself rather than being fully determined by prior indicators. A more complete understanding of harm pathways is required, much in the same way Ferguson *et al*. (2023) theorised victimisation pathways. Their application of LET considers exposures occurring before or during the missing episode, such as survival crimes committed while missing. According to LET, different factors interact to place individuals in risky environments that increase exposure to harm. The same principle likely applies to broader harm pathways, yet current police data are not structured to facilitate empirical examination of these dynamics.

Overall, police data collection, typically gathered through safe and well checks, is often limited. This may reflect unwillingness from missing individuals to engage or result from limited police resources constraining the ability to conduct and record detailed follow-up conversations. RHIs could offer richer data, but these are often reserved for repeat missing children and do not always contain information about harm (Boulton *et al*. 2022). Nor is information from RHIs routinely integrated with police systems. Additional relevant information may exist elsewhere in police records, particularly in cases involving mental health or criminality (Ferguson *et al*. 2023), but these sources are not systematically linked or analysed in harm-related research. To address these gaps, future studies could replicate the present research using matched RHIs to better understand what occurs during the missing episode. Further qualitative work would also be valuable to assess the extent to which police systems currently capture information relevant to harm, particularly in cases where crimes or high-risk situations are also suspected.

A final reflection concerns the emphasis on harm as an outcome in missing person research. While harm-based outcomes are important for evaluation, police decision-making must also be guided by proportionality and moral judgement. Some forms of harm, particularly emotional harm, may fall outside the police remit. Nonetheless, as multi-agency models gain traction (Gambier-Ross *et al*. 2023), policing must be seen as one part of a broader system aiming to improve outcomes for missing people. With better integration of data from RHIs and other sources, studies such as this can contribute to an evidence-based understanding of harm vulnerability. This in turn can support multi-agency risk assessment and response. Whether structured professional judgement or alternative approaches are adopted, police-led frameworks will benefit from continued empirical testing provided the data captured is of high quality and validity.

Conclusion

Effective policing of missing person cases depends on accurately identifying those at greatest risk of harm and prioritising resources accordingly. This study found that high-risk categorisation and suicide ideation were consistent predictors of harm among children and adults, with medium-risk categorisations also predicting harm for adults. While these findings alone do not justify the development of new actuarial tools, they highlight factors that could strengthen prioritisation decisions. In particular, prior harm during a previous missing episode emerged as a potentially important indicator of a repeating harm pathway and may warrant greater operational attention. Findings also suggest scope for more structured decision-support approaches for missing children, where age, sex and mental health concerns were associated with harm vulnerability and may justify prioritisation even in the absence of suicide ideation or high-risk categorisation. More broadly, results provide partial empirical support for the cumulative vulnerability perspective proposed by Lifetime Exposure Theory, while also demonstrating the limits of routinely captured police data for fully examining harm processes. Further research is needed to improve understanding of harm pathways, ideally through qualitative inquiry, better integration between police data, multi-agency records and RHIs, and greater recognition of the role of police and partner interventions in preventing harm.

Notes

1. These numbers are slightly lower than the total number of individual children and adults due to missing data.
2. Categories were pre-defined by the respective forces.
3. Risk assessments can be changed throughout an investigation (see College of Policing 2024) so the risk gradings applied in the initial stages and the later stages of the investigation were given.
4. The No apparent risk category is not now used within the force in Sample 2. Therefore, results show this category only within Sample 1.
5. Latest risk assessment violated the assumption of multicollinearity and was not included in the analysis. As initial high risk was identified as a significant predictor of harm, the variable initial risk was transformed into 'high risk' (high risk cases were given a code of '1', not high risk given a code of '0.)' Similarly, the variable 'gender' was

transformed into two variables, 'female' and 'transgender'. These variables violated the assumption of multicollinearity and were not included in the analysis.

6. Again, latest risk assessment violated the assumption of multicollinearity and was not included in the analysis. Initial risk was transformed into 'high risk' (high risk cases were given a code of '1', not high risk given a code of '0.)'.

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Author contributions

CRediT: **S.P. Giles:** Conceptualization, Data curation, Project administration, Writing – original draft, Writing – review & editing; **F. O'Brien:** Data curation; **S. Waring:** Writing – original draft, Writing – review & editing.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Data consists of case records from two UK police forces. They did not give written consent for this data to be shared publicly. Due to the sensitive nature of the research, supporting data is not available.

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