

# A service evaluation of restraint, seclusion and escalation in inpatient mental health care: a retrospective observational study in England

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## Research Article

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# Abstract

## Background

Restrictive practices, including physical restraint and seclusion, remain a major concern in inpatient mental health care because of their well-documented association with physical harm, psychological trauma and adverse experiences for both patients and staff. Although previous research has shown that restraint use varies across services, less is known about why some incidents escalate to seclusion while others do not. This study examined both the variation in the use of restraint and its progression to seclusion across forensic (secure) and non-forensic inpatient settings.

## Methods

We conducted a retrospective observational study using routinely collected incident data from inpatient mental health services within a large NHS Mental Health and Community Trust in England between June 2024 and May 2025. A total of 41,685 incidents were analysed across forensic (secure) settings (including high secure services (HSS), medium secure unit (MSU) and low secure unit (LSU), and acute inpatient settings including older adult, psychiatric intensive care unit, and acute wards). Descriptive analyses were used to estimate restraint prevalence across service type, ward type, and ward gender. Regression, sensitivity, interaction, multilevel and counterfactual analyses were used to examine the association between restraint and subsequent seclusion, and the contribution of ward-level context to escalation.

## Results

Restraint was unevenly distributed across both forensic and non-forensic settings. In forensic settings, restraint prevalence was highest in LSU (12.86%), followed by MSU (11.81%) and HSS (11.45%). In non-forensic settings, restraint prevalence was highest in older adult wards (12.93%) and was more common in mixed (11.55%) and female wards (9.47%) compared to male wards (6.73%). Escalation from restraint to seclusion was highest in medium secure units (6.22%) and acute wards (4.72%), but minimal in high secure and older adult wards. Multilevel modelling suggested that ward-level context contributed to variation in seclusion outcomes. Counterfactual simulation suggested that, in high-risk settings, reducing escalation processes may reduce seclusion rates than achieving a similar reduction in restraint incidents alone.

## Conclusions

Restrictive practice in inpatient mental health care appears to operate as a two-stage system, with service configuration shaping where restraint occurs and ward context influencing whether incidents

progress to seclusion. Reduction efforts should target both restraint frequency and ward-level processes that interrupt escalation and support safer, more therapeutic care.

## Introduction

Restrictive practices, including physical restraint and seclusion, remain a major concern in inpatient mental health care because of their well-documented association with physical harm, psychological trauma, and adverse experiences for both patients and staff.<sup>12</sup> Despite sustained policy and regulatory efforts to reduce their use, these interventions continue to be applied across services, with substantial variation between settings.<sup>34</sup> This variation suggests that restrictive practices are shaped by patient-level risk and by service configuration (forensic and non-forensic), ward context (patient group, single sex, mixed) and clinical practice. Previous research has largely focused on prevalence and predictors of restraint, showing that its use varies across ward types, patient groups, and levels of security.<sup>56</sup> However, restraint and seclusion are often treated as separate outcomes rather than linked stages within the management of behavioural disturbance. As a result, less is known about escalation in terms of why some incidents involving restraint resolve, while others progress to seclusion. This distinction is clinically important because escalation may be influenced by local practice, team responses and ward context, making it a potentially modifiable target for service improvement. Within forensic (secure) mental health services in the United Kingdom, the inpatient services are categorised into three tiers (high secure services HSS, medium secure units MSU, and low secure units LSU).<sup>7</sup>

Traditionally, physical restraint and seclusion have been treated as separate responses to acute behavioural disturbance.<sup>58</sup> However, conflict and containment models suggest that restrictive interventions occur within dynamic behavioural management processes, where incidents may resolve or escalate depending on relational, organisational, and environmental factors.<sup>59</sup> In this context, restraint may indicate heightened and containment need, without implying direct progression to seclusion. Evidence highlights the importance of de-escalation, relational practice, and trauma-informed care in reducing the use of restrictive interventions,<sup>10–12</sup> but much comes from intervention or quality improvement studies, with less attention to natural variation in routine systems.<sup>13 14</sup> Examining how similar incidents are managed differently across wards and service types can identify effective embedded practice, aligning with positive deviance by using service variation to inform achievable improvement.<sup>15</sup>

Restrictive practice can also be understood through the People-Capability-Context (PCC) framework (see Fig. 1), designed to explain how restrictive practices arise and intensify within inpatient mental health care by linking structural conditions with ward-level practice. Within this framing, contextual influences such as service configuration, ward environment, and organisational routines help explain where restraint is more likely to occur, while people and capability factors, including staff responses, relational practice, and de-escalation skills, help shape whether incidents of restraint are contained or progress to seclusion. This aligns with NHS England's *Research demand signalling: mental health nursing*,<sup>16</sup> which

identifies restrictive practice as a priority for research and highlights the need to understand and address unwarranted variation across settings to support safer and more person-centred care.

Using routinely collected incident data, our study examines the distribution of restraint across inpatient mental health settings and its relationship with subsequent seclusion. The analysis quantifies restraint prevalence across forensic and non-forensic settings, examine variation by ward type and gender, maps escalation pathways from restraint to seclusion and explores the contribution of ward-level context to escalation.

## Methods

### Study design

A retrospective observational design was employed using routinely collected incident data over a 12-month (1st June 2024 -31st May 2025) period to examine patterns, associations, and predictors of restrictive interventions in inpatient mental health settings (n = 41,685 incidents). Retrospective analyses of administrative datasets are widely used in psychiatric services research to evaluate patterns of restrictive practice and service-level variation.<sup>9</sup> Our approach is consistent with observational epidemiological methods and aligned with the reporting framework for observational studies.<sup>17</sup>

### Setting

The study was conducted within a large NHS mental health and community service provider in England delivering care across multiple inpatient settings. The organisation offers specialist services to support physical and mental health, learning disability, addiction and brain injury services to a population of over 1.5 million people across eight boroughs of the Liverpool City Region, Cheshire and parts of Lancashire.<sup>18</sup> Inpatient services are provided annually to approximately 6,500 service users. Services are classified into forensic (secure) settings; High Secure Services (HSS), Medium Secure Units (MSU), and Low Secure Units (LSU) and non- forensic settings, comprising Older Adult wards, Psychiatric Intensive Care unit (PICU) and Acute male, female, and mixed wards. Incident reporting is standardised across services through the Trust's electronic reporting system (Radar), enabling consistent capture of safety-related events.

### Data Source

Data were extracted from Radar, a web-based platform used across UK mental health services to record safety incidents. The dataset included both structured fields (e.g., categorical indicators of restraint use, demographic variables, and location) and unstructured free-text descriptions of incidents. The inclusion of narrative data enabled a more granular assessment of incident characteristics and facilitated the identification of potential misclassification in structured coding fields; an issue previously identified as a

limitation of administrative datasets.<sup>19</sup> Patient demographic data are typically auto-populated through linkage with the electronic patient record system (RiO); however, where this linkage fails, clinical staff manually enter variables such as gender and ethnicity during incident reporting. Each incident is assigned a unique identifier and undergoes managerial verification within the system. The fully anonymised dataset was accessed on 12 June 2025 and exported in CSV format. Statistical analyses were conducted using RStudio version 12: 2023. Package 12.1 + 402.<sup>20</sup>

## Sample

The unit of analysis was the incident rather than the individual patient, with incidents occurring between 1 June 2024 and 31 May 2025 analysed as discrete events, consistent with incident-level approaches used in comparable restrictive intervention research.<sup>19</sup> Physical restraint was identified using structured coding fields (n = 3,233). To address potential under-ascertainment, free-text incident descriptions were systematically reviewed, identifying an additional 111 definite cases with explicit documentation of restraint and 116 probable cases with behavioural indicators of containment where structured coding was absent. Incidents recorded within the Patient Administration and Clinical Information System (PACIS), used in the High Secure Services (HSS), were expected to transfer automatically to Radar, the Trust's incident reporting system. However, some PACIS-recorded incidents could not be linked to Radar, meaning the narrative information needed for analysis was missing. These incidents were therefore excluded. Consequently, it was not possible to determine how many incidents may have been missed as a result.

### Inclusion criteria

Incidents were eligible for inclusion if they occurred within inpatient mental health settings, contained a valid unique incident identifier, and included recorded information on key variables relating to restrictive interventions. These variables comprised 'was physical intervention used', 'was seclusion or isolation used', 'intervention start date and time', 'intervention end date and time', 'intervention hold used', 'restraint position', 'approval status'.

### Exclusion criteria

Incidents were excluded if they were duplicate records, occurred outside inpatient settings or were associated with non-ward locations (e.g., pharmacy, canteen, or chapel), even where such areas were co-located within inpatient facilities.

## Variables

### Outcome variable

The primary outcome was the use of physical restraint. The variable ‘was physical intervention used’ was operationalised as a binary variable 1 = ‘Yes’, 0 = ‘No’ or ‘Not recorded’ (where data is missing). As these fields were not made mandatory in the form and for analysis to proceed, missing data were recoded ‘Not recorded’ with additional analysis performed. Due to the extent of missingness (86%), gender, sex and ethnicity was not possible.<sup>21</sup>

## **Exposure variables**

Exposure variables comprised incident-level characteristics, including event type, incident category, service location (ward/service area), region, and temporal variables (event date and time).

## **Covariates**

Covariates included available demographic and contextual variables where recorded such as gender, ethnicity, sexual orientation and staff involvement. Categorical variables were recoded into analytically meaningful groupings to improve interpretability and address sparse categories.

# **Measures**

Physical restraint and seclusion were identified from structured incident-reporting fields. To improve classification validity, sensitivity analyses were undertaken using alternative definitions of restraint derived from narrative fields and coding thresholds, including reclassification of incidents where free-text descriptions explicitly documented restraint despite missing structured coding.

## **Missing data**

Missingness was assessed for all variables prior to analysis. Demographic variables, including gender, ethnicity, and sexual orientation, had the highest proportion of missing data. Variables with more than 30% missingness were excluded from inferential analyses and retained for descriptive reporting. For variables with 10–30% missingness, imputation was not undertaken, and analyses were restricted to complete cases. The extent of missingness for each variable is reported, and all decisions regarding data handling were prespecified to minimise bias.<sup>21</sup>

# **Statistical analysis**

All analyses were conducted using RStudio running R.<sup>20</sup> Descriptive statistics summarised incident characteristics. Frequencies and percentages were calculated for categorical variables, while means, medians, standard deviations, and interquartile ranges were reported for continuous variables. Cross-tabulations were used to explore relationships between key variables.<sup>22</sup> Associations between physical restraint use and categorical variables were assessed using Chi-square tests of independence, with effect size quantified using Cramér’s V.<sup>23 24</sup> Restraint prevalence was calculated as the proportion of

recorded inpatient incidents involving physical restraint within each service or ward category, expressed as a proportion of the total number of all incidents logged on RADAR in that category, with 95% confidence intervals estimated using binomial methods. A multilevel logistic regression model, with ward as a random intercept, examined variation in seclusion outcomes across wards. Incidents were nested within wards, and the intraclass correlation coefficient (ICC) estimated the proportion of variance attributable to ward-level context.<sup>27,28</sup> A counterfactual simulation<sup>25</sup> then estimated how changes in escalation probabilities across service types could influence overall seclusion rates, allowing structural influences on restraint and contextual influences on escalation be examined within a unified analytical framework.

## Results

### Sample Characteristics and Outcome Definitions

A total of 41,685 incidents occurring within inpatient mental health services between 1 June 2024 and 31 May 2025 were included in the analysis. Physical restraint was identified using three operational definitions to assess robustness of outcome classification. Under the structured coding definition, restraint was recorded in 3,233 incidents (7.76%, 95% CI 7.50–8.02). Incorporation of reclassified cases increased this estimate to 3,344 incidents (8.02%, 95% CI 7.76–8.28) under the conservative definition, and 3,460 incidents (8.30%, 95% CI 8.03–8.57) under the expanded definition. For the primary analysis, restraint was operationalised using a cleaned structured field definition (“any YES”), yielding 3,390 incidents (8.13%, 95% CI 7.87–8.39). This approach was selected to maximise completeness and consistency across the dataset, while sensitivity analyses using alternative definitions demonstrated that prevalence estimates, and overall patterns of association were not materially altered.

### Structural distribution and heterogeneity of restraint

Restraint prevalence varied significantly across service types (Table 1), indicating strong structural patterning. Within secure services, prevalence was highest in low secure units (LSU: 377/2,931; 12.86%, 95% CI 11.62–14.10), followed by medium secure units (MSU: 563/4,768; 11.81%, 95% CI 10.90–12.72) and high secure services (HSS: 777/6,788; 11.45%, 95% CI 10.70–12.20). In contrast, lower prevalence was observed in non-forensic settings, including acute adult wards (1,397/14,795; 9.44%, 95% CI 8.96–9.92) and older adult wards (59/2,306; 2.56%, 95% CI 1.92–3.20). Other services demonstrated a prevalence of 2.15% (217/10,097; 95% CI 1.87–2.43). The association between service type and restraint was statistically significant ( $\chi^2(5) = 887.49$ ,  $p < 0.001$ ), with a small-to-moderate effect size (Cramér’s  $V = 0.146$ ).

Table 1  
Restraint prevalence by service type

| Service Type               | Incidents (n) | Restraint (n) | Prevalence (%) | 95% CI      |
|----------------------------|---------------|---------------|----------------|-------------|
| High Secure Services (HSS) | 6,788         | 777           | 11.45          | 10.70–12.20 |
| Medium Secure Units (MSU)  | 4,768         | 563           | 11.81          | 10.90–12.72 |
| Low Secure Units (LSU)     | 2,931         | 377           | 12.86          | 11.62–14.10 |
| Acute Adult Wards          | 14,795        | 1,397         | 9.44           | 8.96–9.92   |
| Older Adult Wards          | 2,306         | 59            | 2.56           | 1.92–3.20   |
| Other Services             | 10,097        | 217           | 2.15           | 1.87–2.43   |

Substantial heterogeneity was observed both within and between service types. Within low secure services, restraint prevalence ranged from 0.38% to 30.92% across individual wards. In non-forensic settings, prevalence ranged from 0.12% to 19.17% in acute wards (median 7.56%) and from 1.35% to 15.15% in older adult wards (median 14.42%).

## Determinants of restraint: service type and ward gender

In unadjusted analyses (Fig. 2), service type was strongly associated with restraint. Compared with acute wards (reference category), the odds of restraint were higher in low secure units (OR = 2.14, 95% CI 1.90–2.41,  $p < 0.001$ ), high secure services (OR = 1.87, 95% CI 1.71–2.05,  $p < 0.001$ ) and medium secure units (OR = 1.94, 95% CI 1.75–2.15,  $p < 0.001$ ). These findings indicate that incidents in low secure settings were associated with approximately twofold higher odds of restraint, while medium and high secure services were associated with approximately 1.9-fold increases, relative to acute wards. Within non-forensic inpatient services, restraint prevalence varied by ward gender. The highest prevalence was observed in female wards (9.47%, 450/4,752), followed by mixed wards (8.36%, 283/3,386), and male wards (7.15%, 444/6,214). Male wards demonstrated significantly lower odds of restraint compared with female wards (OR = 0.74, 95% CI 0.64–0.84,  $p < 0.001$ ), while mixed wards showed a non-significant reduction (OR = 0.87, 95% CI 0.75–1.02,  $p = 0.08$ ).

In multivariable logistic regression analyses restricted to non-forensic services in Table 2, both ward type and ward gender remained independently associated with restraint. Compared with acute wards, older adult wards demonstrated higher odds of restraint (AOR = 2.51, 95% CI 1.96–3.22,  $p < 0.001$ ), while psychiatric intensive care units (PICU) showed no significant difference (AOR = 0.90, 95% CI 0.69–1.18,  $p = 0.45$ ). Ward gender remained independently associated after adjustment. Compared with female wards, male wards demonstrated lower odds (AOR = 0.75, 95% CI 0.65–0.86,  $p < 0.001$ ) and mixed wards demonstrated substantially lower odds (AOR = 0.57, 95% CI 0.47–0.70,  $p < 0.001$ ).

Table 2  
Adjusted associations between ward type, ward gender and restraint (non-secure services)

| Variable    | Category     | AOR  | 95% CI    | p-value |
|-------------|--------------|------|-----------|---------|
| Ward Type   | Acute (Ref)  | —    | —         | —       |
|             | Older Adult  | 2.51 | 1.96–3.22 | < 0.001 |
|             | PICU         | 0.90 | 0.69–1.18 | 0.45    |
| Ward Gender | Female (Ref) | —    | —         | —       |
|             | Male         | 0.75 | 0.65–0.86 | < 0.001 |
|             | Mixed        | 0.57 | 0.47–0.70 | < 0.001 |

## Seclusion, escalation, and interaction effects

Seclusion was infrequent, occurring in 165 incidents (0.40%). However, incidents involving restraint were associated with significantly higher odds of seclusion (OR = 5.72, 95% CI 4.13–7.93,  $p < 0.001$ ).

Escalation from restraint to seclusion varied across service types as shown in Fig. 3, with the highest rates observed in medium secure units (6.22%) and the lowest in high secure services (0.26%).

Escalation rates did not increase with level of security. Older Adult services do not routinely operate a formal seclusion pathway.

A logistic regression model including a restraint-by-service type interaction term was fitted to assess whether the association between restraint and seclusion differed across service settings. The interaction term significantly improved model fit compared with a main-effects-only model (likelihood ratio test  $\chi^2 = 50.53$ ,  $df = 3$ ,  $p < 0.001$ ), indicating that the association between restraint and seclusion varied by service type. In acute wards, restraint was associated with higher odds of seclusion (OR 5.73, 95% CI 2.66–12.34,  $p < 0.001$ ). This association was attenuated in high secure services (interaction OR 0.05, 95% CI 0.01–0.25,  $p < 0.001$ ), indicating that the restraint–seclusion relationship was substantially weaker in high secure services than in acute wards. No statistically significant interaction was observed for medium (OR 1.21, 95% CI 0.62–2.37,  $p = 0.58$ ) or low secure services low secure services (OR 0.89, 95% CI 0.41–1.93,  $p = 0.77$ ), indicating that the association between restraint and seclusion in these settings did not differ significantly from that observed in acute wards. Restraint prevalence varied considerably between wards, with several wards exceeding the 95% control limits (Fig. 4). Multilevel modelling demonstrated that approximately 7.5% of the variance in seclusion outcomes was attributable to ward-level effects (ICC  $\approx 0.075$ ), indicating a measurable contribution of ward-level context.

Each point represents an anonymised ward plotted by total number of incidents (x-axis) and the proportion of incidents involving physical restraint (y-axis). The horizontal line represents the overall mean restraint prevalence across the dataset, while the upper and lower curves represent the 95% control limits around the mean. Wards falling outside the control limits demonstrate variation greater

than expected by chance alone, suggesting the influence of local ward-level contextual or organisational factors on restraint use.

## **Counterfactual analysis of restraint and seclusion pathways**

Counterfactual analysis suggested that restraint functioned as a principal operational pathway to seclusion within the study setting. In routine clinical practice, seclusion was typically implemented following restraint, except in cases involving long-term segregation (LTS). Although structured incident fields indicated that 33.3% of recorded seclusion events co-occurred with restraint (55/165), clinical pathway review suggests that restraint is frequently embedded within the process leading to seclusion but may not be consistently recorded in structured fields. On this basis, model-informed estimates suggest that a substantial proportion of seclusion events may be linked to restraint pathways, indicating potential for meaningful reduction through restraint-avoidance strategies. This interpretation should be considered cautiously given the observational design and potential limitations of incident recording.

## **Discussion**

This study examined restrictive through two linked perspectives – where restraint occurs across forensic (secure) and non-forensic services, and when it progresses to seclusion within different ward contexts. This addressed a key gap in existing literature, which has focused mainly on prevalence, predictors or wider ethics of coercion, with less attention to escalation between restrictive responses.<sup>9 26</sup> Our findings show that restraint is unevenly distributed across services and strongly associated with seclusion, but progression is context dependent rather than inevitable. These findings align with Belayneh, et al.<sup>27</sup> who show that restrictive-practice rates are also shaped by how incidents are classified and reported. Their international survey found a systematic decline from clinicians recognising scenarios as restrictive practices to expecting them to be formally documented in hospital systems. This reinforces our finding that narrative review identified additional restraint cases beyond structured coding and suggests that ward-level variation should be interpreted as both an indicator of practice differences and a prompt to strengthen definitions, staff training, and reporting governance.

## **A two-stage model of restrictive practice**

Our findings support a two-stage model of restrictive practice in which structural factors shape where restraint is most likely to occur, while ward-level processes influence whether incidents escalate to seclusion. In the first stage, service configuration, level of security, and ward composition appear to structure the likelihood of restraint.<sup>9 28</sup> In the second stage, local practice, team responses, and ward context appear to shape whether restrictive intervention intensifies. This interpretation is consistent with conflict and containment models, which emphasise the dynamic and interactional nature of inpatient incidents, and with wider literature on de-escalation and relational practice, which suggests that the

significance of restrictive intervention lies not only in its occurrence, but in whether escalation is interrupted.<sup>10 29 30</sup>

The WardSonar study conceptualised safety on acute mental health wards as a real-time and socially mediated process shaped by ward atmosphere, behavioural contagion, and staff responsiveness.<sup>31</sup> It found strong evidence that one incident increased the probability of further incidents within the following four hours. Our study extends that line of thinking by identifying restraint itself as a critical point within restrictive practice pathways and by showing that progression beyond that point is patterned by context rather than occurring uniformly. While WardSonar focused on proactive safety monitoring and the feasibility of capturing patient perspectives in real time<sup>31 32</sup>, our study indicates that escalation within restrictive practice can be understood as part of a wider ward ecology of interaction, response, and risk amplification.

At the same time, a two-stage model should not be interpreted as implying that restraint is only significant when it progresses to seclusion. Ferreira's (2026) analysis is particularly helpful here because it argues that coercive practices are too often interpreted through institutional narratives of necessity and safety while their longer-term relational, psychological, and existential consequences are minimised or displaced. That critique adds an important caution to our interpretation. The value of the model lies in showing how coercion intensifies differently across settings, rather than in reducing the seriousness of earlier forms of restrictive intervention.

Our findings can also be interpreted through the PCC framework. In this context, the framework helps clarify why structural patterning and escalation should not be treated as the same phenomenon. Context helps explain the distribution of restraint across services, whereas people and capability factors are more relevant to whether escalation is interrupted once restraint has occurred. Read in this way, our findings suggest that restrictive practice is produced through the interaction between service structures and ward-level practice rather than by risk alone.<sup>8 31</sup>

## **Structural determinants of restraint**

Consistent with previous research, forensic (secure) services were associated with higher levels of restraint, reflecting the interplay of acuity, legal status, and environmental constraint.<sup>1 33</sup> However, our findings suggest that structural determinants are more complex than a simple risk gradient.<sup>34 35</sup> Patient risk and security needs have been shown to increase with corresponding security levels in forensic mental healthcare.<sup>36</sup> However, restraint prevalence did not increase linearly with level of security, with low secure units showing higher prevalence than high secure services. This suggests that organisational arrangements, ward routines, staffing patterns, and local containment cultures may be at least as important as formal security category alone.<sup>36</sup> This broader interpretation has been supported by showing that ward outcomes are shaped not simply by incident burden, but by the extent to which information, responsiveness, and staff engagement are embedded within everyday ward practice.<sup>7 31</sup>

Although WardSonar addressed patient safety monitoring rather than restrictive practice directly,<sup>31 37</sup> it reinforces the argument that service label and patient acuity alone are insufficient explanations for ward-level variation. It also encourages caution in interpreting differences between services. Lower rates of restraint or seclusion may reflect stronger relational practice or better organisational systems, but they may also reflect differences in documentation, thresholds for intervention, or alternative forms of containment not fully visible in routine data.<sup>7 24</sup> For example, the very high security needs observed in high secure care support the need for greater levels of physical, procedural and relational security, and increase the likelihood of the use of restrictive practices to prevent serious violence and complex challenging behaviours. This may influence the pathway to seclusion following restraint, where an individual is already subject to interventions to manage risk (e.g., LTS) due to the increased likelihood of violence.

This point is deepened by the argument that coercion is sustained through formal intervention and institutional ways of interpreting distress, credibility, compliance, and risk.<sup>38</sup> Applied to our findings, this suggests that structural variation should not be interpreted solely as an operational feature of service design, but also as a reflection of how services differentially define and manage behaviour. Within non-forensic settings, the elevated restraint prevalence in older adult wards further complicates assumptions that restrictive practices are driven mainly by behavioural severity.<sup>39</sup> Our findings are particularly informative here because they show that high restraint prevalence in these wards did not translate into high escalation to seclusion, a distinction that would have been obscured had restraint and seclusion been analysed separately.

## **Escalation as a modifiable process**

A key contribution of our study is that restraint does not uniformly progress to seclusion. Despite higher levels of restraint, both Older Adult wards and HSS showed minimal escalation, whereas Acute wards and MSU demonstrated substantially higher progression from restraint to seclusion. This pattern is consistent with literature emphasising the importance of de-escalation, relational practice, and trauma-informed care in interrupting escalation.<sup>10 40</sup> It also aligns with critical work arguing that coercive practices, while often justified in the name of safety, can undermine trust, dignity, and longer-term engagement when escalation is not effectively contained.<sup>38 41</sup>

Our interaction analysis and multilevel modelling strengthen this interpretation by showing that the effect of restraint on seclusion varies by service type and that ward-level context contributes independently to escalation risk. This suggests that escalation is not simply a by-product of high-risk care, but a potentially modifiable service process. That is an important advance on literature that has largely shown that restrictive practices are harmful and should be reduced but has paid less attention to the transition point at which one restrictive response intensifies into another.<sup>32 38</sup>

Beames et al. (2026) add an important downstream perspective by showing that more invasive coercive profiles were less likely to be followed by post-incident review, and that Black and racially minoritised

patients were more frequently represented in classes less likely to receive such review. Read alongside our findings, this suggests that escalation is significant not only because it intensifies coercion, but also because it may reduce opportunities for restorative or supportive follow-up. In this sense, escalation may represent not only clinical intensification, but also a relational rupture with implications for trust, recovery, and equity.

## **Understanding variation across forensic and non-forensic settings**

The contrasting patterns observed across forensic and non-forensic settings provide useful insight, but they should be interpreted with caution. In HSS, very low escalation rates may indicate that highly structured environments are better able to interrupt progression to seclusion, potentially through anticipatory risk management, clearer routines, or alternative containment pathways.<sup>12 42</sup> However, our data cannot identify the mechanisms responsible, and low escalation should not automatically be equated with better experience of care. As Ferreira (2026) argues, coercion should not be judged only by immediate institutional outcomes, but by its effects on dignity, agency, and longer-term wellness. Lower escalation to seclusion may therefore indicate more effective interruption of this specific pathway, while still leaving open the possibility of other forms of control, coercion, or relational harm. Conversely, MSU demonstrated the highest escalation despite lower formal security. This suggests that the challenge is not security alone, but the organisational and clinical conditions under which restraint is enacted and managed. This is one of the clearest ways in which our study advances knowledge, because it shows that the services of greatest concern may not be those with the highest baseline containment, but those in which restraint is most likely to escalate further.

Within Older Adult services, the combination of high restraint prevalence and minimal seclusion is particularly instructive. It suggests that services can show high use of one restrictive practice without routinely progressing to another and that this may reflect different ethical norms, regulatory expectations, models of containment, or service cultures.<sup>39 12 28</sup> This supports a cautious positive deviance interpretation.<sup>15</sup> Some wards may indeed have developed locally embedded practices worth learning from; equally, it may be that the forms of coercion most relevant in those settings are not fully visible in the current data. The implication is not that such settings are inherently better, but that they may help illuminate how escalation is interrupted.

## **Implications for clinical practice**

Our findings support a shift in clinical focus from reducing restraint frequency alone to actively managing escalation pathways. In practice, this means paying closer attention to what happens during and immediately after restraint, particularly in settings such as MSU and acute wards where escalation risk appears greatest. This includes strengthening de-escalation capability, reviewing post-restraint decision-making, and examining ward routines, staffing pressures, communication processes, and environmental conditions that may influence whether incidents intensify.

Our findings also suggest that restrictive practice should be understood as both a safety and a relational issue. WardSonar highlights the importance of real-time patient perspectives and the difficulty of embedding responsive systems into routine ward practice when staff are stretched, or when processes are not integrated into workflow.<sup>31</sup> Beames et al. (2026) suggest that when coercive practice becomes more invasive, patients may be less likely to receive post-incident review and support, particularly within profiles that include higher proportions of Black and racially minoritised patients. Ferreira (2026) extends this further by arguing that coercive systems are sustained not only through formal interventions, but also through the language, assumptions, and institutional habits that normalise control over agency and privilege professional judgment over lived experience. These studies therefore suggest that reducing coercion is not only about preventing incidents, but also about improving what follows them, how they are interpreted, and whose knowledge is recognised as authoritative.<sup>19</sup>

For services, this suggests several priorities. Escalation from restraint to seclusion should be audited as a meaningful quality indicator rather than treated as a secondary consequence of restraint rates. Wards with lower escalation despite similar incident burden should be examined as potential sites for practice learning. Post-incident support should be viewed as part of the restrictive practice pathway rather than an optional add-on. Greater attention should also be paid to how everyday language, and decision-making processes may reinforce coercive cultures, particularly where best-interests framings override person-centred, rights-based, and relational approaches to care. Finally, future quality improvement should incorporate equity more explicitly, given growing evidence that coercive pathways and follow-up support may not be experienced evenly across patient groups.

## Strengths and limitations

This study has several strengths. It uses a large routine incident dataset and examines restrictive practice across both forensic and non-forensic inpatient settings, allowing structural and escalation perspectives to be examined within a single analytical framework. It also moves beyond simple prevalence reporting by analysing restraint and seclusion as linked stages within a restrictive practice pathway. In doing so, it identifies ward context as an important influence on escalation and offers a more clinically useful account of variation than restraint-rate comparison alone.

Several limitations should also be acknowledged. First, the study was conducted within a single NHS Trust, which may limit generalisability. Second, the analysis relied on routinely recorded incident data and may therefore be influenced by local reporting practices, documentation quality, and completeness. Third, seclusion data were incomplete, and some ward characteristics were derived through mapping rather than directly recorded variables, introducing potential misclassification. Fourth, potentially important confounders, including staffing levels, diagnosis, legal status, acuity, ethnicity, and time of day, were not available.<sup>21</sup> This meant that the analysis could not address some of the issues highlighted in recent literature, including inequities in post-incident support following more invasive coercive practices. Finally, the observational design does not permit causal inference, and the mechanisms underlying variation in escalation cannot be established from these data alone.

# Conclusion

Restrictive practices in inpatient mental health care are shaped not only by where restraint occurs, but also by what happens afterwards. In our study, restraint varied across services, whereas progression to seclusion was more strongly influenced by ward context. This indicates that the most important variation may lie not only in the distribution of restraint, but also in whether ward systems are able to interrupt escalation once physical restraint has been used.

Our findings therefore support a shift in focus from restraint frequency alone to managing escalation pathways. Read alongside recent work on real-time ward safety, post-incident review, and the lived experience of coercion, they suggest that escalation should be understood as a clinical, organisational, and relational process with implications for safety, recovery, and equity. Efforts to reduce restrictive practice should therefore move beyond reduction targets and strengthen the ward-level processes that interrupt escalation, support reflection and repair after incidents, and promote safer, more therapeutic, and more person-centred care.

# List of Abbreviations

## Abbreviation Full term

|       |                                                        |
|-------|--------------------------------------------------------|
| AOR   | Adjusted Odds Ratio                                    |
| CI    | Confidence Interval                                    |
| HSS   | High Secure Services                                   |
| ICC   | Intraclass Correlation Coefficient                     |
| LTS   | Long-Term Segregation                                  |
| LSU   | Low Secure Unit                                        |
| MDT   | Multidisciplinary Team                                 |
| MSU   | Medium Secure Unit                                     |
| M-RIC | Mental Health Research for Innovation Centre           |
| NHS   | National Health Service                                |
| NIHR  | National Institute for Health and Care Research        |
| OR    | Odds Ratio                                             |
| PACIS | Patient Administration and Clinical Information System |

|        |                                                                      |
|--------|----------------------------------------------------------------------|
| PCC    | People-Capability-Context                                            |
| PICU   | Psychiatric Intensive Care Unit                                      |
| RiO    | Electronic Patient Record System (RiO)                               |
| STROBE | Strengthening the Reporting of Observational Studies in Epidemiology |

## Declarations

### Human Ethics and Consent to Participate declarations

Not applicable

### Ethics statement

This study was part of a service evaluation of the Reducing Restrictive Practice Program at Mersey Care NHS Foundation Trust. As such, the study was designed to particularly measure the RRP service within forensic and non-forensic inpatient A research decision tool confirmed that the study did not require NHS ethics approval.<sup>43</sup> The requirement for informed consent to participate was waived because the study constituted secondary analysis of routinely collected anonymised service data and did not meet the definition of research requiring NHS Research Ethics Committee review under the UK Policy Framework for Health and Social Care Research. Mersey Care NHS Trust research and development department approved the study with approval No SE2025-27.

### Consent for publication

Not applicable.

### Availability of data and materials

Data are available upon reasonable request

### Competing interests

Oladayo Bifarin is a National Institute for Health and Care Research Leader. The views expressed in this article are those of the author(s) and not necessarily those of NIHR or the Department of Health and Social Care.

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This research received no external grant funding.

## Authors' contributions

NWU and OB conceived the study. NWU, OB, and DWJ contributed to study design. NWU, OB and AJ undertook the analysis. NWU drafted the manuscript. All authors NWU, OB, DWJ, AJ, CS, SN, AC, and NH contributed to interpretation of findings, revised the manuscript critically for important intellectual content, and approved the final version.

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## References

1. Steinert T, Lepping P, Bernhardsgrütter R, et al. Incidence of seclusion and restraint in psychiatric hospitals: a literature review and survey of international trends. *Soc Psychiat Epidemiol*. 2010;45(9):889–97. 10.1007/s00127-009-0132-3.
2. Sailas EE, Fenton M. Seclusion and restraint for people with serious mental illnesses. *Cochrane Database Syst Reviews*. 2000;2012(6). 10.1002/14651858.CD001163.
3. Ireland CA, Halpin L, Ireland JL. Exploring Individual Factors Associated with Critical Incidents in a Secure Psychiatric Setting: A Preliminary Study. *Psychiatry Psychol Law*. 2015;22(2):259–72. 10.1080/13218719.2014.941091.
4. Paterson B, Bennet L, Bradley P. *Positive and Proactive Care*: could new guidance lead to more problems? *Br J Nurs*. 2014;23(17):939–41. 10.12968/bjon.2014.23.17.939.
5. Bowers L. S afewards: a new model of conflict and containment on psychiatric wards. *Psychiatric Ment Health Nurs*. 2014;21(6):499–508. 10.1111/jpm.12129.
6. Thomann S, Zwakhlen S, Richter D, et al. Restraint use in the acute-care hospital setting: A cross-sectional multi-centre study. *Int J Nurs Stud*. 2021;114:103807. 10.1016/j.ijnurstu.2020.103807. [published Online First: 20201024].
7. Challinor A, Whyler J, Meggison N et al. The utilisation of services by patients with psychosis who engage in antisocial behaviours. *J Forensic Psychiatr Psychol* 2023-01-02;34(1) 10.1080/14789949.2023.2180420
8. Duxbury J, Baker J, Downe S, et al. Minimising the use of physical restraint in acute mental health services: The outcome of a restraint reduction programme ('REsTRAIN YOURSELF'). *Int J Nurs Stud*. 2019;95:40–8. 10.1016/j.ijnurstu.2019.03.016.

9. Bowers L, James K, Quirk A, et al. Reducing conflict and containment rates on acute psychiatric wards: The Safewards cluster randomised controlled trial. *Int J Nurs Stud*. 2015;52(9):1412–22. 10.1016/j.ijnurstu.2015.05.001.
10. Richmond J, Berlin J, Fishkind A, et al. Verbal De-escalation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-escalation Workgroup. *WestJEM*. 2012;13(1):17–25. 10.5811/westjem.2011.9.6864.
11. Celofiga A, Plesnicar BK, Koprivsek J, et al. Effectiveness of De-Escalation in Reducing Aggression and Coercion in Acute Psychiatric Units. A Cluster Randomized Study. *Front Psychiatry*. 2022;13. 10.3389/fpsy.2022.856153.
12. C HG. PB, O P, Barriers and facilitators to the effective de-escalation of conflict behaviours in forensic high-secure settings: a qualitative study - PubMed. *Int J mental health Syst* 08 /02/2020;14  
doi: 10.1186/s13033-020-00392-5.
13. L K, J R, A N, et al. Do patient and ward-related characteristics influence the use of coercive measures? Results from the EUNOMIA international study - PubMed. *Soc Psychiat Epidemiol* 2014;49(10) 10.1007/s00127-014-0872-6
14. Dixon-Woods M, Martin GP. Does quality improvement improve quality? *Future Hosp J*. 2016;3(3). 10.7861/futurehosp.3-3-191.
15. Bradley EH, Curry LA, Ramanadhan S, et al. Research in action: using positive deviance to improve quality of health care. *Implement Sci*. 2009;4(1):25. 10.1186/1748-5908-4-25.
16. England N. Research demand signalling: Mental health nursing, 2024.
17. vE E. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol*. 2008;61(4). 10.1016/j.jclinepi.2007.11.008.
18. Region LC. INNOVATING FOR GROWTH: The best place to grow up, grow a family, and grow a business. LCR; 2024.
19. Beames L, Chua KC, Simpson A, et al. More coercion, less support: A latent class analysis of post-incident reviews for mental health inpatients exposed to coercive practice. *PLOS Ment Health*. 2026;3(4):e0000511. 10.1371/journal.pmen.0000511. [published Online First: 20260415].
20. R. A Language and Environment for Statistical Computing [program]. Version 4.3.0 version. Vienna, Austria: R Foundation for Statistical Computing; 2023.
21. Pham TM, Pandis N, White IR. Missing data: Issues, concepts, methods. *Semin Orthod*. 2024;02/01(1). 10.1053/j.sodo.2024.01.007.
22. Monsen KA. Descriptive Analysis and Interpretation. *Intervention Effectiveness Research: Quality Improvement and Program Evaluation in Healthcare* 2024 doi: 10.1007/978-3-031-54111-7\_6
23. Nahm FS. Nonparametric statistical tests for the continuous data: the basic concept and the practical use. *Korean J Anesthesiology*. 2016;69(1). 10.4097/kjae.2016.69.1.8.

24. Chowdhury KP. Nonparametric functional analysis under joint estimation with applications to identifying highly cited papers. *J Informetrics* 2023/11/01;17(4) 10.1016/j.joi.2023.101446
25. Gerstenberg T. Counterfactual simulation in causal cognition. *Trends Cogn Sci.* 2024;10(10). 10.1016/j.tics.2024.04.012. /01;28.
26. Akther SF, Molyneaux E, Stuart R, et al. Patients' experiences of assessment and detention under mental health legislation: systematic review and qualitative meta-synthesis. *BJPsych Open.* 2019;5(3). 10.1192/bjo.2019.19.
27. Belayneh Z, Lee DA, Petrakis M, et al. Discrepancies in classification and reporting of restrictive practices (restraints, seclusion and other coercive measures) in mental health services: multi-scenario analysis of an international survey. *BJPsych Open.* 2026;12(3):e131. 10.1192/bjo.2026.11040. [published Online First: 2026/05/11].
28. Fletcher J, Brophy L, Pirkis J, et al. Contextual Barriers and Enablers to Safewards Implementation in Victoria, Australia: Application of the Consolidated Framework for Implementation Research. *Front Psychiatry.* 2021;12:733272. 10.3389/fpsyt.2021.733272.
29. Price O, Baker J. Key components of de-escalation techniques: A thematic synthesis. *Int J Mental Health Nurs.* 2012;21(4):310–19. 10.1111/j.1447-0349.2011.00793.x.
30. Simpson A, Brennan G. Safewards: 10 years on and what have we got? *J Mental Health* 2024-5-3;33(3) 10.1080/09638237.2024.2372561
31. Baker J, Kendal S, Bojke C, et al. A service-user digital intervention to collect real-time safety information on acute, adult mental health wards: the WardSonar mixed-methods study. *Health Social Care Delivery Res.* 2024;12(14). 10.3310/UDBQ8402.
32. Baker J, Kendal S, Sturley C et al. Estimating the link between service-user patient safety perceptions, incidents and subsequent contagion in acute mental health wards. *BMC Psychiatry* 2024 24:1 2024;24(1) 10.1186/s12888-024-06261-6
33. Papadopoulos C, Ross J, Stewart D, et al. The antecedents of violence and aggression within psychiatric in-patient settings. *Acta Psychiatr Scand.* 2012;125(6):425–39. 10.1111/j.1600-0447.2012.01827.x.
34. Ravelli HNWWFAHMHMD. Aggressive behaviour on an acute psychiatric admission ward. *Eur J Psychiatry.* 2018;11(2):106–14.
35. Sturmey P. *Reducing Restraint and Restrictive Behavior Management Practices.* Cham: Springer International Publishing; 2015.
36. Williams HK, Senanayke M, Ross CC, et al. Security needs among patients referred for high secure care in Broadmoor Hospital England | *BJPsych Open* | Cambridge Core. *BJPsych Open.* 2020;6(4). 10.1192/bjo.2020.35.
37. Louch G, Berzins K, Walker L, et al. Promoting a Patient-Centered Understanding of Safety in Acute Mental Health Wards: A User-Centered Design Approach to Develop a Real-Time Digital Monitoring Tool. *JMIR Formative Res.* 2024;8. 10.2196/53726.

38. Ferreira S. Held but not healed - Why coercive practices undermine mental health and wellness. PLOS Ment Health. 2026;3(4):e0000594. 10.1371/journal.pmen.0000594. [published Online First: 20260408].
39. Scheepmans K, Casterlé BD, Paquay L et al. Restraint use in older adults in home care: A systematic review. Int J Nurs Stud 2018/03/01;79  
doi: 10.1016/j.ijnurstu.2017.11.008.
40. Cusack KJ, Morrissey JP, Ellis AR. Targeting Trauma-related Interventions and Improving Outcomes for Women with Co-occurring Disorders. Adm Policy Ment Health. 2008;35(3):147–58. 10.1007/s10488-007-0150-y.
41. Molodynski A, Khazaal Y, Callard F. Coercion in mental healthcare: time for a change in direction. BJPsych Int. 2016;13(1). 10.1192/s2056474000000854.
42. Fradley K, Rajan DG, Haines-Delmont A et al. Evaluation of the National HOPE(S) Programme to end long-term segregation (LTS) for children and young people, autistic adults and/or adults with a learning disability in inpatient hospital settings. 2025-06–30 10.23634/MMU.00640963
43. HRA. Is my study research. United Kingdom Health Research Authority. Is my study research?.

## Figures

## The People–Capability–Context (PCC) Model for De-escalation in Mental Health Wards



Early Engagement

Consistent Skills

Safe & Equitable Care

**Figure 1**

illustrates the People-Capability-Context (PCC) model, showing how relational practice, workforce capability, and organisational context supports reliable de-escalation within inpatient mental health settings.

Figure 4. Adjusted odds ratios (non-secure services)

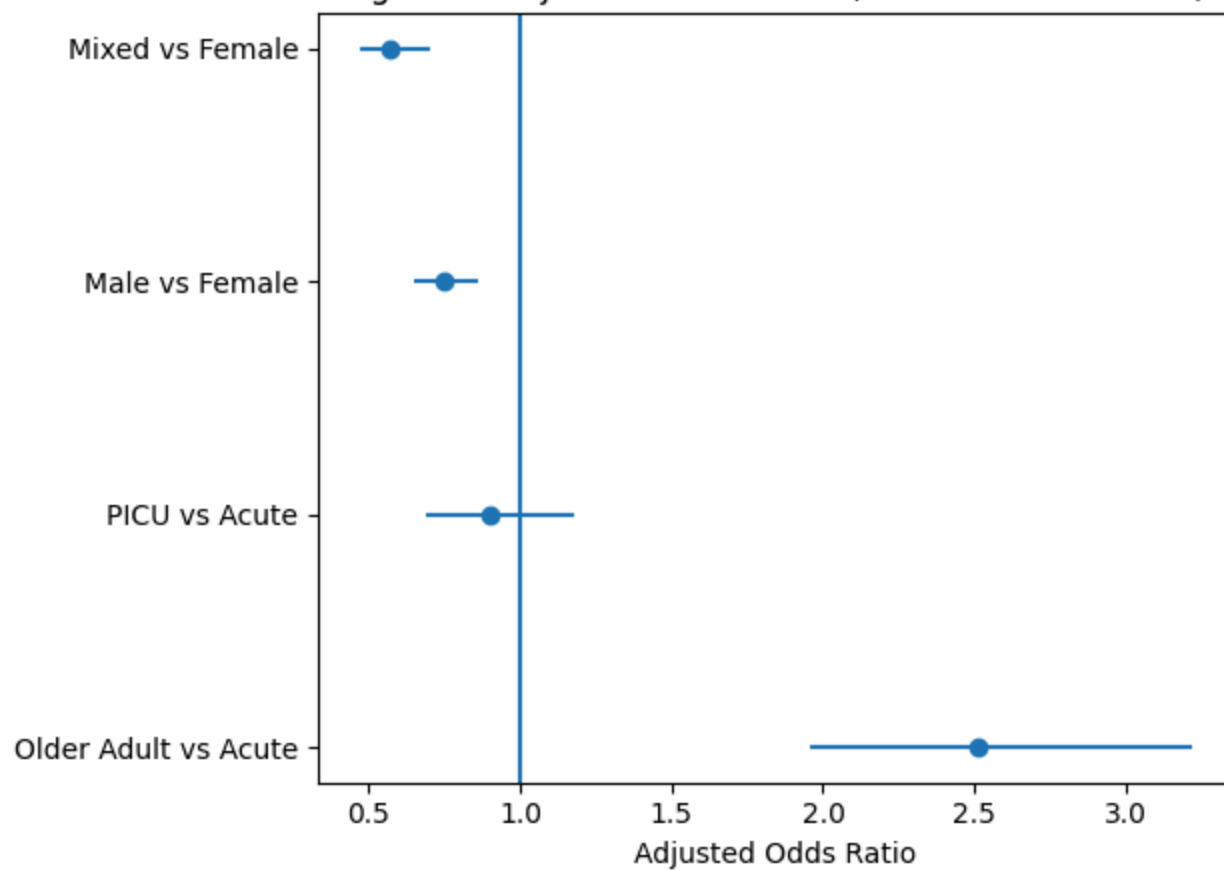


Figure 2

Adjusted Odds Ratios Forest plot.

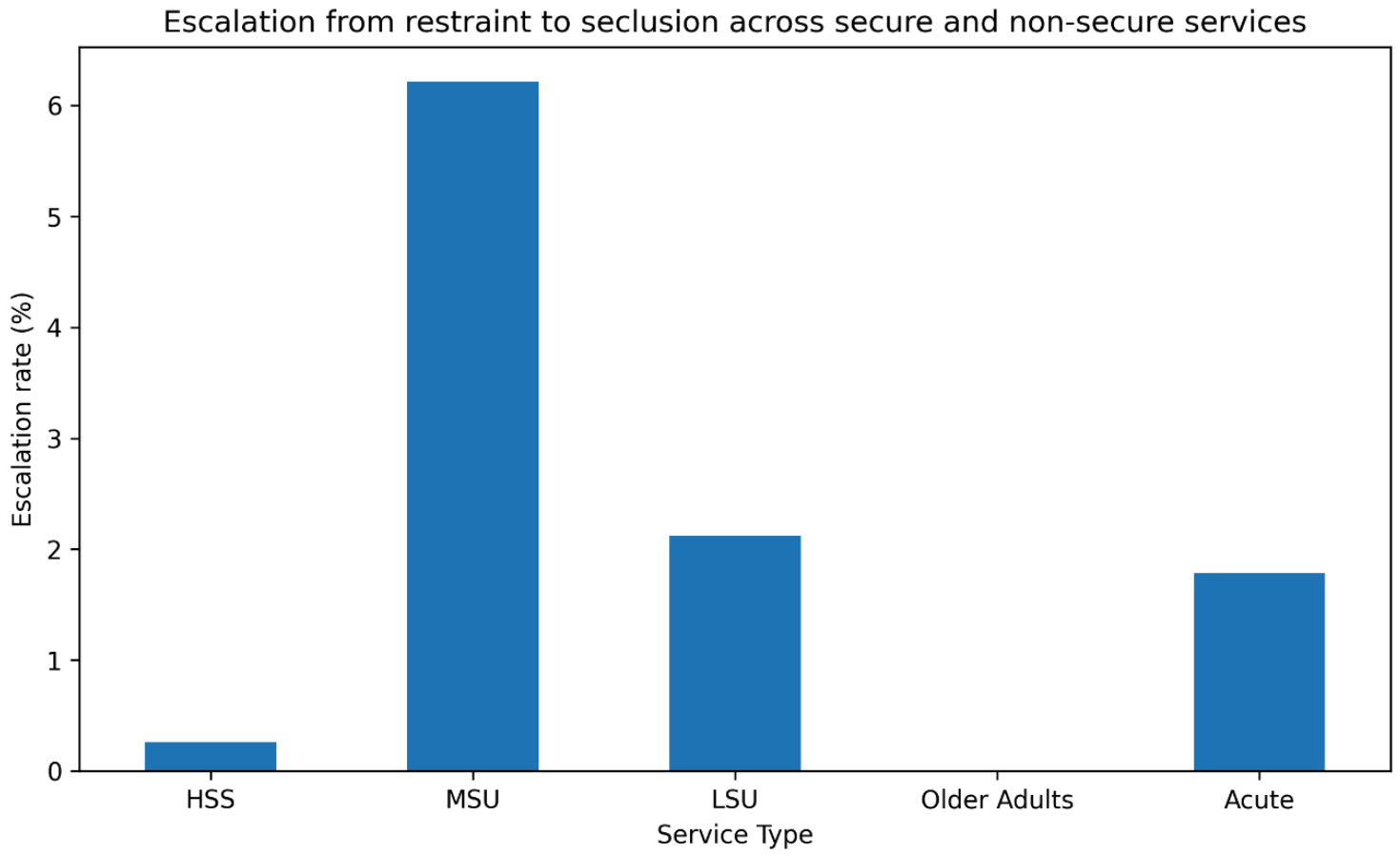


**Figure 3**

**Escalation from restraint to seclusion across secure and non-secure service types.**

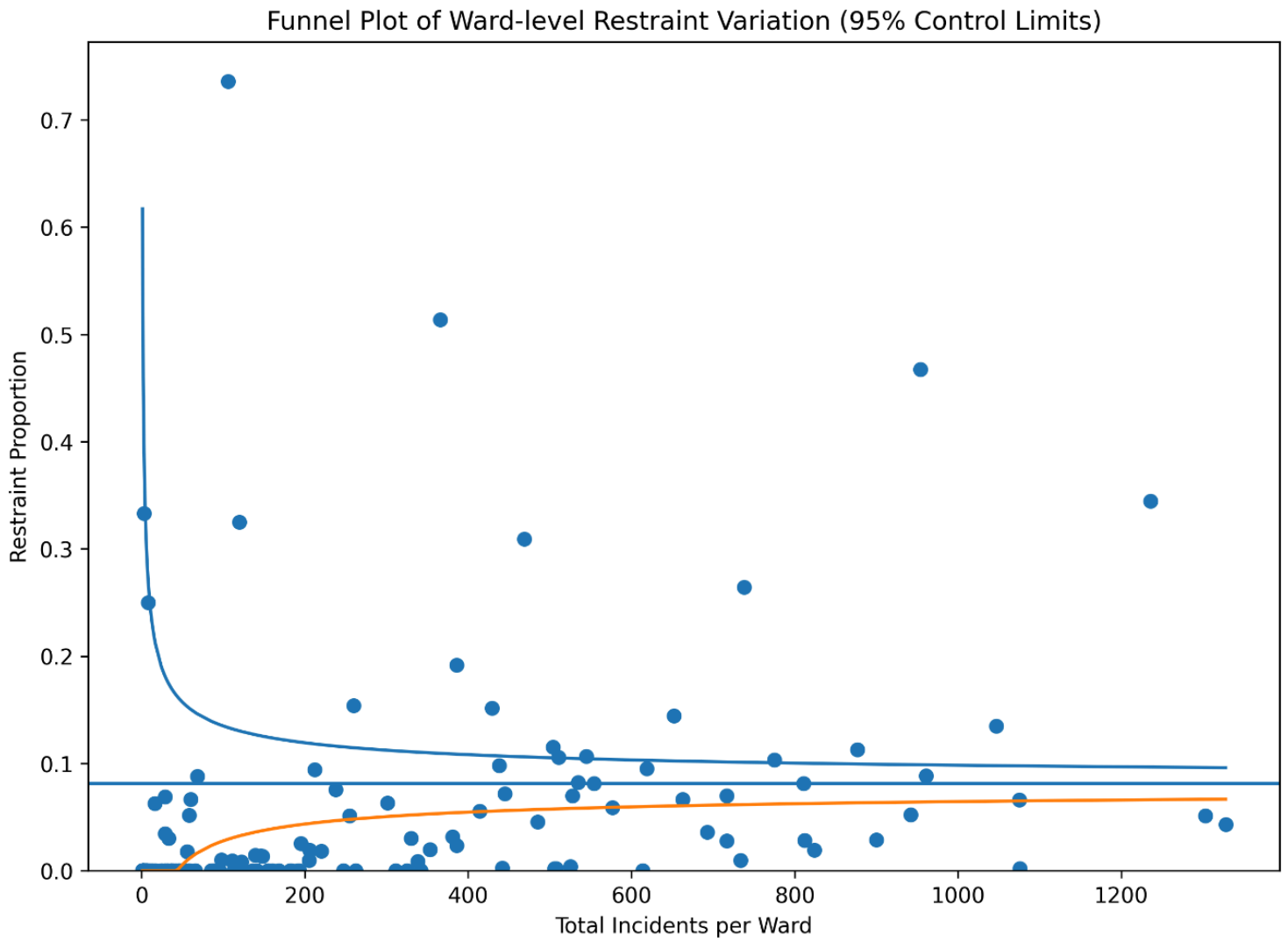


**Figure 4**

**Funnel plot of ward-level variation in restraint proportions.**