

# SE TU

# Analysing the Relationship Between Primary Care Prescribing Patterns and Emergency Department Utilisation in Ireland

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## Introduction

Emergency Departments (EDs) in Ireland are under constant pressure, with overcrowding and long waiting times continuing to be widely reported. Current indicators such as trolley counts are useful for showing what is happening in the system at the moment, but they do not provide much predictive value. They tell us when the pressure is already visible, not whether that pressure may be building in advance. This creates a clear limitation for planning, staffing and resource allocation.

Primary care prescribing may offer an earlier signal. Prescribing behaviour can shift in response to seasonal illness, chronic disease burden, patient demand and wider system constraints. The General Medical Services (GMS) dataset records monthly dispensing patterns for a large and stable portion of the Irish population, making it a useful source for time-based analysis. This study investigates whether prescribing trends can help explain or predict later changes in ED utilisation in Ireland.



## Literature review

Existing research shows that prescribing behaviour is linked to broader healthcare use, but most work does not examine whether prescribing can predict future ED demand. Irish studies on Potentially Inappropriate Prescribing (PIP), multimorbidity and high-risk prescribing suggest that prescribing reflects more than individual clinical decisions. It can also reflect wider system complexity, workload and patient need. However, these studies are mostly descriptive and stop short of testing time-based or predictive relationships.

The Irish GMS dataset is especially useful because it provides consistent prescribing information across a large population over time. Tools such as RxTrends show that prescribing patterns vary clearly by month and drug group, which supports the idea that the data may contain meaningful temporal signals. At the same time, current Irish work using these data has focused more on description than forecasting.

International literature supports the broader argument. South African studies show that prescribing behaviour is often influenced by structural pressures such as workload, uncertainty, time constraints and resource limitations. These findings matter because they suggest that prescribing can mirror wider system strain rather than simply clinical need alone. Even so, much of that research is cross-sectional or based on smaller samples, so it does not really test system-flow patterns over time.

Overall, the main gap in the literature is methodological. Prescribing behaviour is often discussed as a clinical or descriptive issue, but rarely studied as a system-level time series that may provide early signals of ED pressure. This poster is based on the idea that prescribing and ED utilisation should not be treated as separate issues, but as linked parts of a wider healthcare system.

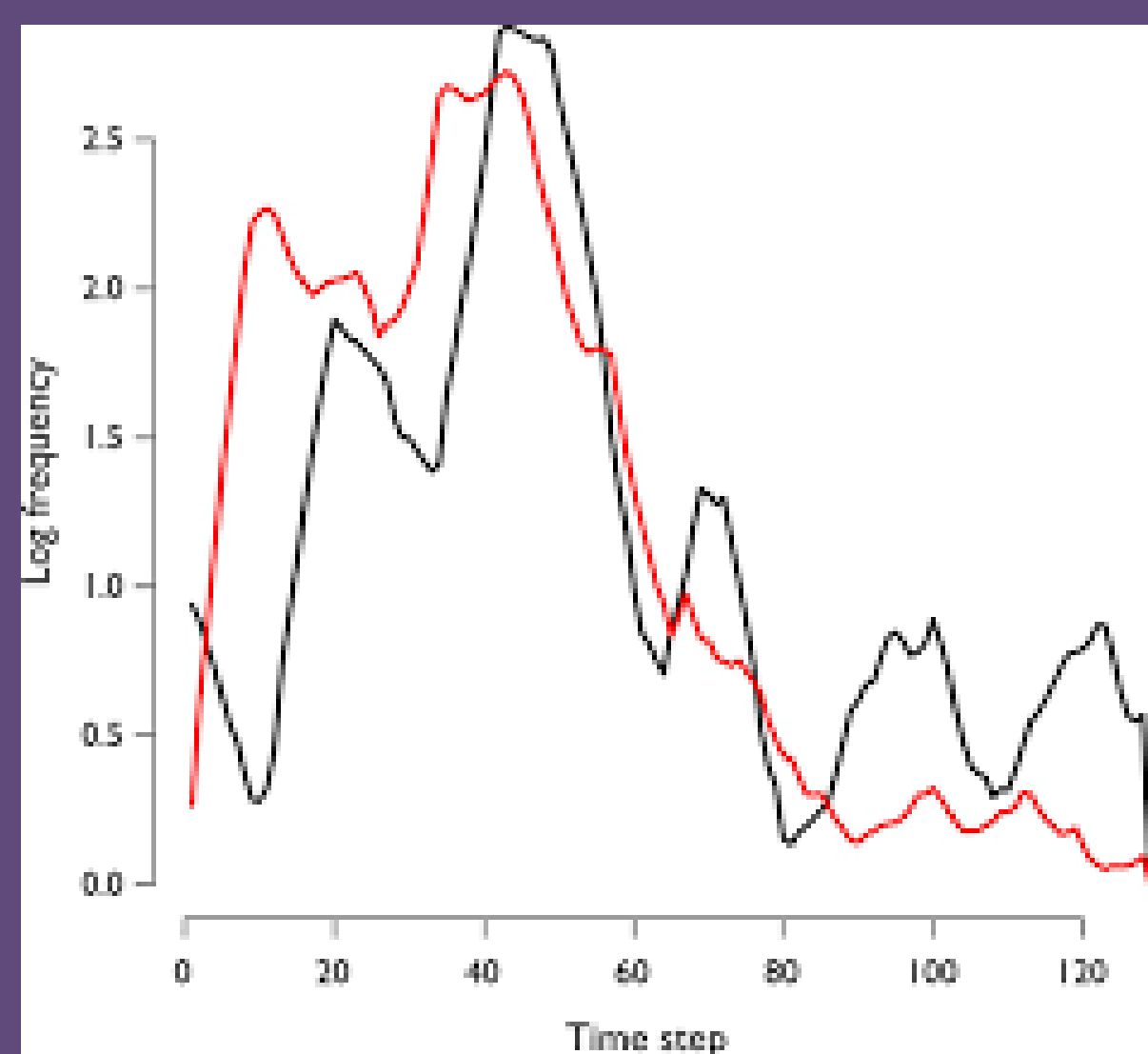
## Methodology

This study uses a quantitative, system-level time-series design to examine whether primary care prescribing patterns can predict ED utilisation in Ireland. The core idea is to take prescribing data and ED data across the same monthly periods, align them properly, and then test whether changes in prescribing occur before changes in emergency care demand. This is not an individual patient-level study. Instead, it focuses on broader system behaviour over time.

The main data source for prescribing is the GMS dataset, using aggregated monthly dispensing counts by drug class and therapeutic group. ED utilisation will be represented using Irish public data sources such as HSE TrolleyGAR and INMO TrolleyWatch. Prescribing variables will include categories such as antibiotics, respiratory medications, cardiovascular medications and other high-volume therapeutic groups. ED outcomes will include attendance and overcrowding-related measures.

The analysis will begin by cleaning and aligning the datasets by month, followed by descriptive exploration of trends and seasonality. After this, lag-based methods will be used to test whether prescribing changes come before changes in ED demand. Models such as ARIMA, lag regression and related time-series techniques will then be applied to evaluate whether prescribing adds meaningful predictive value. The final stage will interpret the results in relation to both Irish and South African literature.

Because the data are aggregated and anonymised, the study is focused on system-level relationships rather than direct clinical causation. This is important, because even if strong patterns are found, they should be interpreted as indicators of system pressure rather than proof that one prescribing trend directly causes ED attendance.



## Significance

If prescribing patterns are shown to precede ED utilisation, this would suggest that primary care data may be useful as an early warning signal for system pressure. That matters because healthcare systems often respond once overcrowding is already visible. A predictive relationship would support a more active approach to staffing, planning and resource allocation, especially during periods of increased seasonal or structural strain.

At the same time, the findings need to be interpreted carefully. Prescribing behaviour is shaped by multiple factors including illness burden, access to care, workload and broader service constraints. This means that even if a relationship is identified, it should not be treated as simple causation. Instead, the value of the research is in showing whether prescribing can function as a useful system indicator within a wider forecasting framework.

## Conclusion

This study explores whether monthly primary care prescribing patterns can act as early indicators of ED utilisation in Ireland. It builds on the idea that prescribing behaviour may reflect wider system pressure, and tests that idea using a system-level time-series approach. Rather than focusing only on what prescribing looks like, the study asks whether it can help explain what may happen next in emergency care demand. If meaningful predictive relationships are found, the study could contribute to more proactive healthcare planning and forecasting. If not, it still helps clarify the limits of prescribing as a system indicator and points future research towards better predictive variables. Either way, the work addresses a clear gap in Irish healthcare research by moving from descriptive analysis towards temporal, system-level modelling.

## Technologies



## References

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