

# The resource utilisation of medically unexplained physical symptoms

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## Abstract

**Objectives:** As patients with medically unexplained physical symptoms may present frequently to hospital settings and receive potentially unnecessary investigations and treatments, we aimed to assess the frequency and type of medically unexplained physical symptoms presentations to clinical services and estimate the associated direct healthcare costs.

**Methods:** This study was undertaken at the largest district health board in New Zealand. All patients with a diagnosed presentation of medically unexplained physical symptoms in 2013 were identified using the district health board's clinical coding system. The clinical records (medical and psychiatric) of 49 patients were examined in detail to extricate all medically unexplained physical symptoms-related secondary care activity within 6 months before or after their medically unexplained physical symptoms presentation. Standardised national costing methodology was used to calculate the associated healthcare costs.

**Results:** In all, 49% of patients attended hospital settings at least twice during 2013. The majority of presentations were for neurological or respiratory concerns. The total cost for the sample was GBP89,636 (median: GBP1,221). Costs were most significant in the areas of inpatient admissions and emergency care.

**Conclusion:** Medically unexplained physical symptoms result in frequent presentations to hospital settings. The costs incurred are substantial and comparable to the costs of chronic medical conditions with identifiable pathology. Improving recognition and management of medically unexplained physical symptoms has potential to offer more appropriate and cost-effective healthcare outcomes.

## Keywords

Medically unexplained physical symptoms, somatoform, healthcare costs, healthcare utilisation, critical care/emergency medicine, epidemiology/public health, mental health/psychiatry

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## Introduction

Medically unexplained physical symptoms (MUPS) is the umbrella term given to any condition where the patient experiences physical symptoms that cannot be explained by observable pathology, despite often intensive medical assessment.<sup>1</sup> Symptoms can affect any organ system and range from recurrent minor symptoms and recognised functional syndromes such as fibromyalgia to somatoform disorders that cause significant distress and disability. MUPS are commonly encountered across all healthcare settings.<sup>2,3</sup> Analyses from the United Kingdom have estimated that MUPS is the presenting problem for around 22% of primary care attendances and 8% of inpatient bed days.<sup>4,5</sup>

As a conceptually and emotionally challenging area for patient and clinicians, MUPS constitute a significant source of

maladaptive medical utilisation.<sup>6–8</sup> Patients with MUPS have disproportionately high rates of healthcare usage, often presenting frequently to healthcare services and receiving potentially unnecessary referrals, investigations and treatments.

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Consequently, the healthcare costs of MUPS are substantial. The United Kingdom's NHS expenditure on the working-age population with MUPS for 2008/2009 is estimated at GBP2.892bn, a sum which is comparable to the cost of dementia.<sup>4,5</sup> In addition to the direct healthcare costs of MUPS, there are indirect societal costs such as reduced productivity, sickness absence, disability benefits and early retirement. These indirect costs are estimated by Konnopka et al.<sup>9</sup> to be approximately seven times greater than the direct costs.

To our knowledge, no study had previously established the cost of MUPS in Australasia, thereby making it difficult to make international comparisons with other healthcare systems such as in the United Kingdom and the United States, although the New Zealand Ministry of Health predicted significant costs.<sup>10</sup> Evaluation of the costs associated with MUPS would highlight not only the costs incurred by healthcare services but also the potential savings achievable through alternative and more effective management opportunities within an Australasian population. We therefore identified a sample of patients within a New Zealand setting in order to assess the frequency and type of MUPS presentations to clinical services and estimate the associated direct healthcare costs. Since the greatest direct health costs of MUPS result from patients who are high users of secondary care,<sup>11</sup> this study focused on patient care at hospital-based services. The patient journey starting in the Emergency Department through to inpatient admission, outpatient clinic and discharge was tracked. Once our final sample had been identified and their associated costs evaluated, we also aimed to conduct a post hoc analysis to compare the cost of MUPS to a medical condition with identifiable pathology (rheumatoid arthritis) so as to put our findings into context.

## Method

### *Study setting, design and sampling method*

This was a retrospective observational study involving patients at Waitemata District Health Board (WDHB) between 1 January and 31 June 2013. WDHB is the largest district health board (DHB) in New Zealand, serving approximately 600,000 people. Ethical approval was obtained from the Health and Disability Ethics Committee with locality authorisation from WDHB. All patients who presented to the Emergency Department at one of the two general hospitals in WDHB (North Shore or Waitakere Hospital) and were subsequently diagnosed with MUPS were identified using the WDHB discharge diagnostic coding system. All presentations which met the International Classification of Diseases–10th Revision (ICD-10) criteria for somatoform disorders or functional somatic syndromes were considered for inclusion in this study.<sup>12</sup> Diagnoses were formally coded during each attendance, either at the Emergency Department or, if the patient was admitted as an inpatient, upon discharge from hospital. These diagnoses were independently verified by

examining the patients' electronic medical and psychiatric records. The total number of attendances per patient was established and any episodes of care which were found to be medically explained were excluded, alongside any patients with incomplete clinical records. A total of 49 patients were found to be eligible for inclusion. This sample size was noted to be smaller than expected based on the existing MUPS literature.

### *Presentations, admissions and management*

Each patient's handwritten and electronic medical records as well as electronic psychiatric records were examined to find all their MUPS-related attendances to hospital services for medical reasons which occurred within 6 months before and after their coded hospital presentation, as well as the specific MUPS diagnoses they received. All MUPS-related Emergency Department attendances, frequency and length of stay of inpatient admissions and frequency and type of outpatient clinic appointments were noted. The number and type of specific investigations (laboratory tests, cardiac telemetry, radiology and procedures such as endoscopy) which occurred during each episode of care were measured. All surgical procedures and medications used to treat each patient were also recorded.

### *Cost calculation and statistical analysis*

New Zealand public hospitals follow a standardised methodology for capturing and costing patient activity. Patient events are categorised and counted according to the Common Counting Standards and Purchase Unit Data Dictionary in the year the activity occurs.<sup>13</sup> Financial information is categorised into the Common Chart to Accounts and from there spreads to patient activity according to the Common Costing Standards and Common Costing Guidelines.<sup>14–17</sup> Purpose-built clinical costing systems receive time-stamped patient activity information from patient care department systems. Costs for physicians, nurses, allied health and administration staff, supplies and overheads are allocated to patient care activity such as bed days, lab tests, imaging, pharmaceuticals, theatre minutes and clinic attendances using appropriate methodology. Non-patient care departments such as finance, information technology and facilities costs are allocated to patient care activity using an indirect costing methodology. The resulting fully absorbed cost of the patient activity includes both direct and indirect healthcare costs and is then attached to standardised patient events such as inpatient, outpatient or emergency contacts. Reconciliation to the annual financial returns of all the DHBs is carried out to ensure all the costs are included. We extracted the cost of MUPS-related healthcare for the patients in our sample from the clinical costing system. Of note, the two hospitals included in this study also have acute Medical Assessment Units and Short Stay Units which are functionally linked to the Emergency Department. Any attendances to either of these two units

were categorised as Emergency Department presentations. However, as per national costing definitions, the patients admitted to the Medical Assessment and Short Stay Units were subsequently classified as incurring inpatient costs.

Descriptive statistics were used to characterise the demographic features of the study sample. Frequency statistics were also used to analyse the frequency and type of MUPS presentations. Data analysis of the healthcare costs was carried out using IBM SPSS Statistics (version 22.0).

### Post hoc analysis

The sub-sample of patients who were admitted as an inpatient at least once with MUPS ( $n=22$ ) was further examined in order to compare costs with a chronic medically explained condition. Whereas previous studies have typically utilised samples focused on single organ systems, this sample examined MUPS across all organ systems. This was taken into consideration in the selection of a suitable comparator condition. Rheumatoid arthritis was regarded as an appropriate comparator to MUPS due to both conditions having a potentially chronic and debilitating course of illness with heterogeneous symptoms of variable severity, as has been previously examined in the literature.<sup>18,19</sup> Therefore, WDHB data for rheumatoid arthritis was obtained to compare with the costs incurred by the MUPS sub-sample. The same costing methodology was used to calculate the median cost of rheumatoid arthritis patients who had at least one inpatient admission in 2013.

## Results

### Descriptive data

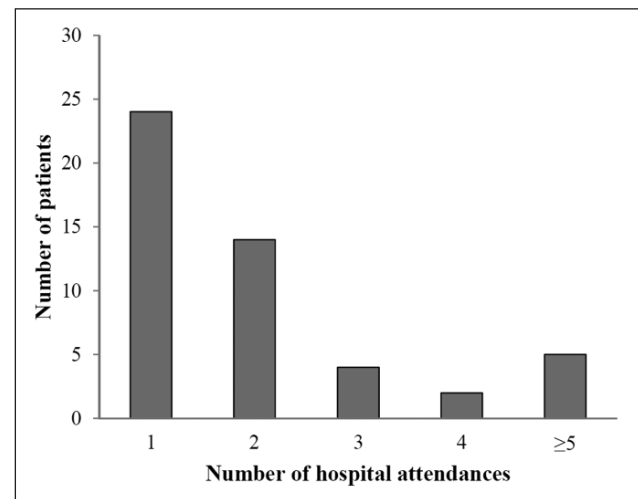
The patients came from a variety of ethnic backgrounds including Maori, Pacific Island and Asian but were predominantly European (65%). With regard to marital status, 37.8% of the cohort was married and a further 10.2% were partnered. However, 26.5% reported being single and the remaining 12 patients were divorced (12.2%) or widowed (12.2%).

Of the 49 patients in the study population, 23 patients (46.9%) had MUPS in an organ system corresponding to a comorbid physical diagnosis, such as atrial fibrillation co-existing with non-cardiac chest pain.

A total of 27 patients (55%) were noted to have one or more pre-existing psychiatric diagnoses. A further three patients presented for the first time in the context of severe acute stressors.

### Type and frequency of presentations

Neurological dysfunction was the most common MUPS presentation to clinical services (39.1%), followed by respiratory (30.4%) and then cardiovascular and gastrointestinal symptoms equally (10.1%). In all, 7.2% of patients experienced symptoms in multiple organ systems simultaneously and 2.9% of patients were diagnosed with persistent somatoform



**Figure 1.** Frequency of hospital attendances (including emergency department care, inpatient admissions and outpatient clinics).

pain. Seven patients were diagnosed with a second MUPS condition when they re-presented to hospital.

Figure 1 shows the frequency distribution of attendances to clinical services. Approximately half the patients (51.0%) had multiple hospital attendances, with 10.2% of the sample attending at least five times. The highest number of attendances for any one patient was 14 visits to hospital services over the 1-year period.

### Estimated healthcare costs

The healthcare costs associated with MUPS are outlined in Table 1. The total cost of the study sample ( $n=49$ ) was GBP89,636. Overall, the greatest proportion of expenditure was from the cost of inpatient admissions (43.4%), followed by emergency care (32.4%). Investigations also made up a significant but smaller proportion (11.6%) of the total healthcare costs. We analysed the subset of patients who were admitted to hospital at least once during the year ( $n=22$ ) and found that these patients comprised 44.9% of the total sample yet constituted 72.4% of the total costs. The median cost incurred by patients with inpatient admissions was higher than the median of the total sample (GBP2766 compared to GBP1221).

Figure 2 shows the distribution of total costs incurred by each patient. Those who were admitted for at least one inpatient stay ( $n=22$ ) had much higher healthcare costs, with 13 of these patients exceeding GBP2500 in total costs. In a post hoc analysis, the median cost for rheumatoid arthritis with at least one inpatient admission in 2013 was GBP1503, compared to GBP2766 for equivalent presenters with MUPS.

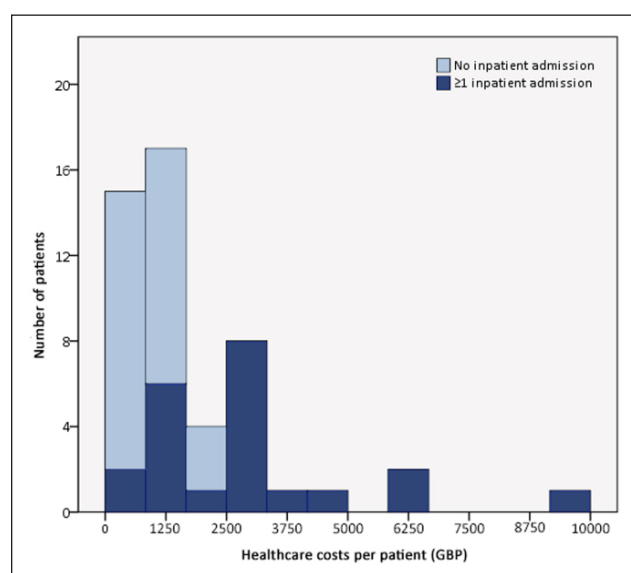
### Non-medical follow-up

A total of 15 patients received follow-up treatment for their symptoms specifically aimed at alleviating symptoms in an

**Table 1.** Summary statistics of the healthcare costs (GBP) associated with the entire sample and the healthcare costs associated with the subset of patients who had at least one inpatient admission.

	Total sample (n=49)	Patients with ≥1 inpatient admission (n=22)
Summary statistics		
Total cost	89,636	64,881
SD	1783	2113
Median	1221	2766
Minimum	213	623
Maximum	9662	9662
Costs by healthcare setting (%)		
Inpatient admissions	38,936 (43.4)	34,214 (53.2)
Emergency Department	29,015 (32.4)	14,079 (21.9)
Outpatient clinics	5056 (5.6)	2974 (4.6)
Investigations	10,409 (11.6)	7812 (12.2)
Procedures	6221 (6.9)	5196 (8.1)

SD: standard deviation.



**Figure 2.** Frequency distribution of healthcare costs of patients with MUPS.

outpatient or community setting. Six received follow-up assessment from community mental health services. Two patients were advised to see their primary care physicians with a view to considering psychotropic medication. A further four patients were referred for support in the form of social worker assessment, volunteer caregivers or targeted physiotherapy. Five patients received inpatient consults from the consultation-liaison psychiatry team based at the DHB. A further six patients were referred to community mental health services following discharge.

While four patients were noted as declining psychiatric follow-up, several patients appeared to be lost to follow-up after leaving hospital services.

## Discussion

This is the first study conducted in Australasia that attempts to quantify the healthcare usage of patients with MUPS. Our findings which are based on tracking Emergency Department presenters 6 months before and after their presentation show that the direct healthcare costs incurred by MUPS are considerable. The total cost of GBP89,636 was for presenters with MUPS identified by the WDHB coding database over a 6-month period; extrapolating this to cover the entire year, the costs are likely to double. Costs will further increase when considered over a longitudinal timeframe beyond a year. The average cost incurred per patient in this study (GBP1221) is comparable to the findings in a European study by Konnopka et al.,<sup>9</sup> who estimated that the mean 6-month direct healthcare costs of patients with MUPS is €1098.

The size of this study population is unexpectedly low compared to the figures from the UK Department of Health<sup>4</sup> and by Bermingham et al.,<sup>20</sup> who estimated that over 25% of outpatient consults and around 8% of inpatient bed days are taken up by medically unexplained attendances, respectively. One possible explanation for the relatively small sample size is the high rate of misdiagnosis which can arise from the persistence in pursuing a possible physical cause or not identifying presenters with MUPS as such because it is often a difficult diagnosis to conceptualise or discuss.<sup>21</sup> Additionally, as was noted in this study, MUPS and medically explained conditions frequently co-exist; the medically explained condition can influence the course of medically unexplained episodes and vice versa. The co-existence of both explained and unexplained symptoms in the same individual tends to result in MUPS episodes being excluded from appropriate diagnostic coding.<sup>20</sup>

Another reason for the small sample size is that the ICD-10 coding system used by the DHBs was developed to categorise severe or chronic MUPS. Patients may not meet ICD-10 criteria at first presentation, particularly in time-limited settings such as the Emergency Department. Furthermore, there exist no common guidelines for the diagnosis of patients with mild to moderate MUPS, rendering all patients who present at the less severe end of the MUPS spectrum uncaptured by the coding database. This is consistent with the literature in primary care which argues for an expansion in the diagnostic classification of MUPS.<sup>1,22,23</sup> Therefore, it is likely that the captured study population is conservative and an underrepresentation of the true proportion of MUPS and costs are expected to be even higher.

When the healthcare costs associated with the current sample of MUPS are compared with those with medically explained conditions, on average MUPS incur higher costs



than a patient with a chronic condition such as rheumatoid arthritis. These results are consistent with findings from existing studies by Longstreth,<sup>24</sup> Spiegel et al.<sup>25</sup> and Labott et al.,<sup>26</sup> which demonstrated that somatoform disorder is associated with increased healthcare resource consumption compared to patients with a physical disorder but no somatisation. As this study is composed of a relatively heterogeneous sample of MUPS which is not confined to any particular specialty or organ system, this clinically representative sample reflects the increased resource utilisation of MUPS across healthcare services.

The greatest proportion of costs is associated with those who were admitted to the inpatient wards. These findings add to the results of the economic analysis by Konnopka et al.,<sup>27</sup> who reported that inpatient admissions make up a high proportion of the direct cost of care. One possible implication is that reducing unnecessary hospital admissions or reducing length of stays is an avenue for potential cost savings. Additionally, the unnecessary cost of inpatient care alongside patients who receive repeat referrals to outpatient clinics or those who re-present to medical services cumulatively contribute to higher healthcare usage and need to be targeted appropriately.<sup>11,28</sup> Moreover, Emergency Departments in alliance with senior staff from other specialties have a role in developing multidisciplinary management plans so that consistent decisions can be made about patient care and shared with the primary care physician, whereby a whole health system approach is considered rather than only individual patient or physician factors. Such an integrated approach may have implications for averting admissions and facilitating shorter stays in hospital. Similarly, early identification and management of MUPS with clearly organised follow-up to target symptoms, stressors and comorbidities is likely to contribute to cost savings and better outcomes in the long term.<sup>29</sup>

### Strengths and limitations

One strength of this study was that MUPS presentations were independently verified by close examination of the study population's records, both medical and psychiatric. Furthermore, this study took a broad approach and included MUPS from all organ systems. The costing methodology was also based on a nationally standardised approach, meaning that the cost estimations can be reproduced across other DHBs. As the New Zealand healthcare system shares many commonalities with Australia and with the National Health Service in the United Kingdom, the findings of this study are relevant to both within Australasia and at an international level.

This study had some limitations. The cost of medically unexplained symptoms was investigated within one DHB. While we were able to identify costs for the underlying sample in detail, the resulting small sample size prevented further analysis of the data with more advanced statistical approaches. Also, due to resource restrictions, the inclusion

of a comparator group at the outset of the study was considered but not performed; this may have allowed the examination and calculation of the costs associated with patients of a medically explained group in the same depth of detail devoted to the study sample with MUPS. Nevertheless, the median sum obtained from the post hoc analysis of rheumatoid arthritis patients provides an appropriate comparator group to put our findings in context.

One limitation of the New Zealand DHB costing methodology is that the costs attributed to each patient are calculated according to the principal specialty caring for a patient on each day of their stay. At present the methodology does not cost any input a patient receives from other consulting specialties because the DHB electronic patient referral system is not yet fully implemented. For example, if a patient under general medicine is visited by the neurology service, the system is unable to cost the neurology consult to that specific patient. Instead the consultation cost is averaged across all the general medicine inpatients. Mental health costs such as consultation-liaison psychiatry services are also not included. Furthermore, if a patient is transferred between DHBs for regional specialist treatment or investigations, the transport costs are not taken into consideration. The calculated costs are therefore an underestimation of the actual costs.

### Implications

There is an increasing body of evidence to show that relatively low-cost psychosocial interventions such as cognitive behavioural therapy have significant potential to modify outcomes for people with MUPS.<sup>30-32</sup> A randomised controlled trial by Fjorback et al.<sup>33</sup> showed that for patients with bodily distress syndrome, mindfulness therapy reduces the health costs of patients even when the additional cost of administering the therapy is taken into account. Additionally, preliminary results from a newly developed specialist primary-secondary care liaison clinic for patients with MUPS show a 48% reduction in patients' secondary care usage in the 2 years following assessment at the symptom management clinic compared to their healthcare usage before assessment.<sup>34</sup> A recent study utilising a mind-body intervention involving relaxation response and resiliency training also showed significant reduction in healthcare utilisation across clinical services.<sup>35</sup> Our study validates the need for further development of such services. Excessively pursuing the possibility of a physical diagnosis serves not only to unnecessarily increase healthcare costs but also reinforces patients' illness beliefs and acts as a barrier to potentially more effective treatment options.<sup>20,36</sup> Furthermore, patients with MUPS report quality of life scores to be among the lowest of any patient group despite the considerable usage of healthcare resources.<sup>37</sup> In the United Kingdom, the Improving Access to Psychological Therapies (IAPT) programme interfaces with multidisciplinary teams at all levels of healthcare by facilitating effective and appropriate delivery of psychological therapies.<sup>38</sup> A similar

change in healthcare pathways at a population level is required in Australasia and internationally to proactively enhance the long-term management of patients with MUPS and decrease maladaptive healthcare practices.

The consequences of MUPS are important not only from a direct healthcare costs perspective but also from a societal perspective. Expansion of this study in future research to include indirect costs as well as primary care costs in WDHB and elsewhere would further strengthen our findings and likely yield much greater costs involved with medically unexplained symptoms. Further research to refine diagnostic coding, electronic referral and database systems and improve evaluation of each subtype of MUPS along the entire spectrum of severity will lead to enhanced consistency of MUPS reporting in the future.

## Conclusion

This study has found that patients with MUPS have high secondary care usage and incur substantial healthcare costs. These costs are comparable to those of chronic medically explained conditions and are most significant in inpatient and Emergency Department settings. There is an urgent need to implement targeted and evidence-based approaches in the management of MUPS so as to increase not only cost-effectiveness but also to improve patient care and outcomes.

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## Declaration of conflicting interests

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

## Ethical approval

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