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Sepsis and documentation of six physiological vital signs in GP Out-of-Hours

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Abstract

Aim

Sepsis is increasing in incidence. International guidelines recommend GP assessment of physiological vital signs in patients with acute infection to promote early detection of sepsis. This study assessed GP documentation of six physiological vital signs in clinical records of non-pregnant patients with lower respiratory tract infection (LRTI) or urinary tract infection (UTI) attending GP Out-of-Hours (GP-OOH) in 2016.

Methods

Retrospective analysis of 4,872 patient clinical records, across four days in 2016, in one GP-OOH service in Ireland. Patient records with LRTI or UTI were selected and assessed for documentation of six physiological vital signs: mental state, blood pressure, temperature, heart rate, oxygen saturation and respiratory rate.

Results

A total of 453 patients had LRTI or UTI. The clinical record documented mental state in 100% (n=453), temperature in 69% (n=313), blood pressure in 24% (n=107), heart rate in 23% (n=106), oxygen saturation in 13% (n=59) and respiratory rate in 8% (n=38). All six physiological vital signs were recorded in 1.7% (n=8) of patient files.

Discussion

The clinical records of over 98% of patients presenting with LRTI or UTI to GP-OOH had suboptimal documentation of the six physiological vital signs. Routine accurate assessment and documentation of physiological vital signs in patients with acute infection may enhance early recognition of sepsis.

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Introduction

The word sepsis has its origins in Greek for "decomposition" or "decay".[1] Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection.[2, 3] Sepsis is a time-dependent medical emergency causing 20% of global deaths.[4] Sepsis "*claims more lives than bowel, breast and prostate cancer combined"*.[5] Sepsis is the most expensive healthcare problem in the USA, consuming over 5% of total hospital costs.[1] Early recognition and intervention is key to reducing sepsis related disability and death.[4, 6] There is currently no suitable 'point-of-care' test to support early accurate identification of sepsis in general practice. There were 13,319 cases of sepsis in Ireland in 2021, with a crude mortality rate exceeding 20%.[7] There is a paucity of sepsis research in Irish general practice.[7]

The Centres for Disease Control (CDC) have identified that 70-80% of sepsis cases arise in the community.[8] Patients commonly attend their GP with acute infections. The key challenge for GPs is how to accurately identify the relatively small number of patients who may have sepsis.[9] The signs of early sepsis are often mild, common and nonspecific.[5, 6] A retrospective study of patients with sepsis admitted to the intensive care found that almost half these patients had prior GP contact.[10] The Royal College of General Practitioners (RCGP) recognises the suboptimal primary care sepsis evidence base.[11] The RCGP supports measurement of physiological vital signs for patients at risk of deterioration in a GP setting.[11] The UK Academy of Medical Royal Colleges recommends that NEWS2 'may' be used in primary care and NEWS2 'should' be used in secondary care. The higher the NEWS score the more likely a patient has sepsis. The physiological vital signs were not documented in one third of patients dying of sepsis in England in 2015.[12]

Irelands' 2021 national sepsis report highlights that early recognition of sepsis is fundamental to combat sepsis.[7] The report identifies the six processes that '*must occur to give a person the best opportunity to survive*'.[7] These processes resonate for both primary care and secondary care. The national sepsis report has eight key recommendations, including mandatory education on sepsis recognition, sepsis documentation; development of a sepsis scoring system and support for sepsis quality improvement.[7] Ireland has a national sepsis strategy since 2014, with almost a decade of resources, education and guidelines to support sepsis management in secondary care.[13] Ireland lacks a national primary care sepsis strategy, guidelines and resources, with predictable adverse consequences for patients, clinicians and the wider healthcare service.

Method

The most common sources of sepsis are lower respiratory tract infection or urinary tract infection, hence these conditions were selected for this research.[14] This retrospective study electronically interrogated patient clinical records using pre-defined keywords (see appendix-table 1), to identify non-pregnant patients aged > 12 years with probable lower respiratory tract infection or urinary tract infection attending Caredoc in 2016. Caredoc is a GP Out-of-Hours (GP-OOH) service, covering a population of 550,000 in south-east Ireland, with c280,000 episodes of patient care in 2016.[15] The clinical records of patients with probable lower respiratory tract infection or urinary tract infection were irrevocably anonymised, then reviewed by one GP registrar (Dr EH) to confirm or refute the diagnosis of lower respiratory tract infection or urinary tract infection. The diagnosis of lower respiratory tract infection or urinary tract infection was based on review of the clinical record, history, examination, diagnosis, and management. These original patient clinical records, as written by the treating GP, were analysed for the six physiological vital signs: mental state, temperature, blood pressure, heart rate, Oxygen saturation (SpO2) and respiratory rate. The mental state was documented or inferred from the clinical record, with clinical notes such as 'Alert'. The other five vital signs was documented (or not) and not inferred.

Seasonal patterns in infectious disease are well recognised.[16] To reflect this seasonal variation, the Caredoc clinical records were chosen on four weekend days across 2016: Jan 9th, Apr 9th, July 9th and Oct 8th. The exclusion criteria were people receiving home oxygen therapy, palliative care, pregnancy and children under the age of 12. Ethical approval was obtained from the Irish College of General Practitioners (ICGP) Research Ethics Committee.

Results

GPs in Caredoc completed 4,872 patient consultations across the selected four days (figure 1). Electronic interrogation of these records using the pre-defined keywords identified 919 patients with possible lower respiratory tract infection or urinary tract infection. These 919 patient clinical records were then manually reviewed with 453 patients having a diagnosis of lower respiratory tract infection or urinary tract infection. The diagnosis was lower respiratory tract infection in 282 and urinary tract infection in 171 of these patients.

Figure 1: Result of patient clinical file interrogation

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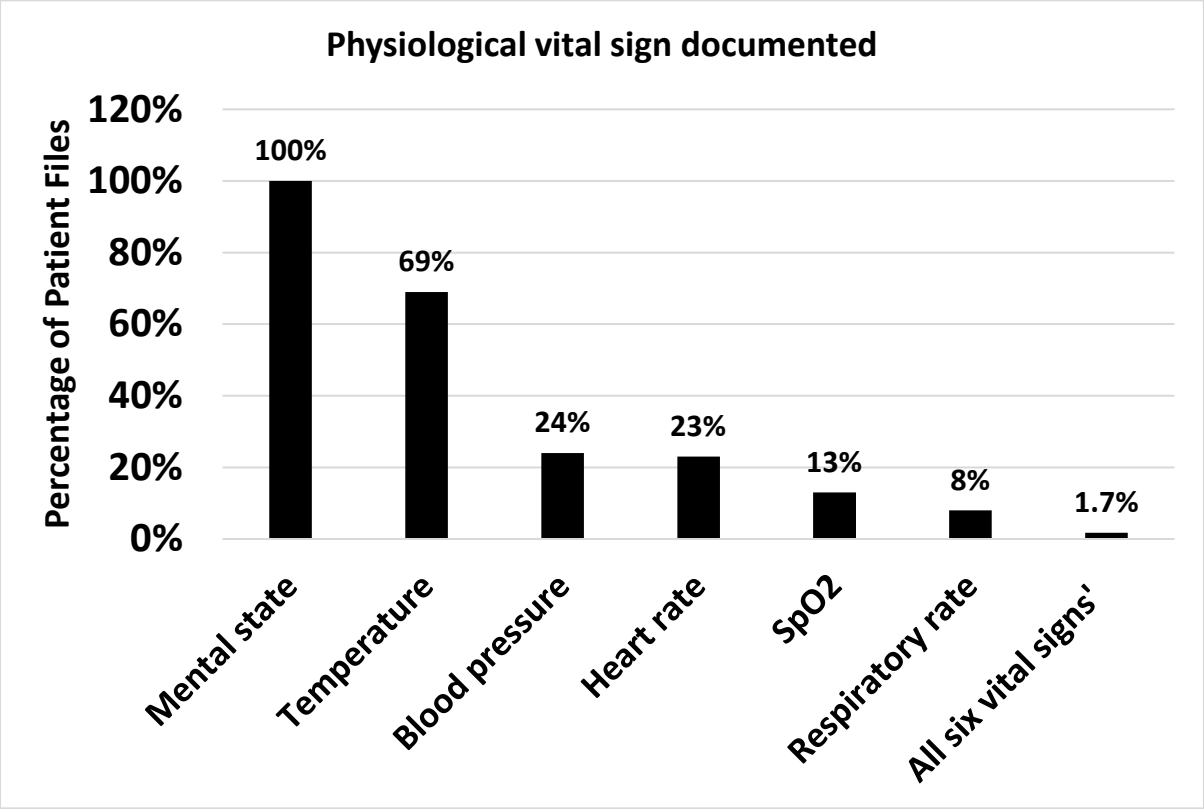
The 453 clinical records included mental state in 100% (n= 453), temperature in 69% (n=313), blood pressure in 24% (n=107), heart rate in 23% (n=106), oxygen saturation in 13% (n=59) and respiratory rate in 8% (n=38). All six physiological vital signs were recorded in 1.7% (n=8) of patient files (Figure 2).

Figure 2: Physiological vital signs documented in 453 GP OOH clinical records



Discussion

The tragic and untimely death of Savita Halappanavar from sepsis in October 2012 "*revolutionised Ireland*".[17] Sepsis was the cause of death in over 2,500 patients in Ireland in 2021.[7] Sepsis survivors commonly have severe physical, psychological, and cognitive disabilities with significant health and social care implications.[18]

In patients with acute infection who are at risk of sepsis, measurement of physiological vital signs is recommended as an integral part of clinical examination.[6, 19] Documenting the full set of vital signs provides objective evidence of a comprehensive physical examination and enhances communication about patient acuity between clinicians. However, these vital signs are commonly not recorded in patients with sepsis.[12] This research demonstrates that over 9% of non-pregnant patients over 12y age attending Caredoc GP OOH had lower respiratory tract infection or urinary tract infection, infections which commonly precede sepsis. The documentation of physiological vital signs in these patients was suboptimal. This study provides an important pre-COVID-19 benchmark of sub-optimal recording of six physiological vital signs in Irish GP OOH. These finding has relevance for patients, clinicians, and the wider healthcare system.

There are limitations to this small study. This study, while limited to four weekend days in one GP OOH co-operative in 2016, electronically interrogated almost 5,000 patient files. Manual review of the relevant files was undertaken by one physician only, without additional validation. The study identified patients with lower respiratory tract infection or urinary tract infection but excluded patients with other acute infectious disease such as influenza or upper respiratory tract infection. The study excluded children, pregnant women, people receiving palliative care or home oxygen: the patient cohorts in whom sepsis is more common. The study was undertaken in 2016, when screening tools for sepsis in primary care were not validated, readily available or widely used. The use of electronic sphygmomanometers has simplified measurement of blood pressure. Our understanding of sepsis has evolved substantially in recent years.

Most cases of sepsis arise in the community.[8] There were in excess of 21 million GP consultations and over one million GP OOH consultations in Ireland in 2022.[20] Irish general practice is experiencing a severe workforce and workload crisis, with increasing numbers of patients attending both daytime and GP OOH.[20] This indicates both the scale of the challenge and unique opportunities for general practice to enhance early identification of sepsis. Assessing and documenting physiological vital signs to identify sepsis in primary care is time consuming, clinically challenging in children and currently lacks a robust evidence base. However, it may improve identification of early sepsis and potentially improve patient

outcomes. This research benchmarks suboptimal clinical documentation of physiological vital signs in adults with acute infection attending GP OOH.

Ireland has resourced management of sepsis in secondary care for the past decade. Irelands' 2017 national sepsis report recommended sepsis education in primary care.[21] It is notable that the words '*General Practice*' are wholly absent from Irelands' 2021 national sepsis report.[7] Ireland lacks GP sepsis resources, guidelines, education and a national primary care sepsis strategy. General practice, the wider healthcare ecosystem and most especially our patients deserve better. Ireland urgently needs a comprehensive, resourced national primary care sepsis strategy.

Declarations of Conflicts of Interest:
None declared.

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Appendix

Table 1: Keywords used for electronic search of “Caredoc” records:

Respiratory keywords:	- Pneumonia
- LRTI	- Lung infection
- Bronchitis	- Cough
- Bronchiolitis	- Respiratory tract infection
- Tuberculosis	

- Pleurisy - Bronchopneumonia - Whooping cough - pertussis - chest infection - infective exacerbation COPD	**Urinary tract infection keywords:** - Urinary tract infection - UTI - pyelonephritis - kidney infection - bladder infection - cystitis