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## The Challenge of Infections in Frail Elderly: The Story of Mr. Nilsson

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### Abstract

Signs and symptoms of infection in Nursing Home Residents (NHR) are often atypical with a lack of specific ones, causing a delay in diagnosis and treatment. The complexity of detecting infections in NHR can be explained by difficulties in understanding and interpreting non-specific signs and symptoms and co-existing chronic diseases that blur the clinical picture. The case of Mr. Nilsson illustrates the process from the first signs and symptoms of infection to diagnosis in an elderly person with severe cognitive decline and physical impairment. What we can learn from this case is to reflect on changed behavior from habitual status and/or non-specific symptoms as possible suspected infection, and to consider a rise from individual baseline temperature, so called DiffTemp™, instead of traditional decided cut-off values for fever.

### Keywords

Assessment, Fever, Infection, Interleukin, Nursing home resident

### Introduction

Nursing Home Residents (NHR) are more likely to suffer from acute infections compared to middle aged and healthy elderly individuals, due to general frailty and physical incapability [1,2]. Signs and symptoms of infection in the frail elderly is often atypical with a lack of specific ones [3], causing a delay in diagnosis and treatment [2]. The most frequent serious infection is pneumonia [3], with mortality rates similar to cerebral vascular insult and heart failure [4]. Risk factors are male gender, physical impairment, Chronic Obstructive Pulmonary Disease (COPD) and advanced dementia [5-7].

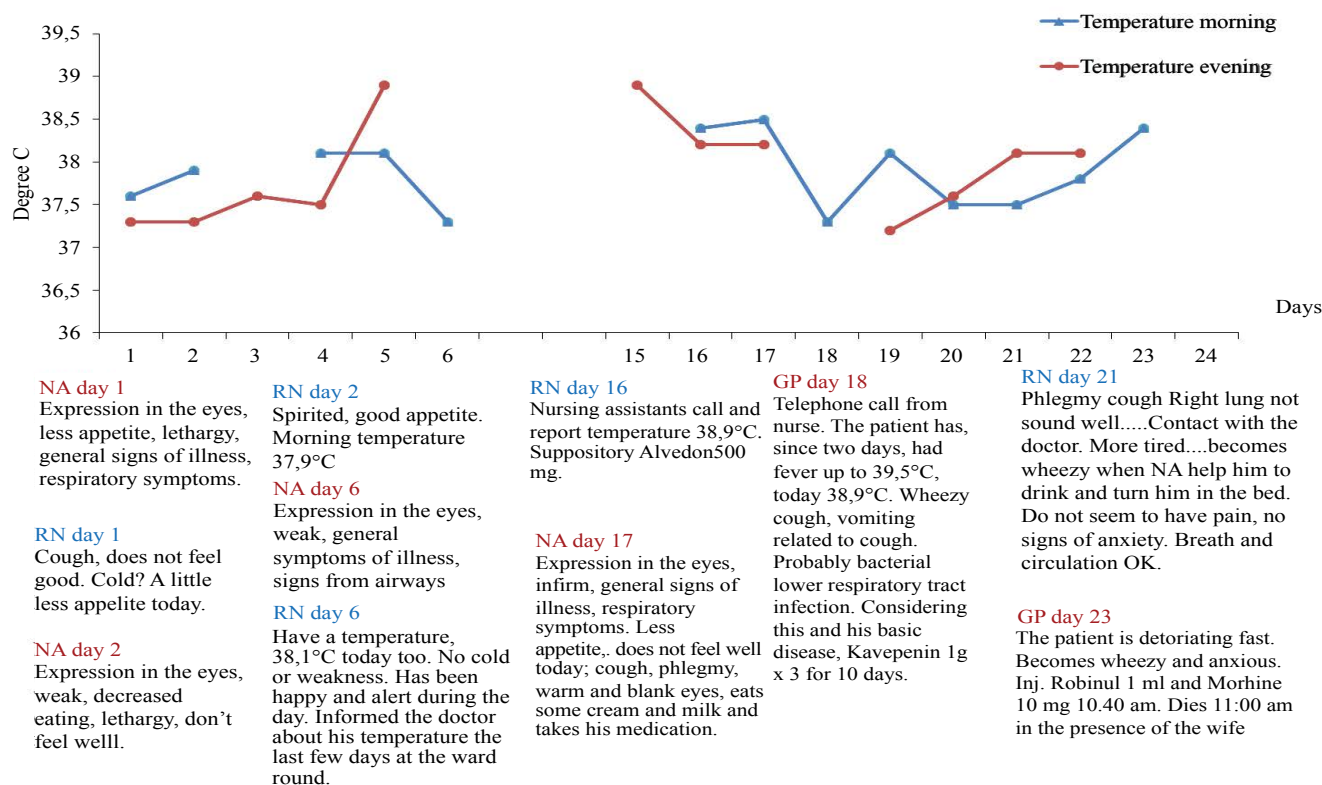
### Case Report

Mr. Nilsson is an 83 years old NHR with late-stage dementia. Because of the cognitive decline he has difficulties with memory, understanding others and expressing himself. He is also diagnosed with COPD and pulmonary cancer. He is on daily medication with sedatives, antidepressants and analgesics (paracetamol) three times a day. He is vaccinated against influenza and pneumonia. He has a severe physical disability and can only manage to eat by himself and tell when he needs the toilet. He often reacts aggressively when the nursing assistant (NA) help him with personal hygiene, eating, or toileting. Sometimes he is apathetic, probably due to mild depression [8]. His baseline body temperature is 36.6°C in the ear and 36.9°C

rectally. One morning nursing assistants (NA) observed that Mr. Nilsson was behaving differently, e.g. he did not feel well, expressed as “expression in the eyes”, less appetite, lethargy and general signs of illness. They also observed respiratory symptoms. The NA continued to report about his changed condition for the next few days to the registered nurse (RN), who noted that he might have a cold but took no further action as he did not have a fever. His ear temperature was 37.6°C in the morning and 36.8°C in the afternoon the first day, and 37.2°C in the morning and 37.3°C in the evening the second day. Day six Mr. Nilsson’s temperature is 38.1°C and hence the RN informs the general practitioner (GP), who takes no further action. There is no more RN documentation about his condition until day 16, when the RN order paracetamol due to increased body temperature (38.9°C). The next morning the nurse contacts the GP who prescribes antibiotics due to suspected pneumonia. The condition worsens and Mr. Nilsson dies on day 24. See flowchart over the 24 days in [figure 1](#).

### Discussion

This case illustrates the process from the first signs and symptoms of infection to diagnosis in an elderly person with severe cognitive decline and physical impairment. It is well known that nonspecific symptoms and lack of specific ones are common in NHR [9-11], contributing to a delayed diagnosis and treatment [10]. These atypical signs are observed as absence of fever, weakness, falling, weight loss, physical dysfunction and cognitive decline [3,7,12-14]. In addition, early signs of infection are very similar to, and also as diffuse as, signs of acute illness [12,15,16]. Changes, such as lethargy, weakness, decreased appetite, agitation, disorientation, dizziness, falls and delusions are reported to have high predictive values for acute illness in frail elderly [16]. The complexity of detecting infections in NHR can be explained by difficulties in understanding and interpreting non-specific signs and symptoms and co-existing chronic diseases that blur the clinical picture. An individual that normally is confused, anxious and restless may become apathetic and infirm, or vice versa, when infection is suspected. On the other hand, an individual who normally is unrestrained could become more confused, aggressive, anxious and restless. As specific symptoms are often lacking [9-11] the presence of fever, in terms of > 38°C, is often evaluated as a significant symptom of illness and an important reason for taking further action. However, fever in frail NHR has been reported to be lower than traditionally stated [17-19]. In addition, the effects on body temperature from medication with paracetamol daily have to be considered.



**Figure 1:** Summary of an episode with infection for an 83 years old nursing home resident.

NA= Nursing Assistant, RN = Registered Nurse, GP = General Practitioner

However, in this case, Mr. Nelson was participating in a study of signs and symptoms of infection in frail elderly. Therefore, on day two blood sampling and analysis of C-reactive protein (CRP), white blood cells (WBC) and inflammatory cytokines Interleukin (IL) were performed. The analysis revealed a CRP of 158 Mg/ml (reference value < 10), a WBC of 14. 4/L (reference value < 9.0 × 10/L), and IL-6 of 44.69 ng/L (reference value < 8 ng/L), indicating an ongoing bacterial infection.

What we can learn from the story of Mr. Nilsson is to listen to the NAs when they report changed behavior from habitual status and/or non-specific symptoms [14] and to consider a rise from individual baseline temperature, so called DiffTemp™ instead of traditional decided cut-off values for fever [20]. Another way to go may be to perform analysis of C-reactive protein (CRP) directly in place at the nursing home, as CRP rise rapidly in response to inflammatory stimuli, especially bacterial infection [21].

## Ethical Statements

Mr. Nilsson was included in a study conducted in accordance with the Declaration of Helsinki and approved by The Ethics Committee for Human Research at the Faculty of Health Sciences, Linköping University (M82-06).

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