**Methods:** The study showed how much a correct diagnosis affects the patients’ QOL. The use of a DDSS would have significantly shortened the diagnostic odysseys and thus improved patients’ QOL at an earlier stage.

**Results:** The study showed that the QOL of most patients improved with a correct diagnosis. The graphically depicted progression of the patients’ health perception are shown in Figure 1: with the onset of the first symptoms, 65% of the patients found their state of health to be less good or bad, in course of disease, this number increased to 70%. At the current time, the time of the interviews, the number declined to 28%. Originally, no patient was in excellent health, but at the current condition after the diagnostic odyssey, 10% were able to describe their state of health as excellent. The interviews show an overall decline in well-being during the diagnostic odyssey, which slowly increases with the correct diagnosis.

**Conclusion:** The study showed how much a correct diagnosis affects the patients’ QOL. The use of a DDSS would have significantly shortened the diagnostic odysseys and thus improved patients’ QOL at an earlier stage.

**Keywords:** Quality of life, Descriptive Studies, Artificial Intelligence

**AB1766-HPR**

**THE IMPACT OF FASTER DIAGNOSIS THROUGH ARTIFICIAL INTELLIGENCE ON THE QUALITY OF LIFE OF PATIENTS WITH RARE DISEASES**

**Background:** Diseases that affect fewer than 2000 people in the general population are defined as rare diseases [1]. The rarity and the associated limited experience with these diseases, but also the large number of about 8000 rare diseases [2], pose a major diagnostic challenge for physicians. On average, affected patients need 5.6 to 7.6 years until they receive a diagnosis and thus the correct therapy [3]. These diagnostic odysseys place a heavy financial, health, and psychological burden both on patients and their families. Diagnostic decision support systems (DDSS) have great potential to assist physicians in diagnostic decision-making and can indicate the presence of a rare disease much earlier. An exploratory study conducted at the Outpatient Clinic for Rare Inflammatory Systemic Diseases with Renal Involvement at Hannover Medical School showed that the diagnostic process can be shortened by a DDSS. The median lead between diagnosis and the hypothetical time of diagnosis by a DDSS was three months [4]. A follow-up study showed that health economic savings were also possible by making the diagnosis so early [5].

**Objectives:** Measured against the hypothetical diagnosis time points determined in the previous study [4], this study aimed to investigate, in the same patient population, the extent to which earlier diagnosis using a DDSS would have influenced the patients’ quality of life (QOL).

**Methods:** To determine the potential for improving QOL through artificial intelligence (AI), 71 patients from the patient cohort of the previous studies were surveyed [4][5]. The questionnaire was composed of established questionnaires such as the WHO HPQ and the SF-36. In five interview sessions from the onset of the disease, the time of professional diagnosis, to the current time, the development of QOL was retrospectively recorded. To analyze the development of QOL during the disease, but also to show the influence of the DDSS on QOL, data were also collected for the time points at which the DDSS would have indicated the correct diagnosis as the first suggestion or among the first five suggestions.

**Statistical analysis:** Graphical presentation and interpretation of the questionnaires were performed using statistical software.

**Results:** The study showed that the QOL of most patients improved with a correct diagnosis. The graphically depicted progression of the patients’ health perception are shown in Figure 1: with the onset of the first symptoms, 65% of the patients found their state of health to be less good or bad, in course of disease, this number increased to 70%. At the current time, the time of the interviews, the number declined to 28%. Originally, no patient was in excellent health, but at the current condition after the diagnostic odyssey, 10% were able to describe their state of health as excellent. The interviews show an overall decline in well-being during the diagnostic odyssey, which slowly increases with the correct diagnosis.

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**Keywords:** Artificial Intelligence, Systemic lupus erythematosus, Systemic sclerosis

**AB1767-HPR**

**DOCUMENT SEARCH IN LARGE RHEUMATOLOGY DATABASES: ADVANCED KEYWORD QUERIES TO SELECT HOMOGENEOUS PHENOTYPES**

**Background:** Natural language processing tools are powerful for mining rheumatology databases, extracting patient information directly from clinical notes. However, these algorithms come with a high computational cost and are often not applicable at the scale of very large databases in the temporality of clinical practice.

**Keywords:** Artificial Intelligence, Systemic lupus erythematosus, Systemic sclerosis

**AB1768-HPR**

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**AB1769-HPR**

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**Methods:** To determine the potential for improving QOL through artificial intelligence (AI), 71 patients from the patient cohort of the previous studies were surveyed [4][5]. The questionnaire was composed of established questionnaires such as the WHO HPQ and the SF-36. In five interview sessions from the onset of the disease, the time of professional diagnosis, to the current time, the development of QOL was retrospectively recorded. To analyze the development of QOL during the disease, but also to show the influence of the DDSS on QOL, data were also collected for the time points at which the DDSS would have indicated the correct diagnosis as the first suggestion or among the first five suggestions.

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**Keywords:** Artificial Intelligence, Systemic lupus erythematosus, Systemic sclerosis

**Disclosure of Interests:** None Declared.

**Acknowledgements:** NIL.

**AB1766-HPR**

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**AB1767-HPR**

**DOCUMENT SEARCH IN LARGE RHEUMATOLOGY DATABASES: ADVANCED KEYWORD QUERIES TO SELECT HOMOGENEOUS PHENOTYPES**

**Keywords:** Artificial Intelligence, Systemic lupus erythematosus, Systemic sclerosis

**Disclosure of Interests:** None Declared.

**Acknowledgements:** NIL.
**Objectives:** The objective of our study is the automatic detection of clinical documents of interest for a specific clinical question, with low computational cost, to be applied on a database of millions of documents. These sets of documents of interest constitute a pre-screening to allow the development of more complex algorithms.

**Methods:** The task was considered as an information retrieval task in French clinical texts. Two different methods were compared. For the first method, we used several state-of-the-art document vector representations: TF-IDF, doc2vec, docBERT and tested if the closest documents are relevant. The second method consists in building a powerful query expansion from a key term entered. Its French synonyms from the UMLS and the synonyms found by similarity with the embeddings of the CODER algorithm. These methods are developed and evaluated on a set of 8 and on 20 phenotypes respectively (e.g., "pericarditis in lupus", etc.). Our database corresponds to 2 million documents from a cohort of patients suffering from four autoimmune diseases: systemic lupus erythematosus, scleroderma, antiphospholipid syndrome, and Takayasu’s disease, coming from the AP-HP’s data warehouse.

**Results:** Our experience does not support the vector representation model of clinical notes for searching similar patients. However, searching with an advanced synonym search method can lead to very good results without additional burden for the clinician: we achieved a precision (or positive predictive value) of 0.93 [0.90; 0.96] evaluated manually by a physician and a recall (or sensitivity) of 0.78 [0.71; 0.85] evaluated on the basis of the ICD10 codes of the retrieved patients.

**Conclusion:** We propose a new advanced keyword search method with automatic synonym search with very good accuracy and recall performance.

**REFERENCES:**

**Table 1. Accuracy and recall results for 13 over 20 queries.**

<table>
<thead>
<tr>
<th>Query</th>
<th>Accuracy (on 50 manually-annotated document per query)</th>
<th>Recall (comparison with respective CIM10)</th>
<th>Number of corresponding documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Rheumatoid Arthritis”</td>
<td>0.98</td>
<td>0.73</td>
<td>15189</td>
</tr>
<tr>
<td>“Takayasu”</td>
<td>0.94</td>
<td>0.94</td>
<td>2459</td>
</tr>
<tr>
<td>“Pericarditis in lupus”</td>
<td>0.92</td>
<td>0.93</td>
<td>7490</td>
</tr>
<tr>
<td>“Kidney transplantation”</td>
<td>0.92</td>
<td>0.98</td>
<td>10716</td>
</tr>
<tr>
<td>“Autoimmune hepatitis”</td>
<td>0.8</td>
<td>0.85</td>
<td>2797</td>
</tr>
<tr>
<td>“Dermatomyositis”</td>
<td>1.0</td>
<td>0.77</td>
<td>3510</td>
</tr>
<tr>
<td>“Idiopathic thrombolytic pericarditis”</td>
<td>0.98</td>
<td>0.91</td>
<td>3749</td>
</tr>
<tr>
<td>“Acute kidney injury”</td>
<td>0.86</td>
<td>0.81</td>
<td>15775</td>
</tr>
<tr>
<td>“Raynaud syndrome”</td>
<td>0.98</td>
<td>0.98</td>
<td>31900</td>
</tr>
<tr>
<td>“HIV”</td>
<td>0.90</td>
<td>0.98</td>
<td>43582</td>
</tr>
<tr>
<td>“Scleroderma”</td>
<td>1.0</td>
<td>0.92</td>
<td>24199</td>
</tr>
<tr>
<td>“Diabetes”</td>
<td>0.96</td>
<td>0.96</td>
<td>51224</td>
</tr>
<tr>
<td>“Stroke”</td>
<td>0.64</td>
<td>0.63</td>
<td>28162</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>0.93 [0.90; 0.96]</td>
<td>0.78 [0.71; 0.85]</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1.** Overview of the two methods of searching for documents in our data warehouse. Method 1 is document oriented and method 2 is keyword oriented.

**Acknowledgements:** The authors would like to thank the AP-HP data warehouse, which provided the data and the computing power to carry out this study under good conditions. We would like to thank all the medical colleges, including internal medicine, rheumatology, dermatology, nephrology, pneumology, hepatogastroenterology, hematology, endocrinology, gynecology, oncology, cardiology, oncology, emergency and intensive care units, that gave their agreements for the use of the clinical data.

**Disclosure of Interests:** None Declared.

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