## Supplementary material

### Materials and methods

A Discrete Choice Experiments (DCE) study is valuable because it directly assesses relative preferences and hypothetical treatment approaches (1), and it has been already applied to other chronic conditions (2) and even in systemic autoimmune diseases (3).

The research questions were:

a) Which features should characterise the diagnostic-therapeutic pathway for SLE?

b) Are these features similar or different when clinicians consider different patients (severe vs. mild-moderate)?

c) What are the features of a new hypothetical pharmacological therapy for SLE that would mainly drive clinicians to prescription?

d) Are these features similar or different when clinicians should choose the therapy for different patients (severe *vs*. mild-moderate)?

Concerning pharmacological therapy, which are the trade-offs between costs (in a broad sense, including side effects and need for GCs) and benefits?

The testable null hypothesis was that the attributes and levels within attributes had equal importance. Therefore, rejecting the null hypothesis would allow us to infer that some attributes are more relevant than others and that some levels attract clinicians' preferences.

Conjoint analysis was chosen as a suitable method to address the research questions, as it allowed us to rank the attributes by relative importance (RI), identify levels of attributes that capture the preferences, and quantify the trade-offs between specific gains/losses of clinical relevance.

*DCE experimental design*

Tasks were built as a forced choice between two profiles. The Expert Board considered that choosing between more profiles could confuse respondents and require more time. Even the possibility of opt-out answers was not considered potentially helpful, and according to answers gathered in a testing session, there was no need to avoid choosing one of the two options. Complete profiles were presented since the number of attributes was a maximum of 7, and participants could manage a 7-item profile.

The experimental design was generated through Sawtooth Software (Lighthouse Studio 9.14), a well-known and validated software that estimates unbiased, precise preference weights (PWs) for all defined attribute levels. The Expert Board chose the attributes' levels to avoid impossible, illogical, or unrealistic combinations; thus, there was no need to define prohibited pairs. The generated experimental design was tested, and a simulation confirmed that it was orthogonal and balanced (Supplementary material - Experimental Design Simulation).

Considering the limited number of clinicians involved in the daily management of patients with SLE and the expected number of participants in the DCE, the choice tasks were set at 12 (see also the considerations about sample size below). Such a number of stimuli was tested by a few people close to the members of the Expert Board and considered feasible. In order to elicit preferences, before choice tasks, respondents were instructed about DCE. Clinicians were contacted via email containing a description of the study and survey method, an invitation to participate, and a direct link to the DCE questionnaire available online in the software platform. The web-based mode of administration resulted in a feasible and pleasant view of the questionnaire, a great control of data gathering, and a suitable check of the dataset.

*Sample size*

A total of n=115 clinicians were invited to participate. As to sample size calculation, firstly, Orme's rule-of-thumb was applied. The minimum sample size necessary for the DCE was computed as n≥500*c/ta, where n is the number of respondents, c is the maximum number of levels per attribute (in our study, c=3), t is the number of tasks (in our study t=12 for clinicians), and a is the number of alternatives (in our study, a=2), resulting in n=63 clinicians. In addition, according to a simulation performed with Sawtooth Software Lighthouse Studio (9.14.2), with 80 responders, the maximal standard error resulted equal to 0.057 (considering the most demanding DCE questionnaire, *i.e*. that with the highest number of attributes/levels). We expected that some clinicians would not complete all the tasks for each of the four DCEs since the time for full completion was about 40 minutes. For this reason, we increased the number of invited clinicians by 30%. The sample of clinicians was not selected randomly from all clinicians treating SLE patients since this list is unavailable. Instead, the Expert Board indicated Italian SLE centres, and a sort of snowball sample was obtained.

### Results

The clinicians' characteristics are reported in Supplementary Table S1.

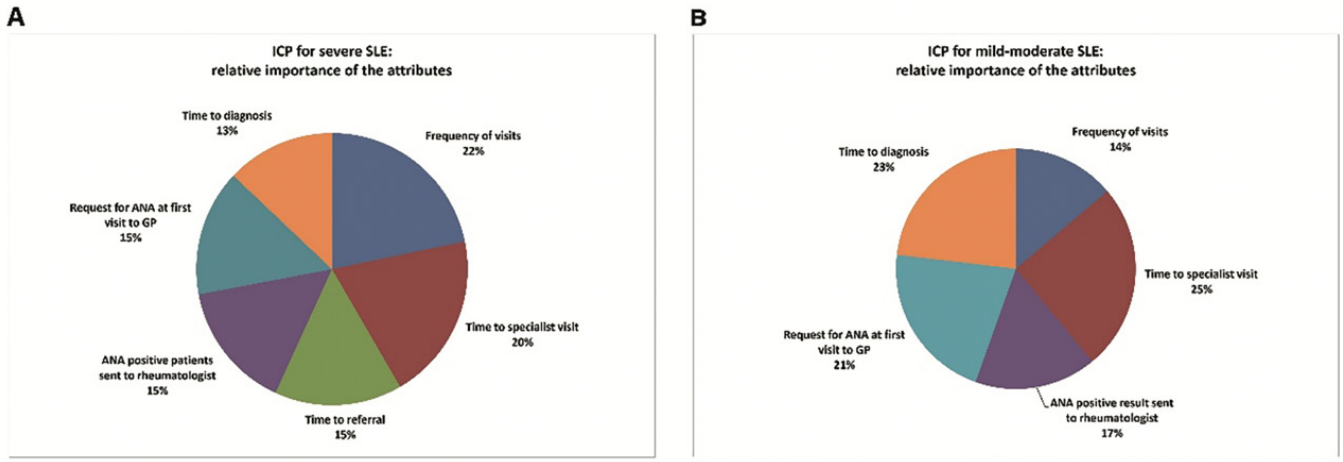
**Supplementary Table S1.** Clinicians' summary statistics (n=95).

| Characteristics | | Statistics | |
|---|---|---|---|
| Age (years): median, min-max | | 45 | 31-71 |
| Time since MD degree (years): median, min-max | | 19 | 3–46 |
| Clinical experience on SLE (years): median, min-max | | 15 | 1–40 |
| Sex | M: n, % | 41 | 43 |
| | F: n, % | 54 | 57 |
| Specialty (not mutually exclusive) | Rheumatology: n, % | 67 | 71 |
| | Nephrology: n, % | 6 | 7 |
| | Internal medicine: n, % | 12 | 13 |
| | Other: n, % | 19 | 21 |
| Number of SLE patients (visits per year) | Less than 25 | 2 | 2 |
| | 25-50 | 15 | 16 |
| | More than 50 | 78 | 82 |
| Member of a scientific society | Yes | 95 | 100 |

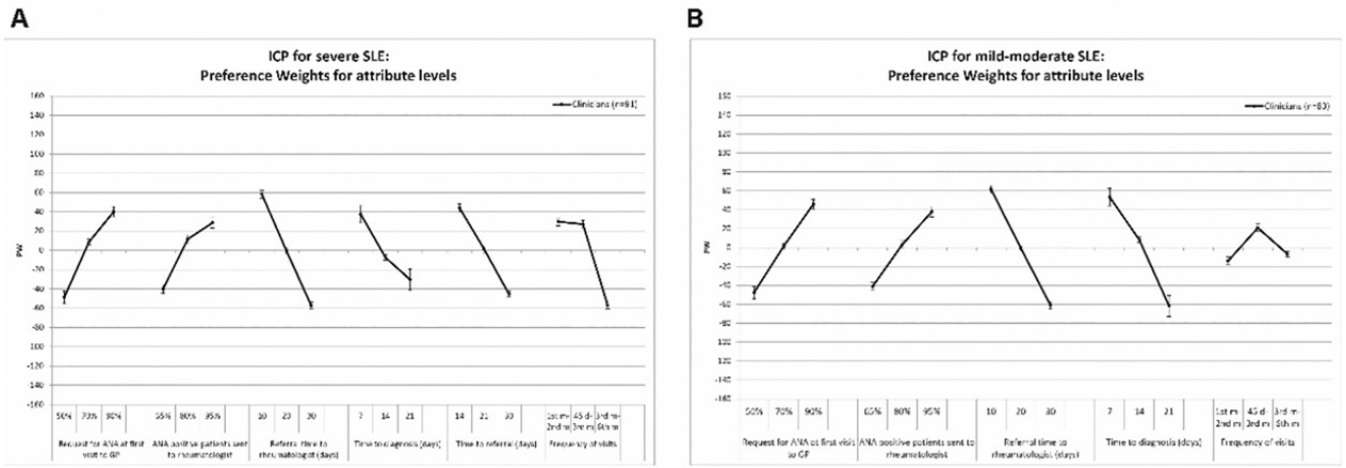
*DCE about the diagnostic pathway*

Looking at utilities for specific levels (Suppl. Fig. S2), the optimal diagnostic pathways for severe SLE (Fig. 2A) encompassed 90% or more requests for ANA at the first visit to the GP (PW=40.1), a referral in 95% or more of ANA-positive cases to the rheumatologist (PW=28.6), a waiting time of no more than 10 days to get visited by the rheumatologist (PW=58.1), a time to diagnosis of no more than 7 days (PW=37.6), a definite response to the biopsy examination after a maximum of 14 days (PW=44.0), and a schedule of two visits within the first three months (PW=29.7).

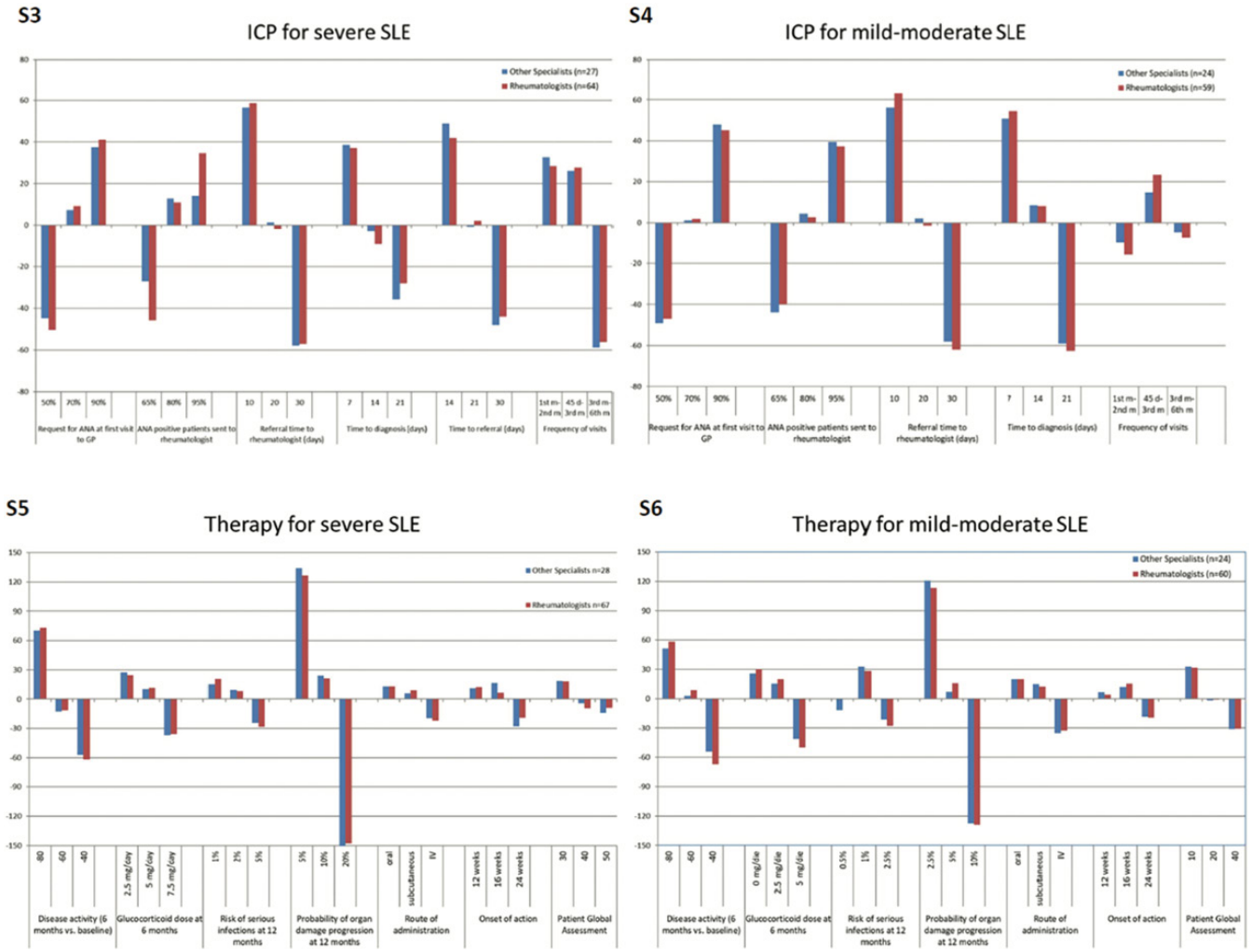
For mild to moderate SLE patients, it was found that a schedule with the first visit at 45 days and a second visit at three months is considered more suitable (PW=20.9) compared to a schedule with the first visit at 30 days and a second visit at two months (PW= -14.0), as well as a schedule with the first visit at three months and a second visit at six months (PW= -6.9).




**Supplementary Fig. S1.** Reports the relative importance of the attributes of the diagnostic pathway for severe (**A**) and mild-moderate (**B**) SLE. ICP: integrated care pathway.




**Supplementary Fig. S2.** Diagnostic pathway for severe (**A**) and mild-moderate (**B**) SLE: preference for attribute levels. The values of the reported weights indicate the average preference for one attribute level over other attribute levels, also reflecting the relative strength of utility for each attribute level, where more positive numbers indicate higher utility, and more negative numbers indicate higher disutility.




**Supplementary Fig. S3-6.** Diagnostic pathway and therapy features about severe (S3, S5) and mild-moderate (S4, S6) SLE: preferences for attribute levels by type of specialist (Rheumatologists *vs*. Others).

## References


1. RYAN M, WATSON V, KRUCIEN N *et al*.: Using discrete choice experiments in health economics: theoretical and practical issues. University of Aberdeen, UK: Health Economics Research Unit, 2014.
2. SHUBROOK JH, RADIN M, ALI SN *et al*.: Preference for Type 2 diabetes therapies in the United States: a discrete choice experiment. *Adv Ther* 2022; 39(9): 4114-30. https://doi.org/10.1007/s12325-022-02181-7
3. BRUNI C, HEIDENREICH S, DUENAS A *et al*.: Patient preferences for the treatment of systemic sclerosis-associated interstitial lung disease: a discrete choice experiment. *Rheumatology* (Oxford). 2022; 61(10): 4035-46. https://doi.org/10.1093/rheumatology/keac126