# The Impact of Accuracy of Predicting Risk of Disease on Preferences For Preventative Treatment Options

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## BACKGROUND

- Evidence suggests treating people at high risk of rheumatoid arthritis (RA) with disease modifying anti-rheumatic drugs (DMARDs) could prevent the onset of disease.
- There are currently multiple ongoing randomized controlled trials studying the efficacy of preventing RA, for example:
  - Rituximab, a biologic DMARD
  - Hydroxychloroquine, a non-biologic DMARD.
- Even if these trials successfully meet their primary endpoint and are considered successful, the demand by asymptomatic people for preventative treatment is unclear because of:
  - Uncertainty in the precise benefits/harms of treatment, as well as the convenience of treatment
  - Uncertainty in the ability to predict those at risk of RA

## OBJECTIVE

To determine the impact of uncertainty in the ability to predict the risk of RA on preferences of people at high risk of RA for treatments aimed at preventing the onset of disease.

## PREFERENCE ELICITATION DESIGN

- We focus on preferences for treatment, the values and most important attributes of preventative treatment programs.
- Discrete choice experiment (DCE) where respondents were:
  - told to imagine a test had classified them as at high risk of developing RA.
  - asked to choose between sets of 2 hypothetical preventative RA treatments, then between their preferred treatment and 'no treatment for now'.

The treatment attributes identified in focus groups with RA patients, first-degree relatives of RA patients and rheumatologists, were:

1. risk of developing RA,
2. the way treatment is taken,
3. chance of side effects,
4. certainty in estimates,
5. health care provider's opinion

- Respondents were also given a background scenario which described the chance that the test is wrong. The risk that the test was wrong was randomized to either 20% or 40%.
- Experimental design (SAS) developed 18 choice sets, blocked into 4 sets of 9 choices.

## METHODS & ANALYSIS

- The DCE was given to a representative sample of the US general population via a market research panel.
- Responses were analyzed using a conditional logit regression model to estimate the significance and relative importance of attributes in influencing preferences
- Attribute levels were interacted with a dummy variable for the impact of test accuracy (0=20%, 1=40%).

**Figure 1. Example choice set**

Imagine that you have taken a test to predict your risk of developing rheumatoid arthritis (RA), and these are the results:

• **Risk of developing rheumatoid arthritis** in the next 5 years: 60% (60 out of 100 people like you are expected to develop RA)

• **Chance that the test is wrong**: 20% (20 out of 100 people are expected to get inaccurate information from this test)

Imagine you are now offered the choice between two treatments which could prevent you developing rheumatoid arthritis. Both are thought to be appropriate, but differ in a number of ways.

Part 1: choose your **preferred treatment.**

Click here if you are unsure what to do.

| | Treatment A | Treatment B |
|---|---|---|
| **Your risk of developing rheumatoid arthritis** | Your predicted risk of RA would reduce from *60 people out of 100* to *44 people out of 100* over the next 5 years. | Your predicted risk of RA would reduce from *60 people out of 100* to *24 people out of 100* over the next 5 years. |
| **The way you take the treatment** | *IV/slow drip*, given by a physician or nurse at their office or hospital, which takes 3-4 hours / *Twice, 15 days apart, repeated once (2 doses total)*. | An *oral pill* / *Once daily* for one year. |
| **Chance of side effects** | Common: minor side effect which is *reversible*<br>Very rare: very serious side effect which is *not reversible*. | Common: minor side effect which is *reversible* |
| **Certainty in estimates** | Very little: The true effect is *likely to be substantially different* from the estimate of effect. | Limited: The true effect *may be substantially different* from the estimate of the effect. |
| **Your health care provider's opinion** | Your health care provider would *not prefer* this treatment. | Your health care provider would *prefer* this treatment. |
| **I prefer:** | ○ | ○ |

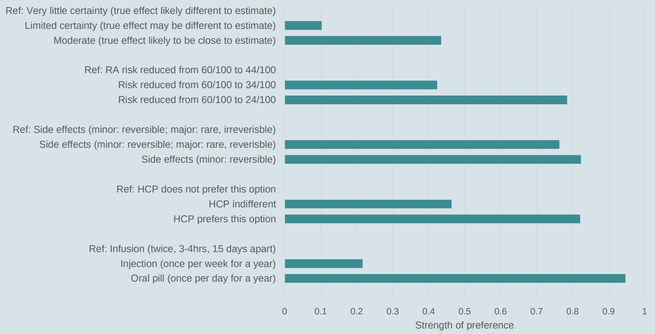
Part 2: Would you choose **no treatment for now**, over your chosen treatment above?

| | **No treatment** |
|---|---|
| **Your risk of developing rheumatoid arthritis** | Your predicted risk will stay the same at *60 people out of 100*. |
| **The way you take the treatment** | You don't take anything |
| **Chance of side effects** | None |
| **Certainty in estimates** | High: The true effect is *likely to be close* to the estimate of the effect. |
| **Your health care provider's opinion** | Your health care provider *does not offer an opinion* about this option. |

**I choose to:**

○ Stay with selected treatment
○ Choose no treatment

**Figure 2. Estimated preferences and marginal rates of substitution for different aspects of preventative treatment**



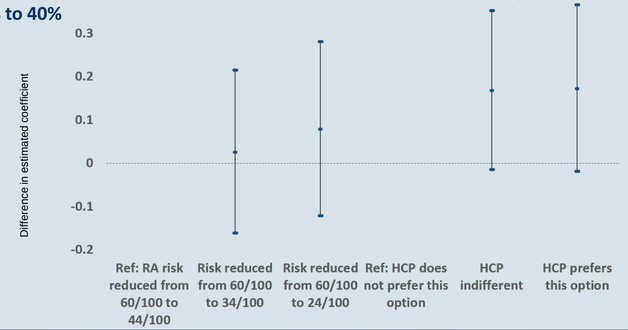

## SAMPLE

- 595 respondents started and completed all tasks in the survey.
- The majority were 25-54 years old (modal 30-39 years (39%)), and 59% female.
- 147 respondents (25%) reported having a physician diagnosis of RA, and 448 (75%) had a family member or close friend with RA.

## RESULTS

- All attributes and levels significantly influenced preferences in the direction expected. The way treatment was taken was most influential and certainty in estimates was least influential (Figure 2).
- Increasing the risk of an incorrect test (from 20 in 100 to 40 in 100) only significantly affected the preferences for the HCP opinion attribute, increasing by 0.168 (p=0.072) to change from a HCP not preferring an option to
- being indifferent, and 0.173 (p=0.077) to change from a HCP not preferring an option to preferring an option (Figure 3).

**Figure 3. Interaction terms: difference in coefficients when risk of test being wrong is increased from 20% to 40%**




## CONCLUSIONS

- The general population values the potential benefits of preventative treatments, but equally values how the treatment is taken and the preference of their health care provider, highlighting the importance of agency and perceived asymmetry of information.
- Increasing uncertainty around the ability to correctly predict who might develop a disease in future appeared to increase people's propensity to rely on physician judgement, but did not affect other attributes.

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