

Using policy simulation games to better prepare epidemic-response strategies

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Introduction

Emerging infectious disease outbreaks require combinations of public-health countermeasures. However, these measures differ not only in their expected epidemiological impact, but also in their acceptability to the population. This study uses a Participatory Value Evaluation experiment to examine how individuals compose portfolios of countermeasures against different epidemic threats.

Objectives

1. To test a new method for eliciting public preferences: "Participatory Value Evaluation", which -by gamification- request respondents to simulate a policy decision task
2. To examine how individuals compose portfolios of countermeasures against different epidemic threats, once their expected epidemiological effects are accounted for

Method

Expert-based design. Countermeasures and epidemic scenarios were first identified using a RAND/UCLA Appropriateness Method. Experts identified four disease families and rated the appropriateness of candidate countermeasures for each scenario on a 1-9 scale. Three of these scenarios are presented in this poster.

Portfolio-choice experiment. We then designed preference-elicitation tasks in which respondents composed a portfolio of countermeasures to reduce projected hospital occupancy below a validation threshold. For each countermeasure, respondents could either exclude the measure or select a level of implementation. Each selected level had an experimentally varied marginal effect on hospital occupancy (sample representative of the French population, $N = 4166$)

Epidémie de maladie respiratoire virale

Veuillez consulter le tableau ci-dessous. Il récapitule les mesures identifiées par les experts ainsi que le niveau d'application qui leur est associé.

Ici, le niveau correspond au degré d'obligation et de contrôle de la mesure.

Par défaut, la mesure est indiquée comme « exclue ». Faites dérouler le menu pour l'inclure et sélectionner son application (recommandée ou obligatoire ou obligatoire avec contrôle et sanctions) et la population concernée (personnes vulnérables ou toute la population, certains lieux ou partout).

Prenez le temps de lire ces informations afin de comprendre les options qui vous seront proposées.

But : votre choix pourra être validé si, après sélection des mesures, l'occupation hospitalière estimée est de 60% ou moins.

Vos choix informeront les décideurs publics pour la mise en place d'une politique de santé publique face à cette épidémie de maladie respiratoire virale.

Mesures	Niveaux
Protection individuelle Port du masque ou de gants dans les lieux collectifs (transport, entreprise, commerces...)	Exclure la mesure
Prise de médicament de manière préventive Ces médicaments sont donnés aux sujets non infectés	Exclure la mesure
Limitation des activités économiques et des interactions sociales Télétravail, restrictions économiques, couvre feu et confinement	Exclure la mesure
Campagne de vaccination 1 dose pour les adultes d'un vaccin déjà existant et adapté au nouveau pathogène	Exclure la mesure
Mesure de protection environnementale Aération, nettoyage, mise à disposition de solution hydroalcoolique	Exclure la mesure
Contrôle et suivi numérique des mobilités des personnes Recherche et notification des cas contacts, isolement en cas de positivité	Exclure la mesure
Importantes campagnes d'information Fréquentes campagnes de sensibilisation aux risques (affiches dans les lieux publics, publicités)	Exclure la mesure

Figure 1 : Screenshot of a portfolio-choice task presented in the survey

Portfolio choice model. Multinomial logit portfolio choice models were estimated separately by epidemic scenario : $U_{ic} = \sum_{j=1}^n \beta_j x_{cj} + \sum_{a=1}^3 \gamma_a s_c^a + \varepsilon_{ic}$. The coefficients β_j indicate how selecting a given countermeasure and level changes the utility of a portfolio, conditional on its expected effect on hospital occupancy.

Results : Preference estimates

Reading note

Points show estimated multinomial logit coefficients for each countermeasure level, with "not selected" as the reference category. Positive coefficients indicate countermeasures that increase the utility of a portfolio and are therefore more likely to be selected, conditional on expected hospital occupancy reduction.

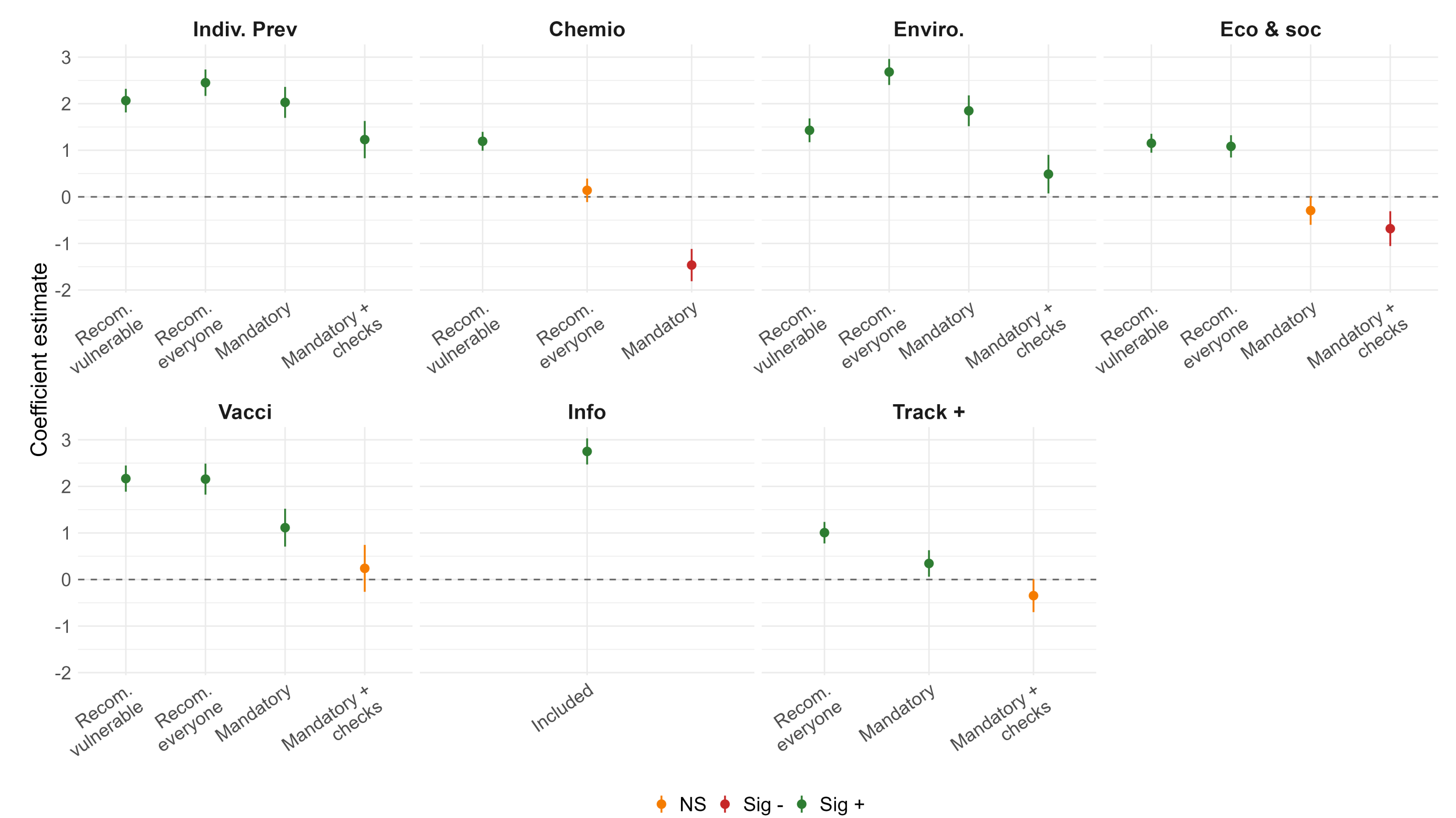


Figure 2 : Estimated preferences for countermeasures in the event of a **respiratory disease outbreak**

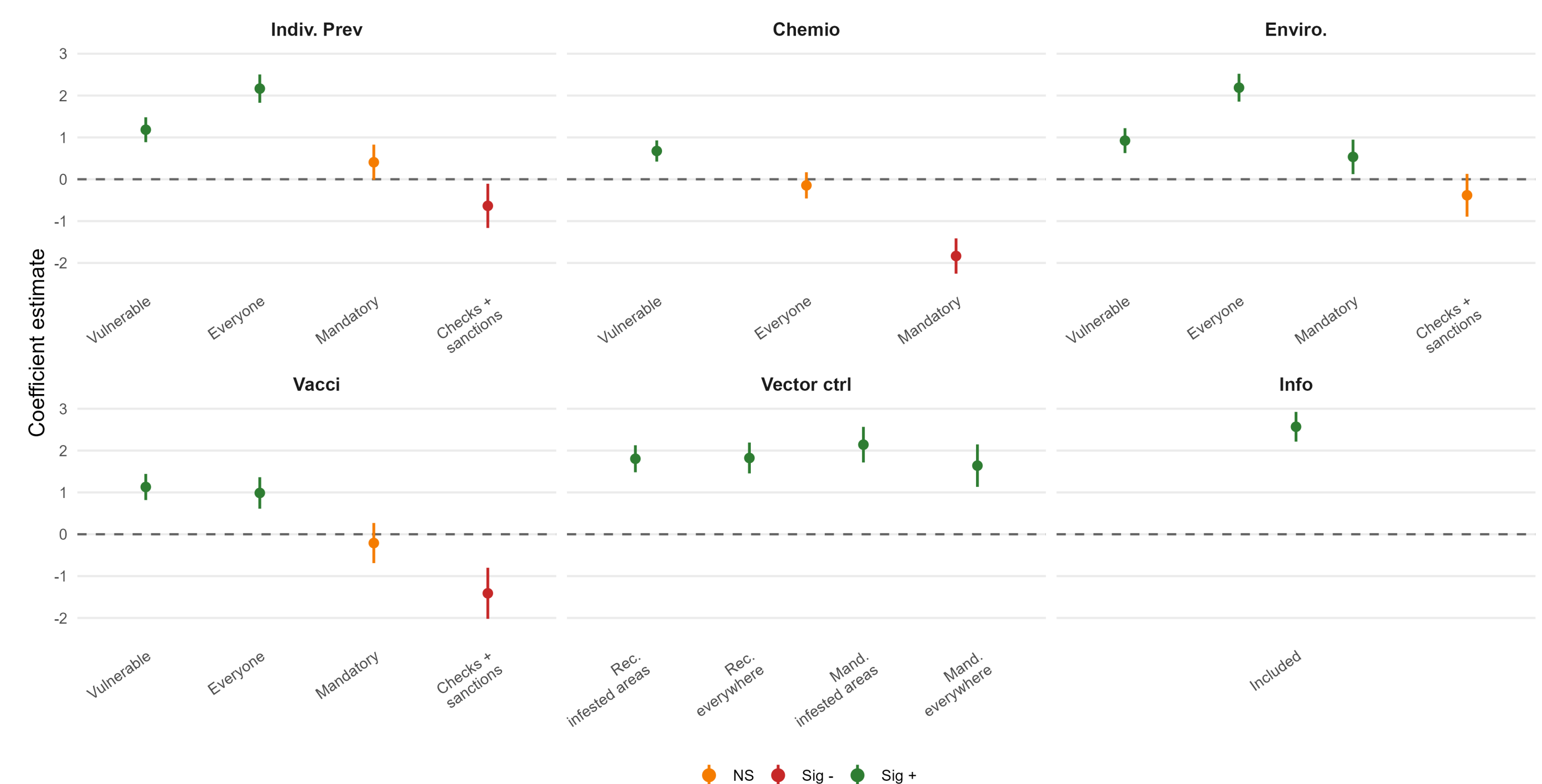


Figure 3 : Estimated preferences for countermeasures in the event of a **vector-borne disease outbreak**

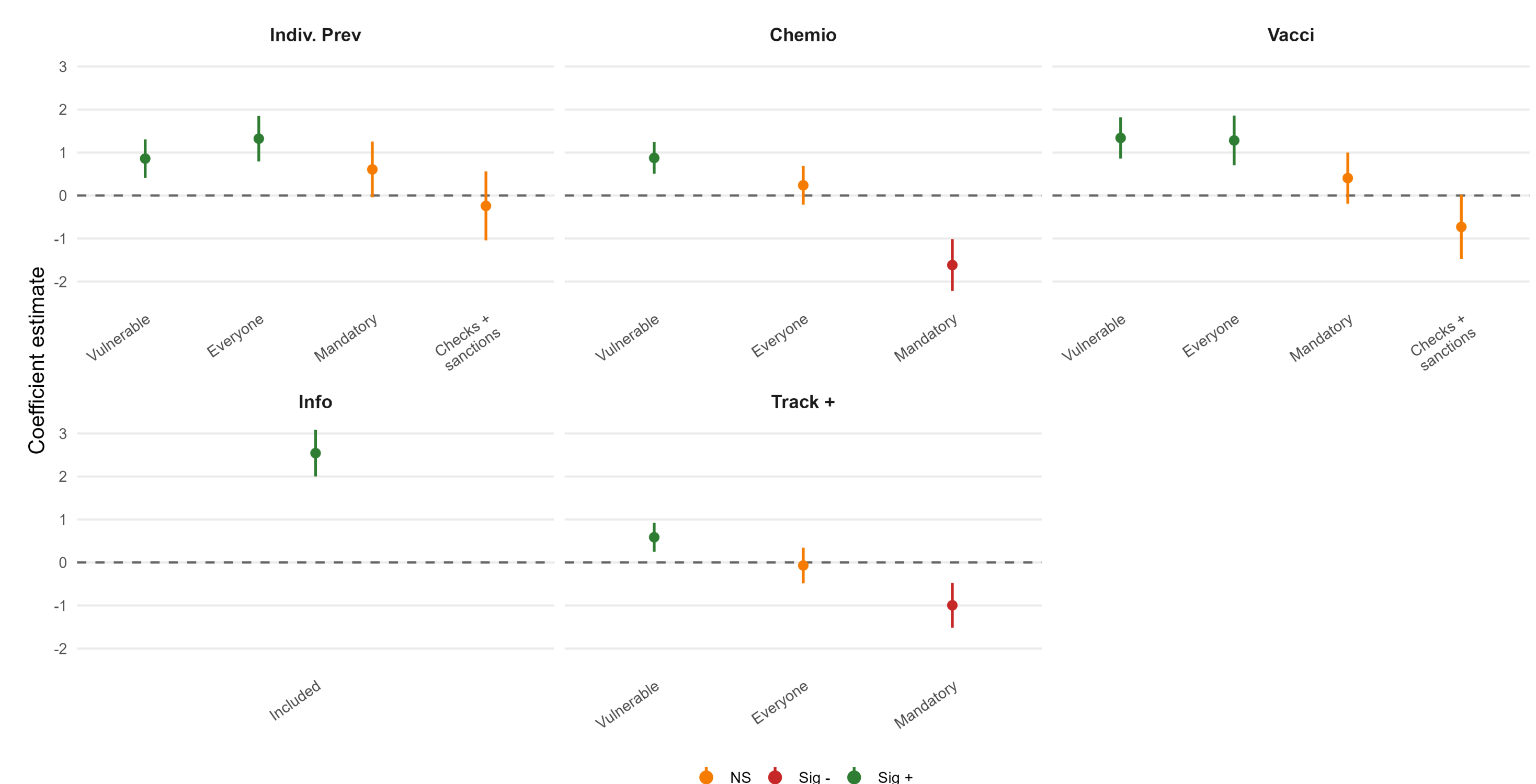


Figure 4 : Estimated preferences for countermeasures in the event of a **food- and water-borne disease outbreak**

Want to learn more ?



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← Scan for the simulation game, methods, supplementary results and contact information (ADELF EPITER 26 tab)

Main takeaway

Public acceptability depends on the composition of the response package, not only on its expected epidemiological impact. **Implication** : preparedness strategies should combine epidemiological expertise with preference evidence to design epidemic-response packages that are both effective in real life and acceptable.