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Assessment of health state utilities associated with treatment for chronic hepatitis B virus (HBV) infection

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Results from this vignette-based study provide health state utilities that may be used in cost-effectiveness analyses of treatments for hepatitis B

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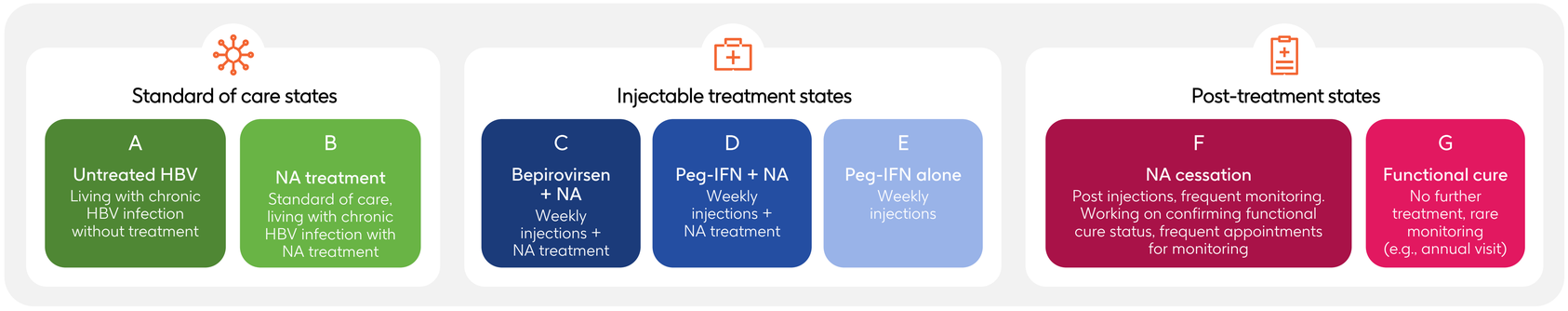
Background

- Chronic HBV infection management typically requires use of continuous, often lifelong medication with NAs[1]
- New treatments are being developed with the goal of functional cure (i.e., sustained HBsAg loss and undetectable HBV DNA after cessation of therapy), regarded as the optimal treatment endpoint for chronic HBV infection[2]
- Patients who achieve functional cure have reduced risk of long-term negative outcomes associated with chronic HBV (e.g., hepatocellular carcinoma),[3] and would no longer need therapy, which could result in a quality-of-life benefit, and therefore an impact on cost-effectiveness compared with existing standard of care
- Cost-utility analyses are needed to examine the value of new treatments for chronic HBV infection and require health state utilities as inputs[4]
- This vignette-based utility study estimated health state utilities associated with various treatments and disease states of chronic HBV infection to inform future cost-effectiveness analyses

Methods

- Seven health state vignettes depicting a range of treatments and chronic HBV infection disease states were drafted based on published literature and clinician and patient interviews (**Figure 1**)
  - A targeted literature review was performed to support the health state content and inform the development of the semi-structured interview guides to be used in the clinician and patient interviews
  - Health states were developed and validated through multiple interviews with clinicians and patients with chronic HBV infection

Figure 1: **Health states administered in the current study**



- Health states were valued in time trade-off interviews (10-year time horizon) with general population adult respondents from two UK locations (London [England] and Edinburgh [Scotland])
- Descriptive statistics were used to summarise utilities on a scale anchored with 0 representing dead and 1 representing full health. Pairwise comparisons were performed using t tests to compare health state utilities

Results

- In total, 216 participants completed valid interviews (n=101 England, n=115 Scotland) and were included in the analysis (**Table 1**)

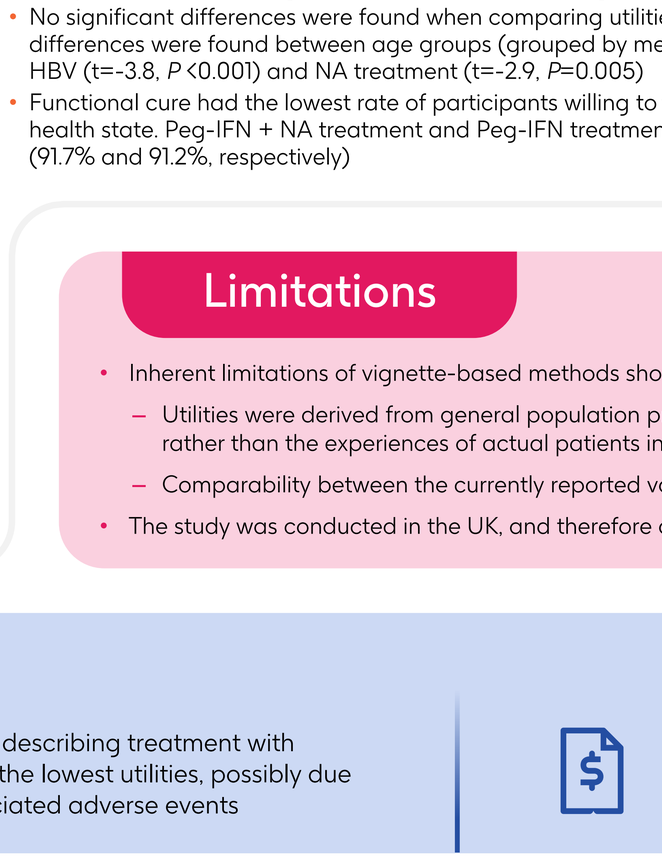
Table 1: **Demographic characteristics of participants**

Characteristic		Total (n=216)
Age, mean (SD)		47.6 (16.2)
Gender, n (%)		
	Male	108 (50.0)
	Female	107 (49.5)
	Nonbinary	1 (0.5)
Ethnicity, n (%)		
	Asian/Asian British	9 (4.2)
	Black/African/Caribbean/Black British	9 (4.2)
	White	188 (87.0)
	Mixed/Multiple ethnic groups*	7 (3.2)
	Other	3 (1.4)
Employment status†, n (%)		
	Full-time work	101 (46.8)
	Part-time work	49 (22.7)
	Other‡	66 (30.6)
Ever been diagnosed with HBV, n (%)		
	Yes	1 (0.5)
	No	215 (99.5)

**Ethnicity recodes: One participant selected multiple ethnic groups and was recoded to "Mixed/Multiple ethnic groups" ("White" and "Mixed/Multiple ethnic groups" [n=1]); †employment status recodes: 19 participants selected multiple employment statuses. Three participants were recoded to "Full-time" ("Full-time" and "Student" [n=2]; "Full-time" and "Disabled" [n=1]). Twelve participants were recoded to "Part-time" ("Part-time" and "Student" [n=7]; "Part-time", "Student" and "Retired" [n=1]; "Part-time" and "Disabled" [n=1]; "Part-time" and "Retired" [n=3]). One participant was recoded to "Student" ("Student" and "Unemployed" [n=1]). Two participants were recoded to "Disabled" ("Disabled" and "Unemployed" [n=2]). One participant was recoded to "Retired" ("Retired" and "Student" [n=1]); ‡includes "Homemaker", "Student", "Unemployed", "Disabled", "Retired", and "Other".*

- In an introductory ranking task ranking health states by preference, functional cure was the health state most commonly ranked first (95.8%), and NA cessation was most commonly ranked second (88.9%). Untreated HBV was the health state most commonly ranked last (66.7%), indicated as undesirable by participants because of the risk of transmission and the feeling of being ill without taking any action
- Achieving functional care yielded the highest utility values from participants, followed by NA cessation and NA treatment (**Figure 2**)

Figure 2: **Health state utilities***



Range	95% CI	Floor, n (%)†	Ceiling, n (%)†
0.43 – 1.00	0.93 – 0.95	0 (0.0%)	143 (66.2%)
0.38 – 1.00	0.91 – 0.93	0 (0.0%)	114 (52.8%)
0.38 – 1.00	0.85 – 0.89	0 (0.0%)	77 (35.6%)
0.08 – 0.98	0.83 – 0.87	0 (0.0%)	61 (28.2%)
-1.00 – 0.98	0.75 – 0.82	1 (0.5%)	60 (27.8%)
-1.00 – 0.98	0.60 – 0.68	3 (1.4%)	18 (8.3%)
-1.00 – 0.98	0.60 – 0.68	3 (1.4%)	19 (8.8%)

*Error bars represent SD. *The difference between health states D and E appears in the third decimal place; †a utility of -1.00 or -0.98 is at the floor. A utility of 1.00 or 0.98 (indicating unwillingness to trade time) is at the ceiling.*

- Significant differences were found when comparing all health state pairs (all $P < 0.0001$) except for the comparison between Peg-IFN + NA treatment and Peg-IFN treatment ($P = 0.8969$)
- No significant differences were found when comparing utilities by gender or country. Significant differences were found between age groups (grouped by median split) for untreated HBV ($t = -3.8$, $P < 0.001$) and NA treatment ($t = -2.9$, $P = 0.005$)
- Functional cure had the lowest rate of participants willing to trade time (33.8%) to avoid living in this health state. Peg-IFN + NA treatment and Peg-IFN treatment health states had the highest rates (91.7% and 91.2%, respectively)

Limitations

- Inherent limitations of vignette-based methods should be considered:[5]
  - Utilities were derived from general population preferences for hypothetical health state vignettes, rather than the experiences of actual patients in these medical events
  - Comparability between the currently reported values and utilities derived from patients is unknown
- The study was conducted in the UK, and therefore generalisability to other countries is unknown

Conclusions

The highest utilities were found for health states describing functional cure and the period immediately preceding functional cure (NA cessation)

Health states describing treatment with Peg-IFN had the lowest utilities, possibly due to drug-associated adverse events

Information from this study may be useful in models examining cost-effectiveness of HBV treatments

Abbreviations

CI, confidence interval; HBV, hepatitis B virus; HBsAg, hepatitis B surface antigen; NA, nucleos(t)ide analogue; Peg-IFN, pegylated interferon; SD, standard deviation.

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