

# Elbasvir–grazoprevir for treating chronic hepatitis C

Technology appraisal guidance

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[www.nice.org.uk/guidance/ta413](https://www.nice.org.uk/guidance/ta413)

## Your responsibility

The recommendations in this guidance represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, health professionals are expected to take this guidance fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this guidance is at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the [Yellow Card Scheme](#).

Commissioners and/or providers have a responsibility to provide the funding required to enable the guidance to be applied when individual health professionals and their patients wish to use it, in accordance with the NHS Constitution. They should do so in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should [assess and reduce the environmental impact of implementing NICE recommendations](#) wherever possible.

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# 1 Recommendations

- 1.1
- Elbasvir–grazoprevir is recommended, within its marketing authorisation, as an option for treating genotype 1 or 4 chronic hepatitis C in adults, as specified in table 1, only if the company provides the drug at the same price or lower than that agreed with the Commercial Medicines Unit.

Table 1 Elbasvir–grazoprevir for treating chronic hepatitis C in adults

Genotype	Treatment and duration
1a	Elbasvir–grazoprevir for 12 weeks. Consider elbasvir–grazoprevir plus ribavirin for 16 weeks in people with a baseline hepatitis C virus RNA level of more than 800,000 IU/ml or specific NS5A polymorphisms causing at least a 5-fold reduction in activity of elbasvir.
1b	Elbasvir–grazoprevir for 12 weeks.
4	Elbasvir–grazoprevir for 12 weeks. Consider elbasvir–grazoprevir plus ribavirin for 16 weeks in people with a baseline hepatitis C virus RNA level of more than 800,000 IU/ml.

- 1.2
- It is recommended that the decision to treat and prescribing decisions are made by multidisciplinary teams in the operational delivery networks put in place by NHS England, to prioritise treatment for people with the highest unmet clinical need.

## 2 Information on elbasvir–grazoprevir

### Description of the technology

- 2.1 Elbasvir–grazoprevir (Zepatier, Merck Sharp & Dohme) is a fixed-dose combination drug. Elbasvir inhibits hepatitis C virus (HCV) non-structural viral protein NS5A and grazoprevir inhibits HCV NS3/4A protease.

### Marketing authorisation

- 2.2 Elbasvir–grazoprevir has a marketing authorisation in the UK for treating chronic hepatitis C in adults.
- 2.3 The recommendations in the marketing authorisation for the specific genotypes are listed below:
- genotype 1a: 12 weeks (16 weeks plus ribavirin should be considered in patients with baseline HCV RNA level >800,000 IU/ml or the presence of specific NS5A polymorphisms causing at least a 5-fold reduction in activity of elbasvir to minimise the risk of treatment failure)
  - genotype 1b: 12 weeks
  - genotype 4: 12 weeks (16 weeks plus ribavirin should be considered in patients with baseline HCV RNA level >800,000 IU/ml to minimise the risk of treatment failure).

### Adverse reactions

- 2.4 The summary of product characteristics includes headache and fatigue as very common adverse reactions, and nausea as a common reaction. For full details of adverse reactions and contraindications, see the summary of product characteristics.

## Recommended dose and schedule

- 2.5 The recommended dose of elbasvir–grazoprevir is 1 tablet once daily, orally. Each tablet contains 50 mg elbasvir and 100 mg grazoprevir.

## Price

- 2.6 Elbasvir–grazoprevir costs £12,166.67 per 28-day pack. The total cost of a 12-week treatment course is £36,500.
- 2.7 The company has agreed a nationally available price reduction for elbasvir–grazoprevir with the Commercial Medicines Unit. The contract prices agreed through the framework are commercial in confidence.

## 3 Evidence

The [appraisal committee](#) considered evidence submitted by Merck Sharp & Dohme and a review of this submission by the evidence review group (ERG). See the [committee papers](#) for full details of the evidence.

## 4 Committee discussion

The appraisal committee reviewed the data available on the clinical and cost effectiveness of elbasvir–grazoprevir, having considered evidence on the nature of chronic hepatitis C and the value placed on the benefits of elbasvir–grazoprevir by people with the condition, those who represent them, and clinical experts. It also took into account the effective use of NHS resources.

### Clinical need and practice

- 4.1 The committee heard from the clinical and patient experts that people who have chronic hepatitis C are a disadvantaged population and often have to cope with stigma and discrimination because people associate hepatitis C with drug use. The clinical experts stated that because of the introduction of the newer direct-acting antivirals, treatment with peginterferon alpha plus ribavirin is gradually diminishing in clinical practice, particularly for genotypes 1 and 4. However, they highlighted that some of these newer treatments are given in combination with peginterferon alpha or ribavirin. The committee heard from the patient experts that having treatment options that are free from peginterferon alpha with or without ribavirin is important to people with chronic hepatitis C because of the associated adverse reactions. The clinical experts stated that people with renal disease are an important group whose condition is difficult to treat because there are few treatment regimens without ribavirin, especially for people who also have compensated cirrhosis. The committee heard that elbasvir–grazoprevir does not have to be used with ribavirin, an important advantage for improved tolerability in people with renal disease. The committee also heard that elbasvir–grazoprevir provided another alternative to the existing oral treatment combinations for people with genotype 1 and 4 hepatitis C virus (HCV). Therefore, the committee recognised the importance of having an additional effective and tolerable treatment for people with chronic hepatitis C and concluded that elbasvir–grazoprevir could be a valuable option for genotype 1 and 4 HCV.
- 4.2 The committee discussed the relevant comparators for elbasvir–grazoprevir given the changes in managing chronic hepatitis C. It noted that the company did not include boceprevir and telaprevir as comparators because they are no longer

used in clinical practice, although the NICE scope included them. The committee also noted that the company included peginterferon alpha plus ribavirin as a comparator alongside the newer treatments, although it has been less commonly used since new direct-acting antivirals were introduced. The committee questioned whether it was appropriate to keep peginterferon alpha plus ribavirin as a comparator, given the argument for excluding boceprevir and telaprevir. It heard from a clinical expert that peginterferon alpha plus ribavirin is associated with toxicities and these were worsened by adding other toxic treatments, such as boceprevir or telaprevir, which is why boceprevir and telaprevir are no longer used. The clinical expert stated that although treatment with peginterferon plus ribavirin for genotype 1 and 4 HCV is rapidly diminishing, its use in clinical practice has not completely stopped. The clinical experts confirmed that the new direct-acting antivirals would be the most relevant comparators for elbasvir–grazoprevir. The committee accepted the views of the clinical experts and concluded that the most relevant comparators are the new direct-acting antivirals and acknowledged that peginterferon alpha plus ribavirin may be used for a small number of people.

## Clinical effectiveness

- 4.3 The committee considered the clinical evidence for elbasvir–grazoprevir, which came from 8 clinical trials. It noted that 4 of these trials had a comparator arm (3 placebo-controlled trials and 1 active-controlled trial with sofosbuvir plus peginterferon alpha plus ribavirin), but the rest did not. The committee was aware that the evidence review group (ERG) agreed with the company's assessment that the risk of bias in the trials was generally low. The committee noted that the results of the clinical trials showed high sustained virological response (SVR) at 12 weeks for elbasvir–grazoprevir; ranging from 67% (for genotype 4 in some of the trials) to over 90% in most of the trials and up to 100% in some cases, irrespective of genotype, cirrhosis stage or treatment experience. The committee also noted that the SVR rates for elbasvir–grazoprevir and sofosbuvir plus peginterferon alpha plus ribavirin were comparable in people with genotype 1a HCV, but higher for elbasvir–grazoprevir than sofosbuvir plus peginterferon alpha plus ribavirin in genotype 1b HCV. Having noted the high SVR rates as well as the ERG and the company's comments that the risk of bias in the trials was generally low, the committee concluded that the trials showed that elbasvir–grazoprevir

was effective in people with genotype 1 and 4 HCV.

- 4.4 The committee noted that the company submitted a network meta-analysis to provide comparative estimates of SVR and safety outcomes for elbasvir–grazoprevir and the relevant comparators included in the scope (except boceprevir and telaprevir) for 12 subpopulations (that is, genotype 1a, 1b and 4, further divided according to treatment history, and cirrhosis status). The committee was aware that the company used genotype 1 HCV data as a proxy for genotype 4 HCV. The committee and clinical experts considered this assumption valid given the limited data available for people with genotype 4 HCV, in line with previous NICE technology appraisals for chronic hepatitis C. The committee also noted the ERG's concern about the serious limitations of the network meta-analysis results, given the lack of connected trial networks and the imputation of missing treatment arms using peginterferon alpha plus ribavirin as a control arm. The committee was aware that the company also submitted a naive comparison, which was not discussed because it was considered to be the least robust method of comparing treatments across trials. The committee noted that the results of the network meta-analysis showed no significant differences in SVR rates between elbasvir–grazoprevir and the other all-direct-acting antiviral regimens (ledipasvir–sofosbuvir, ombitasvir–paritaprevir–ritonavir with dasabuvir, and daclatasvir–sofosbuvir) in any of the 12 subgroups. However, the results did show differences in SVR rates between elbasvir–grazoprevir and the peginterferon alpha plus ribavirin-containing regimens (except sofosbuvir plus peginterferon alpha plus ribavirin) in some subgroups. The committee heard from the clinical experts that these new all-direct-acting antiviral regimens were interchangeable for efficacy and tolerability, and treatment decisions would mostly be guided by cost. Although the committee recognised that there were limitations in the network meta-analysis, it concluded that elbasvir–grazoprevir was similar in efficacy to the other all-direct-acting antiviral regimens.
- 4.5 The committee considered the safety data included in the company's submission and was aware that the most commonly reported adverse events were headache, fatigue and nausea. The committee noted that the results showed that elbasvir–grazoprevir had a relatively favourable safety and tolerability profile, irrespective of cirrhosis stage and treatment experience, especially when compared with the peginterferon alpha plus ribavirin-containing regimen. It also heard from the clinical experts that elbasvir–grazoprevir had a similar safety

profile to all-direct-acting antiviral regimens. The committee concluded that the adverse events associated with elbasvir–grazoprevir were generally tolerable.

## Cost effectiveness

- 4.6 The committee considered the company's economic model, the assumptions underlying the values of the parameters, and the critique and exploratory analyses from the ERG. The committee noted that the structure of the model showing the natural history of the disease was similar to models submitted for other NICE technology appraisals for chronic hepatitis C. The committee considered the ERG's comment that a dynamic model would have better captured the health benefits of more effective treatments for preventing transmission of HCV. The committee had highlighted this as a concern in the previous hepatitis C appraisals. Although the committee would have preferred the company to explore further the effect of future transmission, it acknowledged that this would have needed a different (and potentially more complex) model structure. The committee agreed that not using a dynamic model introduces uncertainty in the cost-effectiveness estimates because of potential benefits not being captured, but concluded that the structure of the model was acceptable for decision making.
- 4.7 The committee noted that unlike some of the previous hepatitis C appraisals, the company's model allowed for re-infection after getting an SVR. The committee considered this to be a good approach that will improve the robustness of the results. However, it noted the ERG's concerns that the model allows people who become re-infected to go back to health state F0 (that is, no fibrosis), which assumes that liver damage caused by hepatitis C is fully reversible. The committee did not consider this assumption to be plausible and was aware that the ERG's base-case revision assumes that people who become re-infected after getting an SVR return to their pre-SVR fibrosis health state instead. The clinical experts agreed that the ERG's assumption was reasonable and better reflects clinical practice. The committee was satisfied with the company's approach of including re-infection but concluded that the ERG's assumption on re-infection was more reasonable.
- 4.8 The committee discussed the population included in the company's model. It

noted that the company presented separate analyses according to the 12 subpopulations covered by the marketing authorisation (see [section 4.4](#)). The committee was satisfied with the company's approach of assessing these groups separately. The committee noted the ERG's comment that the company's model does not account for the genotype 1a and 4 groups, for whom 16 weeks of elbasvir–grazoprevir treatment is recommended in line with the marketing authorisation. The committee understood that this could have cost implications as well as higher SVR rates for elbasvir–grazoprevir. It heard from the company and the clinical experts that only a few people could potentially have treatment for 16 weeks. The committee heard from the ERG that the balance between the cost of an extra period of treatment and the benefits of getting an improved SVR rate and utility led to uncertainty in determining the cost effectiveness of this strategy. The committee noted the comments from the company and those from the stakeholders in the previous appraisals that people with HIV co-infection would be expected to be treated similarly to those with HCV infection alone. The clinical experts commented that people with HIV co-infection have more comorbidities and faster disease progression than those with HCV infection alone. The committee considered that this could mean that the newer treatments become associated with more health gains in people with HIV co-infection than in those with HCV alone. Without any evidence to support this assertion, it could not come to a conclusion on this. Therefore, the committee concluded that it would not consider HIV co-infection separately.

- 4.9 The committee considered the clinical inputs in the model. It noted that the company used the network meta-analysis to estimate the SVR, treatment discontinuation and adverse-event rates in the base case. The committee recalled its previous conclusion that there were limitations with the network meta-analysis, but accepted that this was the best source of evidence available for estimating the clinical inputs for model. The committee noted that the company used outcome data from genotype 1 as a proxy for genotype 4 in the base case, and recalled that it had accepted this approach for previous hepatitis C appraisals. It was aware that using genotype 4-specific data in the scenario analysis did not have a large effect on the incremental cost-effectiveness ratios (ICERs) for genotype 4. Taking into account the comments from the clinical experts (see [section 4.4](#)), the committee concluded that the company's approach to estimating the model's clinical inputs was acceptable.

- 4.10 The committee discussed the transition probabilities used in the model. It was aware that the company used the same sources for the non-treatment-specific transition probabilities as those used in previous appraisals. The committee was generally satisfied with this approach. However, it noted that the company and the ERG used the study by Grishchenko et al. (2009) to estimate age-dependent transition probabilities across fibrosis health states F0 to F3 (no cirrhosis health states) in scenario analyses, rather than the study by Thien et al. (2008) as used in the base case. When the ERG and the company did this, some of the ICERs increased above £20,000 per quality-adjusted life year (QALY) gained using the list price of elbasvir–grazoprevir. The committee noted that this was because of the slower progression rates using Grishchenko et al. It heard from the ERG that there was no particular preference because both the Grishchenko and Thien studies were published at a similar time. The committee considered that although Grishchenko et al. included UK patients, Thien et al. was a meta-analysis of several studies and included people from other countries. Without any clear rationale for preferring 1 study over the other, the committee concluded that the cost-effectiveness analyses using both studies should be considered.
- 4.11 The committee discussed how health-related quality of life was incorporated into the economic model. It noted that the company used utility data from the literature (Wright et al. 2006) in line with the previous NICE technology appraisals for chronic hepatitis C. The committee noted that the company collected utility data in some of the clinical trials using the EQ-5D, but that no UK patients were included in the studies. It was aware that 1 of the company's scenario analyses and the ERG's preferred base case used the SVR-related utility increment from the European subgroup of the clinical trials. The committee noted that the average SVR-related utility increment from Wright et al. was 0.05, which was larger than that reported in the European subgroup of the elbasvir–grazoprevir trials (0.03). The committee was aware that higher utility benefits from Wright et al. (0.05) and Vera-Llonch et al. (2013; 0.04) had been accepted in previous NICE technology appraisals for chronic hepatitis C. It emphasised that where available, it prefers utility values collected from the clinical trials used to inform the effectiveness of the intervention under evaluation to those estimated from other sources. Therefore, the committee concluded that the values from elbasvir–grazoprevir's clinical trials would be used to inform its decision for this appraisal, but it was aware that this assumption had little effect on the results. The committee also noted the ERG's comment that the company's approach of

including age-based utility decrements could lead to double-counting. The ERG stated that utility values used in the model already incorporate the effect of ageing, because they were based on average utility data from Wright et al. that included people with a wide range of ages. The committee agreed that there would be some double-counting at first, but in the later stages of a life-time model, utility decrements would need to be accounted for separately. The committee was aware that including age-based utility decrements had very little effect on the ICERs and it concluded that both the company's and the ERG's approach would be taken into account in the decision making.

- 4.12 The committee considered the costs used in the company's model. It noted that list prices of elbasvir–grazoprevir and the comparators were used in the company's base case. The committee noted from the company submission that elbasvir–grazoprevir has a confidential reduced price based on contract pricing arrangements between the company and the Commercial Medicines Unit. It also noted that confidential reduced contract prices for the comparators were included in the analyses carried out by the ERG, where known and important to the committee's decision making. The committee understood that the contract prices were the prices that the NHS pays for these treatments. The committee noted that NICE's guide to the methods of technology appraisal prefers using nationally available price reductions in the reference-case analysis to reflect the price relevant to the NHS. The committee concluded that the contract prices were the most relevant prices to the NHS and therefore the appropriate prices on which to base its decision.
- 4.13 The committee considered the cost effectiveness of elbasvir–grazoprevir. It noted that all ICERs were below £20,000 per QALY gained, regardless of genotype, treatment history or cirrhosis status. The committee noted that this applied to the different analyses presented (that is, those of the company compared with the ERG; base case compared with scenario analyses; and pairwise compared with fully incremental results). It concluded that elbasvir–grazoprevir was a cost-effective use of NHS resources. The committee also noted that accounting for the few patients who could have up to 16 weeks of elbasvir–grazoprevir did not change the conclusion on the cost effectiveness of elbasvir–grazoprevir. The committee therefore recommended elbasvir–grazoprevir within its marketing authorisation for treating genotype 1a, 1b and 4 HCV.

- 4.14 The committee was aware of NHS England's ongoing concerns about the increase in investment and capacity needed to make these new oral treatments for hepatitis C available. The committee heard that the capacity to treat all eligible persons with hepatitis C in the NHS according to the NICE's recommendation is still constrained. It recalled that treatment decisions are influenced by clinical characteristics including HCV genotype, level of liver damage, comorbidities, and treatment history. With these factors in mind, people with chronic hepatitis C may accept treatment being prioritised for those with the highest unmet clinical need (including some people without cirrhosis), as determined by multidisciplinary teams.

## Innovation

- 4.15 The committee agreed with the company that there is significant unmet need in people with chronic hepatitis C complicated by severe renal disease. The committee noted that like some of the newer treatments for chronic hepatitis C, the dose of elbasvir–grazoprevir does not need to be adjusted for any stage of renal impairment. The committee also recognised the additional value of elbasvir–grazoprevir as an interferon- and ribavirin-free treatment but concluded that these health gains are likely to have been included in the QALY calculations. The committee agreed that there were other wider benefits to society (for example, reduced transmission of HCV) that were not captured in the QALY calculation and that, if taken into account, were likely to decrease the ICERs. However, the committee noted that it had taken these potential benefits into account when considering the cost effectiveness of elbasvir–grazoprevir and concluded that its recommendations for each population remained unchanged.

## Equality issues

- 4.16 The committee noted the potential equality issues raised by the company and a professional organisation that there are proportionately more people from black, Asian and minority ethnic groups and people with HIV co-infection in the genotype 4 population than in the genotype 1 population. The committee also noted from the company that people who have hepatitis C and chronic kidney

disease can feel stigmatised because they must have dialysis treatment in a separate room. The company also commented that people with HIV co-infection are more likely to disclose their HIV status than their hepatitis C status because of the perceived stigma around hepatitis C as a result of the lack of awareness about the condition. However, having decided that elbasvir–grazoprevir should be recommended for genotype 1 and 4, the committee concluded that no further consideration of these potential equality issues was needed to meet NICE's obligation to promote equality of access to treatment.

## 5 Implementation

- 5.1 Section 7 of the National Institute for Health and Care Excellence (Constitution and Functions) and the Health and Social Care Information Centre (Functions) Regulations 2013 requires integrated care boards, NHS England and, with respect to their public health functions, local authorities to comply with the recommendations in this evaluation within 3 months of its date of publication.
- 5.2 The Welsh ministers have issued directions to the NHS in Wales on implementing NICE technology appraisal guidance. When a NICE technology appraisal guidance recommends the use of a drug or treatment, or other technology, the NHS in Wales must usually provide funding and resources for it within 2 months of the first publication of the final draft guidance.
- 5.3 When NICE recommends a treatment 'as an option', the NHS must make sure it is available within the period set out in the paragraphs above. This means that, if a patient has chronic hepatitis C and the healthcare professional responsible for their care thinks that elbasvir–grazoprevir is the right treatment, it should be available for use, in line with NICE's recommendations.
- 5.4 The contract prices used for decision making in this appraisal are the relevant prices that the NHS pays for elbasvir–grazoprevir. These prices are based on contract pricing arrangements between the company and the Commercial Medicines Unit. The contract prices are commercial in confidence. Any enquiries from NHS organisations about the contract prices used in this appraisal should be directed to the Commercial Medicines Unit.

# 6 Appraisal committee members and NICE project team

## Appraisal committee members

The 4 technology appraisal committees are standing advisory committees of NICE. This topic was considered by [committee D](#).

Committee members are asked to declare any interests in the technology to be appraised. If it is considered there is a conflict of interest, the member is excluded from participating further in that appraisal.

The [minutes of each appraisal committee meeting](#), which include the names of the members who attended and their declarations of interests, are posted on the NICE website.

## NICE project team

Each technology appraisal is assigned to a team consisting of 1 or more health technology analysts (who act as technical leads for the appraisal), a technical adviser and a project manager.

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