Ledipasvir-sofosbuvir for treating chronic hepatitis C

ERG Addendum 2

Produced by School of Health and Related Research (ScHARR), The University of Sheffield

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Description of additional analyses undertaken by the ERG

Additional analyses were undertaken to exclude some comparators from the incremental analysis. The details of the comparators excluded and the reasons for their exclusion are as below:

- SMV+SOF excluded for all patients (reason: not established in current clinical practice)
- SOF+PEG-IFN2a+RBV excluded for GT4 non-cirrhotic patients (reason: not recommended in NICE guidance)
- SOF+RBV excluded for GT3 treatment experienced non-cirrhotic IFN-ineligible group (reason: not recommended in NICE guidance)

The analysis excluding these comparators was run for the following scenarios

- ERG base case
- *Additional analysis 1:* Alternative EMA-recommended treatment durations for LDV/SOF
- *Additional analysis 2:* Alternative transition probabilities based on the sofosbuvir STA model

It should be noted that the additional analyses 2 uses the ERG-preferred base case analysis as a starting point. All analyses were undertaken using point estimates of parameters due to the excessive computation time and complexity associated with running the probabilistic version of the model.

Table 1: Central estimates of cost-effectiveness (ERG-preferred base case)

(i) Genotype 1 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	17.20	£42,160.45	0.39	£8,843.83	**£22,676**
SOF+PEG-IFN2a+RBV	17.04	£41,081.62	-	-	ext dom
SMV+PEG-IFN2a+RBV	16.81	£33,316.62	0.85	£14,111.22	£16,601
TVR+PEG-IFN2a+RBV	16.69	£34,631.46	-	-	dominated
BOC+PEG-IFN2b+RBV	16.41	£35,002.22	-	-	dominated
PEG-IFN2a+RBV	15.96	£19,205.40	0.89	£6175.99	£6,939
No treatment	15.07	£13,029.41	-	-	-
(ii) Genotype 1 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	10.08	£101,051.95	0.83	£37,618.44	**£45,323**
SOF+PEG-IFN2a+RBV	9.25	£63,433.51	2.71	£15,167.91	£5,597
SMV+PEG-IFN2a+RBV	8.28	£59,097.68	-	-	ext dom
BOC+PEG-IFN2b+RBV	8.09	£64,985.45	-	-	dominated
TVR+PEG-IFN2a+RBV	7.95	£61,326.36	-	-	ext dom
PEG-IFN2a+RBV	6.54	£48,265.60	1.29	£7,012.58	£5,436
No treatment	5.25	£41,253.02	-	-	-

(iii) Genotype 4 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	17.20	£42,160.45	0.39	£8,843.83	**£22,676**
SMV+PEG-IFN2a+RBV	16.81	£33,316.62	0.85	£14,111.22	£16,601
PEG-IFN2a+RBV	15.96	£19,205.40	0.89	£6,175.99	£6,939
No treatment	15.07	£13,029.41	-	-	-
(iv) Genotype 4 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	10.08	£101,051.95	0.83	£37,618.44	**£45,323**
SOF+PEG-IFN2a+RBV	9.25	£63,433.51	2.71	£15,167.91	£5,597
SMV+PEG-IFN2a+RBV	8.28	£59,097.68	-	-	ext dom
PEG-IFN2a+RBV	6.54	£48,265.60	1.29	£7,012.58	£5,436
No treatment	5.25	£41,253.02	-	-	-
(v) Genotype 1/4 treatment-experienced non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	16.11	£41,978.77	1.80	£29,819.05	**£16,566**
SOF+PEG-IFN2a+RBV*	15.71	£42,386.90	-	-	dominated
SMV+PEG-IFN2a+RBV	15.67	£38,729.70	-	-	ext dom
TVR+PEG-IFN2a+RBV*	15.62	£36,459.92	-	-	ext dom
BOC+PEG-IFN2b+RBV*	15.48	£39,911.38	-	-	dominated
PEG-IFN2a+RBV	14.61	£18,984.11	-	-	ext dom
No treatment	14.31	£12,159.72	-	-	-
(vi) Genotype 1/4 treatment-experienced cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	9.70	£99,222.17	1.11	£36,028.74	**£32,458**
SOF+PEG-IFN2a+RBV	8.59	£63,193.43	3.4	£22,542.63	£6,630
SMV+PEG-IFN2a+RBV	8.31	£62,045.65	-	-	ext dom
TVR+PEG-IFN2a+RBV*	7.46	£63,324.53	-	-	dominated
BOC+PEG-IFN2b+RBV*	6.95	£68,413.45	-	-	dominated
PEG-IFN2a+RBV	5.74	£47,441.22	-	-	ext dom
No treatment	5.19	£40,650.80	-	-	-
(vii) Genotype 3 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	17.24	£83,330.76	0.81	£71,970.90	**£88,853**
PEG-IFN2a+RBV	16.43	£11,359.86	-	-	-
No treatment	14.57	£14,928.01	-	-	dominated
(viii) Genotype 3 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	10.23	£102,644.92	0.85	£39,226.39	**£46,149**
SOF+RBV	9.87	£95,947.03	-	-	ext dom
SOF+PEG-IFN2a+RBV	9.38	£63,418.53	4.13	£22,165.51	£2,363
No treatment	5.25	£41,253.02	-	-	-
(ix) Genotype 3 treatment-experienced IFN-ineligible non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	15.97	£84,108.64	2.09	£70,172.93	**£33,576**
No treatment	13.88	£13,935.71	-	-	-
(x) Genotype 3 treatment-experienced IFN-ineligible cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	8.76	£105,760.87	3.57	£65,110.07	**£18,238**
SOF+RBV	8.01	£101,108.73	-	-	ext dom
No treatment	5.19	£40,650.80	-	-	-

**not applicable for genotype 4 patients*
Inc. – incremental; ICER – incremental cost-effectiveness ratio; ext dom – extended dominance; IFN – interferon

Table 2: Central estimates of cost-effectiveness (additional analysis 1, alternative EMA-recommended LDV/SOF treatment durations)

(i) Genotype 1 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 8 weeks	17.12	£29,522.69	1.16	£10,317.29	**£8,894**
SOF+PEG-IFN2a+RBV	17.04	£41,081.62	-	-	dominated
SMV+PEG-IFN2a+RBV	16.81	£33,316.62	-	-	dominated
TVR+PEG-IFN2a+RBV	16.69	£34,631.46	-	-	dominated
BOC+PEG-IFN2b+RBV	16.41	£35,002.22	-	-	dominated
PEG-IFN2a+RBV	15.96	£19,205.40	0.89	£6,175.99	£6,939
No treatment	15.07	£13,029.41	-	-	-
(ii) Genotype 1 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	9.94	£62,440.44	4.69	£21,187.42	**£4,518**
SOF+PEG-IFN2a+RBV	9.25	£63,433.51	-	-	dominated
SMV+PEG-IFN2a+RBV	8.28	£59,097.68	-	-	ext dom
BOC+PEG-IFN2b+RBV	8.09	£64,985.45	-	-	dominated
TVR+PEG-IFN2a+RBV	7.95	£61,326.36	-	-	ext dom
PEG-IFN2a+RBV	6.54	£48,265.60	-	-	ext dom
No treatment	5.25	£41,253.02	-	-	-
(iii) Genotype 1/4 treatment-experienced non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	16.21	£80,577.05	0.54	41847.35	**£77,495**
SOF+PEG-IFN2a+RBV*	15.71	£42,386.90	-	-	ext dom
SMV+PEG-IFN2a+RBV	15.67	£38,729.70	0.05	£2,269.78	£45,396
TVR+PEG-IFN2a+RBV*	15.62	£36,459.92	1.31	£24,300.20	£18,550
BOC+PEG-IFN2b+RBV*	15.48	£39,911.38	-	-	dominated
PEG-IFN2a+RBV	14.61	£18,984.11	-	-	ext dom
No treatment	14.31	£12,159.72	-	-	-
(iv) Genotype 3 treatment-naive non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	17.24	£42,997.49	0.81	£31,637.63	**£39,277**
PEG-IFN2a+RBV	16.43	£11,359.86	-	-	-
No treatment	14.57	£14,928.01	-	-	dominated

**not applicable for genotype 4 patients*

Inc. – incremental; ICER – incremental cost-effectiveness ratio; ext dom – extended dominance; IFN – interferon

Table 3: Central estimates of cost-effectiveness (additional analysis 2, use of alternative transition probabilities based on the sofosbuvir STA model)

(i) Genotype 1 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	17.20	£42,184.89	0.34	£8,678.81	**£25,526**
SOF+PEG-IFN2a+RBV	17.06	£41,170.98	-	-	ext dom
SMV+PEG-IFN2a+RBV	16.86	£33,506.08	0.75	£13,725.14	£18,300
TVR+PEG-IFN2a+RBV	16.75	£34,867.92	-	-	dominated
BOC+PEG-IFN2b+RBV	16.51	£35,371.57	-	-	dominated
PEG-IFN2a+RBV	16.11	£19,780.94	0.75	£5,679.23	£7,572
No treatment	15.36	£14,101.71	-	-	-
(ii) Genotype 1 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	10.18	£102,305.63	0.45	£35,954.63	**£79,899**
SOF+PEG-IFN2a+RBV	9.73	£66,351.00	1.46	£9,632.22	£6,597
SMV+PEG-IFN2a+RBV	9.20	£64,023.82	-	-	ext dom
BOC+PEG-IFN2b+RBV	9.12	£70,316.26	-	-	dominated
TVR+PEG-IFN2a+RBV	9.03	£66,927.05	-	-	dominated
PEG-IFN2a+RBV	8.27	£56,718.78	0.71	£4,268.64	£6,012
No treatment	7.56	£52,450.14	-	-	-
(iii) Genotype 4 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 12 weeks	17.20	£42,184.89	0.34	£8,678.81	**£25,526**
SMV+PEG-IFN2a+RBV	16.86	£33,506.08	0.75	£13,725.14	£18,300
PEG-IFN2a+RBV	16.11	£19,780.94	0.75	£5,679.23	£7,572
No treatment	15.36	£14,101.71	-	-	-
(iv) Genotype 4 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	10.18	£102,305.63	0.45	£35,954.63	**£79,899**
SOF+PEG-IFN2a+RBV	9.73	£66,351.00	1.46	£9,632.22	£6,597
SMV+PEG-IFN2a+RBV	9.20	£64,023.82	-	-	ext dom
PEG-IFN2a+RBV	8.27	£56,718.78	0.71	£4,268.64	£6,012
No treatment	7.56	£52,450.14	-	-	-
(v) Genotype 1/4 treatment-experienced non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF12 weeks	16.12	£42,032.16	1.56	£29,038.36	**£18,614**
SOF+PEG-IFN2a+RBV*	15.77	£42,603.76	-	-	dominated
SMV+PEG-IFN2a+RBV	15.73	£38,911.81	-	-	ext dom
TVR+PEG-IFN2a+RBV*	15.68	£36,678.99	-	-	ext dom
BOC+PEG-IFN2b+RBV*	15.57	£40,189.27	-	-	dominated
PEG-IFN2a+RBV	14.81	£19,643.16	-	-	ext dom
No treatment	14.56	£12,993.80	-	-	-
(vi) Genotype 1/4 treatment-experienced cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	9.78	£100,330.45	0.59	£33,857.41	**£57,385**
SOF+PEG-IFN2a+RBV	9.19	£66,473.04	1.81	£15,676.01	£8,660
SMV+PEG-IFN2a+RBV	9.03	£65,803.66	-	-	ext dom
TVR+PEG-IFN2a+RBV*	8.59	£68,854.52	-	-	dominated
BOC+PEG-IFN2b+RBV*	8.33	£74,964.16	-	-	dominated
PEG-IFN2a+RBV	7.68	£56,386.16	-	-	ext dom
No treatment	7.38	£50,797.03	-	-	-

(vii) Genotype 3 treatment-naïve non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF 24 weeks	17.24	£83,330.76	0.7	£71,547.68	**£102,210**
PEG-IFN2a+RBV	16.54	£11,783.08	-	-	-
No treatment	14.97	£16,429.60	-	-	dominated
(viii) Genotype 3 treatment-naïve cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	10.26	£103,591.07	0.47	£37,517.89	**£79,825**
SOF+RBV	10.08	£97,657.23	-	-	ext dom
SOF+PEG-IFN2a+RBV	9.79	£66,073.18	2.23	£13,623.04	£1,392
No treatment	7.56	£52,450.14	-	-	-
(ix) Genotype 3 treatment-experienced IFN-ineligible non-cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	16.01	£84,234.47	1.78	£69,124.36	**£38,834**
No treatment	14.23	£15,110.11	-	-	-
(x) Genotype 3 treatment-experienced IFN-ineligible cirrhotic					
Option	QALYs	Costs	Inc. QALYs	Inc. costs	ICER
LDV/SOF+RBV 24 weeks	9.28	£108,736.80	1.9	£57,939.77	**£30,495**
SOF+RBV	8.89	£105,607.67	-	-	ext dom
No treatment	7.38	£50,797.03	-	-	-

**not applicable for genotype 4 patients*

Inc. – incremental; ICER – incremental cost-effectiveness ratio; ext dom – extended dominance; IFN – interferon